Chapter 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

This chapter describes the existing condition of the environment that could be affected by implementing the Applicant's Proposed Action Alternative or other alternative routes and the known and predicted effects on the existing natural and human environment from construction, operation, and maintenance of the B2H Project and associated actions. The Chapter 3 analysis includes impacts associated with substations under the Proposed Action. The information for the affected environment and the environmental consequences is provided for each resource and environmental topic analyzed in the Final EIS. Section 3.2 of this chapter is organized into resource subsections as follows:

3.2.1 Earth Resources
3.2.2 Water Resources
3.2.3 Vegetation
3.2.4 Wildlife Resources
3.2.5 Fish Resources
3.2.6 Land Use
3.2.7 Agriculture
3.2.8 Recreation
3.2.9 Transportation
3.2.10 Lands with Wilderness Characteristics
3.2.11 Potential Congressional Designations
3.2.12 Visual Resources
3.2.13 Cultural Resources
3.2.14 Native American Concerns
3.2.15 National Historic Trails
3.2.16 Air Quality and Climate Change
3.2.17 Socioeconomics and Environmental Justice
3.2.18 Public Health and Safety

Section 3.3 presents the cumulative effects associated with the B2H Project.

Section 3.4 identifies proposed LUP Amendments to authorize the Agency Preferred Alternative route, as well as other proposed LUP Amendments required should another route ultimately be selected for construction, followed by an analysis of the potential environmental impacts associated with each LUP Amendments.

3.1.1 Summary of Changes from the Draft Environmental Impact Statement

Based on comments received by the BLM on the Draft EIS and collaboration with the counties, a number of recommended route-option variations were incorporated into the network of alternative routes analyzed for the Final EIS (refer to Sections 2.1.1.3 and 2.5.2). Analysis of the alternative routes is reported throughout Chapter 3.

Comments on the Draft EIS expressed that not enough information was provided in the Draft EIS to enable the reviewers to understand where impacts would occur and where mitigation would be applied to reduce impacts. Chapter 2, Section 2.5.1 of the Final EIS presents an explanation of the study and analysis approach employed for the B2H Project, Chapter 3 has been expanded to provide more description of the methods used for analyzing effects associated with each resource (tiered to the overall approach) and to provide more information about the resources, mitigation applied to reduce impacts, and residual impacts on resources along each alternative route by segment. In addition, a map volume of large-scale maps is provided to present resource data and to show the level of residual impacts on the resources along all of the alternative routes.

To provide distinction between the issues relevant to and the management emphasis relevant to agriculture, recreation, and transportation, these resources are discussed separately from land use, in Sections 3.2.7, 3.2.8, and 3.2.9, respectively, in the Final EIS.

To provide distinction between the policy issues and the management emphasis relevant to BLM lands with wilderness characteristics, designated areas established by an act of Congress, and other special designations, lands with wilderness characteristics, and potential congressional designations are discussed in separate sections, Sections 3.2.10 and 3.2.11, respectively, in the Final EIS.

Further, information regarding designated TCPs in and adjacent to the B2H Project area is discussed in a section separate from cultural resources, Section 3.2.13.

3.1.2 Affected Environment

In accordance with NEPA regulations codified at 40 CFR 1502.15, this section presents a summary of the existing condition of the human and natural environment in the areas that could be affected by the Applicant's Proposed Action Alternative and alternative routes. This information serves as a baseline from which the impacts anticipated to result from implementing the B2H Project were assessed.

These topics were selected based on federal regulatory requirements and policies, concerns of the lead and cooperating agencies, and/or issues derived from comments expressed by agencies and the public during scoping. Issues raised by the tribes during government-to-government consultation and by the public and agencies during scoping are presented in Section 1.6.3.

3.1.3 Environmental Consequences

The analysis of potential environmental effects predicts how a resource would be affected and the degree of change (impact) that could result from implementation of an action. Potential environmental

effects on each resource were determined through a systematic analysis that included assessing the impacts of each alternative route on the environment and how the impacts could be mitigated most effectively. An overview of the methodology for this analysis is presented in Section 2.5.1 and described for each resource in Section 3.2.

Although the federal agencies have no authority to either permit or prohibit construction of the Project on non-federal land, NEPA requires an analysis and disclosure of project effects on all lands, not just the effects to federal lands. Therefore, the EIS makes assumptions on where the B2H Project would be sited on non-federal lands and on how it would be designed and constructed. This is not meant to imply that the federal agencies are authorizing the Project on non-federal lands. Decisions on siting and construction requirements on non-federal lands are under the authority of state and local governments (in coordination with the landowner), and not the federal agencies. However, the federal agencies maintain some authority to regulate activities under Section 106 of the NHPA and Section 7 of the ESA.

3.2 RESOURCES ANALYZED

This section describes the affected environment and known and predicted effects of implementing the Project on resources relevant to the issues and concerns identified during agency and public scoping. The affected environment and effects analysis area were assessed for each alternative. Generally, each resource discussion is organized as follows:

- ***Introduction and Regulatory Framework***. A description of the resource and the laws, regulations, and policies related or relevant to management or analysis of the resource
- ***Issues Identified for Analysis***. A description of the issues identified for each resource that were analyzed for the B2H Project
- ***Methods***. Resource-specific methods used to assess the affected environment and initial and residual impacts for each alternative
- ***Affected Environment***. Organized by B2H Project segment, then by alternative and route variation
- ***Environmental Consequences***. Organized by B2H Project segment, then by alternative and route variation

A summary of baseline resource inventory and results of the effects analysis is presented in each resource section. Tables 2-18 through 2-35 present a comparison of results of the effects analysis for the alternative routes, Tables 2-19, 2-22, 2-25, 2-28, 2-31, and 2-34 present a summary of the 500-kV transmission line parallel conditions and jurisdiction by alternative route. Section 2.5.1.1 presents the estimates for ground disturbance, vegetation clearing, and the miles of access roads.

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3.2.1 EARTH RESOURCES (GEOLOGIC HAZARDS, SOILS, MINERALS, AND PALEONTOLOGY)

3.2.1.1 INTRODUCTION

This section describes earth resources within the B2H Project area and the regulatory framework governing these resources. It also describes the scoping issues, affected environment, methods of resource evaluation, and environmental consequences on earth resources from the B2H Project. The following issues regarding earth resources are addressed:

- Geologic hazards that could affect the B2H Project, including earthquakes and landslides
- Potential impacts on soil resources in the B2H Project area, such as soil erosion and compaction and removal of soil resources from productivity, including soil on farmlands; also, soil suitability for reclamation
- Leasable, locatable, and salable mineral deposits
- Paleontological resources that are known to exist in the B2H Project area, and geologic units that previously have produced fossils

3.2.1.2 REGULATORY FRAMEWORK

GEOLOGIC HAZARDS

Federal

No federal regulations apply to the management of geologic hazards. However, the 2012 International Building Code (International Code Council 2011) provides building standards for structures (which may be affected by geologic hazards), including special standards for structures located within seismically active areas. Local building codes may require that B2H Project structures conform to the international standards.

State

Oregon's EFSC oversees facility-siting standards and site-certificate applications. OAR 345-022-0020 (Structural Standard) and OAR 345- 021-0010(1)(h) (Contents of an Application, Exhibit H) outline EFSC facility standards and application requirements related to geologic and soil stability. To issue a site certificate, the EFSC "must find that the applicant can design, engineer, and construct the facility to avoid dangers to human safety presented by seismic hazards" (OAR 345-022-0020(1)(b)).

SOILS

Federal

The EPA oversees the prevention and management of soil erosion through stormwater management regulations under the Clean Water Act (CWA)(33 U.S.C. 1251 et seq.). The CWA's National Pollutant Discharge Elimination System (NPDES) stormwater program requires operators of construction sites of one or more acres (as well as smaller sites that are part of a larger common POD) to obtain authorization to discharge stormwater under an NPDES construction stormwater permit (40 CFR 122).

The development and implementation of SWPPPs are the focus of NPDES stormwater permits for regulated construction activities. The runoff from stormwater could be a factor in soil erosion by water.

Federal agencies also have handbooks and other guidance governing soil management that are applicable to their jurisdictions.

Applicable U.S. Forest Service handbooks (FSH), found in Forest Service Manual (FSM) 2500, *Watershed and Air Management* (USFS 2010), for evaluating soil conditions on National Forest System lands include the following:

- Soil Management Handbook (FSH 2509.18)
- Soil and Water Conservation Practices Handbook (FSH 2509.22)
- Watershed Conservation Practices Handbook (FSH 2509.25)
- Watershed Protection and Management (FSH 2520, R6 Supplement 2500-98-1)
- Interim Directive No. 2520-2013-1 (best management practices [BMPs] for sediment reduction from forest roads)
- Wallowa-Whitman National Forest LMRP (USFS 1990)—contains qualitative soil management requirements that would be applicable to the B2H Project

The BLM also has several documents related to soil managing resources, and that are applicable to the B2H Project, including the following:

- *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (referred to as the Gold Book)* (BLM and USFS 2007)—a guidance document for permitting and drilling oil and gas wells; the document also contains general standards for road construction and stormwater BMPs
- *BLM Instruction Memorandum OR-2011-074, Incorporating Road and Sediment Delivery Best Management Practices into Resource Management Plans* (BLM 2011)—lists BMPs that provide direction regarding road maintenance practices and road-related actions with the intention of minimizing or preventing sediment delivery to water(s) of the U.S.
- BLM Manuals MS 9113 (Roads); 9113-1 (Road Design Handbook); 9113-2 (Roads Inventory and Condition Assessment Guidance and Instructions); and 9115 (Primitive Roads); Manual 9112 (Bridges and Major Culverts)

Baker Resource Management Plan and Record of Decision

The *Baker RMP* (BLM 1989) directs that soils be managed to maintain productivity and minimize erosion. To implement that management directive, the plan states the following:

- Actions shall be planned to coordinate soil, water, and air concerns and activities with other resources in all phases of management actions, from the planning stage to final monitoring of the results.
- All proposed resource projects and surface-disturbing activities shall be reviewed to ensure that soils and watersheds are protected, rehabilitated, or improved.

- Projects shall be monitored to ensure that stipulations and specifications for soil and water protection achieve the desired results.
- Standard design features normally incorporated as needed into specific surface-disturbing activity plans and authorizations include: scalping, saving, and respreading available topsoil; regrading to natural contours; re-establishing appropriate stabilizing vegetation; and installing water erosion and runoff prevention measures, such as waterbars, benches, and drainage systems.
- Management activities in riparian areas will be designed to maintain or improve riparian values; roads and utility corridors will avoid riparian zones to the extent practical.

Owyhee Resource Management Plan

The *Owyhee RMP* (BLM 1999) contains the following objectives and management actions for soil-disturbing activities that may occur in the B2H Project area:

> **Objective**: Achieve stabilization of current, and prevent the potential for future, localized accelerated soil erosion problems, particularly on stream banks, roads, and trails. (Localized accelerated soil erosion is where humans, by their actions, are responsible for the site-specific erosive process.)
>
> **Relevant Management Actions and Allocations**: (1) Review authorizations for site-specific surface-disturbing activities (e.g., road building, drill pad construction, and utility lines) to ensure that approved BMPs are incorporated to reduce soil erosion and keep sediment yields to a minimum. (2) Limit surface-disturbing activities on soils that are sensitive to compaction, have a high soil erosion potential rating, or are exhibiting existing accelerated erosion problems.

Southeastern Oregon Resource Management Plan

The *Southeastern Oregon RMP* (BLM 2002) contains the following BMPs for soil erosion protection:

> **Surface-Disturbing Activities:** (1) Special design and reclamation measures may be required to protect scenic and natural landscape values. This may include transplanting trees and shrubs, mulching and fertilizing disturbed areas, using low-profile permanent facilities, and painting to minimize visual contrasts. Surface-disturbing activities may be moved to avoid sensitive areas or to reduce the visual effects of the Proposed Action. (2) Reclamation shall be implemented concurrently with construction and site operations to the fullest extent possible. Final reclamation actions shall be initiated within 6 months of the termination of operations unless otherwise approved in writing by the authorized officer. (3) Fill material shall be pushed into cut areas and up over back slopes. Depressions that would trap water or form ponds shall not be left.
>
> **Rights-of-Way and Utility Corridors:** (1) Rights-of-way and utility corridors shall use areas adjoining or adjacent to previously disturbed areas whenever possible, rather than traverse undisturbed communities. (2) Waterbars or dikes shall be constructed on all of

the rights-of-way and utility corridors and across the full width of the disturbed area, as directed by the authorized officer. (3) Disturbed areas within road \ and utility corridors shall be stabilized by vegetation practices designed to hold soil in place and minimize erosion. Vegetation cover shall be re-established to increase infiltration and provide additional protection from erosion. (4) Sediment barriers shall be constructed when needed to slow runoff, allow deposition of sediment, and prevent transport from the site. Straining or filtration mechanisms also may be employed for the removal of sediment from runoff.

Wallowa-Whitman National Forest Land and Resource Management Plan

The *Wallowa-Whitman National Forest LRMP* (USFS 1990) includes the following standards and guidelines related to the LRMP's goal of maintaining or enhancing soil productivity:

> **Conflicts with Other Uses:** Prioritize maintenance of soil productivity and stability over uses described or implied in all other management direction, standards, or guidelines.
>
> **Protection:** Give special consideration to scablands or other lands having shallow soils during project analysis. Such analysis will especially consider the fragile nature of the soils involved and, as needed, provide protection and other mitigation measures.

State

Most states, including Oregon, are authorized by the EPA to implement the stormwater NPDES permitting program. In Oregon, compliance with state requirements is necessary for stormwater management activities. The ODEQ (2010) Stormwater Program models its permits and requirements on the EPA program.

The Oregon EFSC provides for soil protection as part of its facility-siting standards and site-certificate application requirements. To issue a site certificate, the EFSC must find that the facility is not likely to result in a significant adverse impact on soils (OAR 345-022-0022). Exhibit I under OAR 345-021-0010(1)(i) outlines the EFSC application requirements related to soils.

The EPA remains the permitting authority in a few states (including Idaho) and territories and on most land owned by Native American tribes. For construction (and other land-disturbing activities) in areas where the EPA is the permitting authority, operators must meet the requirements of the EPA (2012) Construction General Permit.

MINERALS

On federal land, the BLM is the primary management agency for minerals. The BLM classifies mineral products as locatable, leasable, or salable. Locatable minerals include metallic minerals (gold, silver, lead, copper, zinc, nickel, etc.), nonmetallic minerals (fluorspar, mica, certain limestones, uranium, gypsum, clay, heavy minerals in placer form, and gemstones), and a variety of certain uncommon minerals. Mining of locatable minerals on public land is a right protected by the General Mining Law (Act) of 1872 (30 U.S.C. 22–42) and implementing regulations (43 CFR 3800–3870).

The BLM leases certain minerals, such as oil and gas, oil shale, geothermal resources, potash, sodium, native asphalt, solid and semisolid bitumen, bituminous rock, phosphate, and coal, on public and other federal lands. The BLM also leases these minerals on certain private lands where the mineral rights are owned by the federal government. Most of the minerals leased under this program are used to make fertilizer and to feed livestock or are used for energy development. Leasable minerals are regulated by 43 CFR 3000–3590 and the Mineral Leasing Act of 1920, as amended.

Salable minerals include sand, gravel, soil, rock, and building stone used for common construction uses. The BLM sells mineral materials to the public at fair market value but gives them to states, counties, or other government entities for free for public projects. Disposals of salable minerals from BLM-administered lands are regulated by the Materials Act of 1947, as amended, and 43 CFR 3600.

State

The Oregon Department of State Lands is responsible for managing, leasing, and selling state-owned mineral rights on approximately 3 million acres throughout Oregon. The department's authority derives from the Federal Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1234–1328) and from the department's rules (OAR 141-067).

The Idaho Department of Lands (IDL), through its State Board of Land Commissioners, administers mineral leases on approximately 3 million acres of state land, as well as on the beds of navigable waters, which, on statehood in 1890, were granted to the state in trust. The state leases its minerals to generate revenue for the endowment fund for public purposes, such as public schools, or for the general fund when public trust lands are involved. The state issues leases for metals, other mineral commodities, oil and gas, and geothermal resources on land and in navigable waters. In Idaho, the EPA, IDEQ, and IDL administer federal and state programs to oversee environmental requirements for mining, including environmental permitting for mine operation and postmining reclamation.

PALEONTOLOGICAL RESOURCES

Federal

Federal protection for important paleontological resources applies on federally owned or managed lands. For the purposes of this EIS, a "paleontological resource" means any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth (16 U.S.C. 470aaa). Federal legislative protection for paleontological resources began with the Antiquities Act of 1906 (16 U.S.C. 431 et seq.), which requires protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federal land. The Antiquities Act forbids disturbance of any object of antiquity on federal land without a permit issued by the responsible managing agency. The act also establishes criminal sanctions for unauthorized appropriation or destruction of antiquities.

In addition to the Antiquities Act, other federal statutes protect fossils. The NEPA (42 U.S.C. 4321–4327) requires that important natural aspects of our national heritage be considered in assessing the

environmental consequences of any proposed action. The FLPMA (43 U.S.C.1701–1782) requires that public lands be managed in a manner that protects the quality of their scientific values.

The most explicit protection for paleontological resources, the Paleontological Resources Preservation Act (16 U.S.C. 470aaa), regulates who may collect fossils on public lands and where such fossils must be curated. The BLM pamphlet *Fossils on Public Lands* explains that "vertebrate fossils may only be collected with a permit because of their relative rarity and scientific importance. They include not only bones and teeth, but also footprints, burrows, and other traces of activity. Vertebrate fossils are fragile and complex; and permit applicants must be able to show a sufficient level of training and experience to collect them. In addition, all vertebrate fossils collected under a permit must be held in an approved repository." Management of paleontological resources on BLM-administered land is governed by BLM Manual Section MS-8270 (BLM 1998a) and the accompanying BLM Handbook 8270-1 (1998b). Handbook 8270-1 presents an area classification system for locations with varying fossil potential. This classification system has since been replaced by the Potential Fossil Yield Classification system (PFYC), as stipulated by BLM Instruction Memorandum 2008-009 (BLM 2009a), and is the classification system used in this environmental analysis.

BLM Instruction Memorandum 2009-011 (BLM 2009b) provides guidance for assessing impacts on paleontological resources to determine applicable mitigation actions for cases in which significant paleontological resources will be adversely affected by a federal action.

BLM RMPs provide additional guidance on paleontological resources. The *Baker RMP* (BLM 1989) states the following:

> Paleontological localities will be protected through review of all surface-disturbing proposals. Collecting of important vertebrate fossils will be allowed subject to existing restrictions and permitting requirements. Commercial or hobby collection of common fossils will be allowed subject to existing federal regulations.
>
> A regional data review and evaluation of the importance of known paleontological resources will be completed. Inventories for paleontological resources will be conducted in connection with individual project proposals. Important paleontological localities will be patrolled periodically to detect unauthorized uses or determine threats to the resource. Evaluation and protection of paleontological resources will be accomplished through coordination with professional paleontologists and DOGAMI [Department of Geology and Mineral Industries]. Volunteers may be used to assist in monitoring and inventories.
>
> Localities containing vertebrate fossils, and resources that may provide important scientific information, will receive priority for protection and evaluation, in comparison to common invertebrate or common plant fossil localities which are not ordinarily the focus of protection measures.

The *Proposed Southeastern Oregon RMP and Final Environmental Impact Statement* (BLM 2001:121) describes paleontological resources as the fossilized remains of plants and animals. It further states the following:

> Fossils are of Pliocene, Miocene, and Pleistocene age and are located in various volcanic tuff, sandstone/siltstone beds or Pleistocene gravels. Of particular interest are vertebrate fossils such as those of extinct camels, mammoths, giant sloths, turtles, and horses.
>
> Fossil localities have been reported on public land in the planning area. Most of the finds have been exposed by wind or water erosion, and they are widely dispersed, situated primarily along maintained county or BLM roads. Several localities are the subject of ongoing academic research.

The RMP also states that for paleontological management, an interagency agreement is in effect between the BLM's Burns, Vale, and Prineville Districts and the John Day Fossil Beds National Monument. This agreement provides for an exchange of technical expertise and other services.

3.2.1.3 Issues Identified for Analysis

Geologic Hazards

- Can the soils and geology sustain the construction and operation of the B2H Project?
- A seismic fault and geothermal resources occur in the B2H Project area. The area is composed of steep canyons, hills, valleys, and mountains that often experience seismic instability. What are the hazards associated with those features?
- What are the hazards posed by rockslides and landslides?
- What would B2H Project impacts be to cliffs and rock outcrops in the B2H Project area?

Soils

- Will removing vegetative cover cause soil erosion during spring runoff?
- What hazards are posed by soils that are highly erosive and unstable?
- Silt loam soil in some portions of the B2H Project area is highly wind erodible. What measures will be taken to prevent soil erosion by wind?
- What will be the B2H Project impacts regarding soil compaction?

Minerals

- What would be the B2H Project impacts on well sites and the injection field for the Neal Hot Springs Geothermal Project?
- What impacts on highly mineralized areas of gold, silver, platinum, opals, agates, and other valuable minerals found in Baker County are possible?
- What impact would the B2H Project have on mining claims in Owyhee County between Marsing and Murphy?
- Would the B2H Project restrict the ability to extract minerals?

PALEONTOLOGICAL RESOURCES

- Would the B2H Project violate the Federal Paleontological Resources Preservation Act (16 U.S.C. 470aaa)?
- Would the B2H Project adversely affect petrified wood on Lindsey Mountain and in the Kitchen Creek Valley (Oregon)?
- Would the B2H Project damage fossils?

3.2.1.4 METHODS

The general study methods used to analyze the impacts of the B2H Project in this EIS are described in Sections 3.2.1 and 2.5.1. This section describes how the study methods are applied to evaluate the existing conditions of geologic hazards, soils, minerals, and paleontological resources and to analyze environmental impacts on each resource.

For characterizing soils, minerals, and paleontological resources, the study corridor is 1 mile wide (i.e., 0.5 mile on each side of the reference centerline of the alternative routes). For geologic hazards, the study corridor is 2 miles wide (i.e., 1 mile on each side of the reference centerline of the alternative routes).

DATA SOURCES

Geologic Hazards

Earthquakes

The potentially affected area used for recorded historical earthquakes varies depending on earthquake magnitude. Using information from the seismology department at the University of Nevada at Reno as a guideline (Louie 1996), resource specialists established a 25-mile radius of potential effect for earthquakes less than magnitude 6.0, a 50-mile radius for earthquakes from magnitude 6.0 to less than 7.0, and a 100-mile radius for earthquakes of magnitude 7.0 or greater.

Historical earthquake data for Oregon was obtained from DOGAMI (2011a) and for Idaho was obtained from the Idaho Geological Survey (2011). This data was updated to include any new earthquakes since 2011. The historical earthquake epicenters were mapped within the 2-mile study corridor for the alternative routes. The historical earthquake data is discussed qualitatively based on the reported magnitude.

The Quaternary Period includes the past 2.6 million years of geologic time. Of the Quaternary faults identified by the U.S. Geological Survey (USGS), faults and fault zone segments less than 15,000 years old are fairly recent by geological standards and are likely to pose the greatest potential for future earthquakes (USGS 2006). Quaternary faults and Class B faults within the 2-mile study corridor of the alternative routes were identified. Class B faults are those faults where Quaternary deformation exists but either (1) the structure does not extend deeply enough to be a source of significant earthquakes, or (2) not enough evidence is available to classify the fault as a Class A Quaternary fault or a Class C fault (non-tectonic origin). To characterize the risk of Quaternary faults, more recent Quaternary faults were classified as having a higher chance to become active in the future.

Landslides

Landslides, including mudflows, mudslides, rock flows, rock slides, and debris flows, could occur in the geologic hazards study corridor. Landslides are often triggered by other natural events, including earthquakes or precipitation that is sufficient to cause earth movements. The analysis for landslides included data from the U.S. Department of Transportation's National Pipeline Hazard Index. The National Pipeline Hazard Index is based on information and data from the USGS and the USDA Natural Resources Conservation Service (NRCS) for locations of swelling clay, landslide incidence, landslide susceptibility, and land subsidence. Based on those four factors, landslide hazard rankings from 0 to 100 are assigned, with 0 representing the lowest ground-failure hazard and 100 representing the highest. Landslide hazard rankings between 85 and 100 are classified as a high risk for landslides, rankings between 70 and 84 are a moderate risk, and areas less than 70 are a low risk.

Subsidence

Subsidence, which is defined as the vertical collapse of the ground surface, can occur where land surface overlies natural underground voids, such as karst (sinkhole) topography or caves. Subsidence also can occur where land surface overlies underground voids that result from the removal of solid or liquid mineral resources; overlying land that is not adequately supported in such resource extraction areas can collapse. A review of the geology within several miles of the B2H Project showed that the B2H Project area does not contain either natural subsidence or locations containing large-scale mineral extraction that could lead to subsidence. Therefore, subsidence is not considered a geologic hazard to the B2H Project and, thus, is not discussed further in this EIS.

Volcanoes

The geologic hazards study corridor for characterizing the risk from active volcanoes to the transmission line extended 100 miles on each side of the Proposed Action and each alternative route. Although volcanic ash could travel 100 miles, the thick clouds of ash and gases necessary to cause shorting of transmission lines, or weight damage, would likely be dispersed at 100 miles from all but the largest volcanoes (Scott et al. 1995). No active volcanoes are present in the study corridor. The closest volcano monitored by the USGS is near Bend, Oregon, in the Cascade Range, which is more than 130 miles away from the Project (USGS 2016). Because there are no active volcanoes located within 100 miles of the B2H Project, volcanoes are not considered a geologic hazard to the B2H Project and, therefore, are not discussed further in this EIS.

Floodzones

Floodzones are geographical areas that the Federal Emergency Management Agency (FEMA) has defined according to varying levels of flood risk. FEMA data and data from the Office of Pipeline Safety (OPS) *National Disaster Study, National Pipeline Risk Index Technical Report* (OPS 1996), were used to evaluate the flood hazard rankings for the geologic hazards study corridor. The OPS data provide flood hazard rankings for the U.S., including those portions of Oregon and Idaho near the B2H Project. Flooding risk (based on FEMA mapping) was used to produce flood hazard rankings from 0 to 100, with 0 representing the lowest flood hazard and 100 representing the highest. Flood hazard rankings of 85 to 100 represent a high risk from flooding, rankings of 70 to 84 represent a medium risk, and rankings less

than 70 represent a low risk. For the B2H Project corridor, the combined OPS and FEMA mapping data for flood risks were used to determine the areas of medium and high flood risks within the 2 mile geologic hazards study corridor. The area (in acres) of medium and high flood risk within the 2 mile geologic hazards study corridor was calculated.

Soils

Soils Inventory data were obtained from the NRCS and mapped in the study corridor at two scales of resolution: (1) the finer-scale State Soil Geographic Database (STATSGO) and (2) the coarser-scale Soil Survey Geographic Database (SSURGO). For the B2H Project, SSURGO data were used as much as possible since it represents a more detailed analysis; STATSGO data were used in areas where SSURGO data were not available. In addition, a review of the NRCS Soil Surveys was performed to identify soil types of soils in the study corridor (USDA 1954; 1976; 1980; 1983; 1985; 1988; 2003). Per the NRCS data, soil factors that could cause increased soil erosion or soil compaction or that are difficult to revegetate were identified. Further, the following factors were considered in the evaluation of soil conditions relevant to the B2H Project:

Wind Erodibility

The soil resources study corridor was overlaid on the NRCS geographic information system (GIS) wind erosion data to characterize existing soil conditions related to wind erodibility group (WEG). Soils assigned to WEG 1 or 2 are highly susceptible to wind erosion; soils assigned to WEG 3, 4, or 4L have a moderate susceptibility to wind erosion; soils assigned to WEG 5, 6, or 7 have a low susceptibility to wind erosion; and soils assigned to WEG 8 are not susceptible to wind erosion.

Water Erosion Potential

A soil's potential to erode by water runoff is measured by its K_w factor, a numerical factor representing the relative water erodibility of the whole soil. The susceptibility of a soil to water erosion is based on its assigned K_w value, K factor values range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by rainfall. Soils assigned a K_w value of 0.40 or higher have a high susceptibility to water erosion; whereas soils assigned a K_w value between 0.20 and 0.40 have a moderate susceptibility to water erosion. Soils assigned a K_w value below 0.20 have a low susceptibility to water erosion.

Compacted Soil

The compaction potential of soils was based on their clay content and drainage characteristics. For the analysis, clay content of 28 percent or higher was considered to have high compaction potential. Soils with moderately to highly poor drainage characteristics also were included in the analysis. Soils meeting both the high clay content and drainage characteristics are defined as highly compactable.

Stony-Rocky Soil

Stony-rocky soil contains a high percentage of coarse soil fragments, such as sand and gravel. Stony-rocky soil does not retain moisture as well as fine-grained soil and is poor in providing soil nutrients to

new or established vegetation. Areas with stony-rocky soil were identified by locating soils with related descriptors, from NRCS data, such as very cobbly loam, bedrock, and extremely stony loam.

Droughty Soil

Soil is considered droughty if it is unable to store enough water to meet plant requirements. Sandy and gravelly soils are droughty because they have low water-holding capacities. Droughty soil is coarse textured (sandy loam or coarser) and is excessively well drained. Areas with droughty soil were identified by overlaying the soil resources study corridor on the NRCS GIS data for soil classified as moderately to excessively well-drained sandy loam or coarser texture.

Unique or Prime Farmlands

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and also is available for these uses. Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables (NRCS 2015).

Reclamation Potential

The reclamation potential of soil was developed by combining the characteristics of compaction potential, stony-rocky soil, and droughty soil. With these characteristics combined, impact levels of high, moderate, and low were determined for reclamation potential.

Minerals

Data for mineral resources was obtained from the BLM's LR-2000 database and the USGS. This data provided areas containing mineral resources, including active mines, mining claims, and mining leases (mineral products not typically specified), oil and gas wells and leases, geothermal leases, past producers, closed mines, and mineral occurrences.

PALEONTOLOGICAL RESOURCES

The geologic units for the paleontological resources study corridor were derived from the USGS integrated geological map databases (Ludington et al. 2007). The PFYC was derived from information from the BLM Vale and Baker City Field Offices. Because Oregon does not currently have PFYC values for geologic units, these values were estimated based on the type of bedrock (igneous, metamorphic, and sedimentary), similarities to others with known PFYC values, and comparisons to other projects where the PFYCs were estimated.

ANALYSIS AREA

Geologic Hazards

The geologic hazards study corridor is 2 miles wide (i.e., one mile on either side of the reference centerline for the alternative routes). Additional information on the approach to identifying the best available data within this study corridor is presented in the Data Sources subsection.

Soils

The soil resources study corridor is 2 miles wide (i.e., one mile on either side of the reference centerline for the alternative routes). The study corridor was overlaid on the NRCS GIS soils data to characterize existing soil conditions.

Minerals

The mineral resources study corridor is 2 miles wide (i.e., one mile on either side of the reference centerline for the alternative routes). Data for mineral resources, including spatial information, were obtained from BLM sources and the USGS. BLM's LR-2000 database (http://www.blm.gov/lr2000) also was reviewed. This data provided areas containing mineral resources, including active mines, mining claims and mining leases (mineral products not typically specified), oil and gas wells and leases, geothermal leases, past producers and closed mines, and mineral occurrences.

Paleontological Resources

For this EIS, paleontological analysis is based on interviews with BLM Oregon and State paleontologists and on reviews of paleontological information at BLM Vale and Baker City Field Offices (Pritchard 2011). To complete the paleontology analysis, the alternative routes were plotted on geologic maps to calculate route distances across each geologic unit.

The paleontological resources study area extends 1 mile on either side of the reference centerlines of the alternative routes. The BLM uses its PFYC system (BLM 2009a) to classify geologic units according to their fossil potential. The five PFYC levels include:

- Class 1 (very low): not likely that a geologic unit has recognizable fossil remains
- Class 2 (low): not likely to contain vertebrate fossils or scientifically significant invertebrate fossils
- Class 3 (moderate or unknown): various significance, abundance, and predictable occurrence or unknown fossil potential
- Class 4 (high): high occurrence of significant fossils
- Class 5 (very high): highly fossiliferous and predictable or significant fossils that are at risk of adverse impacts or degradation

The PFYC system further divides Classes 3, 4, and 5 into "a" and "b" categories. Class 3a is defined by bedrock units with moderate potential for vertebrate fossils or scientifically important invertebrate fossils, while Class 3b is applied to rock units with unknown fossil potential. Classes 4a and 5a apply to rock units with little or no soil or vegetative cover. Fossils in rocks lacking soil or vegetative cover are most susceptible to natural degradation or human-caused damage or collection loss. Classes 4b and 5b apply to bedrock with lower potential for natural or human-caused fossil disturbance because of several factors, including protective soil or vegetative cover.

IMPACT ASSESSMENT AND MITIGATION PLANNING

Criteria for Assessing Level of Impacts

Geologic Hazards

Criteria were developed to assess the intensity of potential effects resulting from geologic hazards on the B2H Project (Table 3-1). Quaternary faults younger than 150 years that are crossed were assigned a high level of intensity of impacts since they are the most recent and potentially could still be active. Quaternary faults older than 150 years but younger than 15,000 years before present (B.P.) were assigned a moderate level of intensity of impacts. Those Quaternary faults that are older than 15,000 B.P., and Class B faults were assigned a low level of intensity of impacts. Intensity for landsliding was based on an area's landslide susceptibility based on the OPS Hazard Index. Since historical earthquakes represent past events, historical earthquakes within the geologic hazards study corridor are mapped and discussed qualitatively. Floodzones were ranked by percentile using the hazard rank mapping of the OPS Hazard Index.

Table 3-1. Criteria for Assessing Intensity of Impacts from Geologic Hazards

Intensity of Impacts	Description
High	• Landslide areas with the highest percentile rank (85 to 100) • Areas where Quaternary faults(younger than 150 years) are present • Areas in Zone A and AE for flooding[1]
Moderate	• Landslide areas with moderate percentile rank (70 to 84) • Areas with Quaternary faults (greater than 150 years, but less than 15,000 years) are present • Areas in Zone X for flooding[1]
Low	• Landslide areas with lowest percentile rank (0 to 69) • Areas with Class B faults and Quaternary faults older than 15,000 years • Areas in 0.2 percent annual chance for flooding[1]

Table Note: [1]Based on Federal Emergency Management Agency

Soils

Criteria were developed to assess the intensity of potential effects on soil resources associated with implementation of the B2H Project (Table 3-2). These criteria were based on susceptibility of soils to water and wind erosion with the application of the B2H Project access model that is discussed in Section 2.5.11.

Table 3-2. Criteria for Assessing Intensity of Impacts on Soils	
Intensity of Impacts	**Description**
High	• Disturbance of land surface where soils exhibit high susceptibility to erosion by water or wind on slopes greater than 15 percent (i.e., access levels 2, 5, and 6) • Construction of new access roads across designated Prime or Unique Farmland soils • Low reclamation potential
Moderate	• Disturbance of land surface where soils exhibit high susceptibility to erosion by water or wind on slopes between 0 and 15 percent (i.e., access levels 3 and 4) • Disturbance of land surface where soils exhibit moderate susceptibility to erosion by water or wind on slopes greater than 15 percent • Improvement of existing roads in areas where soils exhibit moderate susceptibility to erosion by water or wind • Moderate reclamation potential
Low	• Disturbance of land surface where soils exhibit high susceptibility to erosion by water or wind on slopes between 0 and 8 percent and existing access is present (i.e., access level 1) • Disturbance of land surface where soils exhibit moderate susceptibility to erosion by water or wind on slopes less than 15 percent (i.e., access levels 1, 3, and 4) • Disturbance of land surface where soils exhibit low susceptibility to erosion by water or wind for all slope gradients (i.e., all access levels) • Use of existing roads • High reclamation potential

Minerals

The criteria used to assess mineral resources for the B2H Project are shown in Table 3-3.

Table 3-3. Criteria for Assessing Intensity of Impacts on Mineral Resources	
Intensity of Impacts	**Description**
High	• Active mines, producers, and active mining claims • Producing oil and gas or geothermal wells • Permitted mines
Moderate	• Coal leases • Oil and gas leases • Geothermal leases • Prospects
Low	• Potential mineral areas[1]
Table Note: [1]Areas where a mineral resource potential is identified but is not currently being developed (e.g., occurrence or closed mine)	

Paleontological Resources

Criteria were developed to assess the intensity of potential effects on paleontological resources associated with implementation of the B2H Project. These criteria were based on the PFYC rating for geologic units within the B2H Project area and are shown in Table 3-4.

Table 3-4. Criteria for Assessing Intensity of Impacts on Paleontological Resources	
Intensity of Impacts	**Description**
High	• Geologic units having a Potential Fossil Yield Classification of 4 or 5
Moderate	• Geologic units having a Potential Fossil Yield Classification of 3
Low	• Geologic units having a Potential Fossil Yield Classification of 1 or 2

Effects Analysis

Geologic Hazards

Assessment of Initial Impacts

The level of potential impacts on the B2H Project from geologic hazards that could result from implementation of the B2H Project is used for assessing initial impacts of geologic hazards. Based on the level of potential effects on the geologic hazards, initial impacts were assigned using the criteria presented in Table 3-1 and are presented in Table 3-5.

Mitigation Planning and Effectiveness

The following design features will be implemented to help mitigate the impacts on and from geologic hazards:

- **Design Feature 6 (Reclaim Construction Areas)**. Surface reclamation and revegetation in areas where ground disturbance occurred would help to stabilize slopes.

In addition to the design features of the B2H Project for environmental protection (refer to Table 2-7), such as surface reclamation and revegetation in areas where ground disturbance occurs to stabilize soils, Selective Mitigation Measure 4 (i.e., minimizing cut and fill of slopes to the extent possible) would be applied where feasible in areas with moderate or high landslide potential to reduce the risk of landslides and associated impacts on the B2H Project.

Further, the engineering and design of the transmission line towers by the Applicant's engineers typically exceeds earthquake-induced loads; therefore, seismic-induced accelerations on the tower structures are not considered a geologic hazard. The Applicant would be required to follow the 2012 International Building Code design standards for earthquake-resistant structures for all other B2H Project structures, which would further reduce the risk of damage from earthquakes.

Prior to construction, geotechnical investigations of ground stability in the vicinity of potential blasting areas would be conducted, particularly in areas identified as having shallow bedrock or in areas of instability identified by the Oregon DOGAMI SLIDO-2 (2011b), to inform tower design and engineering and tower placement, which would minimize the risk of blasting-induced landslides and associated effects on the B2H Project. The Applicant would conduct geotechnical studies of the terrain types in which construction would take place, including site-specific studies of areas where blasting would be conducted to accommodate tower construction, as proposed in a Framework Blasting Plan in its *Revised Plan of Development* (Idaho Power Company 2011: Appendix F). The Applicant would prepare and include a Blasting Plan Framework as Appendix C6 in its POD as a condition for approval of the

right-of- way application. The Applicant would define the procedures to prevent any unstable condition that may result from blasting operations. Blasting operations would be designed to mitigate unstable soil or geologic conditions that could result in hazards to people or property, such as landslides, mudslides, and ground failure.

Residual Impacts

Table 3-5 summarizes the initial impacts (based on the intensity of potential effects) from geologic hazards, the selective mitigation measures that would be applied to mitigate potentially adverse effects by geologic hazards, and residual impacts.

Table 3-5. Summary of Initial and Residual Impacts From Geologic Hazards

Geologic Hazard	Initial Impact	Selective Mitigation Measures Applied	Residual Impact
Quaternary faults younger than 150 years B.P. (before present)	High	None	High
Landslide areas with highest percentile rank (85 to 100)	High	4	Moderate
Quaternary faults older than 150 years, but younger than 15,000 years B.P.	Moderate	4	Moderate
Landslide areas with moderate percentile rank (70 to 84)	Moderate	4	Low
Landslide areas with lowest percentile rank (0 to 69)	Low	None	Low
Class B faults and Quaternary faults older than 15,000 years B.P.	Low	None	Low

Additional Analysis

In addition to the analyses shown in Table 3-5, earthquake epicenters, floodplains, and liquefaction potential within the study corridor also were identified for the B2H Project.

Soils

Assessment of Initial Impacts

The level of potential impacts of the B2H Project on soils that could result from implementation of the B2H Project is used for assessing initial impacts on soils. Based on the level of potential effects on soils, initial impacts were assigned using the criteria presented in Table 3-2 and are presented in Table 3-6.

Several design features of the B2H Project for environmental protection (refer to Table 2-7) are included in the B2H Project description that will avoid, reduce, or minimize impacts on soils, including:

- **Design Feature 1 (Plan of Development)**. A POD would be prepared that would include a Reclamation, Revegetation, and Monitoring Framework Plan that would help mitigate soil erosion.
- **Design Feature 6 (Reclaim Construction Areas)**. Reseeding and revegetation would be used to mitigate soil erosion.
- **Design Feature 7 (Salvage Topsoil for Revegetation)**. To help mitigate erosion and assist with revegetation efforts, topsoil would be salvaged and segregated prior to construction, to be redistributed and contoured evenly over the surface.

- **Design Feature 10 (Speed Limit on B2H Project Access Roads)**. To minimize dust on traveled roads, a speed limit of 25 miles per hour would be employed.
- **Design Feature 17 (Work During Wet Periods)**. Vehicles would not be allowed to travel when soils are moist enough for deep rutting.
- **Design Feature 35 (Avoid Agricultural Operations)**. The right-of-way would be aligned insofar as practicable to reduce the impact on farm operations and agricultural production.
- **Design Feature 36 (Minimize/Reduce Interference with Agricultural Operations)**. Construction and maintenance activities would be done in a way to minimize impacts on agricultural operations. Soils in these areas would be decompacted or the landowners would be compensated accordingly.

These design features were considered when assessing the level of initial impacts on soils.

Mitigation Planning and Effectiveness

Reclamation seeding methods would include broadcast seeding, drill seeding, or hydroseeding/ hydromulching (or a combination of methods). Seeding methods would be chosen based on the type of seed, disturbance level, soil type, terrain, and precipitation levels for the area to be reclaimed. Seed mixtures and seeding methods would be reviewed and approved by the land-managing agency or private landowner. The Applicant would develop a Reclamation, Revegetation, and Monitoring Plan Framework identifying reclamation stipulations and would incorporate the plan into its POD. The Applicant may use soil amendments (e.g., fertilizer, wood or straw mulches, tackifying agents, or soil-stabilizing emulsions) as needed to ensure reclamation success.

In addition, the Applicant would prepare a SWPPP and an erosion and sediment control plan (ESCP) containing BMPs to control soil erosion, by both water and wind, caused by ground-disturbing activities during construction and operations. The SWPPP and ESCP would identify areas with critical erosion conditions that may require special construction activities or additional BMPs to minimize soil erosion and would be modified as needed to account for changing construction conditions and schedules. As part of the SWPPP and ESCP, temporary and permanent BMPs would be used to control erosion, sediment, and other pollutants associated with construction-related activities. BMP structures would be installed and maintained until disturbed areas meet final stabilization criteria. Damaged temporary erosion and sediment control structures would be repaired in accordance with the SWPPP and ESCP.

On completion of construction, permanent erosion and sediment BMPs would be implemented in accordance with the SWPPP and ESCP. Final cleanup would ensure all construction areas are free of construction debris, including assembly scrap metals, oil or other petroleum-based liquids, construction wood debris, and worker-generated litter. Permanent erosion control devices would be left in place.

In addition to the design features of the B2H Project for environmental protection (refer to Table 2-7),selective mitigation measures would be applied in areas of potential high and moderate (initial) impacts on soils, where feasible, to reduce impacts. The measures applicable to soils are described in this section.

- ***Mitigation Measure 1 (Limit Widening of Existing Roads in Areas of Sensitive Soils and Vegetation)***. In areas where soils and vegetation are sensitive to disturbance, existing roads to be used for construction access and/or B2H Project maintenance would not be widened or otherwise upgraded except in areas needed to make existing roads passable and safe. The potential for increased erosion and sedimentation as a result of soil compaction and/or decompaction would be reduced as well as the loss of soil-stabilizing vegetation. Also, following existing land contours and terrain minimizes the cut and fill of slopes, which reduces the potential for water erosion.
- ***Mitigation Measure 2 (Use Existing Access and/or Crossing for Sensitive Resources Avoidance)***. Existing access and/or crossing would be used for construction and maintenance to avoid disturbance of sensitive resources crossed by the B2H Project. Minimizing ground-disturbing construction activities in the vicinity of surface waters would limit soil disturbance, thereby minimizing the potential for increased erosion and sedimentation.
- ***Mitigation Measure 4 (Minimize Slope Cut and Fill for Access and Work Areas)***. The alignment of new access roads would follow the landform contours where practicable to minimize ground disturbance and/or reduce scarring of the landscape. Minimizing slope cut and fill reduces ground disturbance and potential habitat fragmentation. Water runoff is less likely to accelerate soil erosion, thus minimizing potential damage from rutting and drilling.
- ***Mitigation Measure 6 (Limit New or Improved Accessibility to Areas Previously Inaccessible)***. In areas of sensitive habitat or areas sensitive to additional public access, new or improved access in the B2H Project area would be limited. Most new or improved access would be closed or rehabilitated (in consultation with the landowner or land-managing agency) using the most effective and least environmentally damaging methods appropriate to each area. The closing of these access roads after construction would limit public access to wildlife populations; reduce stress and disturbance to wildlife and special-status wildlife habitats during critical life-cycle periods; and reduce traffic, consequently reducing erosive attributes (e.g., soil compaction, decompaction, and rutting).
- ***Mitigation Measure 8 (Span and/or Avoid Sensitive Features)***. Within the limits of standard tower design, structures would be located to allow conductors to avoid identified sensitive features, such as dwellings/buildings, and span sensitive existing land uses, natural features, and cultural resource sites. Flexibility in the placement of towers allows sensitive features to be avoided. Realigning the towers along an alternative route or realigning the alternative route (micro-siting), to the extent practicable, can result in avoiding or minimizing direct and indirect effects on land uses (e.g., agriculture).
- ***Mitigation Measure 14 (Overland Access)***. In addition to using overland travel in work areas, overland access to work areas may be used to reduce impacts on soils. Overland access would avoid or minimize removal of surface soil and vegetation where soils are susceptible to wind and water erosion, reducing the potential for erosion and loss of habitat.

Activities within the right-of-way, laydown, and staging yards, as well as other areas of extensive vehicle travel and material storage, could cause compacted soils. These soils would be decompacted in some areas, as directed by the agencies or private landowner.

Reclamation seeding methods would include broadcast seeding, drill seeding, or hydroseeding/ hydromulching (or a combination of methods). Seeding methods would be chosen based on the type of seed, disturbance level, soil type, terrain, and precipitation levels for the area to be reclaimed. Seed mixtures and seeding methods would be reviewed and approved by the land-managing agency or private landowner. The Applicant would develop a Reclamation, Revegetation, and Monitoring Plan Framework identifying reclamation stipulations and would incorporate the plan into its POD. The Applicant may use soil amendments (e.g., fertilizer, wood or straw mulches, tackifying agents, or soil-stabilizing emulsions) as needed to ensure reclamation success.

Residual Impacts

Table 3-6 summarizes the initial impacts (based on the intensity of potential effects) on soils, the selective mitigation measures applied to mitigate potentially adverse impacts on soil resources, and residual impacts.

Table 3-6. Summary of Initial and Residual Impacts on Soils

Soils	Initial Impact	Selective Mitigation Measures Applied	Residual Impact
Soils with high susceptibility to water and wind erosion on slopes greater than 15 percent (access levels 2, 5, and 6)	High	1, 2, 4, 6, 14	Low
Soils with high susceptibility to water and wind erosion on slopes between 0 and 15 percent (access levels 3 and 4)	Moderate	1, 2, 4, 14	Low
Soils designated Prime Farmland (based on range of slopes identified for access levels 2, 4, 5, and 6)	High	1, 2, 8	Low
Soils designated Prime Farmland for access level 2)	Moderate	1, 2, 8	Low
Soils with moderate compaction (28 percent or greater clay content) (based on range of slopes identified for access levels 2, 3, 4, and 5)	Moderate	1, 6	Low
Soils with moderate susceptibility to water and wind erosion on slopes greater than 15 percent (access levels 2, 5, and 6)	Moderate	1, 2, 4, 14	Low
Soils with high susceptibility to water or wind erosion on slopes less than 15 percent (access level 1)	Low	None	Low
Soils with moderate susceptibility to water and wind erosion (based on range of slopes identified for access levels 1, 2, 3, 4, and 6)	Low	None	Low
Soils with low susceptibility to water or wind erosion (based on range of slopes identified for all access levels)	Low	None	Low
Soils designated Prime Farmland (based on range of slopes identified for access level 1)	Low	None	Low

Table Note: Includes the implementation of design features for environmental protection.

Minerals

Assessment of Initial Impacts

The level of potential impacts of the B2H Project on minerals that could result from implementation of the B2H Project is used for assessing initial impacts on minerals. Based on the level of potential effects on minerals, initial impacts were assigned using the criteria presented in Table 3-3 and are presented in Table 3-7.

Before construction, the Applicant would call each state's utility locating services so that buried utilities, including oil- and gas-gathering lines and pipelines, could be avoided. Implementation of these measures would avoid adverse effects on mineral exploration and development during the short-term construction period. The Applicant would be required to coordinate with the operators of active mineral operations and to compensate for any loss of access to mineral operations.These design features were considered when assessing the level of initial impacts on soils.

Mitigation Planning and Effectiveness

In addition to the design features of the B2H Project for environmental protection (refer to Table 2-7), selective mitigation measures would be applied in areas of potential high and moderate (initial) impacts on minerals, where feasible, to reduce impacts. In particular, Selective Mitigation Measure 8 (Span or Avoid Sensitive Features) also would be used to mitigate impacts on mineral resources (refer to Table 2-13).

Residual Impacts

Table 3-7 summarizes the initial impacts (based on the intensity of potential effects) on minerals, the selective mitigation measures applied to mitigate potentially adverse impacts on minerals, and residual impacts.

Table 3-7. Summary of Initial and Residual Impacts on Minerals

Mineral Resource	Initial Impact	Selective Mitigation Measures Applied	Residual Impacts
Active mines, producers, and active mining claims	High	4	Low
Producing oil and gas or geothermal wells	High	4	Low
All leases	Moderate	None	Moderate

Paleontological Resources

Assessment of Initial Impacts

The level of potential impacts of the B2H Project on paleontological resources that could result from implementation of the B2H Project is used for assessing initial impacts on paleontological resources. Based on the level of potential effects on paleontological resources, initial impacts were assigned using the criteria presented in Table 3-4 and are presented in Table 3-8.

The loss of paleontological resources due to ground-disturbing activities resulting from implementation of the B2H Project would be the primary potential adverse environmental effect. As a design feature of the B2H Project, a Paleontological Resources Treatment Plan (PRTP) would be developed in

consultation with the appropriate land-managing agencies to mitigate potential adverse effects on paleontological resources. The PRTP would include requirements for the following:

(1) A preconstruction survey, by a permitted paleontologist, to describe and record paleontological resources and collect significant paleontological resources exposed on the surface

(2) The monitoring of ground-disturbing activities during construction to collect significant paleontological resources, including microvertebrates, found below the surface

(3) An Unanticipated Discovery Plan that specifies what steps would be taken if a subsurface fossil is discovered during construction, including stopping construction in the vicinity of the find, notifying the appropriate land-managing agency, contacting a qualified paleontologist to conduct an evaluation of the find, developing an approved data recovery program or other mitigation measures, and curating and preparing any significant paleontological resources collected

(4) The minimizing of unauthorized collection of paleontological resources; to meet this requirement, all B2H Project workers would attend mandatory training on the importance of paleontological resources and the relevant federal regulations that protect them

(5) The deposition and appropriate preparation of significant paleontological resources into a federally approved repository for future scientific study and education

Also, pursuant to the requirements of IM 2009-011 (BLM 2009b), preconstruction field surveys would be conducted in areas of PFYC rankings of 4 or higher to identify areas that should be avoided if possible or areas that would require construction monitoring to protect paleontological resources during the construction period. The Applicant would consult with the BLM on areas with a PFYC ranking of 3 to determine whether field surveys would be required. All paleontological resources work conducted for the B2H Project would be performed by qualified paleontologists that are permittable by federal and state agencies.

These design features were considered when assessing the level of initial impacts on paleontological resources.

Mitigation Planning and Effectiveness

In addition to the PRTP (described in the previous section), Selective Mitigation Measure 8 (Span or Avoid Sensitive Features) also would be used to help mitigate impacts on paleontological resources where high or moderate impacts are predicted if not mitigated. Refer to Table 3-9 for rock formations crossed by the paleontological resources study corridor for the B2H Project.

Table 3-8 summarizes the initial impacts (based on the intensity of potential effects) on paleontological resources, the selective mitigation measures applied to mitigate potentially adverse impacts on paleontological resources, and residual impacts.

Table 3-8. Summary of Initial and Residual Impact Levels on Paleontological Resources			
Resource	**Initial Impact**	**Selective Mitigation Measures Applied**	**Residual Impact**
Potential Fossil Yield Classification 4 and 5	High	8	Low[1]
Potential Fossil Yield Classification 3	Moderate	8	Low[1]
Potential Fossil Yield Classification 1 and 2	Low	None	Low
Table Note: [1]Includes effects of PRTP			

3.2.1.5 AFFECTED ENVIRONMENT

This section describes the existing condition of the environment as it pertains to earth resources that could be affected by implementing the B2H Project.

GEOLOGIC HAZARDS

Earthquakes

The B2H Project crosses areas where earthquakes have occurred and could occur in the future. The historical earthquake epicenters and Quaternary faults within the geographical hazards study corridor are shown on MV-2. The Quaternary fault analysis identifies several fault systems with movement over long geologic time periods, suggesting that future movement is possible. On active faults in Union County, the East Grande Ronde Valley fault system has been active in the last 15,000 years, with other movement dating back to 1.6 million years ago. Portions of the West Grande Ronde Valley fault system are active but also contain evidence of movement 130,000 years ago. The Halfway-Posey Valley Section of the Pine Mountain Graben fault system in Baker County (Oregon) is active, with additional movement approximately 750,000 years B.P. The Powder River Peninsula fault system in Baker County and in Washington County (Idaho) is considered active. Malheur County (Oregon) contains the active Cottonwood Mountain Fault and the Juniper Mountain Fault, both of which have had movement within the past 15,000 years. Lastly, the Rush Peak fault zone in Washington County (Idaho) contains recent movement, as well as movement dating back to 1.6 million years ago.

Landslides

Landslides, including mudflows, mudslides, rock flows, rockslides, and debris flows, could occur in the geologic hazards study corridor. A landslide is described as an en masse downward and outward movement of a relatively dry body of rock and/or surficial material in response to gravitational stresses. A mudflow is the downward movement of mud in a mountain watershed because of peculiar characteristics of extremely high sediment yield and occasional high runoff. A mudslide (also called debris flow) is a moving mass of loose sand, soil, rock, water, and air that travels down a slope under the influence of gravity. A rock flow, or fall, is abrupt movements of masses of geologic materials, such as rocks and boulders that become detached from steep slopes or cliffs. (Colorado Geological Survey 2016; USGS 2013) MV-2 shows the landslide hazard zones, mapped by Oregon's DOGAMI, in the B2H Project area in Oregon.

Floodzones

The B2H Project crosses numerous floodzones that have moderate to high susceptibility to flooding. Floodzones, or flood hazard areas as defined by FEMA, are areas that have a 1 percent chance of being inundated in any given year (base flood), areas between the base flood and the 0.2 percent chance of a flood (500 year flood), and those areas with a 0.2 percent annual chance of a flood (FEMA 2016). Most of these floodzones are associated with streams, rivers, lakes, and reservoirs.

SOILS

The B2H Project crosses several major soil orders. The Mollisol soil order constitutes approximately 67 percent of the soils in the soil resources study corridor. The Mollisol soil order includes a variety of soils formed mainly under grasslands; it is the predominant order in northeastern Oregon. These soils have a strong organic component formed by the decomposition of grass and other vegetation, which results in very productive soils.The soil resources study corridor, which includes and the Colombia Plateau, Blue Mountains, the Owyhee Uplands and Snake River Plain physiographic provinces, also consists of soils of the Aridisol order. Aridisols constitute approximately 21 percent of the soils in the soil resources study corridor. Aridisols are found in dry climates and contain subsurface horizons in which clay, calcium carbonate, silica, salts, and/or gypsum have accumulated. They are usually not suitable for agriculture unless irrigation water is provided. Revegetation in these areas may be more difficult due to a lack of water.

The remaining soil orders include Entisols and Andisols, which make up the remaining approximately 12 percent of the soils in the soil resources study corridor. Entisols are soils that show little or no evidence of pedogenic horizon development, and occur in areas of recently deposited parent materials or in areas where erosion or deposition rates are faster than the rate of soil development. The order Andisol is represented by a variety of soils with a predominantly volcanic or volcanoclastic origin. In the soil resources study corridor, the Andisols are predominantly found under coniferous forest vegetation within the Blue Mountains. However, Andisols are sometimes cleared of forest and are used for agriculture.

Erodible Soils

A soil's potential to erode due to water runoff is measured by its *K* factor. The *K* factor is used in the Universal Soil Loss equation and represents a relative index of susceptibility of bare, cultivated soil to particle detachment and transport by rainfall. The DOE Pacific Northwest National Laboratory online guideline (Strelile et al. 1996) identifies low, moderate, and high *K* factor values. Higher *K* factor values indicate higher susceptibility to erosion. Low *K* factor values range from 0.05 to 0.15, moderate *K* factor values range from 0.16 to 0.4, and high *K* factor values exceed 0.4. Because the highest *K* factor value in the NRCS GIS data file was 0.37, that value, rather than 0.4, was used as the high *K* factor value threshold in this EIS. Soil Resources are displayed in MV 3.

The measure of a soil's susceptibility to erosion by wind is the WEG. The NRCS data for WEG were reviewed for the soil resources study corridor. Soils in groups 1 through 4 (greater than or equal to 86

tons per acre per year) were considered highly wind erodible. Highly wind erodible soils were expressed as a percentage of the total soil resources study corridor. The construction and operations disturbance areas also were reviewed to assess the acres of highly wind erodible soil for the B2H Project.

Reclamation Potential of Soils

A stony-rocky soil typically has a percentage of soil particles greater than 3 inches. A droughty soil is a soil with higher percentage of sand or coarse texture and is regarded as having a drainage class that is moderately to excessively well drained. Although all soil is susceptible to compaction to varying degrees, wet soil is more readily compacted than dry soil, and clay loam or finer soil with poor drainage characteristics is assumed to be more highly compaction prone. All soils with clay content of 28 percent or greater were considered to have compaction potential. The presence of stony or rocky soils, droughty soils, or soils prone to compaction, or a combination of these soils, could complicate revegetation efforts.

MINERALS

The B2H Project area includes a variety of potential mineral assets, including salable minerals (sand, gravel, building stones, etc.), locatable minerals (gold, silver, copper, mercury, etc.), and industrial minerals, and semiprecious gemstones (jasper, opal, agate, etc.). Active oil and gas leases are present near Baker and in Malheur County. Baker County has a rich history of placer and lode- type gold and similar locatable mineral deposits, as do the Owyhee Mountains of southwestern Idaho and southeastern Oregon. Much of the general B2H Project vicinity also has favorable conditions for geothermal development, and there is one active geothermal plant in Malheur County within 1 mile of the Proposed Action. Recent exploration in the vicinity of Payette, Idaho, and Ontario, Oregon, suggests that land within the mineral resources study corridor also may hold reserves of oil and natural gas. Salable minerals—including sand and gravel, building stones, and the like—are found throughout the mineral resources study corridor. Mineral resources are shown in MV 4.

PALEONTOLOGICAL RESOURCES

The geological units crossed by the B2H Project and their PFYC are shown in Table 3-9.

Table 3-9. Geologic Units and Their Potential Fossil Yield Classification within the Paleontological Resources Study Area

Geologic Unit Name	Potential Fossil Yield Classification
Quaternary alluvium (Qal)	2
Quaternary alluvial fan debris, slope wash, colluvium, and talus (Qf)	2
Quaternary glacial deposits (Qg)	2
Quaternary glaciofluvial, lacustrine, and pediments/includes Missoula (Qgs)	2
Quaternary landslide and debris flow deposits (Qls)	2
Quaternary lacustrine and fluvial deposits/includes Estacada Formation (Qs)	3
Quaternary terrace, pediment and lag gravels (Qt)	2
Quaternary and Tertiary basalt (QTb)	1

Table 3-9. Geologic Units and Their Potential Fossil Yield Classification within the Paleontological Resources Study Area	
Geologic Unit Name	**Potential Fossil Yield Classification**
Quaternary and Tertiary terrace gravels (QTg)	2
Quaternary and Tertiary sedimentary/lacustrine, tuffaceous sandstone and siltstone/includes Walter Hill, Springwater, and Glenns Ferry formations in Idaho (QTs)	5
Quaternary and Tertiary mafic vent deposits (QTvm)	1
Miocene tuffaceous sedimentary rocks, tuffs, pumicites/includes Mascall Formation, Sucker (Succor) Creek Formation, rocks of Miocene age, Drip Springs Formation, and Trout Creek Formation (Tts)	5
Miocene welded tuffs and tuffaceous sedimentary rocks (Twt)	3
Tertiary andesite, dacite, and sedimentary rocks/includes Alvord Creek Formation (Tas)	2
Tertiary silicic ash-flow tuff/includes Rattlesnake tuff (Tat)	4
Tertiary basalt (Tb)	1
Tertiary basalt/includes Steens basalt, Owyhee basalt, some sedimentary (Tba)	2
Columbia River Basalt Group (Tc)	2
Tertiary clastic rocks and andesite flows/includes Clarno Formation, some sedimentary (Tca)	3
Grande Ronde Basalt/N2 magnetostratigraphic unit (Tcg)	2
Imhaha basalt (Tci)	1
Picture Gorge basalt (Tcp)	1
Saddle Mountain basalt (Tcs)	1
Wanapum basalt/ includes Frenchman Springs Member (Tcw)	2
Tertiary mafic and intermediate intrusive rocks (Tim)	1
Tertiary lacustrine and fluvial deposits/includes Deer Butte Formation, Juntura Formation, Spring Creek Tuff, and Leslie Gulch ash flow (Tlf)	4
Tertiary marine sandstone and siltstone/includes Unpqua Formation and Flournoy Formation (Tmss)	2
Tertiary olivine basalt, some sedimentary (Tob)	2
Tertiary pyroclastic eject of basaltic cinder cones (Tp)	1
Tertiary subaqueous pyroclastic ejecta, some sedimentary (Tps)	2
Tertiary rhyolite and dacite domes and flows (Tr)	1
Tertiary ridge-capping basalt and basaltic andesite (Trb)	1
Tertiary rhyolite and dacite/includes Jump Creek Rhyolite and Littlefield Rhyolite (Trh)	1
Tertiary tuffaceous sedimentary rocks/includes Glenns Ferry Formation, Drip Springs Formation, Drewsey Formation, Bully Creek Formation, Dalles Group, Shutler Formation, Kern Basin Formation, Danforth Formation, Idaho Group, Thousand Creek Beds, Madras Formation, Simtustus Formation, Yonna Formation, Sandy River Formation, and Helvetia Formation (Ts)	5
Tertiary rhyolitic tuff, tuffaceous sedimentary rocks, and lava flows/ includes Pike Creek Formation (Tsf)	4
John Day Formation (Tsfj)	5
Strawberry volcanics (Tstv)	1
Tertiary mafic and intermediate vent rocks (Tvm)	1
Tertiary silicic vent rocks (Tvs)	3
Granitic rocks late Cretaceous and early Cretaceous (KJg)	1

Table 3-9. Geologic Units and Their Potential Fossil Yield Classification within the Paleontological Resources Study Area	
Geologic Unit Name	**Potential Fossil Yield Classification**
Intrusive rocks Cretaceous and Jurassic (KJi)	1
Hurwal Formation/sedimentary rocks Jurassic and Triassic (JTRs)	3
Weatherby Formation/sedimentary and volcanic rocks Jurassic and Triassic (JTRsv)	3
Triassic-Jurassic granite and diorite (JTRgd)	1
Triassic volcanic and metavolcanic rocks, some sedimentary (TRv)	3
Triassic sedimentary and volcanic rocks (TRsv)	3
Triassic marine sedimentary rocks/includes Beggs Formation, Brisbois Formation, Vester Formation, Rail Canyon Argillite, Fields Creek Formation, Martin Bridge Formation, Doyle Creek Formation, and Wild Sheep Creek Formation (TRs)`	3
Triassic and Permian marble (TRPzsn)	1
Triassic and Paleozoic sedimentary rocks, partly metamorphosed (TRPzs)	2
Triassic-Permian sedimentary and volcanic rocks, partly metamorphosed (TRPsv)	2
Triassic-Permian volcanic rocks (TRPv)	1
Triassic and Paleozoic ultramafic and mafic intrusive rocks (TRPzu)	1
Mixed rocks sedimentary and volcanic Mesozoic and Paleozoic (mr)	3
Paleozoic gabrroic rocks (TRPzg)	1
Table Source: Ludington et al. 2006	

A review of paleontological features in eastern Oregon indicates that whole and partial fossils have been discovered in the sedimentary rocks from the Miocene, Pliocene, and Pleistocene periods. In the northern portion of the paleontological resources study corridor, the Alkali Canyon and McKay Formations of the Dalles Group are fossiliferous late Miocene to Pliocene sedimentary units often interbedded with basalt (Farooqui et al. 1981). Surface surveys or shallow hand excavations in these units have yielded whole fossils or fragments of fossil mammals, including canines, rodents, and herbivores. Southeast of Boardman, a fossil locality within the Dalles Group is recorded within 2 miles of the Longhorn Alternative. Farther south in Baker and Malheur counties, widely distributed Miocene and Pleistocene sedimentary rocks associated with the Idaho Group also are documented to have a large variety of fossil resources. Fossil evidence includes a variety of plants, insects, turtles, canines, rodents, squirrels, beavers, rhinoceroses, small carnivores, camels, deer, peccaries, mastodons, and mammoths. Shotwell (1970) reported finds of up to 36 different mammal species within sedimentary beds in southeastern Oregon. There are two fossil localities within the Chalk Butte Formation recorded within 2 miles of the Malheur A Alternative. A fossil locality was reported within 0.25 miles of the Malheur S Alternative, but this locality does not name a formation but is Miocene in age. Additionally, Jason McClaughry (personal communication, September 6, 2011), field geologist for the Oregon DOGAMI Baker City office, indicated that mammal fossils recently have been discovered in surface alluvial sediments near the La Grande airport. One fossil locality near La Grande was found in a late Pleistocene alluvial fan and is recorded within 0.7 mile of the Mill Creek Alternative.

BLM Oregon has not designated PFYC values for Oregon bedrock units (J. Zancanella, personal and email communication, April 11, 2011). Therefore, PFYC values for the Oregon bedrock units and Idaho

rocks not appearing on the BLM list have been estimated. A number of factors were used to provide the estimates. For instance, very low (Class 1) to low (Class 2) classifications were assumed for igneous rocks. The Miocene-Pliocene sedimentary rocks in Oregon were classified as high (Class 4) or very high (Class 5). These included most of the sedimentary rocks in Baker and Malheur counties and Dalles Group rocks (McKay and Alkali Canyon Formations) in Umatilla and Morrow counties. These sediments are of similar age and depositional environments to the Idaho bedrock formations (Bruneau, Glenns Ferry, Chalk Hills, etc.) that BLM Idaho rated as high to very high. Other bedrock with unknown fossil potential was classified as Class 3 (moderate or unknown potential).

The paleontology report for the Sunstone Pipeline project, originally planned to pass through Malheur, Baker, Union, and Umatilla counties (Uinta Paleontological Associates 2010) also was reviewed. The report also provided estimates of PFYC. A comparison of the Sunstone Pipeline PFYC and the preliminary Oregon PFYC estimates identified a good correlation. In general, the Holocene and Pleistocene sediments in both reports received a Class 3, and Miocene-Pliocene units received Class 3, 4, or 5 designations. The paleontological review also included interviews with BLM Oregon and state paleontologists and visits to the BLM Vale and Baker City Field Offices to meet staff with paleontology oversight and to review paleontological information (D. Pritchard, personal communication, April 8, 2011). Paleontological resources are shown in MV 5.

The Idaho Group bedrock units in Owyhee County, Idaho, have similar fossil potential to the Idaho Group bedrock in Baker and Malheur counties, Oregon (B. Breithaupt, email communication, December 2, 2011; F. Halford, personal communication, August 31, 2011). In several places, the B2H Project crosses the Poison Creek Formation, which has been identified as highly fossiliferous, of the Idaho Group. This formation has yielded the fossils or fossil fragments of several fish species; turtles; mammals, including rabbits, small carnivores, rhinoceroses, small and large camels, horses, and sloths; and more than 50 species of plants (BLM 2007; Smith et al. 1982).

SEGMENT 1—MORROW-UMATILLA

Applicant's Proposed Action Alternative

Geologic Hazards

Table 3-10 presents the miles crossed by geologic hazards for all alternative routes and route variations in Segment 1.

Table 3-10. Geologic Hazards Inventory Data for Segment 1—Morrow-Umatilla						
Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)[2]	
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84
Applicant's Proposed Action	91.9	0.1	0.0	0.0	91.9	0.0
Variation S1-B1	*6.4*	*0.0*	*0.0*	*0.0*	*6.4*	*0.0*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*0.0*	*6.4*	*0.0*
East of Bombing Range Road	92.3	0.1	0.0	0.0	92.3	0.0
Applicant's Proposed Action – Southern Route	99.1	0.1	0.0	0.0	99.1	0.0
West of Bombing Range Road – Southern Route	95.6	0.1	0.0	0.0	95.6	0.0
Longhorn	88.2	0.1	0.0	0.0	88.2	0.0
Interstate 84	84.7	0.1	0.0	0.0	84.7	0.0
Variation S1-A1	*18.5*	*0.0*	*0.0*	*0.0*	*18.5*	*0.0*
Variation S1-A2	*18.5*	*0.0*	*0.0*	*0.0*	*18.5*	*0.0*
Interstate 84 – Southern Route	93.4	0.1	0.0	0.0	93.4	0.0

Table Notes:
[1]Due to the overlap of faults occurring during several time periods, the total miles crossed will not equal the total length of the alternative routes and route variations.
[2]There were no areas with high landslide percentile for Segment 1.

No recently active Quaternary faults, or areas with moderate or high landslide potential were identified for the Applicant's Proposed Action Alternative. Eighteen previously reported earthquake epicenters occurred within one mile of the Applicant's Proposed Action Alternative. All of the previously reported earthquakes had recorded magnitudes of less than 6. A cluster of eight of these earthquakes was reported just west of Hermiston Highway 207. Another cluster of six earthquakes have been reported south of Pilot Rock. The Applicant's Proposed Action Alternative crosses three areas of high liquefaction potential—at Boardman, immediately south of Boardman, and near Hermiston Highway 207 where it would cross the Umatilla River. This alternative crosses three areas with a high percentile ranking for floodzones. These occur along the Upper Grande Ronde, Umatilla, and Middle Columbia-Lake Wallula watersheds, and total approximately 10,936 in the geologic hazards study corridor. The alternative also crosses areas of the same watersheds that have a moderate percentile ranking for floodzones having 11,040 acres for the geologic hazards study corridor.

Variations S1-B1 and S1-B2

There are no faults or previously recorded earthquake epicenters crossed by this route variation. The route crosses lands with low landslide potential. This variation crosses no additional acreage for areas with moderate or high percentile ranking for floodzones.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

There are no Quaternary faults or previously recorded earthquake epicenters for the additional action. The additional action does cross an area with moderate liquefaction south of Boardman near Link I-36. The additional action only crosses areas with a low percentile ranking for floodzones.

Soils

Table 3-11 presents the soil resources and their susceptibility to erosion and compaction crossed by the B2H Project in Segment 1. For the soil comparison tables: Unknown signifies no data was available, Low signifies those soils with low susceptibility to wind and water erosion or compaction, and Moderate signifies moderate susceptibility to wind and water erosion or compaction (based on soil types and their characteristics, and access model discussed in Chapter 2).

Table 3-11. Soils Inventory Data for Segment 1—Morrow-Umatilla (miles crossed)

Alternative Route	Total Length (miles)	Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]	
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate
Applicant's Proposed Action	91.9	8.3	50.9	32.7	0.0	91.6	0.3	89.6	2.3
Variation S1-B1	*6.4*	*0.0*	*3.1*	*3.3*	*0.0*	*6.4*	*0.0*	*6.4*	*0.0*
Variation S1-B2	*6.4*	*0.0*	*4.0*	*2.4*	*0.0*	*6.4*	*0.0*	*6.4*	*0.0*
East of Bombing Range Road	92.3	8.3	52.7	31.3	0.0	92.0	0.3	90.0	2.3
Applicant's Proposed Action – Southern Route	99.1	9.5	58.0	31.6	0.0	98.8	0.3	94.7	4.4
West of Bombing Range Road – Southern Route	95.6	9.5	50.2	35.9	0.0	95.2	0.4	87.9	7.7
Longhorn	88.2	8.3	50.4	29.5	0.0	80.9	7.3	85.9	2.3
Interstate 84	84.7	8.3	57.7	18.7	0.0	78.8	5.9	82.4	2.3
Variation S1-A1	*18.5*	*0.0*	*16.3*	*2.2*	*0.0*	*18.5*	*0.0*	*18.5*	*0.0*
Variation S1-A2	*18.5*	*0.0*	*5.9*	*12.6*	*0.0*	*18.3*	*0.2*	*18.5*	*0.0*
Interstate 84 – Southern Route	93.4	9.5	66.1	17.8	0.0	87.5	5.9	89.0	4.4

Table Notes:
[1]Soil compaction potential is based on clay content.
No high impacts are anticipated for soil resources.

No soils with high susceptibility to water or wind erosion are crossed by the Applicant's Proposed Action Alternative. The alternative does cross 32.7 miles of soils with moderate susceptibility to water erosion and 0.3 mile of soils with moderate susceptibility to wind erosion. The alternative crosses 2.3 miles of soils with high compaction potential. Droughty soils also are present throughout the alternative route study corridor particular in the vicinity of Boardman, east of Hermiston Highway, and south and east of Pilot Rock. Stony/rocky soils are crossed east of Hermiston Highway and south and east of Pilot Rock.

Variation S1-B1

This variation crosses 3.3 miles of soils with moderate susceptibility to water erosion. This variation does not cross soils with compaction potential. This variation does not cross any droughty or stony soils.

Variation S1-B2

This variation crosses 2.4 miles of soils with moderate susceptibility to water erosion. This variation does not cross any prime farmlands or soils with compaction potential. This variation does not cross any droughty or stony soils.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The additional action does not cross any soils with high susceptibility to wind or water erosion, but does cross areas with moderate susceptibility to wind erosion. The additional action also crosses an area with drought soils near Boardman.

Minerals

Table 3-12 presents the mineral resources crossed by the B2H Project in Segment 1.

Table 3-12. Minerals Inventory Data for Segment 1—Morrow-Umatilla (miles crossed)

Alternative Route	Total Length (miles)	Active Mine or Active Mining Claims	All Leases	Producing Oil and Gas or Geothermal Wells
Applicant's Proposed Action	91.9	0.0	0.0	0.0
Variation S1-B1	*6.4*	*0.0*	*0.0*	*0.0*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*0.0*
East of Bombing Range Road	92.3	0.0	2.0	0.0
Applicant's Proposed Action – Southern Route	99.1	0.0	0.0	0.0
West of Bombing Range Road – Southern Route	95.6	0.0	0.5	0.0
Longhorn	88.2	0.0	2.9	0.0
Interstate 84	84.7	0.0	0.4	0.0
Variation S1-A1	*18.5*	*0.0*	*0.0*	*0.0*
Variation S1-A2	*18.5*	*0.0*	*0.0*	*0.0*
Interstate 84 – Southern Route	93.4	0.0	0.4	0.0

Table Note: Due to some mineral resources not occurring for the alternative routes and route variations, the miles crossed will not equal the total length of the alternative routes and route variations.

No mineral resources are crossed by the Applicant's Proposed Action Alternative or Variations S1-B1 and S1-B2.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The additional action does not cross any mineral resources.

Paleontological Resources

Table 3-13 presents information on the paleontological resources crossed by the B2H Project in Segment 1.

Table 3-13. Paleontological Resources Inventory Data for Segment 1—Morrow-Umatilla

Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)				
		1	2	3	4	5
Applicant's Proposed Action	91.9	0.0	61.3	10.8	19.8	0.0
Variation S1-B1	*6.4*	*0.0*	*6.4*	*0.0*	*0.0*	*0.0*
Variation S1-B2	*6.4*	*0.0*	*6.4*	*0.0*	*0.0*	*0.0*
East of Bombing Range Road	92.3	0.0	61.3	10.8	20.2	0.0
Applicant's Proposed Action – Southern Route	99.1	0.0	72.1	10.8	16.2	0.0
West of Bombing Range Road – Southern Route	95.6	0.0	71.4	10.8	13.4	0.0
Longhorn	88.2	0.0	61.3	13.2	13.7	0.0
Interstate 84	84.7	0.0	58.2	22.9	3.6	0.0
Variation S1-A1	*18.5*	*0.0*	*12.6*	*5.9*	*0.0*	*0.0*
Variation S1-A2	*18.5*	*0.0*	*14.0*	*4.5*	*0.0*	*0.0*
Interstate 84 – Southern Route	93.4	0.0	70.5	22.9	0.0	0.0

The Applicant's Proposed Action Alternative crosses 19.8 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources, and 10.8 miles with a moderate sensitivity (PFYC 3) for paleontological resources. No geologic units with very high sensitivity (PFYC 5) are crossed by the Applicant's Proposed Action Alternative.

No geologic units with very high, high, or moderate sensitivity for paleontological resources are crossed by Variations S1-B1 and S1-B2.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The additional action crosses geologic units with moderate and high sensitivity for paleontological resources.

East of Bombing Range Road Alternative

Geologic Hazards

No recently active Quaternary faults, or areas with moderate or high landslide potential are crossed by the East of Bombing Range Road Alternative (Table 3-10). Thirteen historic earthquake epicenters are located within one mile of the reference centerline, including the same cluster of epicenters located just east of Hermiston Highway 207 (Link I-45) and in the study corridor for the Applicant's Proposed Action Alternative. The East of Bombing Range Road Alternative crosses one area of instability that also is crossed by the Applicant's Proposed Action Alternative. This is located west of Link I-45. This alternative crosses the same three areas with a high percentile ranking for floodzones as crossed by the West of Bombing Range. This alternative crosses one area with a high percentile ranking for floodzones. This occurs along the Umatilla watershed and totals approximately 575 acres in the

geologic hazards study corridor. The alternative also crosses same watershed with areas having a moderate percentile ranking for floodzones having 1,998 acres for the geologic hazards study corridor.

Soils

No soils with high susceptibility to water or wind erosion are crossed by the alternative (Table 3-11). The alternative crosses 31.3 miles of soils with moderate susceptibility to water erosion and 0.3 mile of soils with moderate susceptibility to wind erosion. The alternative crosses 2.3 miles of soils with high compaction potential.

Similar to the Applicant's Proposed Action Alternative, droughty soils are present throughout the study corridor for the East of Bombing Range Road Alternative, particularly in the vicinity of Boardman and east of Hermiston Highway, and south and east of Pilot Rock. Stony/rocky soils occur east of Hermiston Highway. Also, stony/rocky soils are crossed east of Hermiston Highway but this route does not cross the stony/rocky soils south of Pilot Rock.

Minerals

The East Bombing Range Road Alternative crosses 2.0 miles of existing minerals leases near Boardman. No active mine or mining claims or producing oil, gas, or geothermal wells are crossed.

Paleontological Resources

The alternative route crosses 20.2 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources, and 10.8 miles with a moderate sensitivity (PFYC 3) for paleontological resources. No geologic units with very high sensitivity (PFYC 5) are crossed by the Applicant's Proposed Action Alternative.

Applicant's Proposed Action – Southern Route Alternative

Geologic Hazards

No recently active Quaternary faults, or areas with moderate or high landslide potential are crossed by the Applicant's Proposed Action – Southern Route Alternative (Table 3-10). Seventeen historic earthquakes are located within 1.0 mile of the reference centerline. All of the previously reported earthquakes had recorded magnitudes of less than 6. A cluster of eight of these earthquakes occurred east of Highway 207 (Link I-45); another six earthquakes occurred south of Pilot Rock along Link I-64. The Applicant's Proposed Action – Southern Route Alternative crosses 7 areas of high liquefaction potential—at Boardman, immediately south of Boardman, and scattered areas in the study corridor where it crosses streams. This alternative crosses one area with a high percentile ranking for floodzones. This occurs along the Umatilla watersheds and totals approximately 575 acres in the geologic hazards study corridor. The alternative also crosses an area of the same watershed having moderate percentile ranking for floodzones with 1,212 acres for the geologic hazards study corridor.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

There are no Quaternary faults or previously recorded earthquakes for the additional action. The additional action does cross an area with moderate liquefaction potential near Boardman. The additional action only crosses areas with a low percentile ranking for floodzones.

Soils

There were no soils with high susceptibility to water or wind erosion identified for the alternative route. The alternative route does cross 31.6 miles of soils with moderate susceptibility to water erosion and 0.3 mile of soils with moderate susceptibility to wind erosion. The alternative route also crosses 4.4 miles of soils with high compaction potential. Droughty soils, identified, were scattered throughout most of this alternative route except for the area around Highway 207. Soils that were identified as stony/rock do not occur until after Highway 207 but, from that point forward, occur sporadically throughout rest of the alternative to the terminus of Segment 1.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The additional action does not cross any soils with high susceptibility to wind or water erosion, but does cross areas with moderate susceptibility to wind erosion. The additional action also crosses an area with drought soils near Boardman

Minerals

No mineral resources were identified for this alternative route.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The additional action does not cross any mineral resources

Paleontological Resources

The alternative route crosses 16.2 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources, and 10.8 miles with a moderate sensitivity (PFYC 3) for paleontological resources.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The additional action does cross geologic units with moderate and high sensitivity for paleontological resources.

West of Bombing Range Road – Southern Route Alternative

Geologic Hazards

No recently active Quaternary faults, or areas with moderate or high landslide potential were identified for the alternative route. There are 11 previously reported earthquake epicenters within one mile of the alternative route, all of which have recorded magnitudes of less than 6. A cluster of six of these

earthquakes was reported south of Pilot Rock near Link I-64. The alternative route crosses eight areas of high liquefaction potential; at Boardman, immediately south of Boardman, and scattered areas throughout the alternative where it crosses streams. This alternative crosses the same floodzone as the West of Bombing Range Alternative and their total acres.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The impacts on geologic hazards are the same as the Applicant's Proposed Action Alternative.

Soils

There were no soils with high susceptibility to water or wind erosion identified for the alternative route. The alternative route does cross 35.9 miles of soils with moderate susceptibility to water erosion and 0.4 mile of soils with moderate susceptibility to wind erosion. The alternative route also crosses 15.1 miles of prime or unique farmland, and 7.7 miles of soils with high compaction potential. Droughty soils, identified, were scattered throughout the alternative route. However, concentrations of droughty soils occur in and around the Boardman area, east of Highway 207, and south of Pilot Rock. Soils that were identified as stony/rock are scattered throughout this alternative beginning east of Highway 207

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The impacts on soils would be the same as the Applicant's Proposed Action Alternative.

Minerals

The West of Bombing Range Road Southern Route Alternative crosses 0.5 mile of leases near Boardman, and between highways 207 and 74.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The impact on mineral resources would be the same as the Applicant's Proposed Action Alternative.

Paleontological Resources

The alternative route crosses 3.4 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources, and 10.8 miles with a moderate sensitivity (PFYC 3) for paleontological resources.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The impact on paleontological resources would be the same as the Applicant's Proposed Action Alternative.

Longhorn Alternative

Geologic Hazards

The Longhorn Alternative does not cross any recently active Quaternary faults or any areas with moderate or high landslide susceptibility. There are 13 earthquake epicenters within the geologic

hazards study corridor for this alternative with a concentration of them just east of Highway 207. All of these previously recorded earthquakes had a magnitude of less than 6. This alternative crosses 7 areas with high liquefaction potential. These occur in the Boardman area and scattered throughout the alternative near streams that are within the geologic hazards study corridor. This alternative crosses one area with a high percentile ranking for floodzones. This occurs along the Umatilla watershed and totals approximately 1,998 acres in the geologic hazards study corridor. The alternative also crosses areas of the same watershed have a moderate percentile ranking for floodzones having 575 acres for the geologic hazards study corridor.

Soils

This alternative crosses 29.5 miles of soils with moderate susceptibility to water erosion and 7.3 miles of soils with moderate susceptibility to wind erosion. In addition, droughty soils are found scattered throughout the alternative, but have concentrations in the Boardman area, and east of Pilot Rock. Stony/rocky soils are found along this alternative east of Highway 207 and between Pilot Rock and I-84.

Minerals

This alternative crosses 2.9 miles of leases southeast of Boardman.

Paleontological Resources

This alternative crosses 13.7 miles of geologic units with a high sensitivity (PFYC of 4), and 13.2 miles of geologic units with a moderate sensitivity (PFYC of 3).

Interstate 84 Alternative

Geologic Hazards

This alternative crosses no Quaternary faults with recent activity. There are eight previously recorded earthquake epicenters within the geologic hazards study corridor for this alternative. All of these had a recorded magnitude of less than 6. This alternative crosses two areas that were identified as having very high liquefaction potential. These were located near Stanfield(Link I-31) and just west of Pendleton. In addition there are five areas with moderate liquefaction potential. Most of these are scattered throughout the alternative, but a large area of high liquefaction exists from Boardman to Stanfield. This alternative crosses one area with a high percentile ranking for floodzones. This occurs along the Umatilla watershed and totals approximately 6,015 acres in the geologic hazards study corridor. The alternative also crosses areas of the same watershed having a moderate percentile ranking for floodzones with 6,198 acres for the geologic hazards study corridor.

Variation S1-A1

There are two earthquake epicenters previously reported for this variation. This variation has one area, west of Pendleton, with very high liquefaction potential. This variation crosses one area with a high percentile ranking for floodzones. This occurs along the Umatilla watershed and total approximately 1,087 acres in the geologic hazards study corridor. The alternative also crosses areas of the same watershed have a moderate percentile ranking for floodzones having 4,342 acres for the geologic hazards study corridor.

Variation S1-A2

This variation has three previously reported earthquake epicenters. The variation crosses one area of very high liquefaction near Stanfield, and one area with high liquefaction potential, south of Stanfield. This variation crosses one area with a high percentile ranking for floodzones. This occurs along the Umatilla watershed and total approximately 4,544 acres in the geologic hazards study corridor. The alternative also crosses areas of the same watershed have a moderate percentile ranking for floodzones having 2,505 acres for the geologic hazards study corridor.

Soils

This alternative crosses 18.7 miles of soils with moderate susceptibility to water erosion and 5.9 miles of soils with moderate susceptibility to wind erosion. In addition, droughty soils are found scattered throughout the alternative, but have concentrations in the Boardman area, near Pendleton, and east of Pilot Rock. Stony/rocky soils are found along this alternative near Pendleton and east of Pilot Rock. This alternative also crosses 2.3 miles of soils with high compaction potential.

Variation S1-A1

This variation crosses 2.2 miles of soils with moderate susceptibility to water erosion and 0.0 mile of soils with moderate susceptibility to wind erosion. In addition, this variation crosses 0.7 mile of farmlands and 0.0 mile of soils with high compaction potential. This variation also crosses small areas of droughty soils east of Stanfield, and stony/rocky soils west of Pendleton.

Variation S1-A2

This variation crosses 12.6 miles of soils with moderate susceptibility to water erosion and 0.2 mile of soils with moderate susceptibility to wind erosion. In addition, this variation crosses 3.6 miles of farmlands and 0.0 mile of soils with high compaction potential. This variation has a concentration of droughty and stony/rocky soils west of Pendleton.

Minerals

Interstate 84 Alternative crosses 0.4 mile of leases and Variations S1-A1 and S1-A2 do not across any mineral resources.

Paleontological Resources

Interstate 84 Alternative crosses 3.6 miles of geologic units with a high sensitivity (PFYC of 4) and 22.9 miles of geologic units with a moderate sensitivity (PFYC of 3).

Variation S1-A1

This variation crosses 4.5 miles of geologic units with a PFYC of 3.

Variation S1-A2

This variation crosses 5.9 miles of geologic units with a PFYC of 3.

Interstate 84 – Southern Route Alternative

Geologic Hazards

This alternative crosses 14 previously recorded earthquake epicenters, all of which had a magnitude of less than 6. The alternative also crosses two areas of very high liquefaction potential east of Stanfield and two areas of high liquefaction potential between Boardman and Stanfield. This variation crosses one area with a high percentile ranking for floodzones. This occurs along the Umatilla watershed and total approximately 6,015 acres in the geologic hazards study corridor. The alternative also crosses areas of the same watershed have a moderate percentile ranking for floodzones having 5,412 acres for the geologic hazards study corridor.

Soils

This alternative crosses 17.8 miles of soils with moderate susceptibility to water erosion and 5.9 miles of soils with moderate susceptibility to wind erosion. This alternative also crosses 4.6 miles of farmlands and 4.4 miles of soils with high compaction potential. In addition, droughty soils were identified east of Boardman, west of Pendleton, and east of Pilot Rock. Stony/rocky soils were identified west of Pendleton and east of Pilot Rock.

Minerals

This alternative crosses 0.4 mile of leases.

Paleontological Resources

This alternative crosses 22.9 miles of geologic units with a moderate sensitivity (PFYC of 3).

SEGMENT 2—BLUE MOUNTAINS

Applicant's Proposed Action Alternative

Geologic Hazards

Table 3-14 presents the miles crossed by geologic hazards for all alternative routes and route variations in Segment 2.

Table 3-14. Geologic Hazards Inventory Data for Segment 2—Blue Mountains

Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)	
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84
Applicant's Proposed Action	33.8	0.0	0.0	0.0	33.8	0.0
Variation S2-A1	*2.8*	*0.0*	*0.0*	*0.0*	*2.8*	*0.0*
Variation S2-A2	*2.9*	*0.0*	*0.0*	*0.0*	*2.9*	*0.0*
Variation S2-B1	*3.7*	*0.0*	*0.0*	*0.0*	*3.7*	*0.0*
Variation S2-B2	*3.8*	*0.0*	*0.0*	*0.0*	*3.8*	*0.0*
Variation S2-C1	*9.3*	*0.0*	*0.0*	*0.0*	*9.3*	*0.0*
Variation S2-C2	*8.8*	*0.0*	*0.0*	*0.0*	*8.8*	*0.0*

Table 3-14. Geologic Hazards Inventory Data for Segment 2—Blue Mountains						
Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)	
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84
Variation S2-E1	*2.3*	*0.0*	*0.0*	*0.0*	*2.3*	*0.0*
Variation S2-E2	*2.6*	*0.0*	*0.0*	*0.0*	*2.6*	*0.0*
Variation S2-F1	*12.1*	*0.0*	*0.0*	*0.0*	*12.1*	*0.0*
Variation S2-F2	*12.2*	*0.0*	*0.0*	*0.0*	*12.2*	*0.0*
Glass Hill	33.7	0.0	0.0	0.0	33.7	0.0
Variation S2-D1	*4.3*	*0.0*	*0.0*	*0.0*	*4.3*	*0.0*
Variation S2-D2	*4.1*	*0.0*	*0.0*	*0.0*	*4.1*	*0.0*
Mill Creek	34.0	0.0	0.0	1.0	34.0	0.0

Table Notes:
[1]Due to the overlap of faults occurring during several time periods, the total miles crossed will not equal the total length of the alternative routes and route variations.
[2]There were no areas with high landslide percentile for Segment 2.

No recently active Quaternary faults, or areas with moderate or high landslide potential were identified for the Applicant's Proposed Action Alternative. No previously reported earthquake epicenters occurred within one mile of the Applicant's Proposed Action Alternative. The Applicant's Proposed Action Alternative crosses one large area of high liquefaction potential—along Links 2-52 through 2-85. This alternative crosses one area with a high percentile ranking for floodzones. This occurs along the Upper Grande Ronde watershed and totals approximately 375 acres in the geologic hazards study corridor. The alternative also crosses areas of the same watershed have a moderate percentile ranking for floodzones having 378 acres for the geologic hazards study corridor.

Variation S2-A1

This variation crosses no Quaternary faults or areas with moderate or high landslide susceptibility. There are no previously reported earthquake epicenters for this variation in the geologic hazards study corridor. This variation does not cross any areas with moderate or high liquefaction potential. This variation crosses one area with a high percentile ranking for floodzones. This occurs along the Upper Grande Ronde watershed and totals approximately 77 acres in the geologic hazards study corridor. The alternative also crosses areas of the same watershed have a moderate percentile ranking for floodzones having 321 acres for the geologic hazards study corridor.

Variation S2-A2

This variation crosses no Quaternary faults or areas with moderate or high landslide susceptibility. There are no previously reported earthquake epicenters for this variation in the geologic hazards study corridor. This variation does not cross any areas with moderate or high liquefaction potential. This variation crosses one area with a high percentile ranking for floodzones. This occurs along the Upper Grande Ronde watershed and totals approximately 0.21 acres in the geologic hazards study corridor.

The alternative also crosses areas of the same watershed have a moderate percentile ranking for floodzones having 333 acres for the geologic hazards study corridor.

Variation S2-B1

This variation crosses no Quaternary faults or areas with moderate or high landslide susceptibility. There are no previously reported earthquake epicenters for this variation in the geologic hazards study corridor. This variation crosses one area with moderate liquefaction potential. This occurs near La Grande. This variation would not cross any areas with moderate or high percentile for floodzones.

Variation S2-B2

This variation crosses no Quaternary faults or areas with moderate or high landslide susceptibility. There are no previously reported earthquake epicenters for this variation in the geologic hazards study corridor. This variation crosses one area with moderate liquefaction potential. This occurs near La Grande. This variation would not cross any areas with moderate or high percentile for floodzones.

Variations S2-C1, S2-C2, S2-E1, S2-E2, S2-F1, and S2-F2

These variations cross no Quaternary faults or areas with moderate or high landslide susceptibility. There are no previously reported earthquake epicenters for these variations in the geologic hazards study corridor. These variations cross no areas with moderate or high liquefaction potential. This variation would not cross any areas with moderate or high percentile for floodzones.

Soils

Table 3-15 presents the miles crossed by soil resources and their susceptibility to erosion and compaction for all alternative routes and route variations in Segment 2.

Table 3-15. Soils Inventory Data for Segment 2—Blue Mountains (miles crossed)

Alternative Route	Total Length (miles)	Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]	
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate
Applicant's Proposed Action	33.8	9.9	19.6	4.3	0.1	33.7	0.0	29.9	3.9
Variation S2-A1	*2.8*	*0.3*	*2.3*	*0.2*	*0.0*	*2.8*	*0.0*	*2.8*	*0.0*
Variation S2-A2	*2.9*	*0.2*	*2.2*	*0.5*	*0.0*	*2.9*	*0.0*	*2.9*	*0.0*
Variation S2-B1	*3.7*	*2.0*	*1.5*	*0.2*	*0.0*	*3.7*	*0.0*	*3.5*	*0.2*
Variation S2-B2	*3.8*	*1.9*	*1.6*	*0.3*	*0.0*	*3.8*	*0.0*	*3.6*	*0.2*
Variation S2-C1	*9.3*	*5.6*	*2.4*	*1.3*	*0.0*	*9.3*	*0.0*	*7.8*	*1.5*
Variation S2-C2	*8.8*	*5.1*	*3.5*	*0.2*	*0.0*	*8.8*	*0.0*	*7.9*	*0.9*
Variation S2-E1	*2.3*	*0.8*	*1.5*	*0.0*	*0.0*	*2.3*	*0.0*	*2.3*	*0.0*
Variation S2-E2	*2.6*	*0.6*	*1.9*	*0.1*	*0.0*	*2.6*	*0.0*	*2.3*	*0.3*
Variation S2-F1	*12.1*	*0.1*	*9.9*	*2.1*	*0.1*	*12.0*	*0.0*	*9.9*	*2.2*
Variation S2-F2	*12.2*	*0.0*	*11.0*	*1.2*	*0.0*	*12.2*	*0.0*	*10.1*	*2.1*

Table 3-15. Soils Inventory Data for Segment 2—Blue Mountains (miles crossed)									
Alternative Route	Total Length (miles)	Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]	
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate
Glass Hill	33.7	9.0	21.5	3.2	0.1	33.6	0.0	31.1	2.6
Variation S2-D1	*4.3*	*3.1*	*0.8*	*0.4*	*0.0*	*4.3*	*0.0*	*4.3*	*0.0*
Variation S2-D2	*4.1*	*2.5*	*0.9*	*0.7*	*0.0*	*4.1*	*0.0*	*4.1*	*0.0*
Mill Creek	34.0	4.4	26.6	3.0	0.0	34.0	0.0	30.5	3.5

Table Notes:
[1]Soil compaction potential is based on clay content.
No high impacts are anticipated for soil resoures.

No soils with high susceptibility to water or wind erosion are crossed by the Applicant's Proposed Action Alternative. The alternative does cross 4.3 miles of soils with moderate susceptibility to water erosion. The alternative crosses 3.9 miles of soils with high compaction potential. Droughty and stony/rocky soils also are present throughout the alternative route study corridor particular in the vicinity south of La Grande.

Variation S2-A1

This variation crosses 0.2 mile of soils with moderate susceptibility to water erosion. No soils with moderate or high susceptibility to wind erosion, or soils with high compaction potential are crossed by this variation. This variation does cross a small area of droughty and stony/rocky soils near its terminus.

Variation S2-A2

This variation crosses 0.5 mile of soils with moderate susceptibility to water erosion. No soils with moderate or high susceptibility to wind erosion, or soils with high compaction potential are crossed by this variation. This variation does cross a small area of droughty and stony/rocky soils near its terminus.

Variation S2-B1

This variation crosses 0.2 mile of soils with moderate susceptibility to water erosion, and no miles of moderate or high susceptibility to wind erosion. This variation crosses 0.2 mile of soils with high compaction potential. This variation does cross a small area of droughty and stony/rocky soils near La Grande.

Variation S2-B2

This variation crosses 0.2 mile of soils with moderate susceptibility to water erosion. No soils with moderate or high susceptibility to wind erosion, or soils with high compaction potential are crossed by this variation. This variation does cross a small area of droughty and stony/rocky soils near La Grande.

Variation S2-C1

This variation crosses 1.3 miles of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation does cross 1.5 miles of soils with high compaction potential. This variation does cross a small area of droughty and stony/rocky soils near La Grande.

Variation S2-C2

This variation crosses 0.2 mile of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation does cross 0.9 mile of soils with high compaction potential. This variation does cross areas of droughty and stony/rocky soils near La Grande.

Variation S2-E1

This variation does not cross any soils with moderate or high susceptibility to water or wind erosion, or soils with high compaction potential. This variation does cross droughty and stony/rocky soils throughout its length.

Variation S2-E2

This variation crosses 0.1 mile of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation does cross 0.3 mile of soils with high compaction potential. This variation does cross areas of droughty and stony/rocky soils throughout its length.

Variation S2-F1

This variation crosses 2.1 miles of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation does cross 2.2 miles of soils with high compaction potential. This variation does cross areas of droughty and stony/rocky soils throughout its length.

Variation S2-F2

This variation crosses 1.2 miles of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation does cross 2.1 miles of soils with high compaction potential. This variation does cross areas of droughty and stony/rocky soils throughout its length.

Minerals

Segment 2 alternative routes and route variations do not cross any mineral resources.

Paleontological Resources

Table 3-16 presents the miles crossed by paleontological resources for all alternative routes and route variations in Segment 2.

Table 3-16. Paleontological Resources Inventory Data for Segment 2—Blue Mountains						
Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)				
		1	2	3	4	5
Applicant's Proposed Action	33.8	16.7	17.1	0.0	0.0	0.0
Variation S2-A1	*2.8*	*0.0*	*2.8*	*0.0*	*0.0*	*0.0*
Variation S2-A2	*2.9*	*0.0*	*2.9*	*0.0*	*0.0*	*0.0*
Variation S2-B1	*3.7*	*1.2*	*2.5*	*0.0*	*0.0*	*0.0*
Variation S2-B2	*3.8*	*1.6*	*2.2*	*0.0*	*0.0*	*0.0*
Variation S2-C1	*9.3*	*8.4*	*0.9*	*0.0*	*0.0*	*0.0*
Variation S2-C2	*8.8*	*5.8*	*2.1*	*0.9*	*0.0*	*0.0*
Variation S2-E1	*2.3*	*0.7*	*1.6*	*0.0*	*0.0*	*0.0*
Variation S2-E2	*2.6*	*1.0*	*1.6*	*0.0*	*0.0*	*0.0*
Variation S2-F1	*12.1*	*6.1*	*6.0*	*0.0*	*0.0*	*0.0*
Variation S2-F2	*12.2*	*7.5*	*4.7*	*0.0*	*0.0*	*0.0*
Glass Hill	33.7	15.6	18.1	0.0	0.0	0.0
Variation S2-D1	*4.3*	*4.1*	*0.2*	*0.0*	*0.0*	*0.0*
Variation S2-D2	*4.1*	*4.0*	*0.1*	*0.0*	*0.0*	*0.0*
Mill Creek	34.0	19.0	15.0	0.0	0.0	0.0

Variation S2-C2 of the Applicant's Proposed Action Alternative crosses 0.9 mile of geological units with a moderate sensitivity (PFYC of 3). All other variations and alternatives do not cross any geological units with a moderate, high, or very high sensitivity (PFYC 3, 4, and 5).

Glass Hill Alternative

Geologic Hazards

The Glass Hill Alternative would not cross any Quaternary faults or areas with moderate or high landslide susceptibility. There are no previously recorded earthquake epicenters within the geologic hazards study corridor for this alternative. The alternative does cross an area of moderate and high liquefaction potential where it crosses Higgard Highway, and another one along Links 2-52 through 2-85. This variation crosses one area with a high percentile ranking for floodzones. This occurs along the Upper Grande Ronde watershed and totals approximately 77 acres in the geologic hazards study corridor. The alternative also crosses areas of the same watershed have a moderate percentile ranking for floodzones having 378 acres for the geologic hazards study corridor.

Variations S2-D1 and S2-D2

These variations do not cross any Quaternary faults or areas with moderate or high landslide susceptibility. There are no previously reported earthquake epicenters, or areas with moderate or high liquefaction potential in the geologic hazard study corridor for these variations. These variations would not cross any areas with moderate or high percentile for floodzones.

Soils

The Glass Hill Alternative crosses 3.2 miles of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation does cross 2.6

miles of soils with high compaction potential. This variation does cross areas of droughty and stony/rocky soils throughout most of its length.

Variation S2-D1

This variation crosses 0.4 mile of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. There are no soils with high compaction potential found for this variation in the soil resources study corridor. Droughty and stony/rocky soils are found through the length of this variation.

Variation S2-D2

This variation crosses 0.7 mile of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. There are no soils with high compaction potential found for this variation in the soil resources study corridor. Droughty and stony/rocky soils are found through the length of this variation.

Minerals

The Glass Hill Alternative and route variations do not cross any mineral resources.

Paleontological Resources

The Glass Hill Alternative and route variations do not cross any geologic units with moderate, high, or very high sensitivity for paleontological resources.

Mill Creek Alternative

Geologic Hazards

The Mill Creek Alternative crosses approximately one mile of recent Quaternary faults. There are no areas of moderate or high landslide susceptibility for this alternative. There are two areas of moderate liquefaction potential for this alternative. These occur near La Grande and near Highway 84. This variation crosses one area with a high percentile ranking for floodzones. This occurs along the Upper Grande Ronde watershed and totals approximately 0.21 acres in the geologic hazards study corridor.

Soils

The Mill Creek Alternative crosses 3.0 miles of soils with moderate susceptibility to water erosion and no miles of moderate or high susceptibility to wind erosion. This alternative crosses 3.5 miles of soils with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of this alternative.

Minerals

The Mill Creek Alternative does not cross any mineral resources.

Paleontological Resources

The Mill Creek Alternative does not cross any geologic units with moderate, high, or very high sensitivity for paleontological resources.

SEGMENT 3—BAKER VALLEY

Applicant's Proposed Action Alternative

Geologic Hazards

Table 3-17 presents the miles crossed by geologic hazards for all alternative routes and route variations in Segment 3.

Table 3-17. Geologic Hazards Inventory Data for Segment 3—Baker Valley

Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)	
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84
Applicant's Proposed Action	55.2	0.6	0.0	0.0	55.2	0.0
Variation S3-A1	*12.4*	*0.1*	*0.0*	*0.0*	*12.4*	*0.0*
Variation S3-A2	*12.2*	*0.8*	*0.0*	*0.0*	*12.2*	*0.0*
Variation S3-B1	*13.9*	*0.5*	*0.0*	*0.0*	*13.9*	*0.0*
Variation S3-B2	*14.4*	*1.0*	*0.0*	*0.0*	*14.4*	*0.0*
Variation S3-B3	*14.7*	*0.9*	*0.0*	*0.0*	*14.7*	*0.0*
Variation S3-B4	*14.3*	*0.9*	*0.0*	*0.0*	*14.3*	*0.0*
Variation S3-B5	*14.0*	*1.1*	*0.0*	*0.0*	*14.0*	*0.0*
Variation S3-C1	*21.1*	*0.0*	*0.0*	*0.0*	*21.1*	*0.0*
Variation S3-C2	*21.7*	*0.0*	*0.0*	*0.0*	*21.7*	*0.0*
Variation S3-C3	*21.1*	*0.0*	*0.0*	*0.0*	*21.1*	*0.0*
Variation S3-C4	*21.4*	*0.0*	*0.0*	*0.0*	*21.4*	*0.0*
Variation S3-C5	*21.0*	*0.0*	*0.0*	*0.0*	*21.0*	*0.0*
Variation S3-C6	*24.7*	*0.0*	*0.0*	*0.0*	*24.7*	*0.0*
Flagstaff A	55.3	1.2	0.0	0.0	55.3	0.0
Timber Canyon	70.3	0.0	0.0	0.0	68.7	1.6
Flagstaff A – Burnt River Mountain	55.3	1.2	0.0	0.0	55.3	0.0
Flagstaff B	56.0	1.0	0.0	0.0	56.0	0.0
Flagstaff B – Burnt River West	55.7	1.7	0.0	0.0	55.7	0.0
Flagstaff B – Durkee	59.6	1.0	0.0	0.0	59.6	0.0

Table Notes:
[1]Due to the overlap of faults occurring during several time periods, the total miles crossed will not equal the total length of the alternative routes and route variations.
[2]There were no areas with high landslide percentile for Segment 3.

The Applicant's Proposed Action Alternative for Segment 3 crosses 0.6 mile of older Quaternary faults, near Baker City. There are two previously reported earthquake epicenters for this alternative. Both of these occur in the Baker City area, and had magnitudes of less than 3. The Applicant's Proposed Action Alternative would not cross any areas with moderate or high landslide potential. This alternative crosses two areas with moderate liquefaction potential near Baker City and Durkee. This variation

crosses one area with a high percentile ranking for floodzones. This occurs along the Burnt River watershed and totals approximately 73 acres in the geologic hazards study corridor. The alternative also crosses two areas having a moderate percentile ranking for floodzones having 5,900 acres for the geologic hazards study corridor. These occur in the Burnt and Powder watersheds.

Variation S3-A1

This variation crosses 0.1 mile of older Quaternary faults. There are no previously recorded earthquake epicenters for this variation. There are no areas with moderate or high landslide susceptibility for this variation within the geologic hazards study corridor. There is one area of moderate liquefaction potential occurring near the terminus of this variation. This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Powder watershed and totals approximately 189 acres in the geologic hazards study corridor.

Variation S3-A2

This variation crosses 0.8 mile of older Quaternary faults. There are no previously recorded earthquake epicenters for this variation. There are no areas with moderate or high landslide susceptibility for this variation within the geologic hazards study corridor. This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Powder watershed and totals approximately 147 acres in the geologic hazards study corridor.

Variation S3-B1

This variation crosses 0.5 mile of older Quaternary faults. There is one previously recorded earthquake epicenters for this variation near Baker City. There are no areas with moderate or high landslide susceptibility for this variation within the geologic hazards study corridor. There are no areas of moderate or high liquefaction potential for this variation. This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Powder watershed and totals approximately 899 acres in the geologic hazards study corridor.

Variation S3-B2

This variation crosses 1 mile of older Quaternary faults. There are no previously recorded earthquake epicenters for this variation. There are no areas with moderate or high landslide susceptibility for this variation within the geologic hazards study corridor. There is one area of moderate liquefaction potential occurring near Baker City. This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Powder watershed and totals approximately 1,045 acres in the geologic hazards study corridor.

Variation S3-B3

This variation crosses 0.9 mile of older Quaternary faults. There are no previously recorded earthquake epicenters for this variation. There are no areas with moderate or high landslide susceptibility for this variation within the geologic hazards study corridor. There is one area of moderate liquefaction potential occurring near Baker City. This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Powder watershed and totals approximately 1045 acres in the geologic hazards study corridor.

Variation S3-B4

This variation crosses 0.9 mile of older Quaternary faults. There are no previously recorded earthquake epicenters for this variation. There are no areas with moderate or high landslide susceptibility for this variation within the geologic hazards study corridor. There is one area of moderate liquefaction potential occurring near Baker City. This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Powder watershed and totals approximately 1,069 acres in the geologic hazards study corridor.

Variation S3-B5

This variation crosses 1.1 miles of older Quaternary faults. There are no previously recorded earthquake epicenters for this variation. There are no areas with moderate or high landslide susceptibility for this variation within the geologic hazards study corridor. There is one area of moderate liquefaction potential occurring near Baker City This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Powder watershed and totals approximately 1,110 acres in the geologic hazards study corridor.

Variation S3-C1

This variation crosses no Quaternary faults. There are no previously recorded earthquake epicenters for this variation. There are no areas with moderate or high landslide susceptibility for this variation within the geologic hazards study corridor. There are several small areas of moderate liquefaction potential occurring throughout this variation. This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Burnt watershed and totals approximately 4,820 acres in the geologic hazards study corridor.

Variation S3-C2

This variation crosses no Quaternary faults. There are no previously recorded earthquake epicenters for this variation. There are no areas with moderate or high landslide susceptibility for this variation within the geologic hazards study corridor. There are several areas of moderate liquefaction potential scattered throughout this variation. This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Burnt watershed and totals approximately 4,410 acres in the geologic hazards study corridor.

Variation S3-C3

This variation crosses no Quaternary faults. There are no previously recorded earthquake epicenters for this variation. There are no areas with moderate or high landslide susceptibility for this variation within the geologic hazards study corridor. There are several areas of moderate liquefaction potential scattered throughout this variation. This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Burnt watershed and totals approximately 3,945 acres in the geologic hazards study corridor.

Variation S3-C4

This variation crosses no Quaternary faults. There are no previously recorded earthquake epicenters for this variation. There are no areas with moderate or high landslide susceptibility for this variation

within the geologic hazards study corridor. There are several areas of moderate liquefaction potential scattered throughout this variation. This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Burnt watershed and totals approximately 4,210 acres in the geologic hazards study corridor.

Variation S3-C5

This variation crosses no Quaternary faults. There is one previously recorded earthquake epicenters for this variation occurring near its terminus that had a magnitude of less than 6. There are no areas with moderate or high landslide susceptibility for this variation within the geologic hazards study corridor. There are two areas of moderate liquefaction potential that occur in the first half of this variation. This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Burnt watershed and totals approximately 1,472 acres in the geologic hazards study corridor.

Variation S3-C6

This variation crosses no Quaternary faults. There are no previously recorded earthquake epicenters for this variation. There are no areas with moderate or high landslide susceptibility for this variation within the geologic hazards study corridor. There is one area of moderate liquefaction potential occurring near the terminus of this variation. This variation crosses one area with a moderate percentile ranking for floodzones. This occurs along the Burnt watershed and totals approximately 1,264 acres in the geologic hazards study corridor.

Soils

Table 3-18 presents the miles crossed by soil resources and their susceptibility to erosion and compaction for all alternative routes and route variations in Segment 3.

Table 3-18. Soils Inventory Data for Segment 3—Baker Valley (miles crossed)

Alternative Route	Total Length (miles)	Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]	
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate
Applicant's Proposed Action	55.2	0.0	43.2	12.0	0.0	52.2	3.0	49.1	6.1
Variation S3-A1	*12.4*	*0.0*	*11.9*	*0.5*	*0.0*	*12.4*	*0.0*	*11.0*	*1.4*
Variation S3-A2	*12.2*	*0.0*	*12.2*	*0.0*	*0.0*	*12.2*	*0.0*	*9.3*	*2.9*
Variation S3-B1	*13.9*	*0.0*	*10.5*	*3.4*	*0.0*	*13.9*	*0.0*	*12.6*	*1.3*
Variation S3-B2	*14.4*	*0.0*	*13.1*	*1.3*	*0.0*	*14.4*	*0.0*	*12.5*	*1.9*
Variation S3-B3	*14.7*	*0.0*	*13.3*	*1.4*	*0.0*	*14.7*	*0.0*	*13.2*	*1.5*
Variation S3-B4	*14.3*	*0.0*	*12.4*	*1.9*	*0.0*	*14.3*	*0.0*	*13.4*	*0.9*
Variation S3-B5	*14.0*	*0.0*	*12.2*	*1.8*	*0.0*	*14.0*	*0.0*	*12.8*	*1.2*
Variation S3-C1	*21.1*	*0.0*	*14.1*	*7.0*	*0.0*	*18.1*	*3.0*	*19.3*	*1.8*
Variation S3-C2	*21.7*	*0.0*	*15.7*	*6.0*	*0.0*	*18.9*	*2.8*	*19.8*	*1.9*
Variation S3-C3	*21.1*	*0.1*	*16.5*	*4.5*	*0.0*	*21.0*	*0.1*	*15.5*	*5.6*

Table 3-18. Soils Inventory Data for Segment 3—Baker Valley (miles crossed)									
Alternative Route	Total Length (miles)	Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]	
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate
Variation S3-C4	*21.4*	*0.0*	*16.7*	*4.7*	*0.0*	*21.4*	*0.0*	*16.0*	*5.4*
Variation S3-C5	*21.0*	*0.8*	*17.0*	*3.2*	*0.0*	*21.0*	*0.0*	*16.8*	*4.2*
Variation S3-C6	*24.7*	*2.3*	*18.8*	*3.6*	*0.0*	*24.7*	*0.0*	*20.5*	*4.2*
Flagstaff A	55.3	0.0	44.9	10.4	0.0	52.3	3.0	49.3	6.0
Timber Canyon	70.3	2.8	55.7	11.8	0.0	69.4	0.9	63.2	7.1
Flagstaff A – Burnt River Mountain	55.3	0.1	47.3	7.9	0.0	55.2	0.1	45.5	9.8
Flagstaff B	56.0	0.0	46.0	10.0	0.0	53.0	3.0	49.7	6.3
Flagstaff B – Burnt River West	55.7	0.8	49.2	5.7	0.0	55.7	0.0	45.5	10.2
Flagstaff B – Durkee	59.6	2.3	50.7	6.6	0.0	59.6	0.0	50.9	8.7

Table Notes:
[1]Soil compaction potential is based on clay content.
No high impacts are anticipated for soil resoures.

The Applicant's Proposed Action Alternative for Segment 3 crosses 12 miles of soils with moderate susceptibility to water erosion and 3 miles of moderate susceptibility to wind erosion. This alternative crosses 6.1 miles of soils with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of the Applicant's Proposed Action Alternative.

Variation S3-A1

This variation crosses 0.5 mile of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation crosses 1.4 miles of soils with high compaction potential. Droughty and stony/rocky soils occur throughout the length of this variation.

Variation S3-A2

This variation crosses no miles of soils with moderate or high susceptibility to water or wind erosion. This variation crosses 2.9 miles of soils with high compaction potential. Droughty and stony/rocky soils occur throughout the length of this variation.

Variation S3-B1

This variation crosses 3.4 miles of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation crosses 1.3 miles of soils with high compaction potential. Droughty and stony/rocky soils occur throughout the length of this variation.

Variation S3-B2

This variation crosses 1.3 miles of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation crosses 1.9 miles of soils with high compaction potential. Droughty and stony/rocky soils occur throughout the length of this variation.

Variation S3-B3

This variation crosses 1.4 miles of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation crosses 1.5 miles of soils with high compaction potential. Droughty and stony/rocky soils occur throughout the length of this variation.

Variation S3-B4

This variation crosses 1.9 miles of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation crosses 0.9 mile of soils with high compaction potential. Droughty and stony/rocky soils occur throughout the length of this variation.

Variation S3-B5

This variation crosses 1.8 miles of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation crosses 1.2 miles of soils with high compaction potential. Droughty and stony/rocky soils occur throughout the length of this variation.

Variation S3-C1

This variation crosses 7.0 miles of soils with moderate susceptibility to water erosion and 3.0 miles of soils with moderate susceptibility to wind erosion. This variation crosses 1.8 miles of soils with high compaction potential. Droughty and stony/rocky soils occur at the beginning and end of this variation.

Variation S3-C2

This variation crosses 6.0 miles of soils with moderate susceptibility to water erosion and 2.8 miles of soils with moderate susceptibility to wind erosion. This variation crosses 1.9 miles of soils with high compaction potential. Droughty and stony/rocky soils occur throughout the length of this variation.

Variation S3-C3

This variation crosses 4.5 miles of soils with moderate susceptibility to water erosion and 0.1 mile of soils with moderate susceptibility to wind erosion. This variation crosses 5.6 miles of soils with high compaction potential. Droughty and stony/rocky soils occur throughout the length of this variation.

Variation S3-C4

This variation crosses 4.7 miles of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation crosses 5.4 miles of soils with high compaction potential. Droughty and stony/rocky soils occur throughout the length of this variation.

Variation S3-C5

This variation crosses 3.2 miles of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation crosses 4.2 miles of soils with high compaction potential. Droughty and stony/rocky soils occur throughout the length of this variation.

Variation S3-C6

This variation crosses 3.6 miles of soils with moderate susceptibility to water erosion and no miles of soils with moderate or high susceptibility to wind erosion. This variation crosses 4.2 miles of soils with high compaction potential. Droughty and stony/rocky soils occur throughout the length of this variation.

Minerals

Table 3-19 presents the miles crossed by mineral resources for all alternative routes and route variations in Segment 3.

Table 3-19. Minerals Inventory Data for Segment 3—Baker Valley (miles crossed)

Alternative Route	Total Length (miles)	Active Mine or Active Mining Claims	All Leases	Producing Oil and Gas or Geothermal Wells
Applicant's Proposed Action	55.2	1.9	0.0	0.0
Variation S3-A1	*12.4*	*0.0*	*0.0*	*0.0*
Variation S3-A2	*12.2*	*0.0*	*0.0*	*0.0*
Variation S3-B1	*13.9*	*1.1*	*0.0*	*0.0*
Variation S3-B2	*14.4*	*0.3*	*0.0*	*0.0*
Variation S3-B3	*14.7*	*0.3*	*0.0*	*0.0*
Variation S3-B4	*14.3*	*0.0*	*0.0*	*0.0*
Variation S3-B5	*14.0*	*0.0*	*0.0*	*0.0*
Variation S3-C1	*21.1*	*0.8*	*0.0*	*0.0*
Variation S3-C2	*21.7*	*1.8*	*0.0*	*0.0*
Variation S3-C3	*21.1*	*3.3*	*0.0*	*0.0*
Variation S3-C4	*21.4*	*3.3*	*0.0*	*0.0*
Variation S3-C5	*21.0*	*1.6*	*0.0*	*0.0*
Variation S3-C6	*24.7*	*4.2*	*0.0*	*0.0*
Flagstaff A	55.3	0.8	0.0	0.0
Timber Canyon	70.3	2.5	0.0	0.0
Flagstaff A – Burnt River Mountain	55.3	3.3	0.0	0.0
Flagstaff B	56.0	1.1	0.0	0.0
Flagstaff B – Burnt River West	55.7	1.9	0.0	0.0
Flagstaff B – Durkee	59.6	4.5	0.0	0.0

Table Note: Due to some mineral resources not occurring for the alternative routes and route variations, the miles crossed will not equal the total length of the alternative routes and route variations.

The Applicant's Proposed Action Alternative for Segment 3 crosses 1.9 miles of active mines or mining claims. Most of these occur in the Baker City-Durkee area. There are no leases or producing wells crossed by the Applicant's Proposed Action Alternative.

Variations S3-A1 and S3-A2

These variations do not cross mineral resources.

Variation S3-B1

This variation crosses 1.1 miles of active mines or mining claims that occur in the Baker City area.

Variations S3-B2 and S3-B3

These variations crosses 0.3 mile of active mines or mining claims that occur in the Baker City area.

Variations S3-B4 and S3-B5

These variations do not cross mineral resources.

Variation S3-C1

This variation crosses 0.8 mile of active mines or mining claims that occur near Durkee.

Variation S3-C2

This variation crosses 1.8 miles of active mines or mining claims that occur near Durkee.

Variations S3-C3 and S3-C4

These variations cross 3.3 miles of active mines or mining claims that occur near Durkee.

Variation S3-C5

This variation crosses 1.6 miles of active mines or mining claims that occur near Durkee.

Variation S3-C6

This variation crosses 4.2 miles of active mines or mining claims that occur near Durkee.

Paleontological Resources

Table 3-20 presents the miles crossed by paleontological resources for all alternative routes and route variations in Segment 3.

Table 3-20. Paleontological Resources Inventory Data for Segment 3—Baker Valley

Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)				
		1	2	3	4	5
Applicant's Proposed Action	55.2	13.4	21.9	4.8	15.1	0.0
Variation S3-A1	*12.4*	*9.9*	*2.5*	*0.0*	*0.0*	*0.0*
Variation S3-A2	*12.2*	*8.6*	*3.6*	*0.0*	*0.0*	*0.0*
Variation S3-B1	*13.9*	*2.8*	*9.3*	*0.0*	*1.8*	*0.0*
Variation S3-B2	*14.4*	*0.8*	*9.7*	*0.0*	*3.9*	*0.0*
Variation S3-B3	*14.7*	*0.8*	*9.5*	*0.0*	*4.4*	*0.0*
Variation S3-B4	*14.3*	*0.7*	*8.0*	*0.0*	*5.6*	*0.0*
Variation S3-B5	*14.0*	*0.7*	*9.3*	*0.0*	*4.0*	*0.0*
Variation S3-C1	*21.1*	*0.7*	*5.9*	*4.8*	*9.7*	*0.0*
Variation S3-C2	*21.7*	*0.8*	*6.6*	*4.8*	*9.5*	*0.0*
Variation S3-C3	*21.1*	*6.8*	*4.3*	*5.8*	*4.2*	*0.0*
Variation S3-C4	*21.4*	*7.1*	*5.4*	*5.8*	*3.1*	*0.0*
Variation S3-C5	*21.0*	*8.6*	*4.0*	*5.9*	*2.5*	*0.0*
Variation S3-C6	*24.7*	*10.6*	*4.7*	*5.8*	*3.6*	*0.0*
Flagstaff A	55.3	11.3	21.9	4.8	17.3	0.0
Timber Canyon	70.3	30.6	26.1	4.8	8.8	0.0
Flagstaff A – Burnt River Mountain	55.3	17.4	20.3	5.8	11.8	0.0

Table 3-20. Paleontological Resources Inventory Data for Segment 3—Baker Valley						
Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)				
		1	2	3	4	5
Flagstaff B	56.0	11.4	22.1	4.8	17.7	0.0
Flagstaff B – Burnt River West	55.7	18.0	21.3	5.9	10.5	0.0
Flagstaff B – Durkee	59.6	21.3	20.9	5.8	11.6	0.0

The Applicant's Proposed Action Alternative for Segment 3 crosses 15.1 miles of geologic units with a high sensitivity for paleontological resources (PFYC 4), and 4.8 miles of geologic units with a moderate sensitivity (PFYC 3) for paleontological resources.

Variations S3-A1 and S3-A2

These variations do not cross geologic units with a moderate or high sensitivity for paleontological resources.

Variation S3-B1

This variation crosses 1.8 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and no geologic units with a moderate sensitivity (PFYC 3).

Variation S3-B2

This variation crosses 3.9 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and no geologic units with a moderate sensitivity (PFYC 3).

Variation S3-B3

This variation crosses 4.4 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and no geologic units with a moderate sensitivity (PFYC 3).

Variation S3-B4

This variation crosses 5.6 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and no geologic units with a moderate sensitivity (PFYC 3).

Variation S3-B5

This variation crosses 4.0 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and no geologic units with a moderate sensitivity (PFYC 3).

Variation S3-C1

This variation crosses 9.7 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 4.8 miles of geologic units with a moderate sensitivity (PFYC 3).

Variation S3-C2

This variation crosses 9.5 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 4.8 miles of geologic units with a moderate sensitivity (PFYC 3).

Variation S3-C3

This variation crosses 4.2 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 5.8 miles of geologic units with a moderate sensitivity (PFYC 3).

Variation S3-C4

This variation crosses 3.1 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 5.8 miles of geologic units with a moderate sensitivity (PFYC 3).

Variation S3-C5

This variation crosses 2.5 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 5.9 miles of geologic units with a moderate sensitivity (PFYC 3).

Variation S3-C6

This variation crosses 3.6 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 5.8 miles of geologic units with a moderate sensitivity (PFYC 3).

Flagstaff A Alternative

Geologic Hazards

The Flagstaff A Alternative crosses 1.2 miles of older Quaternary faults near Baker City. There are two previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative. These occur near Baker City and both had a magnitude of less than 3. There are no areas with moderate or high landslide potential for this alternative. This alternative crosses two areas with moderate liquefaction potential near Baker City and Durkee. This variation crosses two areas with a moderate percentile ranking for floodzones. These occur along the Burnt and Powder watersheds and total approximately 6,109 acres in the geologic hazards study corridor.

Soils

The Flagstaff A Alternative crosses 10.4 miles of soils with moderate susceptibility to water erosion and 3 miles of moderate susceptibility to wind erosion. This alternative crosses 6 miles of soils with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of this alternative.

Minerals

The Flagstaff A Alternative crosses 0.8 mile of active mines or mining claims. These occur in the Baker City and Durkee areas.

Paleontological Resources

The Flagstaff A Alternative crosses 17.3 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 4.8 miles of geologic units with a moderate sensitivity (PFYC 3) for paleontological resources.

Timber Canyon Alternative

Geologic Hazards

The Timber Canyon Alternative does not cross any older Quaternary faults. There are no previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative. This alternative crosses 1.6 miles of areas with moderate landslide potential on Link 3-8. This alternative has two areas with moderate liquefaction potential also on Link 3-8. This variation crosses two areas with a moderate percentile ranking for floodzones. These occur along the Burnt and Powder watersheds and total approximately 4,862 acres in the geologic hazards study corridor.

Soils

The Timber Canyon Alternative crosses 11.8 miles of soils with moderate susceptibility to water erosion and 0.9 mile of moderate susceptibility to wind erosion. This alternative crosses 7.1 miles of soils with high compaction potential. Droughty and stony/rocky soils are found within the last half of this alternative.

Minerals

The Timber Canyon Alternative crosses 2.5 miles of active mines or mining claims. These occur northeast and east of Baker City.

Paleontological Resources

The Timber Canyon Alternative crosses 8.8 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources, and 4.8 miles with a moderate sensitivity (PFYC 3).

Flagstaff A – Burnt River Mountain Alternative

Geologic Hazards

The Burnt River Mountain Alternative crosses 1.2 miles of older Quaternary faults near Baker City. There is one previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative near Baker City. This earthquake had a magnitude of less than 2. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. This alternative has one area with moderate liquefaction potential near Baker City. This variation crosses two areas with a moderate percentile ranking for floodzones. These occur along the Burnt and Powder watersheds and total approximately 5,233 acres in the geologic hazards study corridor.

Soils

The Burnt River Mountain Alternative crosses 7.9 miles of soils with moderate susceptibility to water erosion and 0.1 mile of moderate susceptibility to wind erosion. This alternative crosses 9.8 miles of soils with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of this alternative.

Minerals

The Burnt River Mountain Alternative crosses 3.3 miles of active mines or mining claims, including the Ash Grove Limestone Mine. These occur near Baker City.

Paleontological Resources

The Burnt River Mountain Alternative crosses 11.8 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 5.8 miles of geologic units with a moderate sensitivity (PFYC 3).

Flagstaff B Alternative

Geologic Hazards

The Flagstaff B Alternative crosses 1.0 mile of older Quaternary faults near Baker City. There is one previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative southeast of Baker City. This earthquake had a magnitude of less than 3. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. This alternative crosses two areas with moderate liquefaction potential near Baker City and Durkee. This variation crosses two areas with a moderate percentile ranking for floodzones. These occur along the Burnt and Powder watersheds and total approximately 6,044 acres in the geologic hazards study corridor.

Soils

The Flagstaff B Alternative crosses 10 miles of soils with moderate susceptibility to water erosion and 3.0 miles of moderate susceptibility to wind erosion. This alternative crosses 6.3 miles of soils with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of this alternative.

Minerals

The Flagstaff B Alternative crosses 1.1 miles of active mines or mining claims. These occur near Baker City.

Paleontological Resources

The Flagstaff B Alternative crosses 17.7 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 4.8 miles of geologic units with a moderate sensitivity (PFYC 3).

Flagstaff B – Burnt River West Alternative

Geologic Hazards

The Burnt River West Alternative crosses 1.7 miles of older Quaternary faults near Baker City. There are two previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative. One is near Baker City and the other is close to the terminus of the alternative. Both of these earthquakes had a magnitude of less than 6. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. This alternative crosses one area with moderate liquefaction potential near Baker City. This variation crosses two areas with a moderate percentile ranking for floodzones. These occur along the Burnt and Powder watersheds and total approximately 2,458 acres in the geologic hazards study corridor.

Soils

The Burnt River West Alternative crosses 5.7 miles of soils with moderate susceptibility to water erosion and 0.0 mile of moderate susceptibility to wind erosion. This alternative crosses 10.3 miles of soils with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of this alternative.

Minerals

The Burnt River West Alternative crosses 1.9 miles of active mines or mining claims. These occur near Baker City.

Paleontological Resources

The Burnt River West Alternative crosses 10.5 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 5.9 miles of geologic units with a moderate sensitivity (PFYC 3).

Flagstaff B – Durkee

Geologic Hazards

The Flagstaff B – Durkee Alternative crosses 1.0 mile of older Quaternary faults near Baker City. There are two previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative. One is near Baker City and the other is southeast of Baker City along Link 3-55. Both of these earthquakes had a magnitude of less than 6. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. This alternative crosses three areas with moderate liquefaction potential; one near Baker City, and two more south of Baker City along Link 3-74. This variation crosses two areas with a moderate percentile ranking for floodzones. These occur along the Burnt and Powder watersheds and total approximately 2,488 acres in the geologic hazards study corridor.

Soils

The Flagstaff B – Durkee Alternative crosses 6.6 miles of soils with moderate susceptibility to water erosion and 0.0 mile of moderate susceptibility to wind erosion. This alternative crosses 8.7 miles of soils with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of this alternative.

Minerals

The Flagstaff B – Durkee Alternative crosses 4.5 miles of active mines or mining claims. These occur in the Baker City and Durkee areas.

Paleontological Resources

The Flagstaff B – Durkee Alternative crosses 11.6 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 5.8 miles of geologic units with a moderate sensitivity (PFYC 3).

SEGMENT 4—BROGAN

Applicant's Proposed Action Alternative

Geologic Hazards

Table 3-21 presents the miles crossed by geologic hazards for all alternative routes and route variations in Segment 4.

Table 3-21. Geologic Hazards Inventory Data for Segment 4—Brogan

Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)	
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84
Applicant's Proposed Action	40.1	0.4	0.0	0.8	40.1	0.0
Variation S4-A1	*5.9*	*0.0*	*0.0*	*0.0*	*5.9*	*0.0*
Variation S4-A2	*6.0*	*0.0*	*0.0*	*0.0*	*6.0*	*0.0*
Variation S4-A3	*6.1*	*0.0*	*0.0*	*0.0*	*6.1*	*0.0*
Tub Mountain South	40.5	0.0	0.0	0.1	40.5	0.0
Willow Creek	34.6	0.0	0.0	0.1	34.6	0.0

Table Notes:
[1]Due to the overlap of faults occurring during several time periods, the total miles crossed will not equal the total length of the alternative routes and route variations.
[2]There were no areas with high landslide percentile for Segment 4.

The Applicant's Proposed Action Alternative for Segment 4 would cross 0.8 mile of recent Quaternary faults and 0.4 mile of older Quaternary faults. There are no previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. This alternative crosses one area with moderate liquefaction potential. This occurs at the beginning of the alternative. This variation crosses two areas with a moderate percentile ranking for floodzones. These occur along the Burnt and Willow watersheds and total approximately 2,359 acres in the geologic hazards study corridor.

Variation S4-A1

This variation does not cross any Quaternary faults or areas with moderate or high landslide potential. There are no previously reported earthquake epicenters within the geologic hazards study corridor for this variation. There are three small areas of moderate liquefaction potential scattered throughout the length of the variation. This variation crosses one area with a moderate percentile ranking for floodzone. This floodzone occurs along the Burnt watershed and totals approximately 1,891 acres in the geologic hazards study corridor.

Variation S4-A2

This variation does not cross any Quaternary faults or areas with moderate or high landslide potential. There are no previously reported earthquake epicenters within the geologic hazards study corridor for this variation. There are three small areas of moderate liquefaction potential scattered throughout the

length of the variation. This variation crosses one area with a moderate percentile ranking for floodzone. This floodzone occurs along the Burnt watershed and totals approximately 2,392 acres in the geologic hazards study corridor.

Variation S4-A3

This variation does not cross any Quaternary faults or areas with moderate or high landslide potential. There are no previously reported earthquake epicenters within the geologic hazards study corridor for this variation. There are no areas with moderate or high liquefaction potential for this variation. This variation crosses one area with a moderate percentile ranking for floodzone. This floodzone occurs along the Burnt River watershed and totals approximately 2,346 acres in the geologic hazards study corridor.

Soils

Table 3-22 presents the miles crossed by soil resources for all alternative routes and route variations in Segment 4.

Table 3-22. Soils Inventory Data for Segment 4—Brogan (miles crossed)

Alternative Route	Total Length (miles)	Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]	
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate
Applicant's Proposed Action	40.1	0.0	26.9	13.2	0.0	38.6	1.5	13.6	26.5
Variation S4-A1	*5.9*	*0.0*	*4.7*	*1.2*	*0.0*	*5.4*	*0.5*	*5.0*	*0.9*
Variation S4-A2	*6.0*	*0.0*	*3.6*	*2.4*	*0.0*	*5.3*	*0.7*	*5.3*	*0.7*
Variation S4-A3	*6.1*	*0.0*	*3.7*	*2.4*	*0.0*	*5.4*	*0.7*	*5.3*	*0.8*
Tub Mountain South	40.5	0.3	15.4	24.8	0.3	33.3	6.9	16.7	23.8
Willow Creek	34.6	0.0	19.1	15.5	0.0	29.1	5.5	14.1	20.5

Table Notes:
[1]Soil compaction potential is based on clay content.
No high impacts are anticipated for soil resoures.

The Applicant's Proposed Action Alternative for Segment 4 crosses 13.2 miles of soils with moderate susceptibility to water erosion and 1.5 miles of moderate susceptibility to wind erosion. This alternative crosses 26.5 miles of soils with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of this alternative.

Variation S4-A1

This variation crosses 1.2 miles of soils with moderate susceptibility to water erosion and 0.5 mile of moderate susceptibility to wind erosion. This alternative crosses 0.9 mile of soils with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of this variation.

Variation S4-A2

This variation crosses 2.4 miles of soils with moderate susceptibility to water erosion and 0.7 mile of moderate susceptibility to wind erosion. This alternative variation crosses 0.7 mile of soils with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of this variation.

Variation S4-A3

This variation crosses 2.4 miles of soils with moderate susceptibility to water erosion and 0.7 mile of moderate susceptibility to wind erosion. This alternative crosses 0.8 mile of soil with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of this variation.

Minerals

Table 3-23 presents the miles crossed by mineral resources for all alternative routes and route variations in Segment 4.

Table 3-23. Minerals Inventory Data for Segment 4—Brogan (miles crossed)

Alternative Route	Total Length (miles)	Active Mine or Active Mining Claims	All Leases	Producing Oil and Gas or Geothermal Wells
Applicant's Proposed Action	40.1	3.8	6.0	1.1
Variation S4-A1	*5.9*	*0.0*	*0.0*	*0.0*
Variation S4-A2	*6.0*	*0.0*	*0.0*	*0.0*
Variation S4-A3	*6.1*	*0.0*	*0.0*	*0.0*
Tub Mountain South	40.5	3.7	22.7	3.7
Willow Creek	34.6	2.7	4.6	1.1

Table Note: Due to some mineral resources not occurring for the alternative routes and route variations, the miles crossed will not equal the total length of the alternative routes and route variations.

The Applicant's Proposed Action Alternative for Segment 4 crosses 3.8 miles of active mines or mining claims, 6.0 miles of leases, and 1.1 miles of producing wells. These occur near the west end of Segment 4 between Links 4-10 and 4-15, and south of Jamieson near Link 4-70. Variations S4-A1, S4-A2, and S4-A3 cross no mineral resources.

Paleontological Resources

Table 3-24 presents the miles crossed by paleontological resources for all alternative routes and route variations in Segment 4.

Table 3-24. Paleontological Resources Inventory Data for Segment 4—Brogan

Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)				
		1	2	3	4	5
Applicant's Proposed Action	40.1	8.6	14.7	5.8	11.0	0.0
Variation S4-A1	*5.9*	*0.0*	*2.7*	*2.7*	*0.5*	*0.0*
Variation S4-A2	*6.0*	*0.0*	*2.3*	*3.1*	*0.6*	*0.0*
Variation S4-A3	*6.1*	*0.0*	*2.2*	*3.3*	*0.6*	*0.0*

Table 3-24. Paleontological Resources Inventory Data for Segment 4—Brogan						
Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)				
		1	2	3	4	5
Tub Mountain South	40.5	0.0	10.0	3.1	27.4	0.0
Willow Creek	34.6	0.0	10.2	2.7	21.7	0.0

The Applicant's Proposed Action Alternative for Segment 4 crosses 11.0 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources, and 5.8 miles with moderate sensitivity (PFYC 3).

Variation S4-A1

This variation crosses 0.5 mile of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 2.7 miles with moderate sensitivity (PFYC 3).

Variation S4-A2

This variation crosses 0.6 mile of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 3.1 miles with moderate sensitivity (PFYC 3).

Variation S4-A3

This variation crosses 0.6 mile of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 3.3 miles with moderate sensitivity (PFYC 3).

Tub Mountain South Alternative

Geologic Hazards

The Tub Mountain South Alternative crosses 0.1 mile of recent Quaternary faults along Link 4-75. There are two previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative. These occur west of Weiser along Link 4-75 and had magnitudes of less than 4. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. This alternative crosses three areas with moderate liquefaction potential. These occur at mileposts 7, 13, and 20 along Link 4-75. This variation crosses three areas with a high percentile ranking for floodzones. These occur along the Burnt, Willow, and Brownlee Reservoir watersheds totaling approximately 3,355 acres in the geologic hazards study corridor. These same watersheds have areas with moderate percentile ranking for floodzones totaling approximately 7,101 acres.

Soils

The Tub Mountain Alternative crosses 24.8 miles of soils with moderate susceptibility to water erosion and 6.9 miles of moderate susceptibility to wind erosion. This alternative crosses 23.8 miles of soils with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of this variation.

Minerals

The Tub Mountain Alternative crosses 3.7 miles of active mines and mining claims, 22.7 miles of leases, and 3.7 miles of producing wells. These occur at the beginning of the Segment between Links 4-10 and 4-30, and east of Jamieson between Links 4-30 and 4-75.

Paleontological Resources

The Tub Mountain Alternative crosses 27.4 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources, and 3.1 miles with moderate sensitivity (PFYC 3).

Willow Creek Alternative

Geologic Hazards

The Willow Creek Alternative crosses 0.1 mile of recent Quaternary faults at milepost 12, along Link 4-70. There are no previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. This alternative crosses two areas with moderate liquefaction potential. These occur at milepost 3 on Link 4-40, and milepost 5 on Link 4-60. This alternative crosses one with a high percentile ranking for floodzones. This occurs along the Brownlee Reservoir watershed totaling approximately 452 acres in the geologic hazards study corridor. The alternative also crosses three areas with moderate percentile ranking for floodzones. These occur along the Willow, Burnt, and Brownlee Reservoirs totaling approximately 4,193 acres.

Soils

This Willow Creek Alternative crosses 15.5 miles of soils with moderate susceptibility to water erosion and 5.5 miles of moderate susceptibility to wind erosion. This alternative crosses 20.5 miles of soils with high compaction potential. Droughty and stony/rocky soils are found scattered throughout the length of this variation.

Minerals

The Willow Creek Alternative crosses 2.7 miles of active mines and mining claims, 4.6 miles of leases, and 1.1 miles of producing oil and gas or geothermal wells. These at the beginning of the Segment between Links 4-10 and 4-20, and south of Jamieson near Link 4-70.

Paleontological Resources

The Willow Creek Alternative crosses 21.7 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources, and 2.7 miles with moderate sensitivity (PFYC 3).

SEGMENT 5—MALHEUR

Applicant's Proposed Action Alternative

Geologic Hazards

Table 3-25 presents the miles crossed by geologic hazards for all alternative routes and route variations in Segment 5.

Table 3-25. Geologic Hazards Inventory Data for Segment 5—Malheur						
Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)	
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84
Applicant's Proposed Action	40.4	0.0	0.0	0.0	40.4	0.0
Variation S5-A1	*7.4*	*0.0*	*0.0*	*0.0*	*7.4*	*0.0*
Variation S5-A2	*7.4*	*0.0*	*0.0*	*0.0*	*7.4*	*0.0*
Variation S5-B1	*2.5*	*0.0*	*0.0*	*0.0*	*2.5*	*0.0*
Variation S5-B2	*2.8*	*0.0*	*0.0*	*0.0*	*2.8*	*0.0*
Malheur S	43.5	0.1	0.0	0.0	43.5	0.0
Malheur A	43.1	0.1	0.0	0.0	43.1	0.0

Table Notes:
[1]Due to the overlap of faults occurring during several time periods, the total miles crossed will not equal the total length of the alternative routes and route variations.
[2]There were no areas with high landslide percentile for Segment 5.

The Applicant's Proposed Action Alternative for Segment 5 crosses no Quaternary fault. There is one previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative. This epicenter occurs near Link 5-15 and had a magnitude of less than 6. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. This alternative crosses two areas with moderate liquefaction potential. These occur along Link 5-5 and 5-40. The Applicant's Proposed Action Alternative crosses one are with a high percentile ranking for floodzones. This occurs along the Middle Snake-Succor watershed and totals approximately 497 acres within the geologic hazards study corridor. This alternative crosses two areas with a moderate percentile ranking for floodzones. These occur along the Lower Owyhee and Lower Malheur watersheds approximately 706 acres in the geologic hazards study corridor.

Variations S5-A1 and S5-A2

These variations cross no Quaternary fault. There is one previously recorded earthquake epicenters within the geologic hazard study corridor for these variations. This epicenter occurs south of Highway 20 and had a magnitude of less than 6. These variations cross 0.0 mile of areas with moderate or high landslide potential. These variations cross three areas with moderate liquefaction potential. These are scattered throughout the length of the variations. The variations cross no areas with moderate or high percentile for floodzones.

Variation S5-B1

This variation crosses no Quaternary fault. There are no previously recorded earthquake epicenters within the geologic hazard study corridor for this variation. This variation crosses 0.0 mile of areas with moderate or high landslide potential. This alternative crosses one area with moderate liquefaction potential. The variation crosses one area with high percentile for floodzones. This occurs along the

Lower Owyhee watershed and has approximately 497 acres within the geologic hazards study corridor. An area of moderate percentile for floodzones also occurs along the same watershed with 112 acres.

Variation S5-B2

This variation crosses no Quaternary fault. There are no previously recorded earthquake epicenters within the geologic hazard study corridor for this variation. This variation crosses 0.0 mile of areas with moderate or high landslide potential. This alternative crosses one area with high liquefaction potential near the center of the variation. The variation crosses one area with high percentile for floodzones. This occurs along the Lower Owyhee watershed and has approximately 749 acres within the geologic hazards study corridor. An area of moderate percentile for floodzones also occurs along the same watershed with 109 acres.

Soils

Table 3-26 presents the miles crossed by soil resources for all alternative routes and route variations in Segment 5.

Table 3-26. Soils Inventory Data Segment 5—Malheur (miles crossed)

Alternative Route	Total Length (miles)	Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]	
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate
Applicant's Proposed Action	40.4	0.0	27.1	13.3	0.0	39.6	0.8	15.2	25.2
Variation S5-A1	*7.4*	*0.0*	*6.4*	*1.0*	*0.0*	*7.4*	*0.0*	*2.4*	*5.0*
Variation S5-A2	*7.4*	*0.0*	*7.4*	*0.0*	*0.0*	*7.4*	*0.0*	*2.6*	*4.8*
Variation S5-B1	*2.5*	*0.0*	*1.0*	*1.5*	*0.0*	*2.5*	*0.0*	*1.0*	*1.5*
Variation S5-B2	*2.8*	*0.0*	*1.5*	*1.3*	*0.0*	*2.8*	*0.0*	*2.2*	*0.6*
Malheur S	43.5	0.0	32.0	11.5	0.0	43.3	0.2	14.8	28.7
Malheur A	43.1	0.0	32.5	10.6	0.0	42.6	0.5	14.0	29.1

Table Notes:
[1]Soil compaction potential is based on clay content.
No high impacts are anticipated for soil resoures.

The Applicant's Proposed Action Alternative for Segment 5 crosses 13.3 miles of soils with moderate susceptibility to water erosion and 0.8 mile of moderate susceptibility to wind erosion. This alternative crosses 25.2 miles of soils with high compaction potential. No data was available for droughty or stony/rocky soils for this Segment.

Variation S5-A1

This variation crosses 1.0 mile of soils with moderate susceptibility to water erosion and 0.0 mile of moderate susceptibility to wind erosion. This alternative crosses 5.0 miles of soils with high compaction potential. No data was available for droughty or stony/rocky soils for this Segment.

Variation S5-A2

This variation crosses 0.0 mile of soils with moderate susceptibility to water erosion and 0.0 mile of moderate susceptibility to wind erosion. This alternative crosses 4.8 miles of soils with high compaction potential. No data was available for droughty or stony/rocky soils for this Segment.

Variation S5-B1

This variation crosses 1.5 miles of soils with moderate susceptibility to water erosion and 0.0 mile of moderate susceptibility to wind erosion. This alternative crosses 1.5 miles of soils with high compaction potential. No data was available for droughty or stony/rocky soils for this Segment.

Variation S5-B2

This variation crosses 1.3 miles of soils with moderate susceptibility to water erosion and 0.0 mile of moderate susceptibility to wind erosion. This alternative crosses 0.6 mile of soils with high compaction potential. No data was available for droughty or stony/rocky soils for this Segment.

Minerals

Table 3-27 presents the miles crossed by mineral resources for all alternative routes and route variations in Segment 5.

Table 3-27. Minerals Inventory Data for Segment 5—Malheur (miles crossed)

Alternative Route	Total Length (miles)	Active Mine or Active Mining Claims	All Leases	Producing Oil and Gas or Geothermal Wells
Applicant's Proposed Action	40.4	0.3	16.5	0.0
Variation S5-A1	*7.4*	*0.0*	*4.3*	*0.0*
Variation S5-A2	*7.4*	*0.0*	*6.7*	*0.0*
Variation S5-B1	*2.5*	*0.0*	*0.0*	*0.0*
Variation S5-B2	*2.8*	*0.0*	*0.0*	*0.0*
Malheur S	43.5	3.9	12.1	0.0
Malheur A	43.1	6.0	12.1	0.0

Table Note: Due to some mineral resources not occurring for the alternative routes and route variations, the miles crossed will not equal the total length of the alternative routes and route variations.

The Applicant's Proposed Action Alternative for Segment 5 crosses 0.3 mile of active mines and mining claims, and 16.5 miles of leases. The leases occur between Harper and Vale, and several active mines or mining claims or within the study corridor towards the end of the Applicant's Proposed Action Alternative.

Variation S5-A1

This variation crosses 4.3 miles of leases between Vale and Harper.

Variation S5-A2

This variation crosses 6.7 miles of leases between Vale and Harper.

Variation S5-B1 and S5-B2

These variations cross no mineral resources.

Paleontological Resources

Table 3-28 presents the miles crossed by paleontological resources for all alternative routes and route variations in Segment 5.

Table 3-28. Paleontological Resources Inventory Data for Segment 5—Malheur

Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)				
		1	2	3	4	5
Applicant's Proposed Action	40.4	1.0	13.5	0.0	25.9	0.0
Variation S5-A1	*7.4*	*0.0*	*1.3*	*0.0*	*6.1*	*0.0*
Variation S5-A2	*7.4*	*0.0*	*0.0*	*0.0*	*7.4*	*0.0*
Variation S5-B1	*2.5*	*0.0*	*1.4*	*0.0*	*1.1*	*0.0*
Variation S5-B2	*2.8*	*0.0*	*1.4*	*0.0*	*1.4*	*0.0*
Malheur S	43.5	1.5	19.1	0.0	22.9	0.0
Malheur A	43.1	1.2	18.6	0.0	23.3	0.0

The Applicant's Proposed Action Alternative for Segment 5 crosses 25.9 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 0.0 mile of geologic units with a moderate sensitivity (PFYC 3).

Variation S5-A1

This variation crosses 6.1 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources, and 0.0 mile of geologic units with a moderate sensitivity (PFYC 3).

Variation S5-A2

This variation crosses 7.4 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources, and 0.0 mile of geologic units with a moderate sensitivity (PFYC 3).

Variation S5-B1

This variation crosses 1.1 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources, and 0.0 mile of geologic units with a moderate sensitivity (PFYC 3).

Variation S5-B2

This variation crosses 1.4 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources, and 0.0 mile of geologic units with a moderate sensitivity (PFYC 3).

Malheur S Alternative

Geologic Hazards

The Malheur S Alternative crosses 0.1 mile of Class B faults along Link 5-25. There is one previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative. This epicenter occurs near Link 5-25 and had a magnitude of less than 6. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. This alternative crosses five areas with moderate liquefaction potential. These occur along Link 5-5, mileposts 5-6 and 12-15 of Link 5-25, and milepost 5 of Link 5-30. The Applicant's Proposed Action Alternative crosses no areas with a high percentile

ranking for floodzones. This alternative crosses two areas with a moderate percentile ranking for floodzones. These occur along the Lower Malheur and Lower Owyhee watersheds and total approximately 2,026 acres in the geologic hazards study corridor.

Soils

The Malheur S Alternative crosses 11.5 miles of soils with moderate susceptibility to water erosion and 0.2 mile of moderate susceptibility to wind erosion. This alternative crosses 28.7 miles of soils with high compaction potential. No data was available for droughty or stony/rocky soils for this Segment.

Minerals

The Malheur S Alternative crosses 3.9 miles of active mines and mining claims, 12.1 miles of leases, and 2.0 miles of oil and gas, or geothermal producing wells that occur in the Harper area.

Paleontological Resources

The Malheur S Alternative crosses 22.9 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 0.0 mile of geologic units with a moderate sensitivity (PFYC 3).

Malheur A Alternative

Geologic Hazards

The Malheur A Alternative crosses 0.1 mile of Class B faults along Link 5-25. There is one previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative. This epicenter occurs near milepost 3 of Link 5-25 and had a magnitude of less than 6. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. This alternative crosses five areas with moderate liquefaction potential. These occur at Link 5-5, mileposts 5-6 and 12-15 of Link 5-25, and mileposts 3-5 of Link 5-35. The Applicant's Proposed Action Alternative crosses no areas with a high percentile ranking for floodzones. This alternative crosses two areas with a moderate percentile ranking for floodzones. These occur along the Lower Malheur and Lower Owyhee watersheds and total approximately 2,117 acres in the geologic hazards study corridor.

Soils

The Malheur A Alternative crosses 10.6 miles of soils with moderate susceptibility to water erosion and 0.5 mile of moderate susceptibility to wind erosion. This alternative crosses 29.1 miles of soils with high compaction potential. No data was available for droughty or stony/rocky soils for Segment 5.

Minerals

The Malheur A Alternative crosses 6.0 miles of active mines and mining claims, 12.1 miles of leases, and 2.0 miles of producing wells that occur in the Harper area.

Paleontological Resources

The Malheur Alternative crosses 23.3 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 0.0 mile of geologic units with a moderate sensitivity (PFYC 3).

SEGMENT 6—TREASURE VALLEY

Applicant's Proposed Action Alternative

Geologic Hazards

Table 3-29 presents the miles crossed by geologic hazards for all alternative routes and route variations in Segment 6.

Table 3-29. Geologic Hazards Inventory Data for Segment 6—Treasure Valley

Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)	
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84
Applicant's Proposed Action	28.0	1.4	0.0	0.0	28.0	0.0
Variation S6-A1	*9.3*	*0.8*	*0.0*	*0.0*	*9.3*	*0.0*
Variation S6-A2	*8.9*	*0.2*	*0.0*	*0.0*	*8.9*	*0.0*
Variation S6-B1	*14.4*	*0.6*	*0.0*	*0.0*	*14.4*	*0.0*
Variation S6-B2	*14.1*	*1.2*	*0.0*	*0.0*	*14.1*	*0.0*

Table Notes:
[1]Due to the overlap of faults occurring during several time periods, the total miles crossed will not equal the total length of the alternative routes and route variations.
[2]There were no areas with high landslide percentile for Segment 6.

The Applicant's Proposed Action Alternative for Segment 6 crosses 1.4 miles of older Quaternary faults along Link 6-20. There are no previously recorded earthquake epicenters within the geologic hazard study corridor for this alternative. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. There was no liquefaction data available for the Idaho portion of Segment 6. The Applicant's Proposed Action Alternative crosses one area with a high percentile ranking for floodzones. This occurs along the Middle Snake-Succor watershed and totals approximately 1,541 acres within the geologic hazards study corridor. The Middle Snake-Succor watershed also has an approximate area of 564 acres within the geologic hazards study corridor for the Applicant's Proposed Action Alternative having a moderate ranking for floodzones.

Variation S6-A1

This variation crosses 0.8 mile of older Quaternary faults. There are no previously recorded earthquake epicenters within the geologic hazard study corridor for this variation. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. There was no liquefaction data available for the Idaho portion of Segment 6. The Applicant's Proposed Action Alternative crosses no areas with moderate or high percentile ranking for floodzones.

Variation S6-A2

This variation crosses 0.2 mile of older Quaternary faults. There are no previously recorded earthquake epicenters within the geologic hazard study corridor for this variation. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. There was no liquefaction data available for the

Idaho portion of Segment 6. The Applicant's Proposed Action Alternative crosses no areas with moderate or high percentile ranking for floodzones.

Variation S6-B1

This variation crosses 0.6 mile of older Quaternary faults. There are no previously recorded earthquake epicenters within the geologic hazard study corridor for this variation. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. There was no liquefaction data available for the Idaho portion of Segment 6. This variation crosses one are with a high percentile ranking for floodzones. This occurs along the Middle Snake-Succor watershed and totals approximately 785 acres within the geologic hazards study corridor. The Middle Snake-Succor watershed also has an approximate area of 294 acres within the geologic hazards study corridor for the Applicant's Proposed Action Alternative having a moderate ranking for floodzones.

Variation S6-B2

This variation crosses 1.2 miles of older Quaternary faults. There are no previously recorded earthquake epicenters within the geologic hazard study corridor for this variation. This alternative crosses 0.0 mile of areas with moderate or high landslide potential. There was no liquefaction data available for the Idaho portion of Segment 6. This variation crosses one area with a high percentile ranking for floodzones. This occurs along the Middle Snake-Succor watershed and totals approximately 768 acres within the geologic hazards study corridor. The Middle Snake-Succor watershed also has an approximate area of 185 acres within the geologic hazards study corridor for the Applicant's Proposed Action Alternative having a moderate ranking for floodzones.

Soils

Table 3-30 presents the miles crossed by soil resources for all alternative routes and route variations in Segment 6.

Table 3-30. Soils Inventory Data Segment 6—Treasure Valley (miles crossed)

Alternative Route	Total Length (miles)	Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]	
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate
Applicant's Proposed Action	28.0	0.4	25.5	2.1	0.4	27.0	0.6	25.9	2.1
Variation S6-A1	*9.3*	*0.3*	*8.2*	*0.8*	*0.3*	*8.9*	*0.1*	*7.9*	*1.4*
Variation S6-A2	*8.9*	*0.3*	*8.0*	*0.6*	*0.3*	*8.5*	*0.1*	*7.4*	*1.5*
Variation S6-B1	*14.4*	*0.1*	*13.3*	*1.0*	*0.1*	*14.0*	*0.3*	*14.4*	*0.0*
Variation S6-B2	*14.1*	*0.0*	*13.7*	*0.4*	*0.0*	*14.1*	*0.0*	*14.1*	*0.0*

Table Notes:
[1]Soil compaction potential is based on clay content.
No high impacts are anticipated for soil resoures.

The Applicant's Proposed Action Alternative for Segment 6 crosses 2.1 miles of soils with moderate susceptibility to water erosion and 0.6 mile of moderate susceptibility to wind erosion. This alternative crosses 2.1 miles of soils with high compaction potential. Droughty soils are found throughout the Applicant's Proposed Action Alternative for Segment 6, but stony/soils are only found in two areas near the terminus of the Applicant's Proposed Action Alternative.

Variation S6-A1

This variation crosses 0.8 mile of soils with moderate susceptibility to water erosion and 0.1 mile of moderate susceptibility to wind erosion. This alternative crosses 1.4 miles of soils with high compaction potential. Droughty soils are found throughout this variation, but stony/soils are crossed only once near the middle of this variation.

Variation S6-A2

This variation crosses 0.6 mile of soils with moderate susceptibility to water erosion and 0.1 mile of moderate susceptibility to wind erosion. This alternative crosses 1.5 miles of soils with high compaction potential. Droughty soils are found throughout this variation, but stony/soils are crossed only once near the middle of this variation.

Variation S6-B1

This variation crosses 1.0 mile of soils with moderate susceptibility to water erosion and 0.3 mile of moderate susceptibility to wind erosion. This alternative crosses 0.0 mile of soils with high compaction potential. Droughty soils are found throughout this variation but stony/soils are crossed only once near the terminus of the variation.

Variation S6-B2

This variation crosses 0.4 mile of soils with moderate susceptibility to water erosion and 0.0 mile of moderate susceptibility to wind erosion. This alternative crosses 0.0 mile of soils with high compaction potential. Droughty soils are found throughout this variation, but stony/soils are crossed only once near the terminus of this variation.

Minerals

Table 3-31 presents the miles crossed by mineral resources for all alternative routes and route variations in Segment 6.

Table 3-31. Minerals Inventory Data for Segment 6—Treasure Valley (miles crossed)				
Alternative Route	**Total Length (miles)**	**Active Mine or Active Mining Claims**	**All Leases**	**Producing Oil and Gas or Geothermal Wells**
Applicant's Proposed Action	28.0	4.3	0.0	0.0
Variation S5-A1	*9.3*	*2.3*	*0.0*	*0.0*
Variation S5-A2	*8.9*	*1.9*	*0.0*	*0.0*
Variation S5-B1	*14.4*	*2.0*	*0.0*	*0.0*
Variation S5-B2	*14.1*	*1.7*	*0.0*	*0.0*
Table Note: Due to some mineral resources not occurring for the alternative routes and route variations, the miles crossed will not equal the total length of the alternative routes and route variations.				

The Applicant's Proposed Action Alternative for Segment 6 crosses 4.3 miles of active mines and mining claims. These occur near the Oregon/Idaho state line. There are no leases or producing wells crossed by the Applicant's Proposed Action Alternative for Segment 6.

Variation S6-A1

This variation crosses 2.3 miles of active mines and mining claims. These occur near the Oregon/Idaho state line. There are no leases or producing wells crossed by this variation.

Variation S6-A2

This variation crosses 1.9 miles of active mines and mining claims. These occur near the Oregon/Idaho state line. There are no leases or producing wells crossed by this variation.

Variation S6-B1

This variation crosses 2.0 miles of active mines and mining claims. These occur near the Oregon/Idaho state line. There are no leases or producing wells crossed by this variation.

Variation S6-B2

This variation crosses 1.7 miles of active mines and mining claims. These occur near the Oregon/Idaho state line. There are no leases or producing wells crossed by this variation.

Paleontological Resources

Table 3-32 presents the miles crossed by paleontological resources for all alternative routes and route variations in Segment 6.

Table 3-32. Paleontological Resources Inventory Data for Segment 6—Treasure Valley						
Alternative Route	**Total Length (miles)**	**Potential Fossil Yield Classification (miles crossed)**				
		1	**2**	**3**	**4**	**5**
Applicant's Proposed Action	28.0	7.8	2.9	14.5	2.8	0.0
Variation S6-A1	*9.3*	*3.5*	*0.0*	*3.7*	*2.1*	*0.0*
Variation S6-A2	*8.9*	*2.2*	*0.0*	*4.7*	*2.0*	*0.0*
Variation S6-B1	*14.4*	*4.3*	*0.6*	*9.5*	*0.0*	*0.0*
Variation S6-B2	*14.1*	*5.5*	*0.4*	*8.2*	*0.0*	*0.0*

The Applicant's Proposed Action Alternative for Segment 6 crosses 2.8 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 14.5 miles of geologic units with a moderate sensitivity (PFYC 3).

Variation S6-A1

This variation crosses 2.1 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 3.7 miles of geologic units with a moderate sensitivity (PFYC 3).

Variation S6-A2

This variation crosses 2.0 miles of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 4.7 miles of geologic units with a moderate sensitivity (PFYC 3).

Variation S6-B1

This variation crosses 0.0 mile of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 9.5 miles of geologic units with a moderate sensitivity (PFYC 3).

Variation S6-B2

This variation crosses 0.0 mile of geologic units with a high sensitivity (PFYC 4) for paleontological resources and 8.2 miles of geologic units with a moderate sensitivity (PFYC 3).

3.2.1.6 Environmental Consequences (Results of Analysis)

Types of Potential Effects

After compiling the resource inventory for earth resources, the methods for assessing the potential impacts on the B2H Project include (1) identifying the types of potential impacts from the B2H Project, (2) developing criteria for assessing the level of potential impacts from the B2H Project on earth resources, (3) classifying the level of impacts (high, moderate, or low), (4) assessing the initial impacts from the B2H Project, (5) identifying the appropriate selective mitigation measures for minimizing adverse effects, (6) determining specific areas where selective mitigation should be applied, and (7) disclosing potential residual impacts from the B2H Project on earth resources.

Geologic Hazards

The B2H Project would not be anticipated to affect faults or cause earthquakes; however, the B2H Project could be affected by them. Ground shaking and displacement related to earthquakes may damage human-made structures, including transmission lines and substations, which could result in interruption of power and injury to those in the vicinity of the structural damage. The damage to structures caused by earthquakes is highly variable and based on many features, including, but not limited to, types of building materials, quality of construction, distance from the epicenter, earthquake magnitude, and the susceptibility of underlying rock and soil at the site to ground shaking. Therefore, the relationship between the potential for structural damage and distance from earthquake epicenter is only an estimate. However, certain areas are subject to more earthquakes than others and the geographic distribution of earthquakes is considered in the analysis.

The B2H Project potentially could contribute to destabilization of slopes or the reactivation of known landslide deposits. Construction of transmission lines and associated facilities could negatively affect, and be negatively affected by, landslides. Blasting operations, particularly in areas of shallow bedrock, could precipitate landslides in already unstable areas. The potential for landslides partially depends on slope—steep slopes generally having greater potential for landslides than shallow slopes. Other landslide risk factors include the presence of expansive clay minerals; the presence of springs and seeps; and remnant geologic features in the slope profile such as bedding planes. Construction activities can result in human-caused landslides in landslide-prone areas. Removing soil at the base of an unstable slope can decrease slope stability and result in a landslide. Excavation or blasting in geologic hazard areas at substations and transmission tower sites or during road building could destabilize slopes, resulting in landslides, soil erosion, and stream sedimentation. Mid-slope road construction, concentration of drainage water on unstable ground, and removal of vegetation during construction also could trigger landslides (Centers for Disease Control and Prevention n.d.).

Foundations for transmission line towers can be up to 30 feet below ground surface. Construction in areas of shallow bedrock may require blasting. The vibrations generated by blasting also could result in slope instability, damage to nearby structures, damage to water wells, and disturbance to wildlife.

In summary, potential direct effects include direct loss of equipment or injury to personnel as a result of seismic activity or landslides, especially in steep terrain. Potential indirect effects on the operation of the B2H Project could include loss of transmission services as a result of seismic activity or landslides. Also, the construction of the B2H Project could directly or indirectly affect areas with high and moderate landslide susceptibility. A potential direct effect includes the removal of soils and sediments in areas with moderate to high landslide susceptibility. A potential indirect effect is the removal of vegetation, which could affect slope stability.

Soils

The construction, operation, and maintenance of the B2H Project would result in both direct and indirect effects on soils. Direct effects associated with construction activities could include the following:

- Accelerated soil erosion in areas where construction-related activities have disturbed or altered the land surface by exposing soils (temporary)
- Accelerated soil erosion in areas where construction-related activities have altered the contours of the land surface (temporary)
- Loss of designated Prime or Unique Farmland soils (i.e., conversion to nonagricultural uses) (permanent) (refer to Section 3.2.7)
- Compaction of soil resources by construction vehicles, equipment, and facilities (temporary)

Potential direct effects associated with the operation of and presence of the transmission line and associated facilities, or maintenance activities associated with the B2H Project include soil compaction by maintenance vehicles along permanent access roads.

Indirect effects associated with the construction, operation, and maintenance of the B2H Project could include the following:

- Construction of permanent access roads that could be used by the general public to access currently inaccessible areas, potentially resulting in accelerated erosion by water or wind (permanent)
- Degradation of the land surface and loss of soil productivity resulting from accelerated soil erosion (temporary to permanent)

Compaction could result in the loss of soil structure, possibly leading to a decrease in water infiltration rates, soil loss, or environmental degradation (e.g., the establishment of noxious weeds in disturbed areas). In general, overland movement of construction equipment during moist conditions is the primary cause of soil compaction. However, compaction also could occur where new access roads are constructed and at tower sites.

Minerals

Short-term effects on mineral resources could include restriction of exploration for mineral resources or access to existing mines during the construction period. The presence of existing mineral claims and leases could interfere with plans to construct the B2H Project. As part of the preconstruction process, the Applicant would identify mineral claims and leases and either negotiate permission to use the land surface in these areas or relocate the transmission line to avoid existing claims and leases. Where access to mineral resources may be restricted, the Applicant would provide compensation for damage, access rights, and easements with mine owners, claimants, and leaseholders. If necessary, the Applicant would provide mine operators with mine access across the B2H Project area during the construction phase of three years.

Construction of the B2H Project would result in the need for salable minerals, including fill material for grade changes, sand and gravel for concrete production, and gravel for roadbeds and similar uses. The use of salable minerals would provide an economic benefit to local mineral providers but also would result in consumption of materials that would not be available for other uses; therefore, this use would be an irretrievable commitment of resources.

Long-term effects during B2H Project operations could restrict the operation of new mining activities in the transmission line right-of-way. The B2H Project operations area is smaller than the construction disturbance area, but the time interval is much longer: 50 years for operations, compared to about 3 years for construction. B2H Project operations could result in mineral resources not being accessible for mining in the right-of-way for the life of the B2H Project.

Paleontological Resources

The construction, operation, and maintenance of the B2H Project could result in both direct and indirect adverse effects on paleontological resources. Potential direct effects associated with construction activities could include the loss of paleontological resources as a result of ground-disturbing activities, such as excavation; blasting; and construction of facilities, including staging areas; and road

construction or improvement. Potential loss of paleontological resources could occur during maintenance of the B2H Project if trucks or vehicles drive in areas where geologic units are recently exposed due to erosion. There are no foreseeable direct effects on paleontological resources from operation of the facilities and the presence of the transmission.

Indirect effects associated with the construction, operation, and maintenance of the B2H Project could include loss of paleontological resources resulting from increases in the following:

- Access of the general public to sensitive geologic units and unauthorized collection or vandalism from construction of permanent access roads
- Erosion associated with ground-disturbing activities that expose new fossils

BLM's consultation with Native American sovereign tribal governments has indicated that paleontological resources are an integral part of the spiritual landscape. Disruption of intact fossil beds, regardless of species and/or associated time period, may be considered an impact on sacred resources.

No Action Alternative

If the B2H Project is not authorized, there would be no adverse effects on soils in the B2H Project area, nor any adverse effects on mineral exploration and production. There would likewise be no adverse direct or indirect effects on paleontological resources.

Common to All Alternatives

Direct effects on earth resources resulting from the geotechnical drilling would be minimal, as geotechnical testing sites would be 8 inches in diameter. This size of geotechnical testing sites is too small to significantly affect earth resources. For example, due to the limited extent of disturbance, drilling associated with the geotechnical study would result in only minor effects on soils resources within the Project area; whereas the use of overland access routes could be more likely to result in impacts on soil resources. Effects associated with the geotechnical study would be short term, however, and would decrease to acceptable levels over time with the design features of the B2H Project for environmental protection in Table 2-7 and the selective mitigation measures in Table 2-13. Soil resources would be directly affected by onsite drilling and the use of overland access roads for drilling equipment and support vehicles to reach the drilling sites. These activities could crush or clear vegetative cover, compact soils, possibly result in rutting, and could indirectly increase local soil susceptibility to water and wind erosion. An increase in unauthorized OHV use along access roads could increase the time required to return the access routes to a natural state by limiting the effectiveness of revegetation efforts, compacting soil, and increase soil susceptibly to water and wind erosion.

Any ground disturbance associated with overland travel in areas with a PFYC of 4 or higher would have a greater potential for impacting paleontological resources and, therefore the areas would require mitigation, which would include monitoring during the geotechnical investigation. Testing sites and overland access routes would be evaluated for the presence of paleontological resources by a qualified

paleontologist prior to the geotechnical investigation. A possible indirect effect could be the potential for a temporary increase in public access to these areas using overland access routes and the associated possibility of unauthorized collection or vandalism of paleontological resources. However, such incidences would be localized and rare.

No effects of the geotechnical investigation on mineral resources or geological hazards would be anticipated.

SEGMENT 1—MORROW-UMATILLA

Applicant's Proposed Action Alternative

Geologic Hazards

Table 3-33 presents the residual impacts on geologic hazards for the B2H Project in Segment 1.

Table 3-33. Geologic Hazards Inventory Data and Residual Impacts on Segment 1—Morrow-Umatilla

Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)[2]		Residual Impacts (miles crossed)		
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84	Low	Moderate	High
Applicant's Proposed Action	91.9	0.1	0.0	0.0	91.9	0.0	91.9	0.0	0.0
Variation S1-B1	*6.4*	*0.0*	*0.0*	*0.0*	*6.4*	*0.0*	*6.4*	*0.0*	*0.0*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*0.0*	*6.4*	*0.0*	*6.4*	*0.0*	*0.0*
East of Bombing Range Road	92.3	0.1	0.0	0.0	92.3	0.0	92.3	0.0	0.0
Applicant's Proposed Action – Southern Route	99.1	0.1	0.0	0.0	99.1	0.0	99.1	0.0	0.0
West of Bombing Range Road – Southern Route	95.6	0.1	0.0	0.0	95.6	0.0	95.6	0.0	0.0
Longhorn	88.2	0.1	0.0	0.0	88.2	0.0	88.2	0.0	0.0
Interstate 84	84.7	0.1	0.0	0.0	84.7	0.0	84.7	0.0	0.0
Variation S1-A1	*18.5*	*0.0*	*0.0*	*0.0*	*18.5*	*0.0*	*18.5*	*0.0*	*0.0*
Variation S1-A2	*18.5*	*0.0*	*0.0*	*0.0*	*18.5*	*0.0*	*18.5*	*0.0*	*0.0*
Interstate 84 – Southern Route	93.4	0.1	0.0	0.0	93.4	0.0	93.4	0.0	0.0

Table Notes:
[1]Due to the overlap of faults occurring during several time periods, the total miles crossed will not equal the total length of the alternative routes and route variations.
[2]There were no areas with high landslide percentile for Segment 1.

Following implementation of the design features for environmental protection and selective mitigation measures (Section 2.3.4 and Table 2-13), the Proposed Action would have 0.1 mile of moderate residual impacts on geologic hazards, associated with faults. Variations S1-B1 and S1-B2 would have low residual impacts.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The residual impacts on the additional action are the same as the Applicant's Proposed Action Alternative.

Soils

Table 3-34 presents the residual impacts on soil resources for all alternative routes and route variations in Segment 1.

Table 3-34. Soils Inventory Data and Residual Impacts on Segment 1—Morrow-Umatilla

Alternative Route	Total Length (miles)	Inventory Data (miles crossed)								Residual Impacts (miles crossed)
		Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]		
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate	Low
Applicant's Proposed Action	91.9	8.3	50.9	32.7	0.0	91.6	0.3	89.6	2.3	91.9
Variation S1-B1	*6.4*	*0.0*	*3.1*	*3.3*	*0.0*	*6.4*	*0.0*	*6.4*	*0.0*	*6.4*
Variation S1-B2	*6.4*	*0.0*	*4.0*	*2.4*	*0.0*	*6.4*	*0.0*	*6.4*	*0.0*	*6.4*
East of Bombing Range Road	92.3	8.3	52.7	31.3	0.0	92.0	0.3	90.0	2.3	92.3
Applicant's Proposed Action – Southern Route	99.1	9.5	58.0	31.6	0.0	98.8	0.3	94.7	4.4	99.1
West of Bombing Range Road – Southern Route	95.6	9.5	50.2	35.9	0.0	95.2	0.4	87.9	7.7	95.6
Longhorn	88.2	8.3	50.4	29.5	0.0	80.9	7.3	85.9	2.3	88.2
Interstate 84	84.7	8.3	57.7	18.7	0.0	78.8	5.9	82.4	2.3	84.7
Variation S1-A1	*18.5*	*0.0*	*16.3*	*2.2*	*0.0*	*18.5*	*0.0*	*18.5*	*0.0*	*18.5*
Variation S1-A2	*18.5*	*0.0*	*5.9*	*12.6*	*0.0*	*18.3*	*0.2*	*18.5*	*0.0*	*18.5*
Interstate 84 – Southern Route	93.4	9.5	66.1	17.8	0.0	87.5	5.9	89.0	4.4	93.4

Table Notes:
[1]Soil compaction potential is based on clay content.
No high impacts are anticipated for soil resoures.

Following implementation of the design features for environmental protection and selective mitigation measures, the Applicant's Proposed Action Alternative would have only low residual impacts on soil

resources. The residual impacts on soil resources for Variations S1-B1 and S1-B2 would be the same as the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The residual impacts on the additional action would be the same as the Applicant's Proposed Action Alternative.

Minerals

Table 3-35 presents the residual impacts on mineral resources for the B2H Project in Segment 1.

Table 3-35. Minerals Inventory Data and Residual Impacts on Segment 1—Morrow-Umatilla

Alternative Route	Total Length (miles)	Inventory Data (miles crossed)[1]			Residual Impacts (miles crossed)		
		Active Mine or Active Mining Claims	All Leases	Producing Oil and Gas or Geothermal Wells	None	Low	Moderate
Applicant's Proposed Action	91.9	0.0	0.0	0.0	91.9	0.0	0.0
Variation S1-B1	*6.4*	*0.0*	*0.0*	*0.0*	*6.4*	*0.0*	*0.0*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*0.0*	*6.4*	*0.0*	*0.0*
East of Bombing Range Road	92.3	0.0	2.0	0.0	90.3	0.0	2.0
Applicant's Proposed Action – Southern Route	99.1	0.0	0.0	0.0	99.1	0.0	0.0
West of Bombing Range Road – Southern Route	95.6	0.0	0.5	0.0	95.1	0.0	0.5
Longhorn	88.2	0.0	2.9	0.0	85.3	0.0	2.9
Interstate 84	84.7	0.0	0.4	0.0	84.3	0.0	0.4
Variation S1-A1	*18.5*	*0.0*	*0.0*	*0.0*	*18.5*	*0.0*	*0.0*
Variation S1-A2	*18.5*	*0.0*	*0.0*	*0.0*	*18.5*	*0.0*	*0.0*
Interstate 84 – Southern Route	93.4	0.0	0.4	0.0	93.0	0.0	0.4

Table Note: Due to some mineral resources not occurring for the alternative routes and route variations, the miles crossed will not equal the total length of the alternative routes and route variations.

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action Applicant's Proposed Action Alternative would only have low residual impacts on mineral resources. The residual impacts on mineral resources for Variations S1-B1 and S1-B2 would be the same as the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The residual impacts on the additional action would be the same as the Applicant's Proposed Action Alternative.

Paleontological Resources

Table 3-36 presents the residual impacts on paleontological resources for the B2H Project in Segment 1.

Table 3-36. Paleontological Resources Inventory Data and Residual Impacts on Segment 1—Morrow-Umatilla

Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)					Residual Impacts (miles crossed)
		1	2	3	4	5	Low
Applicant's Proposed Action	91.9	0.0	61.3	10.8	19.8	0.0	91.9
Variation S1-B1	*6.4*	*0.0*	*6.4*	*0.0*	*0.0*	*0.0*	*6.4*
Variation S1-B2	*6.4*	*0.0*	*6.4*	*0.0*	*0.0*	*0.0*	*6.4*
East of Bombing Range Road	92.3	0.0	61.3	10.8	20.2	0.0	92.3
Applicant's Proposed Action – Southern Route	99.1	0.0	72.1	10.8	16.2	0.0	99.1
West of Bombing Range Road – Southern Route	95.6	0.0	71.4	10.8	13.4	0.0	95.6
Longhorn	88.2	0.0	61.3	13.2	13.7	0.0	88.2
Interstate 84	84.7	0.0	58.2	22.9	3.6	0.0	84.7
Variation S1-A1	*18.5*	*0.0*	*12.6*	*5.9*	*0.0*	*0.0*	*18.5*
Variation S1-A2	*18.5*	*0.0*	*14.0*	*4.5*	*0.0*	*0.0*	*18.5*
Interstate 84 – Southern Route	93.4	0.0	70.5	22.9	0.0	0.0	93.4

Following implementation of the design features (Section 2.3.4) and Selective Mitigation Measure 8, there would only be low residual impacts on paleontological resources. The residual impacts on paleontological resources for Variations S1-B1 and S1-B2 would be the same as the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The residual impacts on paleontological resources would be the same as the Applicant's Proposed Action Alternative.

East of Bombing Range Road Alternative

Geologic Hazards

The residual impacts would be the same as those for the Applicant's Proposed Action Alternative.

Soils

The residual impacts would be similar to those for the Applicant's Proposed Action Alternative but with less (0.4 mile) low residual impacts.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, this alternative route would have 2.0 miles of moderate residual impacts associated with leases.

Paleontological Resources

The residual impacts would be similar to those for the Applicant's Proposed Action Alternative but with more (0.4 mile more) low residual impacts.

Applicant's Proposed Action – Southern Route Alternative

Geologic Hazards

The residual impacts would be the same as those of the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

Design Options 1, 2, and 3 would have the same residual impacts from geologic hazards as those of the Applicant's Proposed Action Alternative.

Soils

The Southern Route Alternative would have similar residual impacts on soils as the Applicant's Proposed Action Alternative but with more (7.2 miles more) low residual impacts.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

Design Options 1, 2, and 3 would have the same residual impacts on soils as those of the Applicant's Proposed Action Alternative.

Minerals

The Southern Route Alternative would have the same residual impacts on mineral resources as those of the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

Design Options 1, 2, and 3 would have the same residual impacts on mineral resources as those of the Applicant's Proposed Action Alternative.

Paleontological Resources

The Southern Route Alternative would have similar residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative but with more (7.2 miles more) low residual impacts.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

Design Options 1, 2, and 3 would have the same residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative.

West of Bombing Range Road – Southern Route Alternative

Geologic Hazards

The West of Bombing Range Road – Southern Alternative would have the same residual impacts from geologic hazards as those of the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

Design Options 1, 2, and 3 would have the same residual impacts from geologic hazards as those of the Applicant's Proposed Action Alternative.

Soils

The West of Bombing Range Road – Southern Alternative would have similar residual impacts on soils as those of the Applicant's Proposed Action Alternative but with more (3.7 miles more) low residual impacts.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

The impacts on soils would be the same as those of the Applicant's Proposed Action Alternative.

Minerals

Following the implementation of design features for environmental protection and selective mitigation measures, the alternative route would have 0.5 mile of moderate residual impacts associated with leases.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

Design Options 1, 2, and 3 would have the same residual impacts on mineral resources as those of the Applicant's Proposed Action Alternative.

Paleontological Resources

The West of Bombing Range Road – Southern Alternative would have similar residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative but with more (3.7 more miles) low residual impacts.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3

Design Options 1, 2, and 3 would have the same residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative.

Longhorn Alternative

Geologic Hazards

The Longhorn Alternative would have the same residual impacts from geologic hazards as those of the Applicant's Proposed Action Alternative.

Soils

The Longhorn Alternative would have similar residual impacts on soils as those of the Applicant's Proposed Action Alternative but with less (3.7 miles less) low residual impacts.

Minerals

Following the implementation of design features for environmental protection and selective mitigation measures, the alternative route would have 2.9 miles of moderate residual impacts associated with leases.

Paleontological Resources

The Longhorn Alternative would have similar residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative but with less (3.7 miles less) low residual impacts.

Interstate 84 Alternative

Geologic Hazards

The Interstate 84 Alternative would have the same residual impacts from geologic hazards as those of the Applicant's Proposed Action Alternative. Variations S1-A1 and S1-A2 would have low residual impacts from geologic hazards.

Soils

The Interstate 84 Alternative would have similar residual impacts on soils as those of the Applicant's Proposed Action Alternative but with less (7.2 miles less) low residual impacts. The residual impacts on soils for Variations S1-A1 and S1-A2 would be the same as the Interstate 84 Alternative.

Minerals

Following the implementation of design features for environmental protection and selective mitigation measures, the alternative route would have 0.4 mile of moderate residual impacts associated with leases. Variations S1-B1 and S1-B2 would have no residual impacts on mineral resources.

Paleontological Resources

The Interstate 84 Alternative would have similar residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative but with less (7.2 miles less) low residual impacts.

The residual impacts on paleontological resources for Variations S1-B1 and S1-B2 would be the same as the Interstate 84 Alternative.

Interstate 84 – Southern Route Alternative

Geologic Hazards

The Interstate 84 – Southern Route Alternative would have the same residual impacts from geologic hazards as the Applicant's Proposed Action Alternative.

Soils

The Interstate 84 – Southern Route Alternative would have similar residual impacts on soils as the Applicant's Proposed Action Alternative but with more (1.5 more miles) low residual impacts.

Minerals

Following the implementation of design features for environmental protection and selective mitigation measures for the B2H Project, the alternative route would have 0.4 mile of moderate residual impacts associated with leases.

Paleontological Resources

The Interstate 84 – Southern Route Alternative would have similar residual impacts on paleontological resources as the Applicant's Proposed Action Alternative but with more (1.5 more miles) low residual impacts.

Conclusion

In Segment 1, the B2H Project would not cross recent Quaternary faults or areas with moderate or high landslide potential. Thus, impacts on the B2H Project from geological hazards would not be likely to occur during the life of the Project. All alternative routes considered cross soils with moderate potential for water and wind erosion and soil compaction. However, with implementation of the selective mitigation measures (refer to Section 3.2.1.4), residual impacts would be low for any route selected.

No active mines are crossed by alternative routes analyzed in Segment 1. But, with the exception of the Applicant's Proposed Action Alternative and the Applicant's Proposed Action – Southern Route Alternative, some existing leases are crossed. Moderate effects including restriction of exploration for mineral resources or access to existing mines during the construction period could occur where alternative routes analyzed cross existing leases or claims. As part of the preconstruction process, the Applicant would identify mineral claims and leases and either negotiate permission to use the land surface in these areas or relocate the transmission line to avoid existing claims and leases. Where access to mineral resources may be restricted, the Applicant would provide compensation for damage, access rights, and easements with mine owners, claimants, and leaseholders. If necessary, the Applicant would provide mine operators with mine access across the B2H Project area during construction. The Longhorn Alternative would have the greatest effect on mineral resources (2.9 miles of moderate effects). Other alternative routes would have moderate effects ranging from zero to 0.5 miles.

With the exception of the Interstate 84 – Southern Route Alternative, all alternative routes analyzed in Segment 1 cross geological units with high sensitivity for paleontological resources. However, with implementation of the selective mitigation measures (refer to Section 3.2.1.4), preconstruction surveys on the selected route, and development of a PRTP, residual impacts would be low for any route selected.

SEGMENT 2—BLUE MOUNTAINS

Applicant's Proposed Action Alternative

Geologic Hazards

Table 3-37 presents the residual impacts on geologic hazards for all alternative routes and route variations in Segment 2.

Table 3-37. Geologic Hazards Inventory Data and Residual Impacts on Segment 2—Blue Mountains

Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)[2]		Residual Impacts (miles crossed)		
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84	Low	Moderate	High
Applicant's Proposed Action	33.8	0.0	0.0	0.0	33.8	0.0	33.8	0.0	0.0
Variation S2-A1	*2.8*	*0.0*	*0.0*	*0.0*	*2.8*	*0.0*	*2.8*	*0.0*	*0.0*
Variation S2-A2	*2.9*	*0.0*	*0.0*	*0.0*	*2.9*	*0.0*	*2.9*	*0.0*	*0.0*
Variation S2-B1	*3.7*	*0.0*	*0.0*	*0.0*	*3.7*	*0.0*	*3.7*	*0.0*	*0.0*
Variation S2-B2	*3.8*	*0.0*	*0.0*	*0.0*	*3.8*	*0.0*	*3.8*	*0.0*	*0.0*
Variation S2-C1	*9.3*	*0.0*	*0.0*	*0.0*	*9.3*	*0.0*	*9.3*	*0.0*	*0.0*
Variation S2-C2	*8.8*	*0.0*	*0.0*	*0.0*	*8.8*	*0.0*	*8.8*	*0.0*	*0.0*
Variation S2-E1	*2.3*	*0.0*	*0.0*	*0.0*	*2.3*	*0.0*	*2.3*	*0.0*	*0.0*
Variation S2-E2	*2.6*	*0.0*	*0.0*	*0.0*	*2.6*	*0.0*	*2.6*	*0.0*	*0.0*
Variation S2-F1	*12.1*	*0.0*	*0.0*	*0.0*	*12.1*	*0.0*	*12.1*	*0.0*	*0.0*
Variation S2-F2	*12.2*	*0.0*	*0.0*	*0.0*	*12.2*	*0.0*	*12.2*	*0.0*	*0.0*
Glass Hill	33.7	0.0	0.0	0.0	33.7	0.0	33.7	0.0	0.0
Variation S2-D1	*4.3*	*0.0*	*0.0*	*0.0*	*4.3*	*0.0*	*4.3*	*0.0*	*0.0*
Variation S2-D2	*4.1*	*0.0*	*0.0*	*0.0*	*4.1*	*0.0*	*4.1*	*0.0*	*0.0*
Mill Creek	34.0	0.0	0.0	1.0	34.0	0.0	33.0	1.0	0.0

Table Notes:
[1]Due to the overlap of faults occurring during several time periods, the total miles crossed will not equal the total length of the alternative routes and route variations.
[2]There were no areas with high landslide percentile for Segment 2.

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have no residual impacts from geologic hazards. All variations of the Proposed Action would have the same residual impacts from geologic hazards.

Soils

Table 3-38 presents the residual impacts on soil resources for all alternative routes and route variations in Segment 2.

Table 3-38. Soils Inventory Data and Residual Impacts on Segment 2—Blue Mountains

Alternative Route	Total Length (miles)	Inventory Data (miles crossed)								Residual Impacts (miles crossed)
		Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]		
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate	Low
Applicant's Proposed Action	33.8	9.9	19.6	4.3	0.1	33.7	0.0	29.9	3.9	33.8
Variation S2-A1	*2.8*	*0.3*	*2.3*	*0.2*	*0.0*	*2.8*	*0.0*	*2.8*	*0.0*	*2.8*
Variation S2-A2	*2.9*	*0.2*	*2.2*	*0.5*	*0.0*	*2.9*	*0.0*	*2.9*	*0.0*	*2.9*
Variation S2-B1	*3.7*	*2.0*	*1.5*	*0.2*	*0.0*	*3.7*	*0.0*	*3.5*	*0.2*	*3.7*
Variation S2-B2	*3.8*	*1.9*	*1.6*	*0.3*	*0.0*	*3.8*	*0.0*	*3.6*	*0.2*	*3.8*
Variation S2-C1	*9.3*	*5.6*	*2.4*	*1.3*	*0.0*	*9.3*	*0.0*	*7.8*	*1.5*	*9.3*
Variation S2-C2	*8.8*	*5.1*	*3.5*	*0.2*	*0.0*	*8.8*	*0.0*	*7.9*	*0.9*	*8.8*
Variation S2-E1	*2.3*	*0.8*	*1.5*	*0.0*	*0.0*	*2.3*	*0.0*	*2.3*	*0.0*	*2.3*
Variation S2-E2	*2.6*	*0.6*	*1.9*	*0.1*	*0.0*	*2.6*	*0.0*	*2.3*	*0.3*	*2.6*
Variation S2-F1	*12.1*	*0.1*	*9.9*	*2.1*	*0.1*	*12.0*	*0.0*	*9.9*	*2.2*	*12.1*
Variation S2-F2	*12.2*	*0.0*	*11.0*	*1.2*	*0.0*	*12.2*	*0.0*	*10.1*	*2.1*	*12.2*
Glass Hill	33.7	9.0	21.5	3.2	0.1	33.6	0.0	31.1	2.6	33.7
Variation S2-D1	*4.3*	*3.1*	*0.8*	*0.4*	*0.0*	*4.3*	*0.0*	*4.3*	*0.0*	*4.3*
Variation S2-D2	*4.1*	*2.5*	*0.9*	*0.7*	*0.0*	*4.1*	*0.0*	*4.1*	*0.0*	*4.1*
Mill Creek	34.0	4.4	26.6	3.0	0.0	34.0	0.0	30.5	3.5	34.0

Table Notes:
[1]Soil compaction potential is based on clay content.
No high impacts are anticipated for soil resoures.

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have only low residual impacts on soils. All variations of the Proposed Action would have the same residual impacts on soils.

Minerals

Table 3-39 presents the residual impacts on mineral resources for all alternative routes and route variations in Segment 1.

Table 3-39. Minerals Inventory Data and Residual Impacts on Segment 2—Blue Mountains							
Alternative Route	Total Length (miles)	Inventory Data (miles crossed)			Residual Impacts (miles crossed)		
		Active Mine or Active Mining Claims (miles crossed)	All Leases (miles crossed)	Producing Oil and Gas or Geothermal Wells (miles crossed)	None	Low	Moderate
Applicant's Proposed Action	33.8	0.0	0.0	0.0	33.8	0.0	0.0
Variation S2-A1	*2.8*	*0.0*	*0.0*	*0.0*	*2.8*	*0.0*	*0.0*
Variation S2-A2	*2.9*	*0.0*	*0.0*	*0.0*	*2.9*	*0.0*	*0.0*
Variation S2-B1	*3.7*	*0.0*	*0.0*	*0.0*	*3.7*	*0.0*	*0.0*
Variation S2-B2	*3.8*	*0.0*	*0.0*	*0.0*	*3.8*	*0.0*	*0.0*
Variation S2-C1	*9.3*	*0.0*	*0.0*	*0.0*	*9.3*	*0.0*	*0.0*
Variation S2-C2	*8.8*	*0.0*	*0.0*	*0.0*	*8.8*	*0.0*	*0.0*
Variation S2-E1	*2.3*	*0.0*	*0.0*	*0.0*	*2.3*	*0.0*	*0.0*
Variation S2-E2	*2.6*	*0.0*	*0.0*	*0.0*	*2.6*	*0.0*	*0.0*
Variation S2-F1	*12.1*	*0.0*	*0.0*	*0.0*	*2.3*	*0.0*	*0.0*
Variation S2-F2	*12.2*	*0.0*	*0.0*	*0.0*	*2.6*	*0.0*	*0.0*
Glass Hill	33.7	*0.0*	*0.0*	*0.0*	*12.1*	*0.0*	*0.0*
Variation S2-D1	*4.3*	*0.0*	*0.0*	*0.0*	*12.2*	*0.0*	*0.0*
Variation S2-D2	*4.1*	*0.0*	*0.0*	*0.0*	*33.7*	*0.0*	*0.0*
Mill Creek	34.0	*0.0*	*0.0*	*0.0*	34.0	0.0	0.0
Table Note: Due to some mineral resources not occurring for the alternative routes and route variations, the miles crossed will not equal the total length of the alternative routes and route variations.							

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have no residual impacts on mineral resources. All variations of the Proposed Action would have the same residual impacts on mineral resources.

Paleontological Resources

Table 3-40 presents the residual impacts on paleontological resources for all alternative routes and route variations in Segment 2.

Table 3-40. Paleontological Resources Inventory Data and Residual Impacts on Segment 2—Blue Mountains							
Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)					Residual Impacts (miles crossed)
		1	2	3	4	5	Low
Applicant's Proposed Action	33.8	16.7	17.1	0.0	0.0	0.0	33.8
Variation S2-A1	*2.8*	*0.0*	*2.8*	*0.0*	*0.0*	*0.0*	*2.8*
Variation S2-A2	*2.9*	*0.0*	*2.9*	*0.0*	*0.0*	*0.0*	*2.9*
Variation S2-B1	*3.7*	*1.2*	*2.5*	*0.0*	*0.0*	*0.0*	*3.7*
Variation S2-B2	*3.8*	*1.6*	*2.2*	*0.0*	*0.0*	*0.0*	*3.8*
Variation S2-C1	*9.3*	*8.4*	*0.9*	*0.0*	*0.0*	*0.0*	*9.3*
Variation S2-C2	*8.8*	*5.8*	*2.1*	*0.9*	*0.0*	*0.0*	*8.8*

Table 3-40. Paleontological Resources Inventory Data and Residual Impacts on Segment 2—Blue Mountains							
Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)					Residual Impacts (miles crossed)
		1	2	3	4	5	Low
Variation S2-E1	*2.3*	*0.7*	*1.6*	*0.0*	*0.0*	*0.0*	*2.3*
Variation S2-E2	*2.6*	*1.0*	*1.6*	*0.0*	*0.0*	*0.0*	*2.6*
Variation S2-F1	*12.1*	*6.1*	*6.0*	*0.0*	*0.0*	*0.0*	*12.1*
Variation S2-F2	*12.2*	*7.5*	*4.7*	*0.0*	*0.0*	*0.0*	*12.2*
Glass Hill	33.7	15.6	18.1	0.0	0.0	0.0	33.7
Variation S2-D1	*4.3*	*4.1*	*0.2*	*0.0*	*0.0*	*0.0*	*4.3*
Variation S2-D2	*4.1*	*4.0*	*0.1*	*0.0*	*0.0*	*0.0*	*4.1*
Mill Creek	34.0	19.0	15.0	0.0	0.0	0.0	34.0

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Proposed Action would have only low residual impacts on paleontological resources. All variations of the Proposed Action would have the same residual impacts on paleontological resources.

Glass Hill Alternative

Geologic Hazards

Following implementation of the design features for environmental protection and selective mitigation measures, the Glass Hill Alternative would have the same residual impacts from geologic hazards as the Applicant's Proposed Action Alternative. All Variations of this Alternative would have the same residual impacts from geologic hazards.

Soils

Following implementation of the design features for environmental protection and selective mitigation measures, the Glass Hill Alternative would have similar residual impacts on soils as the Applicant's Proposed Action Alternative but with less (0.9 less miles) low residual impacts. All Variations of the alternative would have the same residual impacts on soils.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Glass Hill Alternative would have the same residual impacts on mineral resources as the Applicant's Proposed Action Alternative. All variations of the Proposed Action would have the same residual impacts on mineral resources.

Paleontological Resources

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Glass Hill Alternative would have the same residual impacts on paleontological resources as the Applicant's Proposed Action Alternative but with less (0.9 less miles)

low residual impacts. All variations of the Proposed Action would have the same residual impacts on paleontological resources.

Mill Creek Alternative

Geologic Hazards

Following implementation of the design features for environmental protection and selective mitigation measures, the Mill Creek Alternative would have 1.0 mile of high residual impacts from geologic hazards associated with recent Quaternary faults.

Soils

Following implementation of the design features for environmental protection and selective mitigation measures, the Mill Creek Alternative would have similar residual impacts on soils as the Applicant's Proposed Action Alternative but with more (0.2 more miles) low residual impacts.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Mill Creek Alternative would have the same residual impacts on mineral resources as the Applicant's Proposed Action Alternative.

Paleontological Resources

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Mill Creek Alternative would have the same residual impacts on paleontological resources as the Applicant's Proposed Action Alternative but with more (0.2 more miles) low residual impacts.

Conclusion

In Segment 2, the Project would cross one Quaternary fault on the Mill Creek Alternative. The Applicant's Proposed Action or other alternatives do not cross any other geological hazards. Thus, the impacts on the B2H project from geological hazards would not be likely to occur during the life of the Project. All alternative routes considered cross some small areas with moderate susceptibility to water erosion, and compaction. The Applicants Proposed Action Alternative would have the greatest impact on soils with moderate susceptibility to water erosion and compaction. The Mill Creek Alternative would have the least impact on soils with moderate susceptibility to water erosion. The Glass Hill Alternative would have the least impact to soils with moderate susceptibility for compaction. However, with implementation of the selective mitigation measures (refer to Section 3.2.1.4), residual impacts would be low for any route selected.

The Project would not cross any mineral resources in Segment 2.

The Project would not cross any geological units with moderate or high sensitivity for paleontological resources.

SEGMENT 3—BAKER VALLEY

Applicant's Proposed Action Alternative

Geologic Hazards

Table 3-41 presents the residual impacts on geologic hazards for all alternative routes and route variations in Segment 3.

Table 3-41. Geologic Hazards Inventory Data and Residual Impacts on Segment 3—Baker Valley

Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)[2]		Residual Impacts (miles crossed)		
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84	Low	Moderate	High
Applicant's Proposed Action	55.2	0.6	0.0	0.0	55.2	0.0	55.2	0.0	0.0
Variation S3-A1	*12.4*	*0.1*	*0.0*	*0.0*	*12.4*	*0.0*	*12.4*	*0.0*	*0.0*
Variation S3-A2	*12.2*	*0.8*	*0.0*	*0.0*	*12.2*	*0.0*	*12.2*	*0.0*	*0.0*
Variation S3-B1	*13.9*	*0.5*	*0.0*	*0.0*	*13.9*	*0.0*	*13.9*	*0.0*	*0.0*
Variation S3-B2	*14.4*	*1.0*	*0.0*	*0.0*	*14.4*	*0.0*	*14.4*	*0.0*	*0.0*
Variation S3-B3	*14.7*	*0.9*	*0.0*	*0.0*	*14.7*	*0.0*	*14.7*	*0.0*	*0.0*
Variation S3-B4	*14.3*	*0.9*	*0.0*	*0.0*	*14.3*	*0.0*	*14.3*	*0.0*	*0.0*
Variation S3-B5	*14.0*	*1.1*	*0.0*	*0.0*	*14.0*	*0.0*	*14.0*	*0.0*	*0.0*
Variation S3-C1	*21.1*	*0.0*	*0.0*	*0.0*	*21.1*	*0.0*	*21.1*	*0.0*	*0.0*
Variation S3-C2	*21.7*	*0.0*	*0.0*	*0.0*	*21.7*	*0.0*	*21.7*	*0.0*	*0.0*
Variation S3-C3	*21.1*	*0.0*	*0.0*	*0.0*	*21.1*	*0.0*	*21.1*	*0.0*	*0.0*
Variation S3-C4	*21.4*	*0.0*	*0.0*	*0.0*	*21.4*	*0.0*	*21.4*	*0.0*	*0.0*
Variation S3-C5	*21.0*	*0.0*	*0.0*	*0.0*	*21.0*	*0.0*	*21.0*	*0.0*	*0.0*
Variation S3-C6	*24.7*	*0.0*	*0.0*	*0.0*	*24.7*	*0.0*	*24.7*	*0.0*	*0.0*
Flagstaff A	55.3	1.2	0.0	0.0	55.3	0.0	55.3	0.0	0.0
Timber Canyon	70.3	0.0	0.0	0.0	68.7	1.6	70.3	0.0	0.0
Flagstaff A – Burnt River Mountain	55.3	1.2	0.0	0.0	55.3	0.0	55.3	0.0	0.0
Flagstaff B	56.0	1.0	0.0	0.0	56.0	0.0	56.0	0.0	0.0
Flagstaff B – Burnt River West	55.7	1.7	0.0	0.0	55.7	0.0	55.7	0.0	0.0
Flagstaff B – Durkee	59.6	1.0	0.0	0.0	59.6	0.0	59.6	0.0	0.0

Table Notes:
[1]Due to the overlap of faults occurring during several time periods, the total miles crossed will not equal the total length of the alternative routes and route variations.
[2]There were no areas with high landslide percentile for Segment 3

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would 0.6 mile of moderate residual impacts from geologic hazards associated with older Quaternary faults. All variations of the Proposed Action would have the same residual impacts from geologic hazards.

Variation S3-A1

This variation would have 0.1 mile of moderate residual impacts from geologic hazards.

Variation S3-A2

This variation would have 0.8 mile of moderate residual impacts from geologic hazards.

Variation S3-B1

This variation would have 0.5 mile of moderate residual impacts from geologic hazards.

Variation S3-B2

This variation would have 1.0 mile of moderate residual impacts from geologic hazards.

Variation S3-B3

This variation would have 0.9 mile of moderate residual impacts from geologic hazards.

Variation S3-B4

This variation would have 0.9 mile of moderate residual impacts from geologic hazards.

Variation S3-B5

This variation would have 1.1 miles of moderate residual impacts from geologic hazards.

Variations S3-C1 through S3-C6

These variations would have no moderate or high residual impacts from geologic hazards.

Soils

Table 3-42 presents the residual impacts on soil resources for all alternative routes and route variations in Segment 3.

Table 3-42. Soils Inventory Data and Residual Impacts on Segment 3—Baker Valley

Alternative Route	Total Length (miles)	Inventory Data (miles crossed)								Residual Impacts (miles crossed)
		Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]		
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate	Low
Applicant's Proposed Action	55.2	0.0	43.2	12.0	0.0	52.2	3.0	49.1	6.1	55.2
Variation S3-A1	*12.4*	*0.0*	*11.9*	*0.5*	*0.0*	*12.4*	*0.0*	*11.0*	*1.4*	*12.4*
Variation S3-A2	*12.2*	*0.0*	*12.2*	*0.0*	*0.0*	*12.2*	*0.0*	*9.3*	*2.9*	*12.2*
Variation S3-B1	*13.9*	*0.0*	*10.5*	*3.4*	*0.0*	*13.9*	*0.0*	*12.6*	*1.3*	*13.9*

Table 3-42. Soils Inventory Data and Residual Impacts on Segment 3—Baker Valley

Alternative Route	Total Length (miles)	Inventory Data (miles crossed)								Residual Impacts (miles crossed)
		Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]		
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate	Low
Variation S3-B2	*14.4*	*0.0*	*13.1*	*1.3*	*0.0*	*14.4*	*0.0*	*12.5*	*1.9*	*14.4*
Variation S3-B3	*14.7*	*0.0*	*13.3*	*1.4*	*0.0*	*14.7*	*0.0*	*13.2*	*1.5*	*14.7*
Variation S3-B4	*14.3*	*0.0*	*12.4*	*1.9*	*0.0*	*14.3*	*0.0*	*13.4*	*0.9*	*14.3*
Variation S3-B5	*14.0*	*0.0*	*12.2*	*1.8*	*0.0*	*14.0*	*0.0*	*12.8*	*1.2*	*14.0*
Variation S3-C1	*21.1*	*0.0*	*14.1*	*7.0*	*0.0*	*18.1*	*3.0*	*19.3*	*1.8*	*21.1*
Variation S3-C2	*21.7*	*0.0*	*15.7*	*6.0*	*0.0*	*18.9*	*2.8*	*19.8*	*1.9*	*21.7*
Variation S3-C3	*21.1*	*0.1*	*16.5*	*4.5*	*0.0*	*21.0*	*0.1*	*15.5*	*5.6*	*21.1*
Variation S3-C4	*21.4*	*0.0*	*16.7*	*4.7*	*0.0*	*21.4*	*0.0*	*16.0*	*5.4*	*21.4*
Variation S3-C5	*21.0*	*0.8*	*17.0*	*3.2*	*0.0*	*21.0*	*0.0*	*16.8*	*4.2*	*21.0*
Variation S3-C6	*24.7*	*2.3*	*18.8*	*3.6*	*0.0*	*24.7*	*0.0*	*20.5*	*4.2*	*24.7*
Flagstaff A	55.3	0.0	44.9	10.4	0.0	52.3	3.0	49.3	6.0	55.3
Timber Canyon	70.3	2.8	55.7	11.8	0.0	69.4	0.9	63.2	7.1	70.3
Flagstaff A – Burnt River Mountain	55.3	0.1	47.3	7.9	0.0	55.2	0.1	45.5	9.8	55.3
Flagstaff B	56.0	0.0	46.0	10.0	0.0	53.0	3.0	49.7	6.3	56.0
Flagstaff B – Burnt River West	55.7	0.8	49.2	5.7	0.0	55.7	0.0	45.5	10.2	55.7
Flagstaff B – Durkee	59.6	2.3	50.7	6.6	0.0	59.6	0.0	50.9	8.7	59.6

Table Notes:
[1]Soil compaction potential is based on clay content.
No high impacts are anticipated for soil resoures.

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have only low residual impacts on soils. The variations of the Proposed Action would have the same residual impacts on soils.

Minerals

Table 3-43 presents the residual impacts on mineral resources for all alternative routes and route variations in Segment 3.

Table 3-43. Minerals Inventory Data and Residual Impacts on Segment 3—Baker Valley							
Alternative Route	Total Length (miles)	Inventory Data (miles crossed)[1]			Residual Impacts (miles crossed)		
		Active Mine or Active Mining Claims (miles crossed)	All Leases (miles crossed)	Producing Oil and Gas or Geothermal Wells (miles crossed)	None	Low	Moderate
Applicant's Proposed Action	55.2	1.9	0.0	0.0	53.3	1.9	0.0
Variation S3-A1	*12.4*	*0.0*	*0.0*	*0.0*	*12.4*	*0.0*	*0.0*
Variation S3-A2	*12.2*	*0.0*	*0.0*	*0.0*	*12.2*	*0.0*	*0.0*
Variation S3-B1	*13.9*	*1.1*	*0.0*	*0.0*	*12.8*	*1.1*	*0.0*
Variation S3-B2	*14.4*	*0.3*	*0.0*	*0.0*	*14.1*	*0.3*	*0.0*
Variation S3-B3	*14.7*	*0.3*	*0.0*	*0.0*	*14.4*	*0.3*	*0.0*
Variation S3-B4	*14.3*	*0.0*	*0.0*	*0.0*	*14.3*	*0.0*	*0.0*
Variation S3-B5	*14.0*	*0.0*	*0.0*	*0.0*	*14.0*	*0.0*	*0.0*
Variation S3-C1	*21.1*	*0.8*	*0.0*	*0.0*	*20.3*	*0.8*	*0.0*
Variation S3-C2	*21.7*	*1.8*	*0.0*	*0.0*	*19.9*	*1.8*	*0.0*
Variation S3-C3	*21.1*	*3.3*	*0.0*	*0.0*	*17.8*	*3.3*	*0.0*
Variation S3-C4	*21.4*	*3.3*	*0.0*	*0.0*	*18.1*	*3.3*	*0.0*
Variation S3-C5	*21.0*	*1.6*	*0.0*	*0.0*	*19.4*	*1.6*	*0.0*
Variation S3-C6	*24.7*	*4.2*	*0.0*	*0.0*	*20.5*	*4.2*	*0.0*
Flagstaff A	55.3	0.8	0.0	0.0	54.5	0.8	0.0
Timber Canyon	70.3	2.5	0.0	0.0	67.8	2.5	0.0
Flagstaff A – Burnt River Mountain	55.3	3.3	0.0	0.0	52.0	3.3	0.0
Flagstaff B	56.0	1.1	0.0	0.0	54.9	1.1	0.0
Flagstaff B – Burnt River West	55.7	1.9	0.0	0.0	53.8	1.9	0.0
Flagstaff B – Durkee	59.6	4.5	0.0	0.0	55.1	4.5	0.0
Table Note: Due to some mineral resources not occurring for the alternative routes and route variations, the miles crossed will not equal the total length of the alternative routes and route variations.							

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would not have any moderate or high residual impacts on mineral resources. The variations for the Proposed Action would have the same residual impacts as the Proposed Action.

Paleontological Resources

Table 3-44 presents the residual impacts on paleontological resources for all alternative routes and route variations in Segment 3.

Table 3-44. Paleontological Resources Inventory Data and Residual Impacts on Segment 3—Baker Valley							
Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)					Residual Impacts (miles crossed)
		1	2	3	4	5	Low
Applicant's Proposed Action	55.2	13.4	21.9	4.8	15.1	0.0	55.2
Variation S3-A1	*12.4*	*9.9*	*2.5*	*0.0*	*0.0*	*0.0*	*12.4*
Variation S3-A2	*12.2*	*8.6*	*3.6*	*0.0*	*0.0*	*0.0*	*12.2*
Variation S3-B1	*13.9*	*2.8*	*9.3*	*0.0*	*1.8*	*0.0*	*13.9*
Variation S3-B2	*14.4*	*0.8*	*9.7*	*0.0*	*3.9*	*0.0*	*14.4*
Variation S3-B3	*14.7*	*0.8*	*9.5*	*0.0*	*4.4*	*0.0*	*14.7*
Variation S3-B4	*14.3*	*0.7*	*8.0*	*0.0*	*5.6*	*0.0*	*14.3*
Variation S3-B5	*14.0*	*0.7*	*9.3*	*0.0*	*4.0*	*0.0*	*14.0*
Variation S3-C1	*21.1*	*0.7*	*5.9*	*4.8*	*9.7*	*0.0*	*21.1*
Variation S3-C2	*21.7*	*0.8*	*6.6*	*4.8*	*9.5*	*0.0*	*21.7*
Variation S3-C3	*21.1*	*6.8*	*4.3*	*5.8*	*4.2*	*0.0*	*21.1*
Variation S3-C4	*21.4*	*7.1*	*5.4*	*5.8*	*3.1*	*0.0*	*21.4*
Variation S3-C5	*21.0*	*8.6*	*4.0*	*5.9*	*2.5*	*0.0*	*21.0*
Variation S3-C6	*24.7*	*10.6*	*4.7*	*5.8*	*3.6*	*0.0*	*24.7*
Flagstaff A	55.3	11.3	21.9	4.8	17.3	0.0	55.3
Timber Canyon	70.3	30.6	26.1	4.8	8.8	0.0	70.3
Flagstaff A – Burnt River Mountain	55.3	17.4	20.3	5.8	11.8	0.0	55.3
Flagstaff B	56.0	11.4	22.1	4.8	17.7	0.0	56.0
Flagstaff B – Burnt River West	55.7	18.0	21.3	5.9	10.5	0.0	55.7
Flagstaff B – Durkee	59.6	21.3	20.9	5.8	11.6	0.0	59.6

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Proposed Action would have only low residual impacts on paleontological resources. The variations of the Proposed Action would have similar residual impacts on paleontological resources.

Flagstaff A Alternative

Geologic Hazards

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff A Alternative would have 1.2 miles of moderate residual impacts from geologic hazards associated with older Quaternary faults as the Applicant's Proposed Action Alternative.

Soils

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff A Alternative would have similar residual impacts on soils as the Applicant's Proposed Action Alternative but with more (1.1 more miles) low residual impacts.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff A Alternative would have similar residual impacts on mineral resources as the Applicant's Proposed Action Alternative but with less (1.1 less miles) low residual impacts.

Paleontological Resources

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Flagstaff A Alternative would have similar residual impacts on paleontological resources as the Applicant's Proposed Action Alternative but with more (1.1 more miles) low residual impacts.

Timber Canyon Alternative

Geologic Hazards

Following implementation of the design features for environmental protection and selective mitigation measures, the Timber Canyon Alternative would have no moderate or high residual impacts from geologic hazards.

Soils

Following implementation of the design features for environmental protection and selective mitigation measures, the Timber Canyon Alternative would have 15.1 more miles of low residual impacts on soils as the Applicant's Proposed Action Alternative.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Timber Canyon Alternative would have similar residual impacts on mineral resources as the Applicant's Proposed Action Alternative but with more (0.6 more miles) low residual impacts.

Paleontological Resources

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Timber Creek Alternative would have 15.1 more miles of low residual impacts on paleontological resources as the Applicant's Proposed Action Alternative.

Flagstaff A – Burnt River Mountain Alternative

Geologic Hazards

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff A Burnt River Mountain Alternative would have 1.2 miles of moderate residual impacts from geologic hazards associated with older Quaternary faults.

Soils

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff A Burnt River Mountain Alternative would have similar residual impacts on soils as the Applicant's Proposed Action Alternative but with more (0.1 more miles) low residual impacts.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff A Burnt River Mountain Alternative would have similar residual impacts on mineral resources as the Applicant's Proposed Action Alternative but with more (1.4 more miles) of low residual impacts.

Paleontological Resources

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Flagstaff A Burnt River Mountain Alternative would have similar residual impacts on paleontological resources as the Applicant's Proposed Action Alternative but with more (0.1 more miles) low residual impacts.

Flagstaff B Alternative

Geologic Hazards

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff B Alternative would have 1.0 mile of moderate residual impacts from geologic hazards associated with older Quaternary faults.

Soils

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff B Alternative would have similar residual impacts on soils as those of the Applicant's Proposed Action Alternative but with more (0.8 more miles) of low residual impacts.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff B Alternative would have similar residual impacts on mineral resources as those of the Applicant's Proposed Action Alternative but with less (0.8 less miles) of low residual impacts.

Paleontological Resources

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Flagstaff B Alternative would have similar residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative but with more (0.8 more miles) low residual impacts.

Flagstaff B – Burnt River West Alternative

Geologic Hazards

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff B Burnt River West Alternative would have 1.7 miles of moderate residual impacts from geologic hazards associated with older Quaternary faults.

Soils

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff B Burnt River West Alternative would have similar residual impacts on soils as those of the Applicant's Proposed Action Alternative but with more (0.5 more miles) low residual impacts.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff B Burnt River West Alternative would have the same residual impacts on mineral resources as those of the Applicant's Proposed Action Alternative.

Paleontological Resources

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Flagstaff B Burnt River West Alternative would have similar residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative but with more (0.5 more miles) low residual impacts.

Flagstaff B – Durkee Alternative

Geologic Hazards

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff B Durkee Alternative would have 1.0 mile of moderate residual impacts from geologic hazards associated with older Quaternary faults.

Soils

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff B Durkee Alternative would have similar residual impacts on soils as those of the Applicant's Proposed Action Alternative but with more (4.4 more miles) low residual impacts.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Flagstaff B Durkee Alternative would have similar residual impacts on mineral resources as those of the Applicant's Proposed Action Alternative but with more (2.6 more miles) low residual impacts.

Paleontological Resources

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Flagstaff B Durkee Alternative would have similar residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative but with more (4.4 more miles) of low residual impacts.

Conclusion

The Project would cross several older Quaternary faults, and the Timber Canyon Alternative is the only one which crosses an area in the moderate percentile for landslides. Thus, impacts on the B2H Project

from geological hazards would not be likely to occur during the life of the Project, or the chance of such impacts would be small. The Project does cross soils with moderate susceptibility wind and water erosion, and soil compaction. The Applicant's Proposed Action Alternative would have the greatest impact to soils with moderate susceptibility to water erosion, and the Flagstaff B (Durkee) Alternative would have the least. The Flagstaff B (Durkee) Alternative, Flagstaff B (Burnt River West) Alternative, and the Flagstaff A (Burnt River Mountain) Alterative would have the least impact to soils with moderate susceptibility to water erosion, and the Applicant's Proposed Action Alternative, Flagstaff A Alternative, and Flagstaff B Alternative would have the greatest impact to soils with moderate susceptibility to wind erosion. The Flagstaff B (Burnt River West) Alternative would have the greatest impact in soils with a moderate susceptibility for soil compaction, and the Applicant's Proposed Action Alternative and the Flagstaff A Alternative would have the least. However, with implementation of the selective mitigation measures (refer to Section 3.2.1.4), residual impacts would be low for any route selected.

Active Mines are present in Segment 3. The Flagstaff B (Durkee) Alternative would have the greatest impact to active mines, and the Flagstaff A Alternative would have the least. Moderate effects including restriction of exploration for mineral resources or access to existing mines during the construction period could occur where alternative routes analyzed cross existing leases or claims. As part of the preconstruction process, the Applicant would identify mineral claims and leases and either negotiate permission to use the land surface in these areas or relocate the transmission line to avoid existing claims and leases. Where access to mineral resources may be restricted, the Applicant would provide compensation for damage, access rights, and easements with mine owners, claimants, and leaseholders. If necessary, the Applicant would provide mine operators with mine access across the B2H Project area during construction. The Flagstaff B-Durkee Alternative would have the greatest effect on mineral resources (4.5 miles of active mines and mining claims), and the Flagstaff A Alternative would have the least (0.8 miles of active mines and mining claims.

All of the alternatives in Segment 3 cross geological units with a high sensitivity for paleontological resources. The Flagstaff B Alternative would have the highest impact on these geological units and the Timber Canyon Alternative would have the least.

SEGMENT 4—BROGAN

Applicant's Proposed Action Alternative

Geologic Hazards

Table 3-45 presents the residual impacts on geologic hazards for all alternative routes and route variations in Segment 4.

Table 3-45. Geologic Hazards Inventory Data and Residual Impacts on Segment 4—Brogan									
Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)[2]		Residual Impacts (miles crossed)		
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84	Low	Moderate	High
Applicant's Proposed Action	40.1	0.4	0.0	0.8	40.1	0.0	39.3	0.0	0.8
Variation S4-A1	*5.9*	*0.0*	*0.0*	*0.0*	*5.9*	*0.0*	*5.9*	*0.0*	*0.0*
Variation S4-A2	*6.0*	*0.0*	*0.0*	*0.0*	*6.0*	*0.0*	*6.0*	*0.0*	*0.0*
Variation S4-A3	*6.1*	*0.0*	*0.0*	*0.0*	*6.1*	*0.0*	*6.1*	*0.0*	*0.0*
Tub Mountain South	40.5	0.0	0.0	0.1	40.5	0.0	40.4	0.0	0.1
Willow Creek	34.6	0.0	0.0	0.1	34.6	0.0	34.5	0.0	0.1

Table Notes:
[1]Due to the overlap of faults occurring during several time periods, the total miles crossed will not equal the total length of the alternative routes and route variations.
[2]There were no areas with high landslide percentile for Segment 4

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have 0.8 mile of high residual impacts and 0.4 mile of moderate residual impacts from geologic hazards associated with Quaternary faults

Variations S4-A1 through S4-A3

These variations would have no residual impacts from geologic hazards.

Soils

Table 3-46 presents the residual impacts on soil resources for all alternative routes and route variations in Segment 4.

Table 3-46. Soils Inventory Data and Residual Impacts on Segment 4—Brogan										
Alternative Route	Total Length (miles)	Inventory Data (miles crossed)								Residual Impacts (miles crossed)
		Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]		
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate	Low
Applicant's Proposed Action	40.1	0.0	26.9	13.2	0.0	38.6	1.5	13.6	26.5	40.1
Variation S4-A1	*5.9*	*0.0*	*4.7*	*1.2*	*0.0*	*5.4*	*0.5*	*5.0*	*0.9*	*5.9*
Variation S4-A2	*6.0*	*0.0*	*3.6*	*2.4*	*0.0*	*5.3*	*0.7*	*5.3*	*0.7*	*6.0*
Variation S4-A3	*6.1*	*0.0*	*3.7*	*2.4*	*0.0*	*5.4*	*0.7*	*5.3*	*0.8*	*6.1*
Tub Mountain South	40.5	0.3	15.4	24.8	0.3	33.3	6.9	16.7	23.8	40.5
Willow Creek	34.6	0.0	19.1	15.5	0.0	29.1	5.5	14.1	20.5	34.6

Table Notes:
[1]Soil compaction potential is based on clay content.
No high impacts are anticipated for soil resoures.

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have only low residual impacts on soils. The variations for the Proposed Action would have the same residual impacts on soils

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have only low residual impacts on mineral resources. The variations of the Proposed Action would have the same residual impacts on mineral resources.

Table 3-47 presents the residual impacts on mineral resources for all alternative routes and route variations in Segment 4.

Table 3-47. Minerals Inventory Data and Residual Impacts on Segment 4—Brogan							
Alternative Route	Total Length (miles)	Inventory Data (miles crossed)			Residual Impacts (miles crossed)		
		Active Mine or Active Mining Claims (miles crossed)	All Leases (miles crossed)	Producing Oil and Gas or Geothermal Wells (miles crossed)	None	Low	Moderate
Applicant's Proposed Action	40.1	3.8	6.0	1.1	32.9	1.2	6.0
Variation S4-A1	*5.9*	*0.0*	*0.0*	*0.0*	*5.9*	*0.0*	*0.0*
Variation S4-A2	*6.0*	*0.0*	*0.0*	*0.0*	*6.0*	*0.0*	*0.0*
Variation S4-A3	*6.1*	*0.0*	*0.0*	*0.0*	*6.1*	*0.0*	*0.0*
Tub Mountain South	40.5	3.7	22.7	0	17.8	0.0	22.7
Willow Creek	34.6	2.7	4.6	1.1	30.0	0.0	4.6

Table Note: [1]Due to some mineral resources not occurring for the alternative routes and route variations, the miles crossed will not equal the total length of the alternative routes and route variations.

Paleontological Resources

Table 3-48 presents the residual impacts on paleontological resources for all alternative routes and route variations in Segment 4.

Table 3-48. Paleontological Resources Inventory Data and Residual Impacts on Segment 4—Brogan

Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)					Residual Impacts (miles crossed)
		1	2	3	4	5	Low
Applicant's Proposed Action	40.1	8.6	14.7	5.8	11.0	0.0	40.1
Variation S4-A1	*5.9*	*0.0*	*2.7*	*2.7*	*0.5*	*0.0*	*5.9*
Variation S4-A2	*6.0*	*0.0*	*2.3*	*3.1*	*0.6*	*0.0*	*6.0*
Variation S4-A3	*6.1*	*0.0*	*2.2*	*3.3*	*0.6*	*0.0*	*6.1*
Tub Mountain South	40.5	0.0	10.0	3.1	27.4	0.0	40.5
Willow Creek	34.6	0.0	10.2	2.7	21.7	0.0	34.6

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Proposed Action would have only low residual impacts on paleontological resources. The variations of the Proposed Action would have the same residual impacts on paleontological resources.

Tub Mountain South Alternative

Geologic Hazards

Following implementation of the design features for environmental protection and selective mitigation measures, the Tub Mountain South Alternative would have 0.1 mile of high residual impacts from geologic hazards associated with Quaternary faults.

Soils

Following implementation of the design features for environmental protection and selective mitigation measures, the Tub Mountain South Alternative would have similar residual impacts on soils as the Applicant's Proposed Action Alternative but with more (0.4 more miles) low residual impacts.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Tub Mountain South Alternative would have 22.7 miles of moderate residual impacts on mineral resources.

Paleontological Resources

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Tub Mountain South Alternative would have similar residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative but with more (0.4 more miles) low residual impacts.

Willow Creek Alternative

Geologic Hazards

Following implementation of the design features for environmental protection and selective mitigation measures, the Willow Creek Alternative would have 0.1 mile of high residual impacts from geologic hazards associated with Quaternary faults.

Soils

Following implementation of the design features for environmental protection and selective mitigation measures, the Willow Creek Alternative would have similar residual impacts on soils as the Applicant's Proposed Action Alternative but with less (5.5 less miles) low residual impacts.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Willow Creek Alternative would have 4.6 miles of moderate residual impacts on mineral resources.

Paleontological Resources

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Willow Creek Alternative would have similar residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative but with less (5.5 less miles) low residual impacts.

Conclusion

The Project would cross Quaternary faults in Segment 4. The Applicant's Proposed Action would cross the most Quaternary faults. Thus, impacts on the B2H Project from geological hazards would not be likely to occur during the life of the Project. The Project would cross soils sensitive to erosion and compaction in Segment 4. The Tub Mountain South Alternative would have the highest impact on soils with moderate susceptibility to wind and water erosion and The Applicant's Proposed Action Alternative would have the least. The Applicant's Proposed Action Alternative would have the greatest impact on soils with a moderate susceptibility for compaction, and the Willow Creek Alternative would have the least. However, with implementation of the selective mitigation measures (refer to Section 3.2.1.4), residual impacts would be low for any route selected.

All alternatives in Segment 4 would cross mineral resources. The Applicant's Proposed Action Alternative would cross the highest number of active mines or active claims, and the Willow Creek Alternative would have the least. The Tub Mountain South Alternative would have the highest number of producing oil and gas, or geothermal wells, and the Applicant's Proposed Action Alternative and Willow Creek Alternative would have the least. The Tub Mountain Alternative would have the greatest impact on leases (22.7 miles) whereas the Willow Creek Alternative would have the least (4.6 miles).

All alternatives cross geological units with moderate and high sensitivity for paleontological resources. The Tub Mountain South Alternative would have the highest impact on these geological units (30.5

miles of moderate and high sensitivity), and the Applicant's Proposed Action Alternative would have the least (16.8 miles).

SEGMENT 5—MALHEUR

Applicant's Proposed Action Alternative

Geologic Hazards

Table 3-49 presents the residual impacts on geologic hazards for all alternative routes and route variations in Segment 5.

Table 3-49. Alternative Route Comparison for Geologic Hazards Inventory Data and Residual Impacts on Segment 5—Malheur

Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)[2]		Residual Impacts (miles crossed)		
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84	Low	Moderate	High
Applicant's Proposed Action	40.4	0.0	0.0	0.0	40.4	0.0	40.4	0.0	0.0
Variation S5-A1	*7.4*	*0.0*	*0.0*	*0.0*	*7.4*	*0.0*	*7.4*	*0.0*	*0.0*
Variation S5-A2	*7.4*	*0.0*	*0.0*	*0.0*	*7.4*	*0.0*	*7.4*	*0.0*	*0.0*
Variation S5-B1	*2.5*	*0.0*	*0.0*	*0.0*	*2.5*	*0.0*	*2.5*	*0.0*	*0.0*
Variation S5-B2	*2.8*	*0.0*	*0.0*	*0.0*	*2.8*	*0.0*	*2.8*	*0.0*	*0.0*
Malheur S	43.5	0.1	0.0	0.0	43.5	0.0	43.5	0.0	0.0
Malheur A	43.1	0.1	0.0	0.0	43.1	0.0	43.1	0.0	0.0

Table Notes:
[1]Due to the overlap of faults occurring during several time periods, the total miles crossed will not equal the total length of the alternative routes and route variations.
[2]There were no areas with high landslide percentile for Segment 5

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have only low residual impacts from geologic hazards. The variations to the Proposed Action would have the same residual impacts from geologic hazards.

Soils

Table 3-50 presents the residual impacts on soil resources for all alternative routes and route variations in Segment 5.

Table 3-50. Soils Inventory Data and Residual Impacts on Segment 5—Malheur										
Alternative Route	Total Length (miles)	Inventory Data (miles crossed)								Residual Impacts (miles crossed)
		Water Erosion Potential (K factor)			Wind Erosion Potential (WEG)			Soil Compaction Potential[1]		
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate	Low
Applicant's Proposed Action	40.4	0.0	27.1	13.3	0.0	39.6	0.8	15.2	25.2	40.4
Variation S5-A1	*7.4*	*0.0*	*6.4*	*1.0*	*0.0*	*7.4*	*0.0*	*2.4*	*5.0*	*7.4*
Variation S5-A2	*7.4*	*0.0*	*7.4*	*0.0*	*0.0*	*7.4*	*0.0*	*2.6*	*4.8*	*7.4*
Variation S5-B1	*2.5*	*0.0*	*1.0*	*1.5*	*0.0*	*2.5*	*0.0*	*1.0*	*1.5*	*2.5*
Variation S5-B2	*2.8*	*0.0*	*1.5*	*1.3*	*0.0*	*2.8*	*0.0*	*2.2*	*0.6*	*2.8*
Malheur S	43.5	0.0	32.0	11.5	0.0	43.3	0.2	14.8	28.7	43.5
Malheur A	43.1	0.0	32.5	10.6	0.0	42.6	0.5	14.0	29.1	43.1

Table Notes:
[1]Soil compaction potential is based on clay content.
No high impacts are anticipated for soil resoures.

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have only low residual impacts on soil resources. All variations of the Proposed Action would have the same residual impacts on soils.

Minerals

Table 3-51 presents the residual impacts on mineral resources for all alternative routes and route variations in Segment 5.

Table 3-51. Minerals Inventory Data and Residual Impacts on Segment 5—Malheur							
Alternative Route	Total Length (miles)	Inventory Data (miles crossed)[1]			Residual Impacts (miles crossed)		
		Active Mine or Active Mining Claims (miles crossed)	All Leases (miles crossed)	Producing Oil and Gas or Geothermal Wells (miles crossed)	None	Low	Moderate
Applicant's Proposed Action	40.4	0.3	16.5	2.0	23.4	0.5	16.5
Variation S5-A1	*7.4*	*0.0*	*4.3*	*0.0*	*3.1*	*0.0*	*4.3*
Variation S5-A2	*7.4*	*0.0*	*6.7*	*0.0*	*0.7*	*0.0*	*6.7*
Variation S5-B1	*2.5*	*0.0*	*0.0*	*0.0*	*2.5*	*0.0*	*0.0*
Variation S5-B2	*2.8*	*0.0*	*0.0*	*0.0*	*2.8*	*0.0*	*0.0*
Malheur S	43.5	3.9	12.1	2.0	27.2	4.2	12.1
Malheur A	43.1	6.0	12.1	2.0	24.7	6.3	12.1

Table Note: [1]Due to some mineral resources not occurring for the alternative routes and route variations, the miles crossed will not equal the total length of the alternative routes and route variations.

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have 16.5 miles of moderate residual impacts on mineral resources.

Variation S5-A1

This variation would have 4.3 miles of residual impacts on mineral resources.

Variation S5-A2

This variation would have 6.7 miles of residual impacts on mineral resources.

Variation S5-B1

This variation would have 0.0 mile of residual impacts on mineral resources.

Variation S5-B2

This variation would have 0.0 mile of residual impacts on mineral resources.

Paleontological Resources

Table 3-52 presents the residual impacts on paleontological resources for all alternative routes and route variations in Segment 5.

Table 3-52. Paleontological Resources Inventory Data and Residual Impacts on Segment 5—Malheur

Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)					Residual Impacts (miles crossed)
		1	2	3	4	5	Low
Applicant's Proposed Action	40.4	1.0	13.5	0.0	25.9	0.0	40.4
Variation S5-A1	*7.4*	*0.0*	*1.3*	*0.0*	*6.1*	*0.0*	*7.4*
Variation S5-A2	*7.4*	*0.0*	*0.0*	*0.0*	*7.4*	*0.0*	*7.4*
Variation S5-B1	*2.5*	*0.0*	*1.4*	*0.0*	*1.1*	*0.0*	*2.5*
Variation S5-B2	*2.8*	*0.0*	*1.4*	*0.0*	*1.4*	*0.0*	*2.8*
Malheur S	43.5	1.5	19.1	0.0	22.9	0.0	43.5
Malheur A	43.1	1.2	18.6	0.0	23.3	0.0	43.1

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Proposed Action would have only low residual impacts on paleontological resources. The variations would have the same residual impacts on paleontological resources as those of the Proposed Action.

Malheur S Alternative

Geologic Hazards

Following implementation of the design features for environmental protection and selective mitigation measures, the Malheur S Alternative would have the same residual impacts from geologic hazards as those of the Applicant's Proposed Action Alternative.

Soils

Following implementation of the design features for environmental protection and selective mitigation measures, the Malheur S Alternative would have similar residual impacts on soils as those of the Applicant's Proposed Action Alternative but with more (3.1 more miles) low residual impacts.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Malheur S Alternative would have 12.1 miles of moderate residual impacts on mineral resources.

Paleontological Resources

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Malheur S Alternative would have similar residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative but with more (3.1 more miles) low residual impacts.

Malheur A Alternative

Geologic Hazards

Following implementation of the design features for environmental protection and selective mitigation measures, the Malheur A Alternative would have the same residual impacts from geologic hazards as those of the Applicant's Proposed Action Alternative.

Soils

Following implementation of the design features for environmental protection and selective mitigation measures, the Malheur A Alternative would have similar residual impacts on soils as those of the Applicant's Proposed Action Alternative but with more (2.7 more miles) low residual impacts.

Minerals

Following implementation of the design features for environmental protection and selective mitigation measures, the Malheur A Alternative would have 12.1 miles of moderate residual impacts on mineral resources.

Paleontological Resources

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Malheur A Alternative would have similar residual impacts on paleontological resources as those of the Applicant's Proposed Action Alternative but with more (2.7 more miles) low residual impacts.

Conclusion

For Segment 5, The Malheur S and A alternatives cross a Class B fault. No other geological hazards are crossed in Segment 5. Thus, impacts on the B2H Project from geological hazards would not be likely to occur during the life of the Project. All alternative routes considered cross soils with moderate potential for water and wind erosion and soil compaction. However, with implementation of the selective

mitigation measures (refer to Section 3.2.1.4), residual impacts would be low for any route selected. The Applicant's Proposed Action Alternative would have the highest impact on soils with moderate susceptibility to wind and water erosion. The Malheur A Alternative would have the least impact on soils with moderate susceptibility to water erosion, and the Malheur S Alternative would have the least for soils with moderate susceptibility to wind erosion. The Malheur A Alternative would have the greatest impact on soils with a moderate susceptibility for compaction, and the Applicant's Proposed Action Alternative would have the least.

All alternatives in Segment 5 cross mineral resources. The Malheur A Alternative would cross the most active mines and mining claims (6 miles), and the Applicant's Proposed Action Alternative would cross the least. The Applicant's Proposed Action Alternative would cross the largest area with leases (16.5 miles). All alternatives in Segment 5 have similar impacts to producing wells.

All alternatives for Segment 5 cross geological units with high sensitivity for paleontological resources in Segment 5. The Applicant's Proposed Action Alternative would have the highest impact on these geological units (25.9 miles), and the Malheur S Alternative would have the least (22.9 miles).

SEGMENT 6—TREASURE VALLEY

Applicant's Proposed Action Alternative

Geologic Hazards

Table 3-53 presents the residual impacts on geologic hazards for all alternative routes and route variations in Segment 6.

Table 3-53. Geologic Hazards Inventory Data and Residual Impacts on Segment 6—Treasure Valley

Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)[2]		Residual Impacts (miles crossed)		
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84	Low	Moderate	High
Applicant's Proposed Action	28.0	1.4	0.0	0.0	28.0	0.0	28.0	0.0	0.0
Variation S6-A1	*9.3*	*0.8*	*0.0*	*0.0*	*9.3*	*0.0*	*9.3*	*0.0*	*0.0*
Variation S6-A2	*8.9*	*0.2*	*0.0*	*0.0*	*8.9*	*0.0*	*8.9*	*0.0*	*0.0*

Table 3-53. Geologic Hazards Inventory Data and Residual Impacts on Segment 6—Treasure Valley									
Alternative Route	Total Length (miles)	Faults (miles crossed)[1]			Landslide Hazard Percentile Ranking (miles crossed)[2]		Residual Impacts (miles crossed)		
		Quaternary Faults Older Than 15,000 Years and Class B Faults	Younger Than 150 years	Greater Than 150 Years, but Less Than 15,000 Years Old	0 to 69	70 to 84	Low	Moderate	High
Variation S6-B1	*14.4*	*0.6*	*0.0*	*0.0*	*14.4*	*0.0*	*14.4*	*0.0*	*0.0*
Variation S6-B2	*14.1*	*1.2*	*0.0*	*0.0*	*14.1*	*0.0*	*14.1*	*0.0*	*0.0*

Table Notes:
[1]Due to the overlap of faults occurring during several time periods, the total miles crossed will not equal the total length of the alternative routes and route variations.
[2]There were no areas with high landslide percentile for Segment 6

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have 1.4 miles of high residual impacts from geologic hazards associated with Quaternary faults.

Variation S6-A1

This variation would have 0.8 mile of moderate residual impacts from geologic hazards associated with older Quaternary faults.

Variation S6-A2

This variation would have 0.2 mile of moderate residual impacts from geologic hazards associated with older Quaternary faults.

Variation S6-B1

This variation would have 0.6 mile of moderate residual impacts from geologic hazards associated with older Quaternary faults.

Variation S6-B2

This variation would have 1.2 miles of moderate residual impacts from geologic hazards associated with older Quaternary faults.

Soils

Table 3-54 presents the residual impacts on soil resources for all alternative routes and route variations in Segment 6.

Table 3-54. Soils Inventory Data and Residual Impacts on Segment 6—Treasure Valley										
Alternative Route	Total Length (miles)	Inventory Data (miles crossed)								Residual Impacts (miles crossed)
		Water Erosion			Wind Erosion			Clay		
		Unknown	Low	Moderate	Unknown	Low	Moderate	Low	Moderate	Low
Applicant's Proposed Action	28.0	0.4	25.5	2.1	0.4	27.0	0.6	25.9	2.1	28.0
Variation S5-A1	*9.3*	*0.3*	*8.2*	*0.8*	*0.3*	*8.9*	*0.1*	*7.9*	*1.4*	*9.3*
Variation S5-A2	*8.9*	*0.3*	*8.0*	*0.6*	*0.3*	*8.5*	*0.1*	*7.4*	*1.5*	*8.9*
Variation S5-B1	*14.4*	*0.1*	*13.3*	*1.0*	*0.1*	*14.0*	*0.3*	*14.4*	*0.0*	*14.4*
Variation S5-B2	*14.1*	*0.0*	*13.7*	*0.4*	*0.0*	*14.1*	*0.0*	*14.1*	*0.0*	*14.1*

Table Notes:
[1]Soil compaction potential is based on clay content.
No high impacts are anticipated for soil resoures.

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have only low residual impacts on soils. The variations would have the same residual impacts on soils as those of the Proposed Action.

Minerals

Table 3-55 presents the residual impacts on mineral resources for all alternative routes and route variations in Segment 6.

Table 3-55. Minerals Inventory Data and Residual Impacts on Segment 6—Treasure Valley							
Alternative Route	Total Length (miles)	Inventory Data (miles crossed)			Residual Impacts (miles crossed)		
		Active Mine or Active Mining Claims (miles crossed)	All Leases (miles crossed)	Producing Oil and Gas or Geothermal Wells (miles crossed)	None	Low	Moderate
Applicant's Proposed Action	28.0	4.3	0.0	0.0	23.7	4.3	0.0
Variation S6-A1	*9.3*	*2.3*	*0.0*	*0.0*	*7.0*	*2.3*	*0.0*
Variation S6-A2	*8.9*	*1.9*	*0.0*	*0.0*	*7.0*	*1.9*	*0.0*
Variation S6-B1	*14.4*	*2.0*	*0.0*	*0.0*	*12.4*	*2.0*	*0.0*
Variation S6-B2	*14.1*	*1.7*	*0.0*	*0.0*	*12.4*	*1.7*	*0.0*

Table Note: [1]Due to some mineral resources not occurring for the alternative routes and route variations, the miles crossed will not equal the total length of the alternative routes and route variations.

Following implementation of the design features for environmental protection and selective mitigation measures, the Proposed Action would have no moderate or high residual impacts on mineral resources. The variations for this Proposed Action would have the same residual impacts on mineral resources.

Paleontological Resources

Table 3-56 presents the residual impacts on paleontological resources for all alternative routes and route variations in Segment 6.

Table 3-56. Paleontological Resources Inventory Data and Residual Impacts on Segment 6—Treasure Valley

Alternative Route	Total Length (miles)	Potential Fossil Yield Classification (miles crossed)					Residual Impacts (miles crossed)
		1	2	3	4	5	Low
Applicant's Proposed Action	28.0	7.8	2.9	14.5	2.8	0.0	28.0
Variation S6-A1	*9.3*	*3.5*	*0.0*	*3.7*	*2.1*	*0.0*	*9.3*
Variation S6-A2	*8.9*	*2.2*	*0.0*	*4.7*	*2.0*	*0.0*	*8.9*
Variation S6-B1	*14.4*	*4.3*	*0.6*	*9.5*	*0.0*	*0.0*	*14.4*
Variation S6-B2	*14.1*	*5.5*	*0.4*	*8.2*	*0.0*	*0.0*	*14.1*

Following implementation of the design features (Section 2.3.4) for environmental protection and Selective Mitigation Measure 8, the Proposed Action would have only low residual impacts on paleontological resources. The variations for this Proposed Action would have the same residual impacts on paleontological resources.

Conclusions

The Applicant's Proposed Action Alternative as well as all variations, do cross Quaternary faults in Segment 6. The Applicant's Proposed Action Alternative would cross the most number of faults with Variation S6-A2 having the least. The Applicant's Proposed Action Alternative and all variations considered cross soils with moderate potential for water and wind erosion and soil compaction. However, with implementation of the selective mitigation measures (refer to Section 3.2.1.4), residual impacts would be low for any route selected.. The Applicant's Proposed Action Alternative would have the greatest impact on soils with moderate susceptibility to wind and water erosion, and compaction.

The Applicant's Proposed Action Alternative and all variations considered cross active mines and mining claims in Segment 6. The Applicant's Proposed Action Alternative would cross the highest amount of active mines and mining claims and Variation S6-B2 would have the least among the variations.

The Applicant's Proposed Action Alternative, and variations S6-A1 and S6-A2 cross geological units with high and moderate sensitivity for paleontological resources. Variations S6-B1 and S6-B2 only cross geological units with moderate sensitivity for paleontological resources.

3.2.2 WATER RESOURCES

3.2.2.1 INTRODUCTION

This section discusses water and floodplains, including surface water, groundwater, and wetlands. The regulatory framework, scoping issues, methods, and affected environment are presented, followed by a discussion of environmental impacts from the B2H Project.

- Wetland data was refined based on a GIS desktop analysis.
- Additional analysis was conducted on impacts on Riparian Conservation Areas (RCAs).
- In response to specific comments on the Draft EIS, references to subsections 2 through 5 of Executive Order 11990: Protection of Wetlands, have been added.
- A discussion of proposed impacts on the Ladd Marsh Wildlife Area has been added to the Segment 2 discussion, per comments received on the Draft EIS.
- Updated, revised design features and selective mitigation measures have been included for determining residual impact assessment.
- The impact criteria table has been revised and updated to include references to specific types of wetlands and streams, per comments on the Draft EIS.

3.2.2.2 REGULATORY FRAMEWORK

FEDERAL

Water Resources

Water resources and floodplains are federally regulated under the CWA (33 U.S.C. 1257 et seq.), the Safe Drinking Water Act (SDWA)(42 U.S.C. 300f et seq.), and Executive Order 11988 – Floodplain Management (3 CFR 121, Supp. 177) and Executive Order 11990 – Protection of Wetlands (3 CFR, 1977 Comp., p. 121).

Clean Water Act

The Water Pollution Control Act of 1948 was the first major U.S. law to address water pollution. The Water Pollution Control Act was amended in 1977, and the law became commonly known as the CWA, codified generally in 33 U.S.C. 1251 et. seq. The CWA's objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters.

The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point-source and certain nonpoint-source discharges to surface water.

Under authority of the federal CWA, both Idaho and Oregon have developed state water-quality standards. The IDEQ has issued water-quality standards that include a description of hydrologic units; a list of priority pollutants; and a list of water-quality-impaired streams within each subbasin, along with the parameters for which each stream is impaired (IAPA 58.0.02). The ODEQ maintains water-quality standards for groundwater and surface water for Oregon. Oregon standards include a classification system describing the highest beneficial uses, fish use designations, narrative and numeric criteria to support the beneficial uses, and antidegradation policies (OAR 340-01-0001). The BLM and USFS have

developed handbooks and instruction memoranda that provide BMPs to avoid erosion and the resulting contribution of sediments to water(s) of the U.S. (BLM 2008; USFS 2006, 2013).

The following sections of the CWA may influence construction and maintenance of the B2H Project:

Clean Water Act Section 301: Effluent Limitations from Point Sources

Section 301 of the CWA states that the volume of pollutants generated by a known source, or point source, is limited by the volume of the specific water resources, as described in Section 303(d). These limitations may affect the Project if a construction-related activity discharges a controlled pollutant, such as sediment, into regulated waters, which would require a permit.

Clean Water Act Section 302: Water Quality Related Effluent Limitations

Section 302 of the CWA designates water-quality standards by the state-set levels of allowable pollutants called Total Maximum Daily Load (TMDL). This pollutant allotment criterion is designated for a specific waterbody relative to its particular usage (e.g., recreation, water supply, aquatic life, and agriculture). A water-quality criterion (numeric pollutant concentrations and narrative requirements) also is designated to protect particular resource uses. If the Project has the potential to add pollutants to a particular resource that is protected by a TMDL, it may be necessary to mitigate impacts and potentially require the Project to be included in the TMDL permit.

Clean Water Act Section 303(d): Water Quality Limited Streams and Subbasins

Section 303(d) of the CWA requires states to establish TMDL programs for streams and lakes that do not meet certain water-quality standards. A TMDL is a quantitative assessment of water-quality problems, contributing sources, and load reductions or control actions needed to restore and protect bodies of water. In compliance with the CWA, the IDEQ and the ODEQ have identified Section 303(d) water-quality limited streams and lakes for development of TMDL criteria. The IDEQ (IAPA 58.01.02) and ODEQ (OAR 340-41) assess impaired streams on a subbasin level, which is the same level as a USGS eight-digit hydrologic unit code (HUC). In some subbasins, if a stream segment does not meet water-quality standards, all the streams within that hydrologic unit do not meet the standard.

Designation of impaired waters indicates which waterbodies do not meet state-mandated water-quality standards and are presented to the EPA for designation as impaired waters and issuance of federal protection under a TMDL. Impaired waters that potentially may be affected by the Project are subject to limitations set forth by the TMDL issued for the particular impaired water. If there is a high probability the Project will affect the impaired water, modification to the state Construction General Permit could be required.

Clean Water Act Section 311: Oil and Hazardous Substances Liability

Section 311 of the CWA provides the framework for determining whether an oil spill to inland and coastal waters or their adjoining shorelines, or both, should be reported to the federal government. If hazardous materials, including fuels and lubricants, are used or stored in quantities exceeding certain minimal quantities, a spill prevention, countermeasure, and containment (SPCC) plan is required. Section 311(j)(1)(c) of the CWA contains the regulations preventing discharge of oil to surface water.

In particular, the regulation requires the person in charge of a facility or vessel responsible for discharging oil that may be "harmful to the public health or welfare" to report the spill to the federal government. The regulation establishes the criteria for determining whether an oil spill may be harmful to public health or welfare, thereby triggering reporting requirements.

Clean Water Act Section 319: Effluent Limitations from Nonpoint Sources

Section 319 of the CWA was created following the 1987 amendments to the CWA for management of nonpoint-source pollution. Section 319 regulates the discharge of pollutants from various sources, which accumulate and reduce water-quality standards set by the state. If the Project has the potential to add nonpoint-source pollutants to a particular resource protected by a TMDL, it may be necessary to mitigate impacts and may potentially require the Project to be included into the TMDL permit.

Clean Water Act Section 401: Water Quality Certification

Section 401 of the CWA pertains to federally permitted activities that may result in a discharge into water of the U.S. Projects must obtain a water-quality certification from the state with jurisdiction, certifying that the action will not violate state or federal water-quality standards. Any activity, including river or stream crossings during road or transmission line construction that may result in a discharge into a water of the U.S., must be certified by the IDEQ or ODEQ. State requirements are discussed further below.

Clean Water Act Section 402: National Pollutant Discharge Elimination System

Section 402 pertains to point-source discharges to water resources, which are regulated by the NPDES permit process. Section 402 applies to discharges from all lands, regardless of ownership. The EPA administers the NPDES permit process in Idaho, whereas the ODEQ is delegated to administer the NPDES process in Oregon.

NPDES regulates water-quality standards specifically by issuing and monitoring construction-related permits for discharges into water(s) of the U.S. (described in more detail in the "State of Oregon" and "State of Idaho" sections).

Under NPDES, projects that disturb one or more acres are required to obtain a Construction General Permit. This permit, in turn, requires the development and implementation of a SWPPP. The Applicant has proposed a framework SWPPP as a part of its POD. The SWPPP describes BMPs that the discharger will use to protect surface water from stormwater runoff.

Clean Water Action Section 404: Discharge of Dredge and Fill Materials

Section 404 of the CWA pertains to dredge or fill activities in a water of the U.S., as defined in 33 CFR Part 328.3 of the CWA. The USACE and the EPA regulate the discharge of dredge and fill material into "Waters of the United States" under Section 404(a) of the CWA. Waters of the U.S. are defined as:

> All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide, all interstate waters including interstate wetlands, all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats,

> sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which would affect interstate or foreign commerce, including such waters which are or could be used by interstate or foreign travelers for recreational or other purposes, or from which fish or shellfish are or could be taken and sold in interstate or foreign commerce, or which are used or could be used for industrial purposes by industries in interstate commerce; all impoundment of waters otherwise defined as waters of the United States interstate commerce, tributaries of waters, the territorial seas; and wetlands adjacent to waters. (33 CFR 328.3)

The term "wetlands adjacent to waters (of the United States)" includes wetlands that are adjacent to traditionally navigable waters or non-navigable tributaries of traditionally navigable waters that are relatively permanent, (i.e., where the tributaries typically flow year-round or have continuous flow at least seasonally and wetlands that directly about such tributaries). The USACE determines whether a given wetland is under federal jurisdiction through project-specific jurisdictional determinations.

The permitting process includes submittal of a permit application. Following the receipt of all required information, the USACE would determine whether the Project qualifies for consideration under the Nationwide Permits or instead would merit review as a standard individual permit. A public notice is issued for projects that do not qualify for Nationwide Permit authorization with a 30-day public comment period. During the public comment period, the USACE consults with other agencies, as needed, and may require a public hearing. The final decision is made on a case-by-case basis through the evaluation of the purpose and need of the proposed Project and the expected short- and long-term impacts of the work, and with consideration given to the comments of other government agencies, adjacent property owners, and the general public.

While contacting the local USACE office prior to making a permit application is encouraged, it is not required; however, by discussing the work prior to submitting an application, the application likely would be processed more efficiently. Discussions of permit applications may consist of on-site reviews or pre application meetings. These meetings discuss possible problems up-front and attempt to rectify initial concerns prior to the permit review.

When all considerations are satisfied, the district engineer would decide to either issue or deny the permit. If the permit is denied, the Applicant will receive a written explanation for the reason of denial. The USACE makes every effort possible to process individual permit applications within 120 days of the date of the submission of a complete application. Often, reviews conducted by other agencies may exceed USACE time lines.

Executive Order 11988: Floodplain Management

Executive Order 11988 requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. To accomplish this objective, Section 1 of the executive order provides the following direction:

> Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands, and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

Section 2(a) of the executive order describes the decision-making process required of federal agencies when evaluating projects that have potential impacts on floodplains.

The National Flood Insurance Program is administered by FEMA, a component of the U.S. Department of Homeland Security. In support of the National Flood Insurance Program, FEMA identifies flood hazard areas throughout the U.S., including Special Flood Hazard Areas, which are defined as areas of land that would be inundated by a flood having a 1 percent chance of occurring in any given year (previously referred to as the base flood or 100-year flood). Development may take place in Special Flood Hazard Areas, provided development complies with local floodplain management ordinances, which must meet the minimum federal requirements. Not all jurisdictions along the alternative routes have been mapped for flood zones under the National Flood Insurance Program.

Executive Order 11990: Protection of Wetlands

Executive Order 11990 was signed May 24, 1977, and requires each federal agency to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Each agency, to the extent permitted by law, must avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds that there is no practical alternative to such construction or the Proposed Action includes all practical measures to minimize harm to wetlands that may result from such use. In making this finding, the head of the agency may take into account economic, environmental, and other pertinent factors (Section 2(a)). Each agency also must provide the opportunity for early public review of any plans or proposals for new construction in wetlands (Section 2(b)).

Food Security Act of 1985

The Swampbuster Provision of the Food Security Act of 1985 requires private landowners who are receiving USDA program benefits to comply with federal CWA wetland requirements.

Wallowa-Whitman National Forest Land and Resource Management Plan

The Wallowa-Whitman National Forest is in the process of updating its LRMPs and will incorporate the B2H Project as part of the baseline condition for analysis as the LRMP process moves forward. The current Wallowa-Whitman National Forest LRMP requires that wetlands be identified and that negative impacts on wetlands be avoided, if possible, or mitigated (USFS 1990). The revised LRMP and Draft EIS for Malheur, Umatilla, and Wallowa-Whitman National Forests was published and made available for public comment on March 14, 2014 (USFS 2013). This revised LRMP includes management areas for streams, ponds, and wetlands. Although specific widths are provided for these features, the intention

is to include the greater of either the outer extent of riparian vegetation or the 100-year floodplain. This revised LRMP includes, for wetlands greater than 1 acre, a management area of 150 feet slope distance from the outer edge of the wetland or from the maximum pool elevation, whichever is greatest. The management area for wetlands smaller than 1 acre is 100 feet slope distance. A detailed discussion regarding assessment and analysis of riparian areas is provided in more detail in Section 3.2.2.4.

Drinking Water Resources

Safe Drinking Water Act

The Safe Drinking Water Act originally was passed by Congress in 1974 to protect public health by regulating the quality of drinking water. The act, which was amended in 1986 and 1996 (ODEQ 1996), is the primary federal law to protect the quality of U.S. drinking water and its sources—that is, rivers, lakes, reservoirs, springs, and groundwater wells (42 U.S.C. 300f et seq. (1974)).

Under the act, the EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers that implement those standards. However, the act does not regulate private wells serving fewer than 25 people. The Safe Drinking Water Act also mandates that a Groundwater Wellhead Protection Program be developed by each state to protect groundwater resources that serve as sources for public drinking water.

Wellhead Protection Programs

The Safe Drinking Water Act requires states to develop wellhead protection programs and to identify wellhead protection areas for each drinking water well. Wellhead protection areas are defined in 42 U.S.C. 300h-7(3) as the “surface and subsurface area surrounding a water well or well field supplying a public water system through which contaminants are reasonably likely to move toward and reach such water well or well field.”

Source Water Assessment Plans

In 1996, Congress amended the Safe Drinking Water Act to emphasize the protection of surface water and groundwater sources used for public drinking water. The amendments require that each state possessing primacy over its drinking water (1) develop a source water assessment plan for public drinking water sources and (2) conduct assessments on all public water systems and make the assessments available to the public.

The Idaho Source Water Assessment Plan was completed in 1999, at which time it also was approved and recognized by the EPA (State of Idaho 2016). The IDEQ completed assessments on recognized public water sources, serving as a foundation for public water systems to prepare drinking water protection plans and implement protection measures.

Oregon is in the process of developing its program by expanding the older Wellhead Protection Program and adding surface-water sources (ODEQ 1996). The wellhead protection areas became known as drinking water source areas and include groundwater and surface-water sources.

Floodplains

The National Flood Insurance Program (NFIP) (FEMA 2015a) created in 1968 is administered by FEMA, a component of the U.S. Department of Homeland Security. In support of the NFIP, The NFIP sets a national standard for regulating new development in floodplains, distributes responsibility for floodplain management at the local level, and provides for a comprehensive floodplain mapping program.

Development may take place in mapped Special Flood Hazard Areas, provided development complies with local floodplain management ordinances, which must meet the minimum federal requirements. Not all jurisdictions along the B2H Project alternative routes have been officially mapped by FEMA for flood zones under the NFIP.

STATE OF OREGON

Water Resources

The ODEQ provides local regulation of the CWA under ORS 4648B.005 (10). The ODEQ oversees water quality for water(s) of the U.S. in Oregon, implements water-quality policies, and acts to protect and maintains and improves water quality under several sections of the CWA. The ODEQ reviews projects that require issuance of Section 401 water-quality certifications

Wetlands

The Oregon Department of State Lands (ODSL), under the Aquatic Resource Management Division, is responsible for administering the state's removal-fill law.

The ODSL regulates the removal and placement of material in waterways and wetlands through Oregon's Removal-Fill Law of 1967. Removal includes the extraction or movement of substrate material from a wetland or stream. Fill includes the placement of organic or inorganic material into a wetland or stream. A threshold of 50 cubic yards of material requires that a permit be obtained for most activities. Waters in Oregon designated either as essential salmon habitat, state scenic waterways, or wetland mitigation areas (including impacts on associated upland buffers) require a removal-fill permit regardless of the size of impact. Temporary fill, including fill required for temporary roads or stockpiling, must be included in all fill calculations and contributes to the fill threshold needed for a removal-fill permit. Fill within federally recognized tribal lands typically is not subject to the requirements of the ODSL. Artificially created ponds and wetlands are regulated under the jurisdiction of the ODSL (1) if they are more than 1 acre in size or were created in an area that originally was a water of the U.S. or (2) for authorized wetland mitigation. Wetlands and ponds less than an acre in size and that were created from upland sites are exempt if their intended purpose is for wastewater or stormwater treatment and storage, settling ponds, agricultural ponds, fire ponds, cooling water, surface mining, log storage, or ornamental ponds. Ditches are regulated if (1) they are created in a wetland, if they convey flows of a naturally occurring stream, and if they have a "free and open" connection to a waterway, or (2) if they support populations of fish. If roadside ditches, irrigation channels or other linear depressions do not include the aforementioned characteristics, they are not regulated by Oregon.

To comply with State Planning Goal No. 5, the ODSL must ensure that issuance of a removal-fill permit is not inconsistent with the "protection, conservation, and best uses of the water resources of the State" (OAR 141-085-0565). The rule states that project impacts on water resources should be the minimum necessary, and that the project will not unreasonably interfere with the navigation, fishery, or public recreation of state-owned submerged waters. The following are nine additional factors the ODSL considers prior to issuing a permit:

- The public need for the proposed fill or removal and social, economic, or other public benefits likely to result from the proposed fill or removal;
- The economic cost to the public if the proposed fill or removal is not accomplished;
- The availability of alternatives to the project for which the fill or removal is proposed;
- The availability of alternative sites for the proposed fill or removal;
- Whether the Applicant for the proposed fill or removal conforms with sound policies of conservation and the fill or removal would not interfere with public health and safety;
- Whether the proposed fill or removal conforms with existing public uses of waters and uses designated for adjacent land in an acknowledged comprehensive plan and land-use regulations;
- Whether the proposed fill or removal is compatible with the acknowledged comprehensive plan and land-use regulations for the area where the proposed fill or removal is to take place or can be conditioned on a future local approval to meet this criterion;
- Whether the proposed fill or removal is for streambank protection; and
- Whether the Applicant has provided all practical mitigation to reduce the adverse effects of the proposed fill or removal. If off-site compensatory wetland mitigation is proposed, the Applicant must document the impracticality of on-site compensatory wetland mitigation (OAR 141-085-0565).

The ODSL also reviews wetland delineations and reports, which must include specific methodology and formatting to be accepted; the ODSL has 120 days to review the wetland delineation reports following submittal of the report and required fees. On report and delineation approval, the ODSL issues a jurisdictional determination that is valid for 5 years.

The Applicant anticipates that the ODSL Removal-Fill Permit requirements will be addressed through the EFSC site-certificate process and not through an independent permit-application process.

Ground Water Act

When pumping of groundwater exceeds the long-term natural replenishment of the source aquifer, the Ground Water Act of 1955 (ORS 537.505 et seq.) gives the Oregon Water Resources Department (OWRD) the authority to declare the aquifer a critical groundwater area and, therefore, to restrict water use. In groundwater-limited areas, the OWRD restricts future uses of groundwater.

Floodplains

The Oregon Department of Land Conservation and Development (OLDCD) serves as the state´s coordinating agency for the NFIP through an agreement with the FEMA. The OLDCD's participation in

the NFIP addresses the requirements of statewide planning Goal 7 with respect to flood hazards. Development within Oregon floodplains generally is not prohibited. Floodplain management entails implementation of mitigation measures that may include specific actions that can be taken to prevent future damages and threats to human life. Floodplain management generally is permitted at the local level (city, county, or tribe) using the 2012 Oregon Model Companion Flood Damage Prevention Ordinance (State of Oregon 2011).

Oregon Energy Facility Siting Council

Oregon's EFSC was created in 1975. The council has regulatory and siting responsibility for many high-voltage transmission lines. A proposed facility must undergo a thorough review process and must meet the council's siting standards to receive a site certificate. The EFSC consults with other state agencies by requesting the agencies' comments and proposed site-certificate conditions. The site certificate authorizes the developer to construct and operate the facility.

The Applicant intends that the EFSC site-certificate process will be used to fulfill all state-level requirements for B2H Project-permitting actions.

STATE OF IDAHO

Water Resources

The Idaho Department of Water Resources (IDWR) and the IDL regulate jurisdictional water(s) of the U.S. in Idaho under the Idaho Stream Channel Protection Act of 1971 (Title 42, Chapter 38, Idaho Code, 1993) and the Lake Protection Act (Section 58, Chapter 13 et seq., Idaho Code, 2008). The Idaho Stream Channel Protection Act requires that stream channels and their environment be protected against alteration for the protection of fish and wildlife habitat, aquatic life, recreation, aesthetic beauty, and water quality. The USACE and Idaho (through the IDWR and IDL) have established a joint review and approval process for activities affecting jurisdictional waterways.

Stream Channel Protection Act

The Idaho Stream Channel Protection Act requires that an applicant secure a stream-channel alteration permit from the IDWR before beginning any work that will alter the stream channel. Idaho Stream Channel Alteration Rule 37.03.07 defines stream channel as "a natural water course of perceptible extent with definite beds and banks which confines and conducts continuously flowing water." A stream-channel alteration is defined as any activity that obstructs, diminishes, destroys, alters, modifies, relocates, or changes the natural existing shape or direction of water flow of any stream channel (IDAPA 37.03.07.010.01). This definition includes taking material out of the channel or placing material or structures in or across the channel where the potential exists to affect flow in the channel. Idaho Stream Channel Alteration Rule 37.03.07 defines stream channel as a natural water course of perceptible extent with definite beds and banks which confines and conducts continuously flowing water.

Wetlands

The IDWR and IDL review applications for wetland permits in concert with the USACE for potential impacts on wetland resources. As stated above, the USACE and Idaho (through the IDWR and IDL) have established a joint review and approval process for activities affecting jurisdictional wetlands.

Groundwater Management Areas

In Idaho, the director of the IDWR can designate critical groundwater areas and groundwater management areas (IDAPA 58.01.11). A critical groundwater area is defined as an area that does not have sufficient groundwater to provide a reasonably safe supply for irrigation or other uses at the current or projected rates of withdrawal. No critical groundwater areas have been mapped in the study corridor in Idaho. The nearest groundwater management area is Grand View-Bureau, located east of the B2H Project area in Owyhee County, Idaho.

Floodplains

The governor of Idaho signed state Executive Order 2015-06 on June 22, 2015, to designate the IDWR as the lead state agency to lead and implement the National Flood Insurance Act of 1968. The IDWR floodplain manager coordinates the NFIP in Idaho. Management involves reviewing city ordinances created to deal with floodplain problems and assisting communities in adopting floodplain ordinances and qualifying for the NFIP, which makes it possible for citizens to qualify for FEMA flood insurance. Issuance of floodplain authorizations occurs at the local level in Idaho.

3.2.2.3 Issues Identified for Analysis

The following points summarize water resource-related issues that were raised by the public, federal, and state agencies or Native American tribal governments during scoping or issues that must be considered as stipulated by law or regulation:

- Would ground-disturbing activities affect surface waters, including water quality, quantity, and hydrologic behavior of surface waters?
- Would construction, operations, and maintenance of the B2H Project affect groundwater levels, contamination, or ability to recharge (especially as it relates to potential blasting)?
- Could the B2H Project affect drinking water?
- Could the loss of riparian vegetation affect stream temperature?
- Would national or Oregon scenic waterways be affected?
- Are there wetlands in the B2H Project area?
- Would there be any negative impacts on wetlands?
- What will the B2H Project’s effects be on water quality?
- Does the Applicant need to acquire water rights for the B2H Project? If so, from where?
- Will post construction stormwater runoff have impacts?

3.2.2.4 METHODS

The general study methods used to analyze the impacts of the B2H Project in this EIS are described in Sections 2.5.1 and 3.1.3. This section discusses how the study methods are applied to assess the impacts of the B2H Project on water resources.

DATA SOURCES

Information for the water-resources inventory was obtained from review of scientific literature; from governmental agencies; and from expert institutions, including the BLM, USFS, NRCS, USDA, NRCS, EPA, USFWS, FEMA, USGS, OWRD, Oregon Biodiversity Information Center (ORBIC), ODSL, ODEQ, IDWR, and IDEQ and other state-associated agencies.

U.S. Geological Survey Hydrologic Unit Code (HUC) and the Watershed Boundary

Water resources occurring in the B2H Project study corridor are spatially referenced by the Watershed Boundary Database (WBD) and HUC. The WBD is maintained by the USGS and can be accessed through the USDA NRCS Geospatial Data Gateway (USGS 2015a, 2015b).

A hydrologic unit is a drainage area delineated to nest in a multilevel, hierarchical drainage system. Its boundaries are defined by hydrographic and topographic criteria that delineate an area of land upstream from a specific point on a river, stream, or similar surface waters. A hydrologic unit can accept surface water directly from upstream drainage areas and indirectly from associated surface areas, such as remnant, noncontributing, and diversions, to form a drainage area with single or multiple outlet points. Hydrologic units are only synonymous with classic watersheds when their boundaries include all the source area contributing surface water to a single defined outlet point (USGS 2016a).

The WBD is similar to the original HUC system developed by the USGS and establishes a baseline drainage boundary framework, accounting for all land and surface areas determined solely on science-based hydrologic principles. The WBD differs from the original system by differentiating surface-water drainage areas into six distinct levels rather than four. These six levels include regions (2-digit HUC), subregions (4-digit HUC), basins (6-digit HUC), subbasins (8-digit HUC), watersheds (10-digit HUC), and subwatersheds (12-digit HUC).

During consultation with land managers (i.e., the BLM and USACE) (R. Pastor, personal communication with author, August 2015), representatives from the cooperating agencies indicated their preference to work with the standard fourth-level 8-digit HUC system. The standard 8-digit HUC is used broadly and is applicable to the B2H Project. Subbasins found in the study corridor have vastly different attributes, including mean annual precipitation, drainage area, elevation ranges, and relative aspect (cardinal direction in which the watershed is oriented), all of which play a pivotal role in determining which ecological community or communities are supported in any given drainage area. The distribution of watershed boundaries across the B2H Project area is displayed on MV-6.

Surface Waters

Streams and Waterbodies

The USGS National Hydrography Dataset (NHD) was used to evaluate the number of surface waterbodies that may be crossed by the B2H Project and alternatives. The NHD is a combination of USGS hydrologic digital line graph (DLG) files and EPA stream-reach files, version 3.0 (RF3) (USGS 2013).The surface waterbodies that would be crossed include streams, lakes, ponds, reservoirs, artificial drainage paths, and human-made canals or ditches.

In the B2H Project area, the NHD classifies natural streams as perennial or intermittent (including ephemeral). Perennial streams contain water throughout the year except during periods of drought. Intermittent streams contain water for extended periods but only at certain times of the year, such as when a stream receives seasonal flow from springs or melting snow. Ephemeral streams are very small and generally flow only during large rainfall events. The NHD also includes human-made canal ditches and other artificial paths.

The NHD represents the best available data regarding stream location and type for the entire B2H Project area. The accuracy of the NHD stream data, both for geographic placement and stream type, is primarily based on photographic interpretation and some limited field survey conducted during the Draft EIS (Idaho Power Company 2012).

NHD streams data are limited in terms of specific geometry errors with respect to stream centerlines; changes in stream geometry since initial mapping, as streams may have moved by natural processes; omission of stream segments and headwater areas during initial mapping; and errors in classification of stream type (intermittent vs. perennial). The limited field surveys conducted prior to the Draft EIS for this B2H Project noted that some NHD-mapped streams do not exist on the ground. Revisions to the dataset included incorporating field-checked corrections for attribute verification and location accuracy that have been made where possible.

Data sources also include the OWRD and the IDWR to supplement USGS NHD data. To quantify the number of streams by periodicity (i.e., perennial, intermittent, or artificial ditch) crossed by the Proposed Action and all alternatives, counts of each stream by type were made for both the 1,000-foot buffer and within each subbasin. The 1,000-foot buffer is being used in response to comments on the Draft EIS. A total count of streams that are either directly crossed by the B2H Project alternative route centerlines or that cross buffer areas was completed and compared to all streams mapped within each HUC 8 subbasin. A percentage of affected resources will be calculated for stream type by subbasin and buffer area. The distribution of streams by periodicity across the B2H Project area is displayed on MV-6.

303(d) Listed Impaired Waterbodies

CWA 303(d) listed impaired waterbodies were obtained from data available from EPA Region 10's geospatial gateway, and the IDEQ's and ODEQ's websites (EPA 2016a; IDEQ 2014; ODEQ 2012). Because increases in sediment delivery and stream temperature are the most likely B2H Project impacts on water quality, the analysis evaluated stream segments identified on the 303(d) list as already impaired due to either sedimentation (sediment-impaired streams) or high temperatures

(temperature-impaired streams). Several sediment and temperature TMDLs have been established for surface waters in Oregon and Idaho.

Several waterbodies within the B2H Project area have been identified by the States of Oregon and Idaho, respectively, and designated as impaired waters by the EPA. These water resources may exceed federal water-quality standards for temperature or sediment and may harbor noxious aquatic plants, show signs of significant riparian habitat alteration, low-dissolved oxygen, increased water temperature, or a suite of these problematic elements. Impairment originates from many sources, including agricultural activities, urban runoff, development of impervious surfaces, and recreational activities (ODEQ 2012).

Understanding from where pollutants originate is a developing science in the field of water-quality management. Known sources were initially identified as point-source pollutants as these types of pollutants can be traced to a known source. State and federal water-quality control agencies, including the Oregon Department of Environmental Quality, the Idaho Department of Environmental Quality and the EPA, have identified sources of pollutants and established limits to effluence using TMDLs to identify agency approved maximum-allowable discharge. NPDES has been integral in the establishment of TMDLs and identification of point-source pollutants in the B2H Project area. These actions have significantly improved water quality in Oregon, Idaho and the U.S. (U.S. General Accounting Office 1999).

Until recently, nonpoint-source pollution has been subject to relatively little regulatory attention by the states and EPA. Management of nonpoint-source pollution for the B2H Project relies on the use of design features, which are based off of a number of voluntary environmental protection incentive programs administered by the EPA (U.S. General Accounting Office 1999). Determining the source of a particular type of nonpoint pollution (e.g., sedimentation, discharge of nutrients, or pathogen-harboring effluent) is highly problematic. The States of Oregon and Idaho, respectively, are responsible for collecting and disclosing data from statistical modeling and physical investigation of potential sources of nonpoint-source pollutants used in developing the state list of impaired waters.

When the states recognize potentially impaired waters, modeling and analysis data are sent to the EPA for review and validation. The EPA will often issue a recommended TMDL for the impaired water. Both Oregon and Idaho's State 303(d) list of impaired waters identifies problematic surface-water resources and their TMDL (if an EPA-issued recommended TMDL has been issued) as well as the type and source of impairment.

To quantify the number of temperature- and sediment-impaired waterbodies crossed by the Proposed Action and all alternatives, data for TMDL listed streams and respective state-listed streams for either temperature or sediment impairment were combined into a single geospatial data file. Counts of each stream by impairment type (temperature or sediment) were made for each HUC subbasin within a 1,000-foot buffer from the B2H Project centerlines. The 1,000-foot buffer is being used in response to comments on the Draft EIS.

A total count of 303(d) listed streams for temperature or sediment impairment that either directly crosses the B2H Project alternative route centerlines or cross the 1,000-foot buffer area will be made and compared to all 303(d) listed impaired streams mapped within each HUC 8 subbasin. A percentage of affected resources will be calculated for stream type by subbasin. The distribution of streams by impairment type across the B2H Project area is displayed on MV-6.

Surface-Water Diversions

Geospatial data for Idaho and Oregon (IDWR 2015; OWRD 2013) was reviewed to evaluate surface-water diversions within 1 mile of the alternative route centerlines. A total count of all surface-water diversions, per HUC 8 subbasin was conducted. These sources have not been field verified. Surface diversions were calculated by combining geospatial data from the IDWR, Oregon Data Explorer, OWRD, and USDA NRCS. The combined diversion dataset was overlain on the 1-mile buffer for the alternatives and counts of diversions within each subbasin were calculated.

Surface Water Drinking Water Sources Areas

The ODEQ website was searched to identify locations of surface water drinking water source areas (DWSA) in Oregon (ODEQ 2014). Surface DWSAs represent the watershed that supplies the waterbody where the intake is located (ODEQ 2013). These features are not mapped in Idaho. The ODEQ data was overlaid with the study corridor boundary and the HUC 8 subbasin boundary data to determine total acreage of DWSAs within each boundary. The acreage of surface-water DWSAs within the HUC 8 subbasin boundary was calculated and is presented as a percentage of the total HUC 8 subbasin area in Table 3-64.

Wetlands

Revised wetland data was used in this Final EIS, per receipt of both public and agency comments regarding data sources for wetlands analysis. The Draft EIS used the USGS ReGap land-use classification data for vegetation type (Idaho Power Company 2011), which is built on color infrared imagery captured between 1999 and 2001 (Homer at al. 2012). The ReGap data is represented as 30-meter by 30-meter pixels. The 30 by 30 meter pixels represent a conservative estimate of wetland types and provide an overestimation of wetlands throughout the study corridor. This dataset was replaced with a more refined, accurate dataset developed through a GIS desktop analysis for wetlands within 0.5 mile of B2H Project alternative routes.

The GIS desktop analysis consisted of developing a composite dataset and visually reviewing features from the composite dataset for accuracy against aerial imagery. The composite dataset was created using sources from the National Wetlands Inventory (NWI) (USFWS 2015) supplemented by wetlands and land-type data from the Oregon Wetlands Cover (OWC) (ORBIC and The Wetlands Conservancy [TWC] 2009), a key component of the Oregon Wetland Explorer data portal. The Oregon Wetland Explorer is a comprehensive database whose sources include: the Natural Resources Inventory (NRI), the Oregon Department of Transportation (ODOT), the ODSL, the Oregon Natural Heritage Information Center (ORNHIC), the Pacific Northwest Hydrography Framework (PNHF), potential wetlands, The Nature Conservancy (TNC), TWC, the USFWS, and the USACE.

The composite wetland dataset compiled for this Final EIS is more accurate than the USGS ReGap data, however, there are several known errors in mapping in the original NWI source data (Gergely and McKerrow 2013; Grossmann et al. 2008). These errors include errors in accuracy of wetland boundaries primarily based on photographic interpretation and field checking by government agencies at the time the maps were compiled or revised; changes in wetland boundaries since initial mapping, as wetlands may have moved by natural processes; and known issues with unmapped drier-end wetlands, mowed and grazed wetlands, and significantly drained wetlands. Forested wetlands, small wetlands (less than 0.5 acre), and narrow (linear) wetlands tend to be the major sources of omissions in the original mapping. NWI maps, by design, do not show many farmed wetlands, which may lead to a significant underestimate of the amount of wetland in agricultural regions.

The composite wetlands data was overlaid on 1-meter color aerial imagery from the USDA Farm Service Agency National Aerial Imagery Program photography. The imagery was dated between 2011 and 2015 for both Oregon and Idaho (USDA 2015), NRCS hydric soil mapping units, as identified by the USDA NRCS Soil Survey for each county crossed by the B2H Project centerline, also was overlain on the imagery (USDA 2013). Features from the composite wetland dataset were reviewed visually for accuracy against the aerial imagery and hydric soils data and were revised to eliminate wetlands that have been shown on the imagery as currently developed. Wetland polygons located over soil mapping units identified as hydric were examined to correct interpretive boundaries (i.e., edges of lakes and ponds were corrected against aerial photography).

Wetlands in the B2H Project area were classified as emergent, scrub-shrub, forested or open water wetland types based on the Cowardin code (Cowardin et al. 1979). A fifth category of “unknown” was used to classify wetland areas observed through the visual review process that exhibited a high probability of being a wetland habitat, however the wetland type was unable to be determined. For example, an aerial image of dark green vegetation within an agricultural field overlaid on areas of 100 percent hydric soils in a small, local depression, exhibits a high likelihood of being a wetland. Unknown wetlands are presented only for a qualitative assessment of areas of potential resource and are not carried forward for quantitative impact assessment. The revised composite wetlands data was subdivided by HUC 8 subbasin boundaries to determine acres of wetlands within each subbasin. The distribution of wetlands by community type across the B2H Project area is displayed on MV-6.

Groundwater

Inconsistencies in geologic materials create difficulties for estimating areas of shallow groundwater, drinking water recharge zones and depth to groundwater (Ponce 2006). Shallow groundwater systems interact with surface water, while deep groundwater systems do not (Ponce 2006). Part of the difficulty of describing groundwater within a region, including how geologic units (bedrock) are described differently by different drillers, is that each driller has a unique style of data recording and interpretation. Since water well databases in Oregon generally are historic or archival, the Oregon digital database was created from paper records. An additional source of error in water well databases results from the manual entry of hard copy information into electronic format.

Due to the inconsistencies in mapping of groundwater resources throughout the B2H Project area, effects on groundwater resources are discussed qualitatively.

Shallow Groundwater

Estimates of depth-to-water and water-table elevation are affected by a number of variables, including soil type and porosity, local geologic characteristics, timing of precipitation, and errors associated with the mapping and reporting of data, as well as effects due to the interpolation method (USGS 2015b). The actual water-table depth will vary as a result of short-term, seasonal, or long-term influences, including seasonal rainfall, localized flooding or volume, and intensity of snowmelt.

The OWRD maintains several state-monitored wells that measure depth to groundwater within the study corridor along the I-84 corridor (OWRD 2016). Active wells with current depth to groundwater readings were reviewed to determine whether groundwater was registered within 6.5 feet of the surface.

Groundwater well data from the USGS National Water Information System (USGS 2016b) for Boise, Idaho (the closest monitoring station to the study corridor), shows that groundwater depths vary from approximately 5 feet below ground level to more than 25 feet below ground level. The reporting station is located on the northeastern edge of the Boise River Floodplain.

The USDA NRCS Web Soil Survey uses a predictive model for estimating depth to groundwater, based on soil taxonomy (USDA 2016a). Depth to groundwater is based on soil unit types classified as either shallow (soil mapping units with predicted depth to groundwater within 6.5 feet of the surface) and deep (soil mapping units with predicted depth to groundwater deeper than 6.5 feet below the surface). This information was qualitatively compared with the USGS National Water Information System to measure predictability of results.

Groundwater Drinking Water Source Areas

The ODEQ website was searched to identify locations of groundwater DWSA and groundwater 2-year time-of-travel zones for drinking water source areas in Oregon (ODEQ 2013). These features are not mapped in Idaho.

Oregon’s Source Water Assessments were completed between 2000 and 2005 (ODEQ 2013). The DWSA delineations by the ODEQ define areas that supply the drinking water system. For groundwater, this is defined as the area on the surface that overlies that portion of the aquifer that supplies water to a well or spring (ODEQ 2013). DWSAs for wells typically show the amount of time it takes groundwater to move through the aquifer to the well intake. For this EIS, the 2-year time-of-travel zone for groundwater was used to incorporate short- and longer-term impacts on groundwater resources.

To identify the groundwater DWSAs potentially affected by the B2H Project, the study corridor was overlaid with the ODEQ groundwater DWSA data indicating mapped drinking water sources. The acreage of groundwater DWSAs within both the 1-mile study corridor and each HUC 8 subbasin crossed by the centerline of the alternatives was determined, and the percentage of the affected area was calculated.

Water Wells

IDWR and OWRD databases were used to identify water wells within the 1-mile buffer study corridor (IDWR 2012; OWRD 2016). The combined data include permitted wells; water-level monitoring wells, and shallow and deep injection wells. A distinction between well types has not been made to simplify the results. The density of wells mapped by IDWR is much greater than the density mapped by OWRD.

The number of water wells was determined by HUC 8 subbasin. To compare the number of wells between the Proposed Action and the alternatives, the numbers of wells within the 1-mile study corridor were counted by alternative and compared to the number of total wells within each HUC 8 subbasin crossed by the centerline of the alternatives.

Designated Sole-Source Aquifers

The EPA defines a sole or principal-source aquifer as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer (EPA 2016b). EPA guidelines also stipulate that these areas can have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend on the aquifer for drinking water. For convenience, all designated sole or principal-source aquifers are usually referred to simply as "sole-source aquifers." Sole-source aquifer designation provides only limited federal protection of groundwater resources that serve as drinking water supplies. The EPA states that sole-source aquifers are not a comprehensive groundwater protection program. Although designated aquifers have been determined to be the "sole or principal" source of drinking water for an area, this does not imply that they are more or less valuable or vulnerable to contamination than other aquifers that have not been designated by the EPA.

The EPA Region 10 website was searched to identify locations of mapped designated sole-source aquifers in the water resources study corridor (EPA 2013a). The sole-source aquifer that is closest to the water resources study corridor is the Lewiston Basin Aquifer (in southeastern Washington and western Idaho) and the Eastern Snake River Plain Aquifer (along the Snake River in south-central and southeastern Idaho). No sole-source aquifers or sole-source recharge zones are mapped in the study corridor.

Floodplains

FEMA data and the OPS *National Disaster Study, National Pipeline Risk Index Technical Report* (1996) were used to evaluate the flood hazard rankings for the water resources study corridor (FEMA 2015b; OPS 1996). The OPS data provide flood hazard rankings for the U.S., including those portions of Oregon and Idaho near the B2H Project. Flooding risk (based on FEMA mapping) was used to produce flood hazard rankings from 0 to 100, where 0 represents the lowest flood hazard and 100 represent the highest. Flood hazard rankings of 85 to 100 represent a high risk from flooding, rankings of 70 to 84 represent a medium risk, and rankings less than 70 represent a low risk.

Evaluation of the B2H Project is discussed under Section 3.2.1.4 for potential hazard effects due to flooding on B2H Project facilities, both upstream and downstream of proposed crossing areas.

Riparian Conservation Areas

RCAs were used to define and analyze impacts on wetlands and riparian resources. RCAs encompass traditional riparian corridors, wetlands, intermittent streams, waterbodies, as well as upland areas that maintain the integrity of aquatic ecosystems by: (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams; (2) providing root strength for channel stability; (3) shading streams; and (4) protecting water quality. In addition, riparian-associated plants and animals rely on these areas for critical life functions (e.g., reproduction) and to provide connectivity and dispersal corridors. RCAs are considered portions of watersheds where riparian dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines (USFS and BLM 1995), and are consistent with the Decision Notices for Pacific Anadromous Fish Strategy (PACFISH) and Inland Native Fish (INFISH), the Updated Interior Columbia Basin Strategy, and the proposed federal agency RMPs covering lands within the study corridor. A detailed discussion of RCAs is included in Section 3.2.2.4.

Analysis Area

To provide a consistent area of analysis and compare the potential effects of all alternative routes considered for the B2H Project, the water resources study corridor included all water resources located within a 1-mile corridor; 0.5 mile on either side of the alternatives centerlines, regardless of the land ownership or jurisdiction. The 1-mile study corridor was chosen because it is large enough to encapsulate existing water resources in the vicinity of the B2H Project area, as well as the extent of potential direct and indirect impacts on water resources that could occur during construction and operations of the B2H Project.

Impact Assessment and Mitigation Planning

Criteria for Assessing Level of Impacts

The criteria used to assess impacts were developed in collaboration with the cooperating agencies to assess the intensity of potential effects on water resources from construction, operation, and maintenance of the B2H Project; these criteria also allow equivalent comparison among alternative routes (Table 3-57). Criteria focused on the abundance of a particular resource, the potential for damage to or long-term loss of water and wetland resources, federal and state statutes applicable to water and wetland resources, and the varying degrees of importance that different water resources have to the greater ecosystem. Impact criteria were determined with consideration of the nature and magnitude of expected impacts on sensitive water resources, anticipated length of time needed to recover from disturbance, and federal and state laws protecting resources.

Table 3-57. Criteria for Assessing Intensity of Impacts on Water Resources	
Intensity of Impacts	**Description**
High	• B2H Project activities that result in impacts on wetland functions that last more than 3 years • B2H Project activities that negatively affect forested wetlands, including removal of trees or alteration of tree heights • B2H Project activities that permanently affect natural springs or existing water wells • Placement of tower foundations in areas of shallow groundwater, surface and groundwater drinking water source areas or sole-source aquifers • B2H Project activities that result in long-term increase (greater than 3 years) of sedimentation to nearby surface-water resources
Moderate	• B2H Project activities that result in short-term (fewer than 24 months in duration) increases in sedimentation or temperature increases to nearby surface-water resources, including 303(d) impaired waters • Permanent fill within 100 year floodplain limits
Low	• Temporary dredge/fill (fewer than 24 months) in water(s) of the U.S. • Temporary fill (lasting fewer than 24 months) within the 100 year floodplain limits

Effects Analysis

Assessment of Initial Impacts

Initial impacts are those effects resulting from the implementation of the B2H Project, with consideration of the design features of the B2H Project for environmental protection. These design features would be implemented throughout the B2H Project where appropriate and are expected to reduce initial impacts on water resources. Initial impacts on water resources were assigned using the criteria for assessing impacts identified in Table 3-57. A list and description of all design features of the B2H Project for environmental protection is provided in (Table 2-7). Design features relevant to water resources are summarized below:

- **Design Feature 1 (Plan of Development)**. A POD would be prepared for implementation and maintenance of the B2H Project to provide direction to (1) the Applicant's construction personnel, construction contractors and crews, CIC, environmental monitors, and agency personnel regarding specification of construction and (2) provide direction to the agencies and Applicant's personnel for operation and maintenance of the B2H Project. The POD would contain implementation plans and detailed mapping to facilitate execution of design features to minimize impacts on water resources, mitigation measures, and conservation measures. Example implementation plans specific to water resources include a Water Resources Protection Plan; Environmental Compliance Management Plan; Biological Resources Conservation Plan; and Reclamation, Revegetation, and Monitoring Plan Framework.
- **Design Feature 2 (Environmental Training for All Personnel)**. Prior to construction, the CIC would instruct all personnel on the protection of ecological and natural resources, such as (1) federal and state laws regarding special status plants, including collection and removal; (2) the importance of special status plants; (3) the purpose and necessity of protecting special status plants; and (4) reporting and procedures for stop work. This design feature would minimize

effects on water resources and the vegetative communities providing shade and water filtering capabilities.

- **Design Feature 5 (Spatial Extent of Construction Activities)**. The spatial limits of construction activities, including vehicle movement, would be predetermined with activity restricted to and confined within those limits. No paint or permanent discoloring agents indicating survey or construction limits would be applied to rocks, vegetation, structures, fences, etc. This design feature would minimize effects on water resources by restricting disturbance to a predefined extent.
- **Design Feature 6 (Reclaim Construction Areas)**. In construction areas (e.g., staging areas, material laydown yards, fly yards, and wire pulling/splicing sites) where there is ground disturbance and where recontouring is required, surface reclamation would occur as required by the Reclamation, Revegetation, and Monitoring Plan or the landowner. The method of reclamation may consist of, but is not limited to, returning disturbed areas to their natural contour, reseeding, installing cross drains for erosion control, placing water bars in permanent roads, and filling ditches where they were installed for temporary roads. As a part of the construction or maintenance, or both, of the proposed transmission line, all areas disturbed would be seeded with a seed mixture appropriate for those areas as identified in the Reclamation, Revegetation, and Monitoring Plan. The federal land-managing agency or landowner(s) would approve a seed mixture that is compatible with the affected Ecological Site Description. Seeding methods typically would include drill seeding, where practicable; however, the federal land-managing agency or landowner(s) may recommend broadcast seeding as an alternative method in some cases.

  In construction areas where disturbing the existing contours is not required, vegetation would be left in place wherever possible, and original contours would be maintained to avoid excessive root damage and allow for resprouting, in accordance with the Reclamation, Revegetation, and Monitoring Plan or landowner approval. This design feature would minimize effects on vegetation resources by preventing permanent loss of vegetation communities and reducing indirect effects associated with weed invasion and degradation of special status plant habitat.
- **Design Feature 9 (Use of Access Routes Outside the Right-of-way)**. All vehicle movement outside the right-of-way would be restricted to predesignated access, contractor-acquired access, public roads, overland travel routes, or crossing of streams approved in advance by the applicable land-managing agency or landowner. This would minimize effects on water resources by minimizing disturbance and reducing the potential of non-native plant establishment.
- **Design Feature 14 (Shallow Groundwater Discovery during Drilling)**. State standards for abandoning drill holes would be adhered to where groundwater is encountered.
- **Design Feature 15 (Reduce Impacts on Riparian Areas)**. Consistent with the BLM and USFS PACFISH/INFISH riparian management policies, surface-disturbing activities would be avoided in defined segments of RCAs, using the following delineation criteria, unless exception criteria defined by the BLM are met or with agency approval of acceptable measures to protect riparian

resources and habitats by avoiding or minimizing stormwater runoff, sedimentation, and disturbance of riparian vegetation, habitats, and wildlife species:

- Fish-bearing streams: 300 feet slope distance on either side of the stream, or to the extent of additional delineation criteria—whichever is greatest.
- Perennial non-fish-bearing streams: 150 feet slope distance on either side of the stream, or to the extent of additional delineation criteria—whichever is greatest.
- Ponds, lakes, reservoirs, and wetlands greater than 1 acre: 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs; from the edge of the wetland, pond or lake; or to the extent of additional delineation criteria—whichever is greatest.
- Intermittent or seasonally flowing streams and wetlands greater than 1 acre: In watersheds that support ESA-listed fish species or designated critical habitat, or both, 100 feet slope distance from the edge of the stream channel or wetland to the outer edge of riparian vegetation, whichever resource has the greater areal extent. In watersheds that do not have current documented presence of ESA-listed fish species or designated critical habitat, 50 feet slope distance from the edge of the stream channel or wetland to the outer edge of riparian vegetation, whichever resource has the greater areal extent.

Mitigation measures, such as micro-siting road locations, would be developed on a site-specific basis, in consultation and coordination with the BLM and other federal land-managing agencies, and incorporated into the POD. This would minimize effects on water resources by minimizing disturbance to streams, wetlands, and riparian areas.

- **Design Feature 16 (Span Riparian Communities/Water Courses)**. Based on biological resources surveys and results of Section 7 consultation, state and federally designated sensitive plants, fisheries, wetlands, riparian areas, springs, wells, water courses, or rare/slow regenerating vegetation communities would be flagged and structures would be placed to allow spanning of these features, where feasible, within the limits of standard structure design. This would minimize effects on water resources by siting B2H Project facilities outside of these areas.
- **Design Feature 17 (Work during Wet Periods)**. If work were required during wet periods with saturated soil conditions, vehicles would not be allowed to travel when soils are moist enough for deep rutting (4 or more inches deep) to occur unless prefabricated equipment pads (matting) were installed over the saturated areas or other measures were implemented to prevent rutting. Equipment with low-ground-pressure tires, wide tracks, or balloon tires would be used when possible. This would minimize effects on water resources by reducing soil disturbance or alterations to hydrologic regimes.
- **Design Feature 18 (Crossing of Dry Washes)**. Crossings of dry washes would be made during dry conditions, when possible. Repeated crossings would be limited to the extent possible and constrained to the same location with appropriate stabilization to reduce erosion potential.

- **Design Feature 19 (Canal or Ditch Crossings, or both)**. Canal or ditch crossings, or both, would require placement of temporary bridges or improvement of existing crossings.
- **Design Feature 20 (Reduce Potential for Aquatic Invasive Species)**. Interagency-developed methods of avoidance, inspection, and sanitization as described in the Operational Guidelines for Aquatic Invasive Species Prevention and Equipment Cleaning (USFS 2009) would be adhered to. If control of fugitive dust near sensitive waterbodies is necessary, water would be obtained from treated municipal sources or drafted from sources known to contain no aquatic invasive species. Support vehicles, drill rigs, water trucks, and drafting equipment would be inspected and sanitized, as needed, following interagency-approved operational guidelines. This design feature would minimize effects on water resources by reducing the potential for spread of aquatic invasive species.

Mitigation Planning and Effectiveness

In addition to the design features of the B2H Project for environmental protection, selective mitigation measures would be applied where feasible to reduce potential impacts on water resources or where required to comply with law, regulation, or agency policy. Once an alternative route is selected, the Applicant would coordinate with the BLM and other land-managing agencies or landowners, as appropriate, to refine the implementation of mitigation at specific locations. A list and descriptions of all selective mitigation measures are provided in Table 2-13. The selective mitigation measures that would be applied to water resources are summarized below:

- **Selective Mitigation Measure 2 (Use Existing Access or Crossing, or both, for Sensitive Resources Avoidance)**. Existing access or crossing, or both, would be used as much as possible/practicable for the construction and maintenance of the B2H Project to avoid disturbance of sensitive resources crossed by the B2H Project. Where applied, this measure is expected to reduce impacts on wetland and riparian communities by limiting disturbance associated with new access roads.
- **Selective Mitigation Measure 5 (Minimize Vegetation Clearing for Operational Clearances)**. Removal of vegetation in the right-of-way would be minimized to limit disturbance to timber resources and slow-growing vegetation communities and to protect sensitive resources, including wetlands. Trees and other vegetation would be removed selectively (e.g., edge feathering) to blend the edge of the right-of-way into adjacent vegetation patterns, as practicable and appropriate. Where applied, this measure is expected to reduce impacts on slow-growing vegetation communities (forested wetland areas) by limiting clearing and disturbance to slow-growing vegetation.

Residual Impacts

Residual impacts are the impacts on resources anticipated to occur from B2H Project activities after the application of selective mitigation measures described in the Mitigation Planning and Effectiveness section. The application of selective mitigation measures is anticipated to reduce, from the initial levels, the level of residual impacts associated with B2H Project construction and maintenance (Table 3-58).

The level of anticipated residual impacts on water resources was assessed using the criteria presented in Table 3-57.

Table 3-58. Summary of Initial Impacts and Residual Impact Levels for Water Resources

Resource	Design Features of the B2H Project for Environmental Protection	Initial Impact	Selective Mitigation Measure	Residual Impact
Wetlands – forested	1, 2, 5, 6, 9, 15, 16, 17	High	2, 5	Moderate
Wetlands – scrub-shrub	1, 2, 5, 6, 9, 15, 16, 17	Moderate	2, 5	Low
Wetlands – emergent	1, 2, 5, 6, 9, 15, 16, 17	Low	None	Low
Wetlands – open water	1, 2, 5, 6, 9, 15, 16, 17, 20	Low	None	Low
Streams – perennial	1, 5, 6, 9, 16, 18, 19, 20	Moderate	2	Low
Streams – intermittent	1, 5, 6, 9, 15, 18, 19, 20	Low	None	Low
Streams – ephemeral	1, 5, 6, 9, 16, 18, 19, 20	Low	None	Low
303(d) listed/impaired waters (temperature)	1, 2, 5, 6, 9, 16, 18	Moderate	2	Low
303(d) listed/impaired waters (sediment)	1, 2, 5, 6, 9, 16, 18	Moderate	2	Low

Compensatory Wetland Mitigation

Compensatory wetland mitigation involves actions taken to offset unavoidable adverse impacts on wetlands, streams, and other aquatic resources regulated by the CWA Section 404 permitting process and other USACE permits. There are three mechanisms for providing compensatory mitigation: permittee-responsible compensatory mitigation, mitigation banks, and in-lieu-fee mitigation (USACE 2008). Compensatory mitigation could be satisfied by the creation, enhancement, or restoration of wetlands to replace the lost wetland acreage and functional capacity of the habitat that is initially affected. Other potential options include purchasing credits from a mitigation bank or in-lieu-fee programs. The type of compensatory mitigation required would be determined by the agencies as part of the Section 404 and ODSL removal-fill permitting processes.

As part of the Section 404 permitting process, the USACE, ODSL, and IDWR would evaluate whether wetlands have been avoided to the extent practical and whether the effects have been mitigated adequately. The permitting process also identifies additional requirements, as needed, to comply with USACE and ODSL regulations.

Permittee-responsible mitigation can be located at or adjacent to the impact site (i.e., on-site compensatory mitigation) or at another location generally within the same watershed as the impact site (i.e., off-site compensatory mitigation). Mitigation banks and in-lieu-fee mitigation involves off-site compensation activities generally conducted by a third party—a mitigation bank sponsor or an in-lieu-fee program sponsor. When a permittee's compensatory mitigation requirements are satisfied by a mitigation bank or in-lieu-fee program, the responsibility for ensuring that required compensation is successfully completed shifts from the permittee to the bank or in-lieu-fee sponsor.

According to the 2008 final rule on compensatory mitigation for losses of aquatic resources (USACE 2008), "compensatory mitigation should be located within the same watershed as the impact site, and should be located where it is most likely to successfully replace lost functions and services, taking into account such watershed-scale features as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources (including the availability of water rights), trends in land use, ecological benefits, and compatibility with adjacent land uses." The compensatory wetland mitigation final rule also prioritizes the sequencing of compensatory mitigation from highest priority (most favorable) to lowest priority (least favorable) as follows:

- Mitigation bank credits
- In-lieu-fee program credits
- Permittee-responsible mitigation under a watershed approach
- Permittee-responsible mitigation through on-site and in-kind mitigation
- Permittee-responsible mitigation through off-site and out-of-kind mitigation

Once a proposed route is determined and final engineering is completed, preconstruction surveys to confirm wetland boundaries and wetland types will be completed. Consultation with the USACE will occur to determine areas of impact and the appropriate wetland-permitting-vehicle required. Compensatory wetland mitigation also will be discussed and the most appropriate method to satisfy requirements for compensatory wetland mitigation will be determined. If mitigation bank or in-lieu-fee programs are unavailable for the B2H Project, the Applicant would be responsible for the development and implementation of any necessary mitigation.

The extent of compensatory wetland mitigation is determined through an evaluation of wetland class, acreage, and the functions and values provided by affected wetlands. The degree of functionality of each wetland would be evaluated using the Oregon Wetland Rapid Assessment Protocol (ORWAP) required by the ODSL in Oregon. This assessment method would be used for long-term wetland impacts greater than 0.2 acre; for wetland impacts less than this threshold, best professional judgment may be used for assessing wetland functional values. ORWAP also will be used to characterize the theoretical compensatory wetland mitigation site by predicting site characteristics to obtain expected functional values. The functional values of the affected site would be compared to those of the compensatory wetland mitigation site to determine whether adequate compensation is proposed.

In addition to meeting functional-value requirements, the ODSL currently requires the following mitigation ratios be adhered to:

- 1 acre of restored wetland for 1 acre of impact (1:1)
- 1.5 acres of created wetland for 1 acre of impact (1.5:1)
- 2 acres of enhanced cropped wetland for 1 acre of impact (2:1)
- 3 acres of enhanced wetland for 1 acre of impact (3:1)

Wetland mitigation requirements for greater than 0.2 acre of wetland impact require the following principal objectives be met:

- The replacement of wetland functions and values will be demonstrated using the ORWAP to assess the impact and mitigation sites.
- Locally important wetland functions will be replaced on or near-site where appropriate. The linear nature of the B2H Project may necessitate multiple mitigation sites.
- Compensatory wetland mitigation will be implemented in a manner that creates an eventually self-sustaining system.
- The compensatory wetland mitigation site will be in a logical biological setting chosen by considering a variety of aspects, such as its connectivity to protected habitats, the quality of adjacent upland buffers, long-term maintenance needs, the site's ability to mitigate for impact-site functions, and its compatibility with adjacent land uses.
- The temporal loss of wetlands will be considered and minimized when planning the timing of the wetland impact and mitigation time frame. This issue is especially relevant for forested wetland mitigation due to the time required to develop a forested vegetation class.

Compensatory wetland mitigation typically will occur through in-kind mitigation by replacing the affected wetland with the same type of wetland, although allowances may be made for logical mitigation sites that address the needs of the watershed in which the affected wetland is located. The ODSL also requires that compensatory wetland mitigation be implemented during the same construction season as the wetlands that are affected. A phased approach may be used for the B2H Project impacts that may occur over more than 1 year, and an increase in mitigation ratios also may be used to compensate for a delay in compensatory wetland mitigation. Existing wetland sites proposed for compensatory wetland mitigation must be degraded significantly, including sites that have had significant hydrological alterations, such as diking, ditching, drain tiling, or through fill. Wetland sites that do not qualify as degraded include those that have been altered solely through reversible activities, such as wetlands that have a high percentage aerial cover of non-native or invasive species, wetlands that are currently affected by grazing activities, and logging operations.

The ODSL provides additional guidelines for linear projects, such as transmission lines. Since these projects often result in small amounts of wetland impact over large areas, individual mitigation sites are often unfeasible. Compensatory wetland mitigation required acreage may be combined, resulting in mitigation of the predominant affected wetland type and combining all impacts occurring in the HUC 8 subbasin.

The Applicant will develop a Water Resources Protection Plan as part of the POD, which will include measures to ensure that adequate compensation is provided for wetland impacts.

Additional Analysis

In addition to the assessment of residual impacts on water resources, anticipated amounts of disturbance to water resources were analyzed using the best available B2H Project description. Prior to final engineering design, the location of B2H Project features, such as new access roads, upgrades to existing roads, drive-and-crush areas, transmission line structures, or other B2H Project facilities, were not available and are not identified in the B2H Project description. The disturbance analysis was

completed by estimating the total disturbance due to construction of features such as the B2H Project access network (construction of new roads, upgrades to existing roads, and drive-and-crush travel), transmission line structures, and other B2H Project facilities over the entire length of an alternative route. The analysis assumes a constant rate of disturbance per mile of transmission line, which was calculated using the estimated total disturbance and the total length of the transmission line. The rate then was used to estimate the extent of disturbance that is anticipated to occur with the length of each water resource crossed by an alternative route.

This information guided qualitative discussions assessing B2H Project impacts on wetlands and water resources using the criteria presented in Table 3-57.

3.2.2.5 Affected Environment

Regional Setting

Alternative routes for the B2H Project span 2 states, 4 ecoregions, and 11 subbasins (EPA 2013b). Water resources throughout the B2H Project area reflect the diversity of the landscape in their location, distribution, scale, type, abundance, and condition.

This section describes the existing condition of water resources in the vicinity of the B2H Project. Water resources issues considered in this section include streams, surface-water quality, groundwater, wetlands, and floodplains. In addition, information about surface-water diversions, DWSA (surface and ground) and water wells in the vicinity of the B2H Project has been included.

Surface Water

Streams

Rivers, streams, and other water sources vary greatly throughout the B2H Project area, mainly due to variations in terrain, aspect, geology, and precipitation specific to the drainage areas from which they originate. Most of the significant waters found in the study corridor have conventional names (e.g., Grande Ronde River, Umatilla River, and McKay Creek), but the majority of intermittent and ephemeral streams do not. Rather than relying solely on conventional names, waters can be identified using two highly interconnected datasets, the WBD HUC and the NHD. As discussed previously, the HUC identifies where a water resource exists spatially in a drainage area, while the NHD comprises digital vector data features, such as lakes, ponds, streams, rivers, canals, dams, and stream gauges.

The alternative routes were overlain on the WBD HUC 8 boundaries and a GIS analysis identified 11 subbasins that were intersected by B2H Project centerlines or B2H Project analysis buffers, specific to each water resource under analysis for this EIS. Table 3-59 lists the subbasins in the study corridor:

Table 3-59. Hydrologic Unit Code 8 Subbasins Occurring within the Study Corridor

HUC 8 Code	Subbasin Name	Total Subbasin Acres	State
17050201	Brownlee Reservoir	833,878	Idaho, Oregon
17050118	Bully	375,014	Oregon
17050202	Burnt	703,634	Oregon
17050117	Lower Malheur	607,033	Oregon

Table 3-59. Hydrologic Unit Code 8 Subbasins Occurring within the Study Corridor			
HUC 8 Code	**Subbasin Name**	**Total Subbasin Acres**	**State**
17050110	Lower Owyhee	1,264,289	Oregon
17070101	Middle Columbia-Lake Wallula	1,641,881	Oregon, Washington
17050103	Middle Snake-Succor	1,498,734	Idaho, Oregon
17050203	Powder	1,093,024	Oregon
17070103	Umatilla	1,616,448	Oregon
17060104	Upper Grande Ronde	1,047,238	Oregon
1705019	Willow	486,196	Oregon
Table Source: USGS 2016a			

In addition to the perennial streams (streams that flow year-round) and rivers in the study corridor, the corridor also contains a number of ephemeral streams (streams that only flow during large rainfall events) and intermittent streams (streams that only flow for part of the year). These rivers and streams drain to several major watersheds that ultimately drain to the Columbia River. From northwest to southeast, the affected watersheds are the Middle Columbia and Lower Snake subbasins in Oregon and the Middle Snake subbasin in Oregon and Idaho.

Table 3-60 presents information on the number of perennial and intermittent streams mapped within each subbasin crossed by B2H Project alternative route centerlines.

Table 3-60. Number of Perennial and Intermittent Streams Crossed within 1,000 feet of Alternative Route Centerlines in Each Subbasin			
County	**Subbasin**	**Perennial**	**Intermittent**
Adams, Baker, Malheur, Wallowa, Washington	Brownlee Reservoir	34	72
Malheur	Bully	18	66
Baker, Grant	Burnt	505	604
Malheur	Lower Malheur	50	188
Malheur	Lower Owyhee	46	122
Morrow, Umatilla	Middle Columbia-Lake Wallula	1	54
Ada, Canyon, Owyhee, Malheur	Middle Snake-Succor	27	269
Baker, Union	Powder	315	608
Umatilla, Morrow	Umatilla	180	1095
Union	Upper Grande Ronde	185	406
Malheur	Willow	28	233
	Total	1,388	3,717

303(d) Listed Waterbodies

State-listed impaired waters (303(d) listed impaired waters) crossed by the B2H Project were identified during the water resources inventory. As authorized by the EPA under the CWA, the NPDES controls water pollution by regulating point sources that discharge pollutants into water(s) of the U.S. Point sources are discrete discharge areas, such as pipes, that can be traced back to the original source.

Since its introduction in 1972, the NPDES is responsible for significant improvements to U.S. water quality (EPA 2012).

Table 3-61 presents the number of stream segments in the study corridor identified on the 303(d) list for impaired water quality due to high levels of sediment or elevated temperature. Sheep Creek, Owyhee River, Cottonwood Creek, and Grande Ronde River are some of the impaired major streams crossed by the B2H Project.

Table 3-61. Total Number of 303(d) Listed Stream Segments in the Study Corridor

County	Subbasin	Sediment Impaired	Temperature Impaired
Adams, Baker, Malheur, Wallowa, Washington	Brownlee Reservoir	–	–
Malheur	Bully	–	–
Baker, Grant	Burnt	–	89
Malheur	Lower Malheur	–	–
Malheur	Lower Owyhee	–	3
Morrow, Umatilla	Middle Columbia-Lake Wallula	–	–
Ada, Canyon, Owyhee, Malheur	Middle Snake-Succor	59	–
Baker, Union	Powder	–	16
Umatilla, Morrow	Umatilla	36	18
Union	Upper Grande Ronde	6	14
Malheur	Willow	–	–
	Total	100	140

Surface Water Diversions

Within the study corridor 2,976 surface-water diversions were identified (Table 3-62). Most of these diversions are mapped within the Burnt River subbasin, between Baker and Grant counties. Surface-water diversions are used for irrigation and livestock watering. Some may be potable water sources, and others are used to support aquatic life and wildlife or to provide water for fire protection, road construction, or groundwater recharge. For assessment purposes, a distinction of use for surface-water diversions was not made.

Due to the preliminary nature of the alternative routes, a detailed analysis of effects on surface-water diversions within each analyzed route and variation is unable to be conducted at this time. Several design features, including Design Feature 5 (Spatial Extent of Construction Activities) and Design Feature 9 (Use of Access Routes Outside the Right-of-Way), along with micro-siting of towers, lay down yards, tensioning sites, and other B2H Project facilities, would be used to minimize, to the extent practicable, impacts on surface-water diversions. Preconstruction surveys for sensitive resources, including streams, canals, ditches and attendant features, such as surface-water diversions, would be conducted during implementation of the POD. Further analysis of surface-water diversions is not carried forward.

For each subbasin, Table 3-62 provides the total number of surface-water diversions in the study corridor.

Table 3-62. Total Number of Surface Water Diversions by Subbasin in the Study Corridor		
County	**Subbasin**	**Number of Mapped Diversion**
Adams, Baker, Malheur, Wallowa, Washington	Brownlee Reservoir	27
Malheur	Bully	8
Baker, Grant	Burnt	672
Malheur	Lower Malheur	28
Malheur	Lower Owyhee	42
Morrow, Umatilla	Middle Columbia-Lake Wallula	194
Ada, Canyon, Owyhee, Malheur	Middle Snake-Succor	170
Baker, Union	Powder	391
Umatilla, Morrow	Umatilla	981
Union	Upper Grande Ronde	399
Malheur	Willow	64
	Total	2976

Wetlands

There is a high level of variety in the composition, distribution, and abundance of wetlands areas across the B2H Project area; and water resources hydrologically connected to wetland areas are affected indirectly by the condition of those vegetation components. Wetlands function similarly in their capacity to maintain or even improve water quality by filtering waterborne sediments and cycling nutrients into the soil. The fibrous root systems and perennial nature of most wetland communities provide soil-stabilizing structure to the upper soil strata, reducing the likelihood that high flows and heavy rain events would wash away topsoil. Wetland areas serve as vectors for the percolation of surface water into groundwater systems (groundwater recharge), a process responsible for maintaining stable inputs into groundwater aquifers.

Wetlands also provide a high level of biotic nutrient exchange through the provision of detritus and large wood debris that promote productive, living, breathing soils. Abiotic processes also are commonplace in the vegetation and groundcover associated with wetland areas. Highly dense scrub/shrub and forested wetlands attenuate flood flows, thus reducing the erosive potential of high-velocity runoff events. Canopy cover comprising mature scrub/shrub, forested wetlands, an associated shade to water resources, maintaining—and in some cases improving—the quality and quantity of water through temperature control. It is because of these functions and values, provided by intact, undisturbed wetlands that wetlands are described by community type and are analyzed on the basis that loss or modification of these vegetation communities would have indirect, adverse effects on water quality.

Wetland types are classified by the dominant vegetation type and vegetation structure as defined by the Cowardin system (Cowardin et al. 1979). This system classifies wetland habitats by vegetation structure, density, and water regime. The Cowardin system is the method adopted for discussion of this resource. These wetland types are further defined below. Table 3-63 includes the acres of wetlands, by vegetation community type and HUC 8 subbasin area and county, in the study corridor.

Table 3-63. Acres of Wetlands by Type by Subbasin in the Study Corridor							
County	**Subbasin**	**Emergent Wetlands**	**Scrub-Shrub Wetlands**	**Forested Wetlands**	**Open Water**	**Unknown**	**Total**
Adams, Baker, Malheur, Wallowa, Washington	Brownlee Reservoir	44	8	10	210	82	354
Malheur	Bully	10	–	–	72	1	83
Baker, Grant	Burnt	1,001	430	466	960	1,198	4,055
Malheur	Lower Malheur	186	4	–	324	19	533
Malheur	Lower Owyhee	100	96	16	295	20	527
Morrow, Umatilla	Middle Columbia-Lake Wallula	116	–	22	79	150	367
Ada, Canyon, Owyhee, Malheur	Middle Snake – Succor	124	9	13	146	17	310
Baker, Union	Powder	5,019	68	41	916	312	6,356
Umatilla, Morrow	Umatilla	848	150	128	806	329	2,261
Union	Upper Grande Ronde	8	80	339	347	201	975
Malheur	Willow	8	3	85	232	25.6	427
	Total	7,537	848	1,120	4,387	2,354	16,248

Emergent Wetlands

Emergent wetlands ("palustrine emergent" in the 1979 Cowardin system) are dominated by erect rooted herbaceous hydrophytic angiosperms and have less than 30 percent cover of trees or shrubs. This wetland type is variable and can occur over a variety of locales, including arid-climate ephemeral depressions, farmed wetlands in agricultural areas, and wet meadows. Vegetation also is variable based on the locale but includes species adapted to prolonged inundation or soil saturation. Vegetation found in emergent wetlands includes grasses, sedges, rushes, and other forbs adapted to wet conditions. Common species in emergent wetlands may include reed canarygrass (*Phalaris arundinacea*), Baltic rush (*Juncus balticus*), bulrush (*Scirpus acutus*), and cattail (*Typha latifolia*).

7,537 acres of emergent wetlands are present in the study corridor; emergent wetlands are the most common wetland type and make up 46 percent of the wetland acreage. The Powder River subbasin has the greatest amount of emergent wetlands (5,019 acres) in the study corridor, while the Upper Grande Ronde has the lowest (8 acres).

Scrub-Shrub Wetlands

Scrub-shrub wetlands ("palustrine scrub-shrub" in the 1979 Cowardin system) are identified by the dominance of woody vegetation less than 20 feet tall that may include shrubs and sapling trees. A scrub-shrub dominated wetland has at least 30 percent cover of shrubs as the tallest vegetation layer. This wetland type also can occur over wide elevation ranges. Scrub-shrub wetlands in the water resources study corridor often include red-osier dogwood (*Cornus alba*), hawthorn (*Crataegus* spp.), Woods' rose (*Rosa woodsii*), golden currant (*Ribes aureum*), Douglas' spiraea (*Spiraea douglasii*), and willow (*Salix* spp.).

Scrub-shrub wetlands are the least-common wetland type in the study corridor, totaling 848.8 acres. The majority of scrub-shrub wetlands are located in the Burnt River subbasin (430 acres).

Forested Wetlands

Forested wetlands ("palustrine forested" in the 1979 Cowardin system) are identified by the dominance of woody vegetation that is more than 20 feet tall with greater than 30 percent cover. Common species found in forested wetlands in the study corridor may include black cottonwood (*Populus trichocarpa*), quaking aspen (*Populus tremuloides*), Engelmann spruce (*Picea engelmannii*), and species of willow. There are 1,120.6 acres of forested wetlands are present in the study corridor. The Burnt River subbasin (466 acres) and the Upper Grande Ronde subbasin (339 acres) contain a majority of the forested wetlands in the study corridor.

Open Water

This community type is characterized by the presence of nearly permanent open water that is a minimum of 0.5 acre in size. Although free of vegetation throughout the non-growing season, floating vascular plants or algae, or both, often make up a majority of the vegetation mass during the midsummer months. Rooted vegetation is generally restricted to the shallows. Bottom sediments consist of mud, sand, cobble, gravel, and organic debris. Open water classes for this analysis include lakes, ponds, streams, and rivers. There are 4,387 acres of open water habitat are present in the study corridor. Open water areas are generally evenly distributed across all subbasins in the 0.5-mile buffer study corridor.

Unknown

Unknown wetland habitat areas are the third most common type of wetland found within the study corridor. The Burnt River subbasin contains approximately 1,198 acres of this community type, a majority of the acres identified in the study corridor. Wetlands identified as "unknown" are characterized as polygons that have a high probability of containing a wetland feature. These polygons were not previously captured through NWI photointerpretation, observed with field surveys or identified by other review methods. There are 2,354 acres of unknown wetland habitat are present in the study corridor. Unknown wetlands are presented only for a qualitative assessment of areas of potential resource and are not evaluated quantitatively.

Surface Drinking Water Source Areas

Surface DWSA generally are distributed evenly throughout the B2H Project area, with a concentration of surface-water source areas in the Power River subbasin between Baker and Union counties (Table 3-64). The Columbia River, located to the north of the B2H Project area, is a major supplier in this region. Surface-water source areas include reservoirs, lakes, and rivers and include only mapped public systems. Some pretreatment may be required prior to use. Table 3-64 includes total acres of surface-water DWSA by subbasin in the study corridor.

Table 3-64. Total Acres of Surface Water Drinking Water Source Areas by Subbasin in the Study Corridor				
County	**Subbasin**	**Total Acres of Drinking Water Resource Areas**	**Total Subbasin Acres**	**Percent of Subbasin Acres of Drinking Water Source Areas**
Adams, Baker, Malheur, Wallowa, Washington	Brownlee Reservoir	1,362	833,878	0.4
Malheur	Bully	839	375,014	0.1
Baker, Grant	Burnt	4,021	703,634	0.7
Malheur	Lower Malheur	3,019	607,033	0.2
Malheur	Lower Owyhee	148	1,264,289	0.01
Morrow, Umatilla	Middle Columbia-Lake Wallula	7,979	1,641,881	0.5
Ada, Canyon, Owyhee, Malheur	Middle Snake-Succor	10,437	1,498,734	0.9
Baker, Union	Powder	117,101	1,093,024	7.2
Umatilla, Morrow	Umatilla	21,665	1,616,448	2.0
Union	Upper Grande Ronde	10,731	1,047,238	2.2
Malheur	Willow	795	486,196	0.1
	Total	178,097	11,167,369	–

Several design features will be incorporated into the POD to avoid or minimize impacts on areas mapped as surface DWSA, including Design Feature 1 (Plan of Development), Design Feature 5 (Spatial Extent of Construction Activities) and Design Feature 6 (Reclaim Construction Areas). In addition, the Applicant has committed to using municipal sources of water for B2H Project construction, operation, and maintenance when necessary. Further analysis of this resource is not carried forward.

Groundwater

Shallow Groundwater

Groundwater occurs in several major confined aquifers throughout the study corridor. Northeastern Oregon is underlain by the southern portion of the Columbia Plateau aquifers, and central-eastern Oregon is underlain by the Pacific Northwest aquifers. Southwestern Idaho is underlay by the Snake River Plain aquifer. Shallow groundwater can occur above the regional aquifers, usually from infiltration from surface-water sources. In agricultural areas in the Middle Snake Subbasin, the quantity of shallow groundwater may be enhanced by the flood irrigation.

Groundwater well data from the USGS National Water Information System (USGS 2016a) for Boise, Idaho (the closest monitoring station to the study corridor), shows that groundwater depths vary from approximately 5 feet below ground level to more than 25 feet below ground level. The reporting station is located on the northeastern edge of the Boise River Floodplain.

The OWRD maintains several state-monitored depth to groundwater wells within the study corridor along the Interstate 84 (I-84) corridor (OWRD 2016). Hydrographs indicate that the average depth to groundwater near the Baker City area is within 10 feet below ground surface. Hydrographs for other

well locations in Umatilla, Baker, and Morrow counties indicate average depth to groundwater starting at 50 feet below ground surface to more than 100 feet below ground surface.

Depth to groundwater table readings are estimates of the upper limit of groundwater, generally based on observations of the water table at selected sites and on evidence of a saturated zone. A saturated zone that lasts for less than a month is not considered a water table (USDA 2016a). NRCS data are predictive in nature; are not indicative of real time conditions; and do not factor in local conditions, such as perched water tables, recent deep excavations into local aquifers, or water well drawdown activity.

The lack of consistent groundwater-monitoring stations reporting actual depth to groundwater measurements throughout the B2H Project area leads to an inconclusive assessment of potential impacts on groundwater resources. Where water wells with current depth to groundwater data do occur, the groundwater-monitoring stations are generally clustered near population centers. The majority of the study corridor is located in rural, upland areas where it is unlikely that shallow groundwater is to be encountered during B2H Project activities. However, locally shallow groundwater may exist in some low-lying areas along floodplains, wetlands, and in river bottoms.

The USDA NRCS Web Soil Survey (USDA 2016a) uses a predictive model for estimating depth to groundwater, based on soil taxonomy. Table 3-65 includes a summation of soil unit types classified as either shallow (soil mapping units with predicted groundwater within 6.5 feet below ground surface) and deep (soil mapping units with predicted groundwater deeper than 6.5 feet below ground surface).

Table 3-65. Acres of Shallow and Deep Natural Resources Conservation Service Soil Unit Types by County

County	Subbasin Name	Soil Unit Type	Acres of Soil Unit Type by County	Percent of Total Acres in County
Ada	Middle Snake-Succor	Shallow	26,928	4
		Deep	651,856	96
Adams/Washington (parts of)	Brownlee Reservoir	Shallow	46,260	4
		Deep	1,063,315	96
Baker	Brownlee Reservoir, Burnt, Powder	Shallow	109,510	8
		Deep	1,230,795	92
Canyon	Middle Snake-Succor	Shallow	75,513	16
		Deep	382,041	84
Grant	Burnt	No natural resources conservation service depth to groundwater data		
Malheur (Northeastern Portion only)	Brownlee Reservoir, Bully, Lower Malheur, Lower Owyhee, Middle Snake-Succor, Willow	Shallow	61,023	26
		Deep	173,473	74
Morrow	Middle Columbia-Lake Wallula, Umatilla	Shallow	7,915	0.6
		Deep	1,302,583	99.4
Owyhee	Middle Snake-Succor	Shallow	76,227	2
		Deep	3,631,715	98
Umatilla	Middle Columbia-Lake Wallula, Umatilla	Shallow	74,605	4.6
		Deep	1,580,199	95.4

Table 3-65. Acres of Shallow and Deep Natural Resources Conservation Service Soil Unit Types by County				
County	**Subbasin Name**	**Soil Unit Type**	**Acres of Soil Unit Type by County**	**Percent of Total Acres in County**
Union	Powder, Upper Grande Ronde	Shallow	144,253	22
		Deep	506,950	78
Wallowa	Brownlee Reservoir	Shallow	338,450	35
		Deep	848,113	88

Geotechnical investigations to confirm depth to groundwater throughout the B2H Project area have not been conducted at this time. Geotechnical investigations will be conducted during the preconstruction surveys and would be used to characterize the geologic composition where B2H Project facilities are proposed and to identify areas of shallow groundwater. Micro-siting of facilities then would occur to avoid or minimize impacts on areas of shallow groundwater.

A more detailed analysis of shallow groundwater is provided in Section 3.2.2.4.

Groundwater Drinking Water Source Areas

Groundwater is the major drinking water source in southern Idaho, and a combination of surface water and groundwater provides drinking water in eastern Oregon. Groundwater commonly is available to shallow wells that are completed in unconsolidated-deposit aquifers that consist primarily of sand and gravel but also contain variable quantities of clay and silt. In many places, deeper wells produce water from underlying volcanic rocks, usually basalt (USGS 1994). Groundwater levels in a few areas have declined as a result of withdrawals by wells.

The B2H Project area crosses several groundwater DWSA (Table 3-66), predominantly in Baker County and, to a lesser extent, in Union County (ODEQ and ODHS 2011). In Baker City, the water table ranges from less than 10 to 50 feet below ground surface. Shallow wells yield water from unconsolidated-deposit aquifers; deeper wells yield water from basaltic-rock aquifers for public-supply, domestic and commercial, and agricultural purposes. The wells range in depth from approximately 10 feet to more than 650 feet (USGS 1994). Other source areas include the Blue Bucket Recreational Vehicle Park, City of Huntington, ODOT Weatherby Rest Area, Oregon Parks and Recreation Department (OPRD) Hilgard Junction State Park, Oregon Youth Authority Hilgard, Portland General Electric Boardman Coal Fire Plant, and U.S. Army Depot-Umatilla.

Table 3-66. Acres of Groundwater Drinking Water Source Areas by County	
County	**Groundwater Drinking Water Source Areas**
Baker (Oregon)	8,319
Malheur (Oregon)	84
Morrow (Oregon)	0
Umatilla (Oregon)	139
Union (Oregon)	117
Owyhee (Idaho)	0
Total Acres	8,659

As stated previously, geotechnical investigations to confirm depth to groundwater throughout the B2H Project area have not been conducted at this time. Geotechnical investigations will be conducted during preconstruction surveys and would be used to characterize the geologic composition where B2H Project facilities are proposed and to identify areas of groundwater presence. Micro-siting of facilities, including tower foundations and other B2H Project facilities that may require blasting, would occur to avoid or minimize impacts on areas of shallow groundwater. In addition, the Applicant has committed to using municipally sourced water for construction, operation, and maintenance of the B2H Project. Impacts on groundwater drinking water sources are not anticipated to be affected by local well drawdown due to B2H Project activities.

Further analysis of B2H Project effects on groundwater DWSAs is not carried forward.

Water Wells

There were 352 groundwater wells identified in the study corridor (Table 3-67). As shown in the table below, mapped water wells are not evenly dispersed throughout the study corridor. The Umatilla subbasin contains the majority of mapped water wells (171).

Table 3-67. Total Mapped Water Wells by Subbasin in the Study Corridor

Subbasin	Number of Water Wells
Brownlee Reservoir	0
Bully	0
Burnt	0
Lower Malheur	0
Lower Owyhee	0
Middle Columbia-Lake Wallula	84
Middle Snake-Succor	92
Powder	3
Umatilla	171
Upper Grande Ronde	0
Willow	2
Total	352

Preconstruction surveys will be conducted as part of the POD to identify sensitive resources to be avoided to the maximum extent practicable. The Applicant also has committed to several design features to minimize impacts on water wells due to construction or blasting activities associated with B2H Project construction. Design Feature 1 (Plan of Development) and Design Feature 5 (Spatial Extent of Construction Activities), would avoid or limit effects of blasting on existing water wells within the B2H Project footprint. Further analysis of B2H Project effects on water wells is not carried forward.

Floodplains

Some of the streams that the alternative route centerlines cross have delineated 100-year floodplains or flood hazard areas designated by FEMA. The 100-year floodplain is the area that would be inundated by a flood event having a 1 percent chance of being equaled or exceeded in any given year (also

referred to as the 100-year flood). Table 3-68 provides a breakdown of flood hazard areas within each subbasin crossed by the B2H Project centerline.

Areas within the study corridor that have been identified as having moderate and high flood hazard include the following:

- Willow Creek (near Cecil, Oregon) and Sixmile Canyon and tributaries (between Cecil and Boardman, Oregon) in Morrow County
- Butter Creek and tributaries (Pine City and Hermiston, Oregon) in Morrow and Umatilla counties
- Alkali Canyon (upstream of Echo, Oregon) in Umatilla County, Birch and McKay creeks (between Pilot Rock and Pendleton, Oregon), and the Grande Ronde River (near La Grange, Oregon)
- Powder River tributaries (near Baker, Oregon) and Burnt River Mountain area and tributaries (near Pleasant Valley, Durkee, Weatherby, Dixie, Lime, and Huntington, Oregon) in Baker County
- Willow Creek (near Brogan, Oregon), Malheur River (near Vale, Oregon), and Owyhee River (upstream of Owyhee, Oregon) in Malheur County
- Several tributaries of the Snake River (between Marsing and Melba, Idaho) in Owyhee County

Building is permitted in flood-prone areas with certain restrictions. For instance, buildings may be elevated such that the lowest floor is above the 100-year flood level, and an area of the watercourse (the floodway) is set aside for flow conveyance. Since floodplain mapping usually is done as an aid to local governments in urban areas or in areas that are expected to be prone to urbanization, most watercourses in nonurban areas are unmapped even though they may be subject to flood hazards. It is reasonable to assume that all watercourses that convey natural flows, whether or not mapped as floodplains or flood hazard areas, present some level of flood hazard. The flood hazard is not limited to inundation; bank erosion and bed scour (a lowering or destabilization of the channel bed during a flow event) also are hazards that can occur due to flooding. Further analysis of floodplains is provided under Section 3.2.1.5.

Table 3-68. Acres of Flood Hazard Areas by Hazard Rank Subbasin in the Study Corridor

Subbasin	Flood Hazard Rank Moderate Within 1 Mile Buffer	Flood Hazard Rank Moderate Within Hydrologic Unit Code 8, 1-mile Buffer	Flood Hazard Rank High Within 1 Mile Buffer	Flood Hazard Rank High Within Hydrologic Unit Code 8 Within 1-mile Buffer
Brownlee Reservoir	6,102	47,123	2,082	85,283
Bully	0	6,070	0	426
Burnt	9,349	38,488	73	5,515
Lower Malheur	1,158	66,019	42,613	0
Lower Owyhee	2,015	123,200	801	98,805
Middle Columbia-Lake Wallula	0	378,433	0	233,639
Middle Snake-Succor	646	60,527	1,715	163,831
Powder	2,226	50,886	0	18,643

Table 3-68. Acres of Flood Hazard Areas by Hazard Rank Subbasin in the Study Corridor				
Subbasin	**Flood Hazard Rank Moderate Within 1 Mile Buffer**	**Flood Hazard Rank Moderate Within Hydrologic Unit Code 8, 1-mile Buffer**	**Flood Hazard Rank High Within 1 Mile Buffer**	**Flood Hazard Rank High Within Hydrologic Unit Code 8 Within 1-mile Buffer**
Umatilla	10,584	143,192	10,859	198,008
Upper Grande Ronde	458	40,406	77	8,430
Willow	1,195	35,968	1,652	13,154

Traditional Foods and Water Resources

Water is a resource that is required to produce and support all traditional foods. Water quality includes processes associated with the sustained longevity of traditional foods, including plant, wildlife and fish traditional foods. The physical, chemical, and biological aspects of water quality compose a sustainable river system (Jones et al. 2008). Rivers and streams should be free from pollutants (e.g., toxicants or excess nutrients) that impair drinking water supplies, alter stream-water pH, and stress or kill native aquatic fauna. Maintenance of appropriate water temperature regimes, including cool temperatures during the summer, is especially important because water temperature influences dissolved oxygen concentrations, stress levels of aquatic organisms, growth of pathogens, and the competitive abilities of non-native fishes and native fishes.

Water quality must be adequate to support the sustainable production of traditional foods in terms of its physical properties (e.g., having an appropriate temperature regime), chemical composition (e.g., being free of pollutants), biotic constituents (e.g., having a native biotic community), and hydrology (e.g., having proper timing and adequate volume of river flow and spatial distribution of water throughout the basin) (Jones et al. 2008).

Water quality has been degraded across the B2H Project area by inputs of sediment, fertilizers, pesticides, and other contaminants in areas of development, including areas of agriculture, residential, and commercial expansion. Possible consequences of these inputs include altering the food web by increasing the growth of noxious weeds and algae, which could lead to the accumulation of contaminants in water, sediment, and aquatic organisms.

Conservation measures for the B2H Project to reduce negative effects on water quality include design features for environmental protection and selective mitigation measures that are applied to mitigate site- and/or resource-specific impacts of the B2H Project (Refer to Section 3.2.2.4). As a result, impacts on traditional foods are anticipated to be minimal.

Further discussion of traditional foods is provided under Section 3.2.3.5, Section 3.2.4.5, and Section 3.2.5.5.

SEGMENT 1—MORROW-UMATILLA

Segment 1 begins in the Middle Columbia-Lake Wallula subbasin in the northwest, crosses the Umatilla subbasin and concludes in the Upper Grande Ronde subbasin to the southeast.

Streams and Impaired Waters

Segment 1 begins in the Columbia Plateau major land resource area (MLRA) in the Middle Columbia-Lake Wallula subbasin (USDA 2016b). The Columbia Plateau MLRA is characterized by smooth to deeply dissected plains and plateaus containing rolling hills with incised valleys. This MLRA is in the rain shadow of the Cascade Mountain Range, and, thus receives a low to moderate amount of precipitation typically occurring as rain in fall, winter, and spring from low-intensity, Pacific frontal storms. This MLRA receives some of the lowest total precipitation in the ecoregion. Surface water is abundant throughout most of the region and is dominated by the runoff from snowmelt. The major rivers provide water for irrigation along their courses, but small streams provide little water.

Segment 1 continues south through to the Umatilla subbasin and the Columbia Basin MLRA. The Columbia Basin MLRA is smooth, gently sloping plain broken by some steep basalt ridges (USDA 2016b). The smooth plain also is dissected into large areas by rivers and perennial streams. This MLRA is on the lee side of the Cascade Mountains and is the warmest and driest MLRA in the entire Columbia Plateau geographic area. Two-thirds of the precipitation occurs in winter from low-intensity, Pacific frontal storms. The winter precipitation typically occurs as a mixture of rain and snow, and summers are generally dry. Surface water is abundant throughout most of the region; however it is generally confined to intermittent streams.

Streams in this Segment drain to the Columbia River to the north (USDA 2016c). Several major streams are crossed by alternative routes in this segment, including the Umatilla River, West Birch Creek and Beaver Creek.

Table 3-69 presents the miles of streams by periodicity and by impairment status crossed by all alternative routes and variations in Segment 1. The distribution of these stream types in Segment 1 is displayed on MV-6.

Table 3-69. Streams Inventory Data for Segment 1—Morrow-Umatilla (miles crossed)

Alternative Route	Total Length	Perennial Streams	Intermittent Streams	Total Miles of Streams Crossed
Applicant's Proposed Action	91.9	1.4	19.8	21.2
Variation S1-B1	*6.4*	*0.2*	*1.8*	*2.0*
Variation S1-B2	*6.4*	*0.4*	*1.8*	*2.2*
East of Bombing Range Road	92.3	1.4	19.5	20.9
Applicant's Proposed Action – Southern Route	99.1	1.7	20.5	22.2
West of Bombing Range Road – Southern Route	95.6	2.4	16.6	19.0
Longhorn	88.2	1.5	17.4	18.9
Interstate 84	84.7	1.4	13.1	14.8
Variation S1-A1	*18.5*	*0.2*	*3.0*	*3.2*
Variation S1-A2	*18.5*	*0.2*	*3.8*	*4.0*
Interstate 84 – Southern Route	93.4	2.0	14.4	16.4

Table Note: Inventory data columns represent total miles of stream types crossed by the B2H Project and do not equal the total length as the same stream type may be crossed multiple times.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative predominantly crosses intermittent streams and does not cross any 303(d) impaired waters.

Variations S1-B1 and S1-B2

Variation S1-B1 crosses both intermittent and perennial streams, and Variation S1-B2 crosses twice the distance of perennial streams and the same distance of intermittent streams as Variation S1-B1.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 do not cross any perennial or intermittent streams or 303(d) impaired waters.

East of Bombing Range Road Alternative

Both intermittent and perennial streams are crossed by the East of Bombing Range Road Alternative. The East of Bombing Range Road Alternative crosses fewer total miles of streams than the Applicant's Proposed Action Alternative. This alternative route crosses the West Irrigation Canal near the northern terminus of the alternative route (Link 1-7) and does not cross any 303(d) impaired waters.

Applicant's Proposed Action – Southern Route Alternative

The Applicant's Proposed Action – Southern Route Alternative crosses more miles of both perennial and intermittent streams than the Applicant's Proposed Action Alternative. This alternative route crosses the West Irrigation Canal near the northern terminus of the alternative route (Link 1-7) and crosses the most total miles of streams in Segment 1. The alternative route does not cross any 303(d) impaired waters.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 do not cross any perennial or intermittent streams or 303(d) impaired waters.

West of Bombing Range Road – Southern Route Alternative

The West of Bombing Range Road – Southern Alternative crosses more miles of perennial streams, but fewer miles of intermittent streams, than the Applicant's Proposed Action Alternative. This alternative route crosses fewer total miles of streams than the Applicant's Proposed Action Alternative and does not cross any 303(d) impaired waters.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 do not cross any perennial or intermittent streams or 303(d) impaired waters.

Longhorn Alternative

The Longhorn Alternative crosses more miles of perennial streams, but fewer miles of intermittent streams than the Applicant's Proposed Action Alternative. This alternative route crosses the West Irrigation Canal near the northern terminus of the alternative route (Link 1-7). The Longhorn Alternative

crosses fewer total miles of streams than the Applicant's Proposed Action Alternative and does not cross any 303(d) impaired waters.

Interstate 84 Alternative and Variations

The Interstate 84 Alternative crosses fewer total miles of streams than the Applicant's Proposed Action Alternative and does not cross any 303(d) impaired waters. This alternative route crosses the Umatilla River (Link 1-23).

Variations S1-A1 and S1-A2

Variation S1-A1 crosses fewer total miles of streams than Variation S1-A2. Both variations do not cross any 303(d) impaired waters.

Interstate 84 – Southern Route Alternative

The Interstate 84 – Southern Route Alternative crosses more miles of perennial streams than the Applicant's Proposed Action Alternative, including the Umatilla River (Link 1-23). This alternative route crosses fewer total miles of streams than the Applicant's Proposed Action Alternative and does not cross any 303(d) impaired waters.

Wetlands

The Columbia Plateau MLRA supports a variety of shrub-grass associations that are landscape dependent and position dominant; areas of moderately deep to deeply sloping hills with south facing exposures generally support wheatgrasses and sagebrush associations (USDA 2013, 2016b). Small stands of trees and taller shrubs are associated with warmer sites along the major rivers, on north-facing slopes, in canyons and draws, and along stream channels in linear depressed landscapes. Moderate height shrub communities predominantly grow in canyons and draws.

The Columbia Basin MLRA, within the Umatilla subbasin, supports selective shrub-grass associations that do not require consistent water input (USDA 2016b). Forests and scrub-shrub wetlands are rare and limited to areas of reliable, consistent water sources (perennial streams within topographically defined landscapes, groundwater driven wetlands, springs).

Springs are located throughout Segment 1, however they are inconsistently associated with rolling landform features. The Echo Meadows and Umatilla Meadows areas are located along Interstate 84 in this segment (Link 1-23).

Table 3-70 presents the miles of wetland types crossed by all alternative routes and variations in Segment 1. The distribution of these wetland communities in Segment 1 is displayed on MV-6.

Table 3-70. Wetland Resources Inventory Data for Segment 1—Morrow-Umatilla (miles crossed)

Alternative Route	Total Length	Forested Wetlands	Scrub-Shrub Wetlands	Emergent Wetlands	Open Water	Total Miles of Wetlands Crossed
Applicant's Proposed Action	91.9	0.3	0.1	2	2.3	4.7
Variation S1-B1	*6.4*	*0.0*	*0.0*	*0.1*	*0.0*	*0.1*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*0.0*	*0.4*	*0.4*

Table 3-70. Wetland Resources Inventory Data for Segment 1—Morrow-Umatilla (miles crossed)						
Alternative Route	**Total Length**	**Forested Wetlands**	**Scrub-Shrub Wetlands**	**Emergent Wetlands**	**Open Water**	**Total Miles of Wetlands Crossed**
East of Bombing Range Road	92.3	0.3	0.1	2.1	2.1	4.6
Applicant's Proposed Action – Southern Route	99.1	0.7	0.1	2.0	4.0	6.8
West of Bombing Range Road – Southern Route	95.6	0.9	0.1	2.5	3.8	7.3
Longhorn	88.2	0.1	0.1	2.5	1.9	4.6
Interstate 84	84.7	0.1	0.4	2.9	4.8	8.2
Variation S1-A1	*18.5*	*0.0*	*0.0*	*0.0*	*0.6*	*0.6*
Variation S1-A2	*18.5*	*0.0*	*0.1*	*0.1*	*0.9*	*1.1*
Interstate 84 – Southern Route	93.4	0.5	0.4	2.9	6.4	10.2
Table Note: Inventory data columns represent total miles of wetland types crossed by the B2H Project and do not equal the total length as the same wetland type may be crossed multiple times.						

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative predominantly crosses open water and emergent wetlands associated with open water fringe areas.

Variations S1-B1 and S1-B2

Variation S1-B1 crosses only emergent wetlands and crosses fewer total miles of wetlands than Variation S1-B2. Variation S1-B2 only crosses open water wetlands.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 do not cross any wetland types.

East of Bombing Range Road Alternative

The East of Bombing Range Road Alternative crosses emergent and open water wetlands. This alternative route crosses the West Irrigation Canal) near the northern terminus of the alternative route (Link 1-7).

Applicant's Proposed Action – Southern Route Alternative

The Applicant's Proposed Action – Southern Route Alternative crosses more miles of open water and forested wetlands than the Applicant's Proposed Action Alternative. This alternative route crosses the West Irrigation Canal near the northern terminus of the alternative route (Link 1-7).

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 do not cross any wetland types.

West of Bombing Range Road – Southern Route Alternative

The West Bombing Range Road – Southern Route Alternative crosses the most miles of forested wetlands in Segment 1 and crosses Butter Creek (Link 1-38) and the associated emergent and forested wetlands.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 do not cross any wetland types.

Longhorn Alternative

The Longhorn Alternative crosses the West Irrigation Canal near the northern terminus of the alternative route (Link 1-9) and crosses mostly emergent wetlands associated with agricultural areas.

Interstate 84 Alternative and Variations

The Umatilla Meadows and Echo Meadows areas (Link 1-23) split Interstate 84 north and south, respectively, near the locality of Echo. Large tracts of emergent wetlands, associated with existing agricultural fields, are located throughout this area. The Umatilla River crosses I-84 and the Interstate 84 Alternative to the east of the Echo Meadow area (Link 1-23). This area represents the highest concentration of emergent wetlands in Segment 1.

Variations S1-A1 and S1-A2

Variation S1-A1 only crosses open water wetlands. Variation S1-A2 crosses more total miles of wetlands than Variation S1-A1, including open water, emergent, and scrub-shrub wetlands.

Interstate 84 – Southern Route Alternative

Wetland types crossed by this alternative route consist mostly of open water and associated emergent fringe wetlands. This alternative route crosses the most total miles of wetlands compare to any of the other alternative routes in Segment 1.

SEGMENT 2—BLUE MOUNTAINS

Segment 2 begins in the Wallowa-Whitman National Forest in the northwest and runs generally to the southeast, crossing the Grande Ronde River and Rock Creek in the Upper Grande Ronde River subbasin and the Powder River, Jimmy and Clover Creeks in the Powder River subbasin. Segment 2 ends near Riverdale Hill, just south of the Baker/Union County boundary. Streams in this Segment drain to the Snake River to the north.

Segment 2 starts in the Upper Grande Ronde subbasin and crosses into the crosses the Palouse and Nez Perce Prairies MLRA (USDA 2016b). This MLRA is on the lee side of the Cascade Mountains and is characterized by an area of smooth to deeply dissected plains and plateaus, with locally undulating basalt plateau landscapes that are nearly level to steeply sloping. Local watersheds are further characterized by a surface that is moderately dissected or strongly dissected by intermittent streams. Slopes are mostly hilly and steep. Winter precipitation, primarily snow, occurs during low-intensity, Pacific frontal storms. High-intensity, convective thunderstorms produce some rain during the growing season. Precipitation is evenly distributed throughout fall, winter, and spring. Summers are relatively dry. Surface water runoff is dominated by snowmelt; in years of light snowpack many streams can run dry.

Segment 2 continues through to the Upper Snake River Lava Plains between the Grand Ronde subbasin and the Power River subbasin (USDA 2016b). This MLRA is typified by gently rolling to steep

hills, plateaus, and low mountains. Precipitation is evenly distributed throughout fall, winter, and spring but is low in summer. Some high-intensity, convective thunderstorms occur during the growing season. Winter precipitation is primarily snow. This MLRA is generally drier than the Palouse and Nez Perce Prairies MLRA to the north. Surface water is abundant throughout most of the region and occurs as smaller volume perennial rivers and intermittent streams.

Streams and Impaired Waters

Table 3-71 presents the miles of streams by periodicity and by impairment status crossed by all alternative routes and variations in Segment 2. The distribution of these stream types in Segment 2 is displayed on MV-6.

Table 3-71. Streams and Impaired Waters Inventory Data for Segment 2—Blue Mountains (miles crossed)

Alternative Route	Total Length	Perennial Streams	Intermittent Streams	Temperature-Impaired Streams (303(d) listed)	Total Miles of Streams Crossed
Applicant's Proposed Action	33.8	2.2	5.6	0.2	7.8
Variation S2-A1	*2.8*	*0.0*	*0.7*	*0.0*	*0.7*
Variation S2-A2	*2.9*	*0.0*	*1.4*	*0.0*	*1.4*
Variation S2-B1	*3.7*	*0.8*	*0.7*	*0.0*	*1.5*
Variation S2-B2	*3.8*	*0.7*	*0.8*	*0.0*	*1.5*
Variation S2-C1	*9.3*	*0.3*	*0.7*	*0.0*	*1.0*
Variation S2-C2	*8.8*	*0.6*	*0.5*	*0.0*	*1.1*
Variation S2-E1	*2.3*	*0.6*	*0.7*	*0.0*	*1.3*
Variation S2-E2	*2.6*	*0.7*	*0.2*	*0.0*	*0.9*
Variation S2-F1	*12.1*	*0.0*	*0.3*	*0.0*	*0.3*
Variation S2-F2	*12.2*	*0.1*	*0.2*	*0.0*	*0.3*
Glass Hill	33.7	2.6	5.5	0.2	8.1
Variation S2-D1	*4.3*	*0.7*	*2.1*	*0.2*	*2.8*
Variation S2-D2	*4.1*	*1.1*	*1.6*	*0.2*	*2.7*
Mill Creek	34.0	2.4	5.4	0.2	7.8

Table Note: Inventory data columns represent total miles of stream types crossed by the B2H Project and do not equal the total length as the same stream type may be crossed multiple times.

Applicant's Proposed Action Alternative

For the Applicant's Proposed Action Alternative, streams drain to the Grande Ronde River and, eventually, the Snake River to the north. The Applicant's Proposed Action Alternative crosses the Grande Ronde River (Link 2-20), Rock Creek (Link 2-35), Sheep Creek (Link 2-45), Clover Creek and the Powder River (Link 2-85). This alternative route predominantly crosses intermittent streams.

Variations S2-A1 and S2-A2

Variations S2-A1 and S2-A2 cross only intermittent streams on the Wallowa-Whitman National Forest (Links 2-5 and 2-7, respectively) and do not cross any perennial or 303(d) impaired waters. Variation S2-A2 crosses approximately twice the miles of intermittent streams as Variation S2-A1.

Variations S2-B1 and S2-B2

Variation S2-B1 crosses both Rock and Sheep Creeks while Variation S2-B2 crosses Rock, Sheep, and Graves (tributary to Rock Creek) creeks (Links 2-25 and 2-35, respectively). Variation S2-B1 crosses slightly more miles of perennial streams and slightly fewer miles of intermittent streams than Variation S2-B2. These variations do not cross any 303(d) impaired waters.

Variations S2-C1 and S2-C2

Variations S2-C1 and S2-C2 cross Sheep Creek (Link 2-48) and Variation S2-C2 also crosses an unnamed-mapped tributary to Rock Creek (Link 2-45). Variation S2-C1 crosses fewer miles of perennial and intermittent streams than Variation S2-C2. These variations do not cross any 303(d) impaired waters.

Variations S2-E1 and S2-E2

Variation S2-E1 crosses an unnamed perennial stream near the southern terminus of the variation, and Variation S2-E2 crosses an unnamed perennial stream (tributary to Ladd Canyon Pond) (Link 2-55). Variation S2-E1 crosses fewer miles of perennial streams and approximately three times the distance of intermittent streams than Variation S2-E2. These variations do not cross any 303(d) impaired waters.

Variations S2-F1 and S2-F2

Variations S2-F1 and S2-F2 cross Clover and Jimmy Creeks (Links 2-70 and 2-75, respectively) and the Powder River (Links 2-90 and 2-95, respectively) before terminating just north of Riverdale. Variation S2-F1 crosses slightly more miles of intermittent streams than Variation S2-F2, and Variation S2-F2 crosses slightly more miles of perennial streams than Variation S2-F1. These variations do not cross any 303(d) impaired waters.

Glass Hill Alternative and Variations

The Glass Hill Alternative and variations cross within more of the headwaters areas of Rock and Graves Creeks than the Applicant's Proposed Action Alternative. The Glass Hill Alternative crosses the upstream portion of the Jimmy Creek Reservoir (Link 2-85).

The Glass Hill Alternative crosses more miles of perennial streams, fewer miles of intermittent streams, and the same distance of 303(d) temperature-impaired streams as the Applicant's Proposed Action Alternative.

Variations S2-D1 and S2-D2

Variations S2-D1 and S2-D2 cross Graves, Rock and Little Rock Creeks (Links 2-42 and 2-46, respectively). Variation S2-D1 crosses fewer miles of perennial streams, more miles of intermittent streams, and the same distance of 303(d) temperature-impaired streams than Variation S2-D2 (Rock Creek).

Mill Creek Alternative

The Mill Creek Alternative crosses the Grande Ronde River (Link 2-10), Rock Creek (Link 2-10), Mill Creek (Link 2-12), Jimmy Creek (Link 2-83), Ladd Creek (Link 2-83), Pickup Ditch (Link 2-85) and Powder River (Link 2-85). This alternative route crosses more miles of perennial streams, fewer miles

of intermittent streams, and the same distance of 303(d) temperature-impaired streams than the Applicant's Proposed Action Alternative.

Wetlands

The Palouse and Nez Perce Prairies MLRA supports a mix of grass, shrubs, and trees, with more forested communities concentrated near perennial water sources and areas of shallow groundwater (USDA 2016b). True forested wetlands are exceptionally rare due to lack of year-round water sources; most wetlands within this MLRA consist of scrub-shrub, emergent or open water types.

The Upper Snake River Lava Plains MLRA supports many types of shrub-grass associations, a typical vegetative community found in drier ecoregions (USDA 2016b). Forested areas are rare and occur in perennial stream corridors and natural groundwater driven springs.

The Ladd Marsh Wildlife Area and associated wetland meadows (Map 3-1) are located in this segment (Links 2-48 and 2-83). The Clover Creek Valley and floodplain areas also are located in the southern portion of Segment 2. No mapped forested wetlands are crossed in Segment 2 by any alternative route or variation.

Table 3-72 presents the wetland types crossed by all alternative routes and variations in Segment 2. The distribution of these wetland community types in Segment 2 is displayed on MV-6.

Table 3-72. Wetland Resources Inventory Data for Segment 2—Blue Mountains (miles crossed)

Alternative Route	Total Length	Forested Wetlands	Scrub-Shrub Wetlands	Emergent Wetlands	Open Water	Total Miles of Wetland
Applicant's Proposed Action	33.8	0.0	0.7	1.7	2.2	4.6
Variation S2-A1	*2.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S2-A2	*2.9*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*
Variation S2-B1	*3.7*	*0.0*	*0.0*	*0.5*	*0.5*	*1.0*
Variation S2-B2	*3.8*	*0.0*	*0.0*	*0.0*	*0.7*	*0.7*
Variation S2-C1	*9.3*	*0.0*	*0.0*	*0.1*	*0.2*	*0.3*
Variation S2-C2	*8.8*	*0.0*	*0.1*	*0.0*	*0.3*	*0.4*
Variation S2-E1	*2.3*	*0.0*	*0.1*	*0.0*	*0.4*	*0.5*
Variation S2-E2	*2.6*	*0.0*	*0.1*	*0.0*	*0.5*	*0.6*
Variation S2-F1	*12.1*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*
Variation S2-F2	*12.2*	*0.0*	*0.1*	*0.1*	*0.0*	*0.2*
Glass Hill	33.7	0.0	1.0	1.7	2.2	4.9
Variation S2-D1	*4.3*	*0.0*	*0.6*	*1.1*	*1.0*	*2.7*
Variation S2-D2	*4.1*	*0.0*	*0.1*	*0.3*	*1.0*	*1.4*
Mill Creek	34.0	0.0	0.6	0.9	2.5	4.0

Table Note: Inventory data columns represent total miles of wetland types crossed by the B2H Project and do not equal the total length as the same wetland type may be crossed multiple times.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative predominantly crosses open water and associated emergent wetlands. This alternative route crosses the headwaters areas of Rock and Graves Creeks and the upstream watershed of the Jimmy Creek Reservoir (Link 2-85).

Variations S2-A1 and S2-A2

Variation S2-A1 does not cross any wetlands and Variation S2-A2 crosses a small area of open water wetlands.

Variations S2-B1 and S2-B2

Variation S2-B1 crosses more miles of emergent wetlands and fewer miles of open water wetlands than Variation S2-B2.

Variations S2-C1 and S2-C2

Variation S2-C1 crosses fewer total miles of wetlands than Variation S2-C2; however this variation crosses more miles of emergent wetlands and fewer miles of open water wetlands than Variation S2-C2.

Variations S2-E1 and S2-E2

Variation S2-E1 crosses fewer total miles of wetlands than Variation S2-E2. Variations S2-E1 and S2-E2 cross scrub-shrub and open water wetlands, with Variation S2-E2 crossing more miles of open water wetlands than Variation S2-E1.

Variations S2-F1 and S2-F2

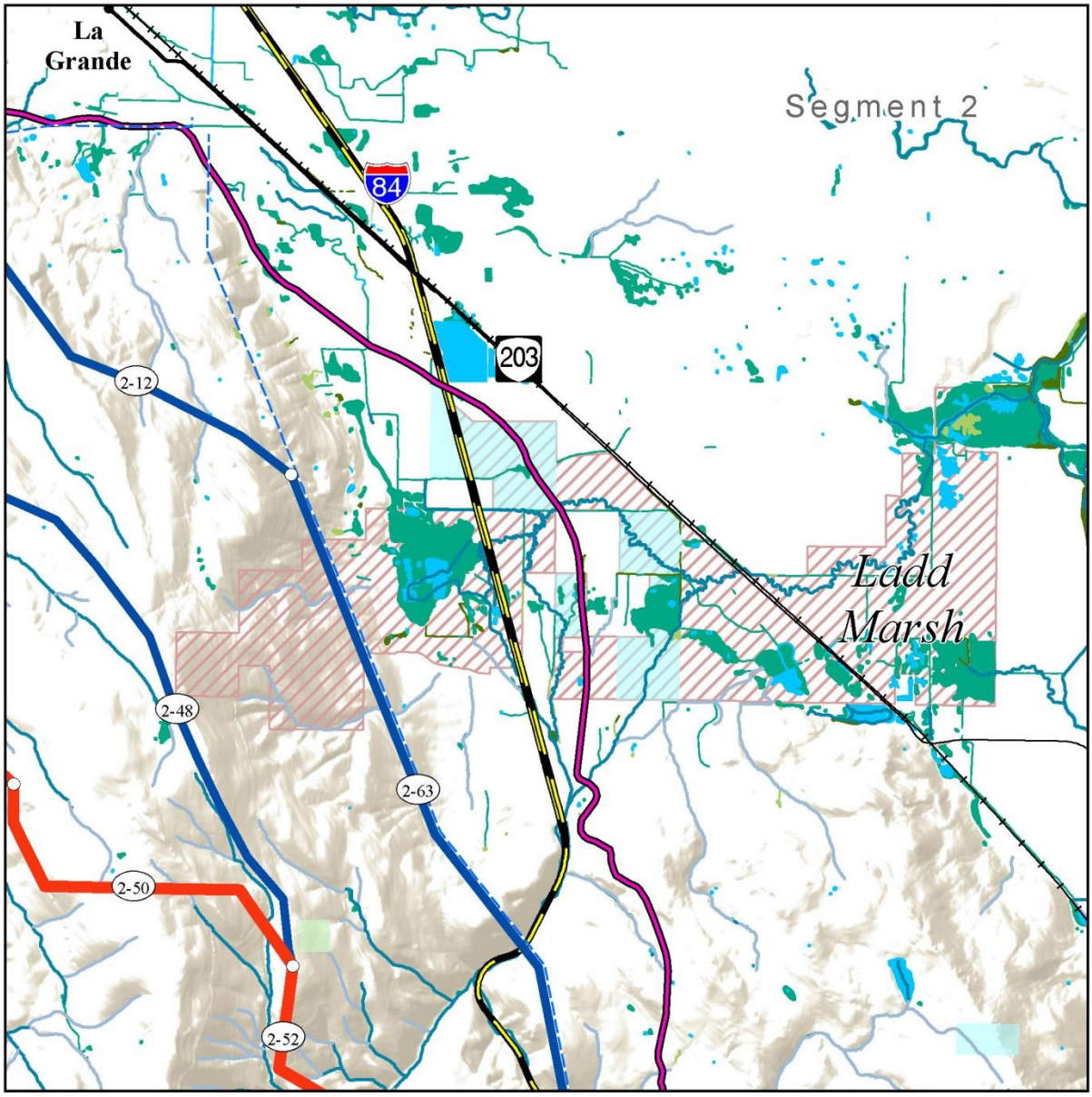
Variation S2-F1 crosses fewer total miles of wetlands than Variation S2-F2. Variation S2-F1 only crosses open water wetlands, and Variation S2-F2 only crosses scrub-shrub and emergent wetlands.

Glass Hill Alternative

The Glass Hill Alternative crosses within more of the headwaters areas of Rock and Graves Creeks (Links 2-40 and 2-42, respectively) in the area crossed by both alternative route variations and crosses the upstream portion of the Jimmy Creek Reservoir (Link 2-80). This alternative route crosses more total miles of wetlands and more miles of scrub-shrub wetlands than the Applicant's Proposed Action Alternative.

Variations S2-D1 and S2-D2

Variation S2-D1 crosses approximately three times the miles of emergent wetlands, six times the miles of scrub-shrub wetlands, and the same distance of mapped open water wetlands as Variation S2-D2.



Map 3-1

Ladd Marsh Wildlife Management Area

BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

Water Features

- Perennial Stream
- Intermittent Stream
- Lake, Pond, or Reservoir
- Emergent Wetland
- Forested Wetland
- Scrub-Shrub Wetland
- Ladd Marsh Wildlife Management Area (WMA)

Project Features

- Applicant's Proposed Action Alternative
- Alternative Route
- Link Node

Land Ownership

- U.S. Forest Service
- State Land
- Private Land

General Reference

- City or Town
- 230-kV Transmission Line
- Railroad
- Interstate Highway
- U.S. Highway
- State Highway
- Oregon National Historic Trail Congressionally Designated Alignment

SOURCES:
National Hydrography Dataset and Aquatic Resources Information Management System, USGS and BLM 2014; Wetlands, USFWS (National Wetlands Inventory) 2014, Oregon State University (OregonExplorer) 2009, Tetra Tech (limited field surveys for wetlands/waters) 2013, Ladd Marsh Wildlife Management Area, ODFW 2014; Land Status, BLM 2014, 2015; Cities and Towns, ESRI 2013; Transmission Lines, Bonneville Power Administration 2009, Idaho Power Company 2007, Logan Simpson Design 2011, Ventyx 2012; Railroads, Idaho DOT 2006, Oregon DOT 2014; Highways, ESRI 2013; Wildlife Management Areas, IDFG 2012, ODFW 2014; Oregon National Historic Trail Congressionally Designated Alignment, BLM 2015

NOTES:
- The map extent falls entirely within the Upper Grande Ronde subbasin (8-digit Hydrologic Unit Code).
- The alternative routes shown on this map are draft and may be revised or refined throughout the development of the Project.
- Each alternative route is composed of links, which are discrete sections of the route sharing common endpoints determined by the point of intersection with other adjacent links, the common endpoint is referred to as a link node. Links generally are numbered from north to south. Similarly, a segment is composed of alternative routes that share common endpoints determined by the point of intersection with other adjacent alternative routes; the common endpoint is referred to as a segment node.
- No warranty is made by the Bureau of Land Management as to the accuracy reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.

Alternative routes last revised: February 18, 2016
Final EIS: November 2016

0 0.5 1
Miles
1:80,000 or 1 inch = 1 mile

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Mill Creek Alternative

The Mill Creek Alternative passes through the Ladd Marsh Wildlife Area (Link 2-63) but does not cross any wetland types on the wildlife area. This alternative crosses the Grande Ronde River (Link 2-10) and the Powder River (Link 2-83). The Mill Creek Alternative crosses fewer total miles of wetlands throughout its entire mapped length than the Applicant's Proposed Action Alternative. This alternative route crosses fewer miles of emergent wetlands and scrub-shrub wetlands, and more miles of open water wetlands than the Applicant's Proposed Action Alternative.

SEGMENT 3—BAKER VALLEY

Segment 3 begins in the Powder River subbasin near Riverdale Hill in Baker County and runs generally to the southeast, crossing the Lower Powder Valley near the Missouri Flats into the Durkee Valley, traversing Gentry Creek, the Powder River, Alder Creek and the Burnt River in the Burnt River subbasin, just southeast of Weatherby Mountain. The Timber Canyon Alternative begins near the Applicant's Proposed Action Alternative in the northwest but takes an eastern route, around Thief Valley Reservoir (Link 3-6), southeast through the Wallowa-Whitman National Forest and crosses through the Eagle Valley before ending near Weatherby.

Streams and Impaired Waters

Segment 3 crosses both the Palouse and Nez Perce Prairies and Upper Snake River Lava Plains MLRAs, as described under Segment 2. The Palouse and Nez Perce Prairies MLRA in the Powder River subbasin is characterized by an undulating basalt plateau landscape that is nearly level to steeply sloping, with a surface that is moderately dissected or strongly dissected by streams (USDA 2016b). Slopes are mostly hilly and steep. Winter precipitation, primarily snow, occurs during low-intensity, Pacific frontal storms. High-intensity, convective thunderstorms produce some rain during the growing season. Precipitation is evenly distributed throughout fall, winter, and spring. Summers are relatively dry (USDA 2016b).

Segment 3 crosses back into the Upper Snake River Lava Plains MLRA in the Burnt River subbasin. This MLRA is typified by gently rolling to steep hills, plateaus, and low mountains (USDA 2016b). Precipitation is evenly distributed throughout fall, winter, and spring but is generally low in summer. Some high-intensity, convective thunderstorms occur during the growing season. Winter precipitation is primarily comprised of snow (USDA 2016b). The Upper Snake River Lava Plains MLRA is generally drier than the Palouse and Nez Perce Prairies MLRA. Streams in Segment 3 drain to the Powder River and eventually the Snake River to the north.

Table 3-73 presents the miles of streams by periodicity and impairment status crossed by crossed by all alternative routes and route variations in Segment 3. The distribution of these stream types in Segment 3 is displayed on MV-6. No 303(d) sediment-impaired streams are crossed by any alternative route or route variation in Segment 3.

Table 3-73. Streams and Impaired Waters Inventory Data for Segment 3—Baker Valley (miles crossed)					
Alternative Route	**Total Length**	**Perennial Streams**	**Intermittent Streams**	**Temperature-Impaired Streams (303(d) listed)**	**Total Miles of Streams Crossed**
Applicant's Proposed Action	55.2	4.6	7.0	1.4	11.6
Variation S3-A1	*12.4*	*1.1*	*2.2*	*0.0*	*3.3*
Variation S3-A2	*12.2*	*0.1*	*2.2*	*0.0*	*2.3*
Variation S3-B1	*13.9*	*0.6*	*0.7*	*0.0*	*1.3*
Variation S3-B2	*14.4*	*0.6*	*3.1*	*0.0*	*3.7*
Variation S3-B3	*14.7*	*0.6*	*2.7*	*0.0*	*3.3*
Variation S3-B4	*14.3*	*0.5*	*2.2*	*0.0*	*2.7*
Variation S3-B5	*14.0*	*0.5*	*2.7*	*0.0*	*3.2*
Variation S3-C1	*21.1*	*2.6*	*2.2*	*1.4*	*4.8*
Variation S3-C2	*21.7*	*2.7*	*2.3*	*1.5*	*5.0*
Variation S3-C3	*21.1*	*2.8*	*3.1*	*1.5*	*5.9*
Variation S3-C4	*21.4*	*2.3*	*2.4*	*1.5*	*4.7*
Variation S3-C5	*21.0*	*1.7*	*3.7*	*0.4*	*5.4*
Variation S3-C6	*24.7*	*2.0*	*5.5*	*0.7*	*7.5*
Flagstaff A	55.3	4.5	9.0	1.4	13.5
Timber Canyon	70.3	6.8	12.5	1.8	19.3
Flagstaff A – Burnt River Mountain	55.3	4.7	9.9	1.5	14.6
Flagstaff B	56.0	4.6	9.0	1.4	13.6
Flagstaff B – Burnt River West	55.7	2.7	10.5	0.4	13.2
Flagstaff B – Durkee	59.6	4.0	12.3	0.7	16.3
Table Note: Inventory data columns represent total miles of stream types crossed by the B2H Project and do not equal the total length as the same stream type may be crossed multiple times.					

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative crosses approximately twice as many miles of intermittent streams as perennial streams.

Variations S3-A1 and S3-A2

Variation S3-A1 crosses more miles of perennial streams and the same distance of intermittent streams as Variation S3-A2. Neither variation crosses any 303(d) impaired streams.

Variations S3-B1 through S3-B5

Variations S3-B1 through B5 cross perennial and intermittent streams. Variation S3-B2 crosses more total miles of streams than the other variations.

Variations S3-C1 through S3-C6

Variations S3-C1 through S3-C6 cross perennial, intermittent, and 303(d) temperature-impaired streams. Variation S3-C6 crosses more total miles of streams than the other variations.

Flagstaff A Alternative

The Flagstaff A Alternative crosses fewer miles of perennial streams, more miles of intermittent streams, and the same amount of 303(d) temperature-impaired streams than the Applicant's Proposed Action Alternative.

Timber Canyon Alternative

The Timber Canyon Alternative crosses more miles of perennial streams, intermittent, and 303(d) temperature-impaired streams than the Applicant's Proposed Action Alternative.

Flagstaff A – Burnt River Mountain Alternative

The Flagstaff A – Burnt River Mountain Alternative crosses more miles of perennial streams, intermittent, and 303(d) temperature-impaired streams than the Applicant's Proposed Action Alternative.

Flagstaff B Alternative

The Flagstaff B Alternative crosses the same amount of perennial and 303(d) temperature-impaired streams, and more miles of intermittent streams than the Applicant's Proposed Action Alternative.

Flagstaff B – Burnt River West Alternative

The Flagstaff B – Burnt River West Alternative crosses more miles of intermittent streams and fewer miles of perennial and 303(d) temperature-impaired streams than the Applicant's Proposed Action Alternative.

Flagstaff B - Durkee

The Flagstaff B – Durkee Alternative crosses fewer miles of perennial and 303(d) temperature-impaired streams and more miles of intermittent streams than the Applicant's Proposed Action Alternative.

Wetlands

The Palouse and Nez Perce Prairies MLRA supports a mix of grass, shrubs, and trees throughout, with taller vegetation concentrated near perennial water sources and areas of shallow groundwater (USDA 2016b). Rangeland areas support a shrub-grassland associated plant community.

The Upper Snake River Lava Plains MLRA supports a discrete mix of shrub-grass associations throughout the B2H Project area (USDA 2016b). This is a typical vegetative community type in drier ecoregions. Forested areas occur within perennial stream corridors and natural springs and are rare. Scrub-shrub and emergent wetland communities are confined to areas of consistent water availability – typically perennial stream corridors and localized groundwater seeps associated with springs.

Table 3-74 presents the wetland types crossed by all alternative routes and route variations in Segment 3. The distribution of these wetland types in Segment 3 is displayed on MV-6.

Table 3-74. Wetland Resources Inventory Data for Segment 3—Baker Valley (miles crossed)						
Alternative Route	**Total Length**	**Forested Wetlands**	**Scrub-Shrub Wetlands**	**Emergent Wetlands**	**Open Water**	**Total Miles of Wetlands Crossed**
Applicant's Proposed Action	55.2	0.5	0.4	3.2	5.0	9.1
Variation S3-A1	*12.4*	*0.0*	*0.0*	*1.1*	*0.9*	*2.0*
Variation S3-A2	*12.2*	*0.0*	*0.0*	*0.2*	*0.8*	*1.0*
Variation S3-B1	*13.9*	*0.0*	*0.0*	*0.0*	*0.7*	*0.7*
Variation S3-B2	*14.4*	*0.0*	*0.0*	*1.1*	*1.5*	*2.6*
Variation S3-B3	*14.7*	*0.0*	*0.0*	*1.1*	*1.5*	*2.6*
Variation S3-B4	*14.3*	*0.0*	*0.0*	*1.0*	*1.7*	*2.7*
Variation S3-B5	*14.0*	*0.0*	*0.0*	*1.6*	*1.6*	*3.2*
Variation S3-C1	*21.1*	*0.5*	*0.4*	*1.0*	*2.3*	*4.2*
Variation S3-C2	*21.7*	*0.5*	*0.7*	*0.9*	*2.4*	*4.5*
Variation S3-C3	*21.1*	*0.4*	*0.6*	*2.0*	*3.7*	*6.7*
Variation S3-C4	*21.4*	*0.4*	*0.6*	*1.1*	*3.1*	*5.2*
Variation S3-C5	*21.0*	*0.5*	*0.1*	*0.5*	*3.1*	*4.2*
Variation S3-C6	*24.7*	*1.2*	*0.4*	*0.7*	*4.2*	*6.5*
Flagstaff A	55.3	0.5	0.4	4.8	5.9	11.6
Timber Canyon	70.3	1.5	2.1	4.0	6.6	14.2
Flagstaff A – Burnt River Mountain	55.3	0.4	0.6	5.8	7.3	14.1
Flagstaff B	56.0	0.5	0.4	4.3	5.8	11.0
Flagstaff B – Burnt River West	55.7	0.5	0.1	2.9	6.5	10.0
Flagstaff B – Durkee	59.6	1.2	0.4	4.0	7.7	13.3
Table Note: Inventory data columns represent total miles of wetland types crossed by the B2H Project and do not equal the total length as the same wetland type may be crossed multiple times.						

Applicant's Proposed Action Alternative

The Applicant's Proposed Action predominantly crosses open water and associated emergent wetlands, as well as areas of forested and scrub-shrub wetlands.

Variations S3-A1 and S3-A2

Variations S3-A1 and S3-A2 cross emergent and open water wetlands. Variation S3-A1 crosses more total miles of wetlands than Variation S3-A2.

Variations S3-B1 through S3-B5

Variations S3-B1 through S3-B5 cross open water wetlands. In addition, Variations S3-B2 through S3-B5 cross emergent wetlands. Variation S3-B5 crosses more total miles of wetlands that the other variations.

Variations S3-C1 through S3-C6

Variations S3-C1 through S3-C6 cross forested, scrub-shrub, emergent, and open water wetlands. Variation S3-C3 crosses more total miles of wetlands than the other variations.

Flagstaff A Alternative

The Flagstaff A Alternative crosses the same amount of forested and scrub-shrub wetlands and more miles of emergent and open water wetlands than the Applicant's Proposed Action Alternative.

Timber Canyon Alternative

The Timber Canyon Alternative crosses to the north of the Thief Valley Reservoir (Link 3-6). The Timber Canyon Alternative crosses a greater amount of all wetland types than the Applicant's Proposed Action Alternative, and all other alternative routes in Segment 3.

Flagstaff A – Burnt River Mountain Alternative

The Flagstaff A – Burnt River Mountain Alternative crosses a greater amount of scrub-shrub, emergent, and open water wetlands, and less forested wetlands than the Applicant's Proposed Action Alternative.

Flagstaff B Alternative

The Flagstaff B Alternative crosses the same amount of forested and scrub-shrub wetlands, and more miles of emergent and open water wetlands than the Applicant's Proposed Action Alternative.

Flagstaff B – Burnt River West Alternative

The Flagstaff B – Burnt River West Alternative crosses the same amount of forested wetlands, less scrub-shrub and emergent wetlands, and more open water wetlands than the Applicant's Proposed Action Alternative.

Flagstaff B - Durkee

The Flagstaff B – Durkee Alternative crosses more miles of forested wetlands, the same amount of scrub-shrub wetlands, and more emergent and open water wetlands than the Applicant's Proposed Action Alternative.

SEGMENT 4—BROGAN

Segment 4 begins in the Burnt River subbasin and the Northern Rocky Mountains MLRA. This region is characterized mainly by rugged mountains, but has some broad valleys and remnants of high plateaus throughout the B2H Project area (USDA 2016d). Annual precipitation varies by elevation; precipitation amounts are generally low to moderate in the valleys and moderate to high on some of the mountain peaks. This MLRA is wetter than MLRAs within Segment 3. Natural and manmade lakes are common in the area (USDA 2016d). Summers are dry. Most of the precipitation during the fall, winter, and spring is in the form of snow. Surface water is derived primarily from snowmelt runoff, which provides for numerous perennial streams throughout the B2H Project area.

Segment 4 continues into the Willow subbasin and the Snake River Plains MLRA. Some of the major streams have cut deep, steep-walled canyons in the basalt flows and terraces (USDA 2016d). Alluvial fans, terraces, and bottom lands are gently sloping or moderately sloping. Annual precipitation varies by elevation; precipitation amounts are generally low to moderate in the valleys and moderate on some of the higher hills. Most of the precipitation falls as rain in fall, winter, and spring. Snowfall is common during winter. Snowmelt is a chief ingredient for providing surface flows. Little or no precipitation occurs

in summer. This MLRA is wetter than MLRAs within Segment 3, but drier than the Northern Rocky Mountains MLRA to the north.

The Applicant's Proposed Action Alternative and the Willow Creek Alternative begins at Dixie Creek in the Burnt River subbasin and proceeds south between Table Rock and the Burnt River valley. Segment 4 crosses Birch and Durbin Creeks west of Hunting, crosses Willow Creek around Brogan and continues south across Hope Flat and ends near Coyote Springs in the Willow subbasin. The Tub Mountain South Alternative begins with and parallels the Applicant's Proposed Action Alternative until southwest of Huntington. The Tub Mountain South Alternative follows the base of the Slaughterhouse Range and continues south, crossing Pine Tree Ridge, staying east of Tub Mountain and west of Moores Hollow. The Tub Mountain South Alternative crosses Alkali Gulch and the Alkali Flats then bends to the west, crossing Willow Creek and several tributaries to Bully Creek before ending near the Coyote Springs. Streams in this Segment drain to the Burnt and Willow Rivers and, eventually, the Snake River, to the east.

Streams and Impaired Waters

Table 3-75 presents the miles of streams by periodicity and impairment status crossed by crossed by all alternative routes and route variations in Segment 4. The distribution of these stream types in Segment 4 is displayed on MV-6.

Table 3-75. Streams and Impaired Waters Inventory Data for Segment 4—Brogan (miles crossed)

Alternative Route	Total Length	Perennial Streams	Intermittent Streams	Temperature-Impaired Streams (303(d) listed)	Total Miles of Streams Crossed
Applicant's Proposed Action	40.1	1.9	11.4	0.0	13.3
Variation S4-A1	*5.9*	*0.6*	*0.6*	*0.0*	*1.2*
Variation S4-A2	*6.0*	*0.6*	*0.4*	*0.0*	*1.0*
Variation S4-A3	*6.1*	*0.6*	*0.4*	*0.1*	*1.0*
Tub Mountain South	40.5	1.9	8.9	0.0	10.8
Willow Creek	34.6	1.4	9.1	0.0	10.5

Table Note: Inventory data columns represent total miles of stream types crossed by the B2H Project and do not equal the total length as the same stream type may be crossed multiple times.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative crosses intermittent and perennial streams and does not cross any 303(d) listed temperature-impaired streams. The Applicant's Proposed Action crosses the most miles of all stream types in Segment 4.

Variations S4-A1 through S4-A3

Variation S4-A1 crosses the same distance of perennial streams as Variations S4-A2 and S4-A3, more intermittent streams than Variations S4-A2 and S4-A3, and does not cross any 303(d) listed temperature-impaired streams.

Tub Mountain South Alternative

The Tub Mountain South Alternative crosses the same amount of perennial streams and less intermittent streams than the Applicant's Proposed Action Alternative. The Tub Mountain South Alternative does not cross any 303(d) listed temperature-impaired streams.

Willow Creek Alternative

The Willow Creek Alternative crosses fewer miles of perennial and intermittent streams than the Applicant's Proposed Action Alternative. The Willow Creek Alternative does not cross any 303(d) listed temperature-impaired streams.

Wetlands

Vegetative associations within the Northern Rocky Mountains MLRA are variable, depending on local precipitation, temperature, elevation, and landform aspect. In the B2H Project area, forested areas on hillslopes are common at higher elevations, with a scare understory of some shrubs and grasses that are shade tolerant (USDA 2016d). In lower elevation areas, forested areas are slightly more expansive than within Segments 2 and 3; however in Segment 4 they are still concentrated around water resources but not as narrowly confined.

Vegetation within the Snake River Plains MLRA tends to be comprised of drier association types, mostly consistent scrub-shrub emergent species throughout the B2H Project area (USDA 2016b). Trees and forested areas are narrowly confined to stream channels and other areas where consistent surficial and reliable groundwater sources are located. Most wetland types within the B2H Project area in the Snake River Plains MLRA are comprised of scrub-shrub and emergent types, reflective of the overall vegetative associations throughout the region.

Table 3-76 presents the wetland types crossed by all alternative routes and route variations in Segment 4. The distribution of these wetland types in Segment 4 is displayed on MV-6.

Table 3-76. Wetland Resources Inventory Data for Segment 4—Brogan Area (miles crossed)

Alternative Route	Total Length	Forested Wetlands	Scrub-Shrub Wetlands	Emergent Wetlands	Open Water	Total Miles of Wetlands Crossed
Applicant's Proposed Action	40.1	0.4	0.1	0.9	5.2	6.6
Variation S4-A1	*5.9*	*0.1*	*0.0*	*0.4*	*0.1*	*0.6*
Variation S4-A2	*6.0*	*0.3*	*0.3*	*0.0*	*0.3*	*0.9*
Variation S4-A3	*6.1*	*0.3*	*0.3*	*0.0*	*0.3*	*0.9*
Tub Mountain South	40.5	1.0	0.9	0.9	5.1	7.9
Willow Creek	34.6	0.4	0.1	0.7	5.5	6.7

Table Note: Inventory data columns represent total miles of wetland types crossed by the B2H Project and do not equal the total length as the same wetland type may be crossed multiple times.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative predominantly crosses open water wetlands, as well as forested, scrub-shrub, and emergent wetlands.

Variations S4-A1 through S4-A3

Variation S4-A1 crosses less forested, scrub-shrub, and open water wetlands and more emergent wetlands than Variations S4-A2 and S4-A3. Variations S4-A2 and S4-A3 cross the same amount of forest wetlands, scrub-shrub wetlands, and open water wetlands.

Tub Mountain South Alternative

The Tub Mountain South Alternative crosses more miles of forested and scrub-shrub wetlands, the same amount of emergent wetlands, and fewer miles of open water wetlands than the Applicant's Proposed Action Alternative.

Willow Creek Alternative

The Willow Creek Alternative crosses the same amount of forested and scrub-shrub wetlands, less emergent wetlands, and more miles of open water wetlands than the Applicant's Proposed Action Alternative.

SEGMENT 5—MALHEUR

Segment 5 begins in the Bully River subbasin near Coyote Springs and proceeds south across Cottonwood Creek and Bully Creek, both headwaters areas to the Bully Creek Reservoir. Segment 5 continues south, crossing into the Lower Malheur subbasin, crossing Lower Malheur Canyon and the Malheur River. In the area of Vine Hill (Link 5-5), the Applicant's Proposed Action Alternative turns east and crosses upper Cow Hollow (Link 5-15), then turns south into the Lower Owyhee subbasin and crosses the Owyhee River near Mitchell Butte (Links 5-40, 5-55 and 5-65). The Applicant's Proposed Action Alternative continues south southeast toward the Segment terminus near Succor River (Link 5-70). Streams in this Segment drain generally toward the Snake River to the east.

Streams and Impaired Waters

Segment 5 begins in the Bully River subbasin and the Snake River Plains MLRA, and continues south into the Lower Malheur subbasin. Some of the major streams have cut deep, steep-walled canyons in the basalt flows and terraces (USDA 2016b). Alluvial fans, terraces, and bottom lands associated with major streams (Malheur and Owyhee rivers) are gently sloping or moderately sloping. Annual precipitation varies by elevation; precipitation amounts are generally low to moderate in the valleys and moderate on some of the higher hills. Most of the precipitation falls as rain in fall, winter, and spring. Snowfall is common during winter. Little or no precipitation occurs in summer (USDA 2016b). This MLRA is wetter than MLRAs within Segment 3, but drier than the Northern Rocky Mountains MLRA within Segment 4.

Segment 5 continues through the Lower Malheur subbasin and the Malheur High Plateau MLRA. The Malheur High Plateau MLRA is characterized as a semi-desert or desert region of plateaus, plains, basins, and many isolated mountain ranges (USDA 2016e). As with other MLRAs, annual precipitation varies by elevation; precipitation amounts are generally low in the valleys and low to moderate on some of the higher elevations. Surface water is generally scarce, except in areas at higher elevations where

precipitation is greater. Streamflow is described within the MLRA as erratic and depends mostly on runoff from melting snow.

Segment 5 travels through the Lower Owyhee subbasin and the Owyhee High Plateau MLRA. The Owyhee High Plateau is a semi-desert region of rolling plateaus, gently sloping basins, plains and several isolated mountains (USDA 2016e). The amount of precipitation is lowest in the valleys and increases with elevation. Rainfall occurs in spring and sporadically in summer. Precipitation occurs mainly as snow in winter. Precipitation is distributed fairly evenly throughout fall, winter, and spring. The amount of precipitation is lowest from midsummer to early autumn. The supply of water from precipitation and streamflow is small and unreliable, except along the Owyhee, Streamflow depends largely on accumulated snow in the mountains.

Table 3-77 presents the miles of streams by periodicity and impairment status crossed by all alternative routes and route variations in Segment 5. The distribution of these stream types in Segment 5 is displayed on MV-6.

Table 3-77. Streams and Impaired Waters Inventory Data for Segment 5—Malheur (miles crossed)

Alternative Route	Total Length	Perennial Streams	Intermittent Streams	Temperature-Impaired Streams (303(d) listed)	Total Miles of Streams Crossed
Applicant's Proposed Action	40.4	1.5	10.7	0.0	12.2
Variation S5-A1	*7.4*	*0.1*	*1.6*	*0.0*	*1.7*
Variation S5-A2	*7.4*	*0.2*	*2.0*	*0.0*	*2.2*
Variation S5-B1	*2.5*	*0.6*	*0.2*	*0.0*	*0.8*
Variation S5-B2	*2.8*	*0.3*	*0.1*	*0.0*	*0.4*
Malheur S	43.5	1.3	11.4	0.1	12.7
Malheur A	43.1	1.3	11.2	0.1	12.5

Table Note: Inventory data columns represent total miles of stream types crossed by the B2H Project and do not equal the total length as the same stream type may be crossed multiple times.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative crosses perennial and intermittent streams, and does not cross any 303(d) listed temperature-impaired streams. The Applicant's Proposed Action Alternative crosses the fewest miles of all stream types in Segment 5 compared to the other alternative routes.

Variations S5-A1 and S5-A2

Variation S5-A1 crosses less perennial and intermittent streams than Variation S5-A2. Variations S5-A1 and S5-A2 do not cross any 303(d) listed temperature-impaired streams.

Variations S5-B1 and S5-B2

Variation S5-B1 crosses more perennial and intermittent streams than Variation S5-B2. Variations S5-B1 and S5-B2 do not cross any 303(d) listed temperature-impaired streams.

Malheur S Alternative

The Malheur S Alternative maintains a generally south running route through Sand Hollow and Negro Rock Canyon (Link 5-25). The Malheur S Alternative turns east toward Government Corral Spring and cross into the Lower Owyhee subbasin and the Owyhee River (Link 5-30). The Malheur S Alternative crosses Long Draw and continues into the Middle Snake-Succor subbasin (Link 5-30), crossing several tributaries and headwater areas to the Succor River. The Malheur S Alternative crosses fewer miles of perennial streams and more miles of intermittent and 303(d) listed temperature-impaired streams than the Applicant's Proposed Action Alternative.

Malheur A Alternative

The Malheur A Alternative maintains a generally south running route through Sand Hollow and Negro Rock Canyon (Link 5-25). The Malheur A Alternative turns east toward Government Corral Spring and crosses into the Lower Owyhee subbasin and the Owyhee River (Link 5-35). The Malheur A Alternative crosses Long Draw and continues into the Middle Snake-Succor subbasin (Link 5-35), crossing several tributaries and headwater areas to the Succor River. The Malheur A Alternative crosses less perennial streams and more intermittent and 303(d) listed temperature-impaired streams than the Applicant's Proposed Action Alternative.

Wetlands

Segment 5 consists of a generally drier region than Segment 4. Segment 5 begins near Coyote Springs, crosses several headwater watersheds to the Bully Creek Reservoir and continues south into the Lower Malheur Canyon. The Segment 5 route splits near Vines Hill, with the Applicant's Proposed Action Alternative generally heading east and then south across the upstream end of Cow Hollow. The Applicant's Proposed Action Alternative crosses the Owyhee River near Mitchell Butte (Links 5-50, 5-55 and 5-65), turns back to the west near Black Jack Butte and crosses Alkali Creek (Link 5-70). Both the Malheur A and Malheur S Alternatives cross through Sand Hollow, Negro Rock Canyon and several headwater watersheds to Succor Creek.

Vegetation within the Snake River Plains MLRA tends to be comprised of drier association types, mostly consistent scrub-shrub emergent species throughout the B2H Project area (USDA 2016b). Trees and forested areas are narrowly confined to stream channels and other areas where consistent surficial and reliable groundwater sources are located. Most wetland types within the B2H Project area in the Snake River Plains MLRA are comprised of scrub-shrub and emergent types, reflective of the overall vegetative associations throughout the region.

The Malheur High Plateau MLRA within the Lower Malheur subbasin consists mainly of shrubs with interspersed grasses and scattered trees (USDA 2016e). The generally dry nature and snowmelt dependent water sources confine larger vegetation to perennial streams and groundwater driven wetlands and springs. Topography defines most wetland areas; depressions and other areas of water confinement are generally associated with scrub-shrub and emergent wetland types. Ribbon like vegetative communities are common throughout the Lower Malheur subbasin.

The Owyhee High Plateau MLRA, a semi-desert region, supports a typical shrub-grass association vegetative community (USDA 2016e). Bottomland areas and playa wetlands (rounded lake-type hollows containing wetland features located in the high plains ecoregions) are common throughout. Scrub-shrub wetlands are confined to perennial stream corridors and other areas of consistent water source. Forested wetlands are rare.

Table 3-78 presents wetland types crossed by crossed by all alternative routes and route variations in Segment 5. The distribution of these wetland community types in Segment 5 is displayed on MV-6.

Table 3-78. Wetland Resources Inventory Data for Segment 5—Malheur (miles crossed)

Alternative Route	Total Length	Forested Wetlands	Scrub-Shrub Wetlands	Emergent Wetlands	Open Water	Total Miles of Wetlands Crossed
Applicant's Proposed Action	40.4	0.0	0.1	0.6	3.6	4.3
Variation S5-A1	*7.4*	*0.0*	*0.0*	*0.2*	*1.0*	*1.2*
Variation S5-A2	*7.4*	*0.0*	*0.0*	*0.0*	*0.9*	*0.9*
Variation S5-B1	*2.5*	*0.0*	*0.1*	*0.1*	*0.7*	*0.9*
Variation S5-B2	*2.8*	*0.1*	*0.6*	*0.4*	*0.8*	*1.9*
Malheur S	43.5	0.0	0.2	0.3	4.7	5.2
Malheur A	43.1	0.0	0.0	0.3	4.7	5.0

Table Note: Inventory data columns represent total miles of wetland types crossed by the B2H Project and do not equal the total length as the same wetland type may be crossed multiple times.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative predominantly crosses open water wetlands, as well as scrub-shrub and emergent wetlands.

Variations S5-A1 and S5-A2

Variation S5-A1 crosses more emergent and open water wetlands than Variation S5-A2. Neither variation crosses forested or scrub-shrub wetlands.

Variations S5-B1 and S5-B2

Variation S5-B2 crosses slight more forested, scrub-shrub, emergent and open water wetlands than Variation S5-B1.

Malheur S Alternative

The Malheur S Alternative crosses more scrub-shrub and open water wetlands and less emergent wetlands than the Applicant's Proposed Action Alternative.

Malheur A Alternative

The Malheur A Alternative crosses less emergent wetlands and more open water wetlands than the Applicant's Proposed Action Alternative.

SEGMENT 6—TREASURE VALLEY

Segment 6 begins and ends in the Middle Snake-Succor subbasin. Segment 6 ends in the Middle Snake-Succor subbasin and crosses both the Snake River Plains MLRA and the Owyhee High Plateau MLRAs. The Snake River Plains MLRA in the Middle Snake-Succor subbasin includes major streams, including Sage, Bridge and Jump Creeks, that have cut moderately deep, steep-walled canyons in the basalt flows and terraces (USDA 2016b). Alluvial fans, terraces, and bottom lands associated with major streams are gently sloping or moderately sloping. Annual precipitation varies by elevation; precipitation amounts are generally low to moderate in the valleys and moderate on some of the higher hills. Most of the precipitation falls as rain in fall, winter, and spring. Snowfall is common during winter. Little or no precipitation occurs in summer. This MLRA is slightly wetter than MLRAs within Segment 4, but drier than MLRAs within Segment 5.

The Owyhee High Plateau is a semi-desert region of rolling plateaus, gently sloping basins, plains and several isolated mountains. The amount of precipitation is lowest in the valleys and increases with elevation. Rainfall occurs in spring and sporadically in summer. Precipitation occurs mainly as snow in winter. Precipitation is distributed fairly evenly throughout fall, winter, and spring (USDA 2016e). The amount of precipitation is lowest from midsummer to early autumn. The supply of water from precipitation and streamflow is small and unreliable. Streamflow depends largely on accumulated snow in the mountains. The southern end of the B2H Project in Segment 6 crosses several artificial ditches and streams used for irrigation. Source water for these ditches is from a mix of both local groundwater and snowmelt from surrounding mountains. Influences from local mining and other activities in the region have added to the base sediment loads within the streams and ditches.

Streams and Impaired Waters

Table 3-79 presents the miles of streams by periodicity and impairment status crossed by the alternative routes and route variations in Segment 6. The distribution of these stream types in Segment 6 is displayed on MV-6.

Table 3-79. Streams and Impaired Waters Inventory Data for Segment 6—Treasure Valley (miles crossed)

Alternative Route	Total Length	Perennial Streams	Intermittent Streams	Sediment-Impaired Streams (303(d) listed)	Total Miles of Streams Crossed
Applicant's Proposed Action	28.0	0.7	5.7	0.2	6.4
Variation S6-A1	*9.3*	*0.2*	*2.3*	*0.0*	*2.5*
Variation S6-A2	*8.9*	*0.1*	*2.2*	*0.0*	*2.3*
Variation S6-B1	*14.4*	*0.2*	*3.1*	*0.2*	*3.3*
Variation S6-B2	*14.1*	*0.3*	*3.0*	*0.1*	*3.3*

Table Note: Inventory data columns represent total miles of stream types crossed by the B2H Project and do not equal the total length as the same stream type may be crossed multiple times.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative crosses perennial, intermittent, and 303(d) listed sediment-impaired streams.

Variations S6-A1 and S6-A2

Variation S6-A1 crosses more miles of perennial streams and intermittent streams than Variation S6-A2. Variations S6-A1 and S6-A2 do not cross any 303(d) listed sediment-impaired streams.

Variations S6-B1 and S6-B2

Variation S6-B1 crosses fewer miles of perennial streams and more miles of intermittent and 303(d) listed sediment-impaired streams than Variation S6-B2.

Wetlands

The Owyhee High Plateau MLRA, a semi-desert region, supports a typical shrub-grass association vegetative community (USDA 2016e). Bottomland areas and playa wetlands (rounded lake-type hollows containing wetland features located in the high plains ecoregions) are common throughout. Scrub-shrub wetlands are confined to perennial stream corridors and other areas of consistent water source. Forested wetlands are rare.

Table 3-80 presents wetland types crossed by crossed by all alternative routes and route variations in Segment 6. The distribution of these wetland community types in Segment 6 is displayed on MV-6.

Table 3-80. Wetland Resources Inventory Data for Segment 6—Treasure Valley (miles crossed)

Alternative Route	Total Length	Forested Wetlands	Scrub-Shrub Wetlands	Emergent Wetlands	Open Water	Total Miles of Wetlands Crossed
Applicant's Proposed Action	28.0	0.2	0.3	0.4	2.3	3.2
Variation S6-A1	*9.3*	*0.0*	*0.2*	*0.3*	*1.2*	*1.7*
Variation S6-A2	*8.9*	*0.0*	*0.0*	*0.3*	*0.4*	*0.7*
Variation S6-B1	*14.4*	*0.2*	*0.1*	*0.1*	*0.3*	*0.7*
Variation S6-B2	*14.1*	*0.2*	*0.0*	*0.1*	*0.3*	*0.6*

Table Note: Inventory data columns represent total miles of wetland types crossed by the B2H Project and do not equal the total length as the same wetland type may be crossed multiple times.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative predominantly crosses open water wetlands. The Applicant's Proposed Action Alternative also crosses forested, scrub-shrub and emergent wetlands.

Variations S6-A1 and S6-A2

Variation S6-A1 crosses the same amount of emergent wetlands and more scrub-shrub and open water wetlands than Variation S6-A2.

Variation S6-B1 and S6-B2

Variation S6-B1 crosses the same amount of forested, emergent, and open water wetlands as Variation S6-B2. In addition, Variation S6-B1 crosses scrub-shrub wetlands.

3.2.2.6 Environmental Consequences (Results of Analysis)

Types of Potential Effects

The method developed for assessing potential impacts on water resources associated with the B2H Project was developed by the BLM in coordination with the cooperating agencies, including the following:

- Identifying particular sensitivity, abundance, and value of inventoried water resources
- Identifying types of potential effects on water resources that could result from construction, operation, and maintenance of the B2H Project
- Developing criteria for assessing the level of potential effects on water resources
- Determining initial impacts on water resources
- Identifying appropriate design features of the B2H Project for environmental protection (Table 2-7) to avoid or minimize potential adverse effects on water resources
- Determining where selective mitigation measures (Table 2-13) should be applied and disclosing residual impacts on water resources

Direct Effects

Construction, operation, and maintenance of the B2H Project could result in direct effects on water quality. Construction of permanent and temporary access roads would require crossing water resources where use of existing facilities is not feasible. Road construction or improvement could require temporary removal of wetland vegetation; grading of banks; and/or the placement of fill, such as washed rock, native substrate, bridge pilings, culverts, wing walls, etc., to support a bridge or other stream-crossing structures. Modification of water resources (i.e., removal of wetland vegetation, dredging of bed materials, temporary diversions, or impoundments) could be required for B2H Project construction, operation, or maintenance. Any such activity would be avoided unless constructability standards preclude such avoidance.

Direct impacts on perennial and intermittent streams could occur with the construction of such features as hardened stream crossings (culverts, larger bridge structures that require piers or footings) or other B2H Project associated structures that may be located below the ordinary high-water mark. Implementation of stream crossings may reduce flood capacity and create backwater conditions upstream of the structures during high precipitation events. Structures also may create turbid conditions around the area of impact and create erosional features, increasing turbidity during flood events.

Direct impacts on 303(d) listed temperature-impaired streams would be limited to removal of streamside vegetation, reduction of the availability of shading resources, point-source addition of surface-water runoff and reduction of volume of water within streams from upstream backwater flooding conditions created from stream-channel alterations due to construction of hardened stream crossings.

B2H Project facilities crossing or located near water resources would be constructed within the minimum footprint required to safely and effectively conduct construction activities while maintaining water conveyance and the stability of wetland areas, streambeds, and stream banks. Improving existing roads and water crossings would require the application of stabilization measures to maintain B2H Project conformance with state and federal water-quality standards not currently implemented or required along existing roads.

Indirect Effects

In areas where B2H Project facilities could not avoid water resources completely, short-term indirect effects also could occur. Indirect effects may include an increased potential for erosion-caused sedimentation to be discharged into a waterbody from destabilization of soils, removal of vegetation, or modification of stream geomorphology. Following implementation of design features of the B2H Project for environmental protection and selective mitigation measures, short-term indirect effects on water resources would be mitigated or reduced to minor levels. Long-term indirect effects are not likely to occur following stabilization and reclamation of areas disturbed by construction activities.

The CWA requires that any work performed in the bed and banks and below the plane of the ordinary high-water mark (i.e., direct effects) in water(s) of the U.S. (including wetlands [33 CFR 328.3]) would require USACE authorization under 33 CFR 404. Dredging or filling any water(s) of the U.S. requires mitigation of impacts, which can range from preconstruction avoidance and minimization during the design phase to mitigation for the permanent loss of water(s) of the U.S. Mitigation requirements for potential B2H Project impacts on water(s) of the U.S. are addressed through design features of the B2H Project for environmental protection, which specify that impacts on water resources are to be avoided or minimized to the extent practicable. Unavoidable impacts over an allowable threshold specified by the CWA permits required for the B2H Project would be offset by additional required mitigation.

Additional indirect effects could occur due to ground-disturbing activities, such as clearing, grubbing, and blading to remove vegetation for safe workspaces. These activities would mobilize fugitive dust and destabilize soils in some places. Mobilization of fugitive dust and erosion may result in the discharge of sediment to water resources. Increased sedimentation indirectly related to ground-disturbing activities potentially could degrade the functional capacity of water resources, including wetland areas, by discharging higher rates of sediment into the system than can be attenuated, filtered, and/or immobilized under normal circumstances. These effects would only occur where unexpected circumstances, such as dramatic or non-typical climactic events, compromise the integrity and functionality of erosion-control design features or where design features are not properly installed and maintained.

Other indirect effects on water resources could include accidental spills of environmentally harmful substances, such as petroleum products, concrete waste, herbicides, or incidental stabilization of native materials. Indirect effects on springs would be similar to those described for perennial wetlands, streams, and ponds, and impacts on wells could include accidental physical damage to well structures

during construction. Another potential indirect effect could include the accidental introduction of aquatic invasive species. Following implementation of design features of the B2H Project for environmental protection and implementation of selective mitigation measures, potential indirect effects on water resources could be mitigated completely.

Effects Common to All Water Resources

Low and moderate residual impacts could occur as a result of construction of temporary and permanent B2H Project facilities associated with all alternative routes in proximity to water resources. Project facilities would be sited away from the banks of any major waterway. Removal of vegetation from the uplands and possibly from the wetland areas on the periphery of perennial streams and rivers, as well as soil compaction and decompaction from construction, operation, and maintenance, would result in greater potential for erosion and sedimentation into perennial streams and rivers or their tributaries. It is expected that through implementation of design features of the B2H Project for environmental protection and selective mitigation measures, residual impacts on most water resources would be reduced to low levels. However, forested wetlands could be subject to moderate residual impacts.

Effects Specific to Each Water Resource

Streams and Crossings

Potential impacts on surface water from stream crossings during B2H Project operations include erosion of streambanks and sedimentation of road runoff from stormwater. Culverts may be blocked by debris in streams and cause water to back up and flood areas. Use of roads during maintenance activities may promote erosion.

Where possible, existing access routes would be used to avoid disturbance to streams and waterbodies, such as perennial and intermittent streams. If constructing a new stream crossing is impractical or requires a very large (greater than 48 inches in diameter) culvert, upgrading local existing stream crossings would be prioritized to avoid construction of a new access route or a new crossing.

The construction of drive-through fords and the installation of culverts and bridges would require in-stream work that potentially could cause short-term increases in erosion and sedimentation in the waterbody at the construction site, with sedimentation effects extending downstream. Fords would not have long-term effects on water flows or quality. Bridges will be placed above and outside of the ordinary high-water line, which would keep all work out of the waterbody. Other potential impacts from culverts include channel scouring, changes in channel geometry and gradient, and aggradation or degradation of the stream channel.

During the construction period (i.e., when the road is used to transport equipment to and from construction sites), temporary crossing structures (including temporary bridges, temporary culverts) and temporary fords would be used at all stream crossings with flow to reduce potential adverse short-term impacts on water quality. Long-term impacts would be eliminated since the temporary crossing structures would be removed after construction, and affected areas, including fords, would be reclaimed.

Culverts would be designed and installed under the guidance of a qualified engineer who would recommend placement locations, culvert sizing, and proper construction methods on a site-specific basis to minimize potential impacts. Construction may occur during periods of low water or normal flow. The use of equipment in streams would be minimized. Culvert slope would not exceed stream gradient. Sandbags or other non-erosive material would be placed around the mouth of culverts to prevent scour or water flow around the culvert. Adjacent sediment-control structures, such as silt fences, check dams, rock armoring, or riprap, may be necessary to prevent erosion or sedimentation. Streambanks and approaches may be stabilized with rock or other erosion-control devices.

The Applicant would construct culverts under a Construction Stormwater General Permit (1200-C) in Oregon and a Construction General Permit, which is required for stormwater management operations in Idaho. These permits require development of BMPs to protect streams from stormwater runoff. BMPs also would be employed to minimize sedimentation to waterbodies from construction activities.

All streambed disturbances would be permitted under the terms of a USACE CWA Section 404 authorization, which governs activities within any water(s) of the U.S. In Idaho and Oregon, additional requirements would be met for the permitting of cut or fill in wetlands and waters (Oregon) and for the permitting of stream-channel alteration activities in streambeds (Idaho). In-stream work also would be conducted during ODFW-designated in-stream work windows, which vary based on fish species present within or supported by each waterbody.

303(d) Listed Impaired Waters

Of the 100 sediment-impaired waters and 140 temperature-impaired waters inventoried in the study corridor, 55 have an EPA-approved TMDL limitation designated for the source or sources of impairment (EPA 2016c). If the B2H Project, for any reason, causes the discharge of materials to these waters and contributes to the maximum-allowable TMDL, such as the discharge of sediment from erosion, fugitive dust, or incidental fallback to an impaired water listed for sediment or total dissolved solids, the B2H Project would be in violation of that TMDL and Sections 319, 401, and 402 of the CWA. The construction of access roads and stream crossings could result in localized effects on TMDL and 303(d) listed sediment-impaired streams from soil disturbance during construction.

Crossings of temperature-listed streams at points that currently do not contain forested vegetation (which serves as summer stream shade) would not have a measurable impact on average stream temperatures. However, tree removal would be necessary in forested wetland areas to provide clearance for energized lines or access roads, and this could contribute to local increases in stream temperatures if substantial amounts of vegetation are cleared, reducing shaded stream cover (Danehy et al. 2005). Additional erosion- and sediment-control measures to minimize impacts on surface water would be contained in the SWPPP and would apply to construction near TMDL and 303(d) listed streams.

Vegetation Removal

Loss of wetland vegetation resulting from construction activities can reduce stream summer shading, large woody debris input, and terrestrial organic input and can increase bank instability, average water

temperatures, and erosion potential. In areas where the roots of wetland vegetation are the primary bank-stabilizing force, loss of wetland vegetation can result in stream migration. In addition, soil disturbances can increase soil erosion (or water runoff in areas with compacted soils) and result in an increase in suspended sediments within adjacent waterbodies (Naiman and Bilby 1998). Because of the extent of direct disturbances to banks and wetland vegetation, these impacts will be greatest where roads cross waterbodies.

Removal of vegetation and direct solar radiance can result in higher local temperature increases (Danehy et al. 2005). As stream temperature constantly is adjusting toward equilibrium with air temperature, influences of direct solar radiance can be substantial. However, even though gaps in canopy cover can result in an immediate increase in stream temperature, as canopy cover resumes downstream, stream temperatures do not continue to increase at an accelerated rate (Danehy et al. 2005).

In areas where the transmission line crosses forested wetlands, tree heights will need to be kept below the transmission line for safety and maintenance reasons. Vegetation removal associated with crossings in forested settings is expected to be minimal and localized, without an overall increase in stream temperatures. Minimal research has been conducted regarding the effects of wetland vegetation removal on stream temperatures in shrub land ecosystems. Other factors being constant, stream temperatures in shrub land systems can be expected to generally be higher than those of forested systems, due to a lack of canopy cover (Danehy et al. 2005). Furthermore, existing shrub land canopy cover likely has a limited effect on stream temperatures because of its minimal shade contribution. Shrub canopy cover typically is concentrated along the edges of a stream. Overhead sun imparts maximum solar radiance directly onto the deeper, middle portions of the stream. Because of the limited shading provided by the existing shrub land vegetation, changes in stream temperature related to wetland vegetation removal are likely to be immeasurable (Danehy et al. 2005).

Wetlands

Construction would result in short-term and long-term impacts on wetlands. Short-term impacts are the impacts on those wetlands that would be restored and would return to full function following construction. The restoration of these wetlands and their return to full function depends on the type of associated vegetative community composing the wetland habitat. These impacts are considered short term because wetland functions would decrease on a short-term basis but would be restored.

The short-term impacts on wetlands primarily would be caused by the removal of vegetation and associated soil disturbance but would not result in a loss of wetland acreage. The effects of short-term impacts caused by clearing may persist beyond the construction phase and, therefore, be long-term but not permanent. Vegetation recovery in wetlands would vary depending on the type of vegetation removed. Emergent wetlands would recover the most quickly and could become revegetated within 1 or 2 years of initial disturbance (Sheldon et al. 2005). Scrub-shrub wetlands, however, may take up to 10 years to recover (Kentula 2004). Forested wetland vegetation recovery could take decades and is dependent on several factors, such as the tree species affected, seral stage of the affected forest, hydrologic regime, and elevation.

The direct effect of removing vegetation and disturbing the soil could alter various functions provided by wetlands, resulting in a variety of indirect and secondary effects, such as the provision of wildlife habitat and the ability to trap sediment and nutrients. Soil disturbances and the removal of vegetation within a wetland temporarily could alter the area's ability to moderate flood flow, control sediments, or facilitate surface-water flow (Sheldon et al. 2005). The removal of vegetation could increase water and soil temperatures locally and alter the vegetative composition in these areas.

Increased soil disturbances can lead to invasions by exotic plant species, which can alter the composition and function of wetlands (Sheldon et al. 2005). Any blasting that may occur within or adjacent to a wetland could fracture the bedrock and alter the hydrology of a perched water table, potentially leading to an altered hydrologic regime (drier conditions) and impairing revegetation efforts. Soil compaction and reduced infiltration rates also may be effects from blasting activities. Failure to restore disturbed areas to preconstruction conditions (contours, hydrology, and the restoration of topsoil) could impede the re-establishment of wetland vegetation. Vegetation in scrub-shrub and emergent wetlands is low growing and does not interfere with transmission lines; therefore, these wetland types would not be affected by maintenance during the operations phase.

The construction of the B2H Project could result in wetland fill for the duration of the B2H Project, due to the footprint of operational facilities. Both long-term and short-term impacts would be included in the Section 404 permit for the B2H Project. An additional long-term wetland impact is the conversion of forested wetlands to other wetland types. This would occur during the maintenance of tree heights below the transmission line, resulting in a vegetative community conversion from forested wetlands to scrub-shrub wetlands. The final B2H Project design would avoid these areas to the maximum extent practical; however, impacts may result from soil compaction, the alteration of surface or subsurface water movement in wetlands, or blasting effects near springs and seeps.

Impacts on wetland resources will be minimized following preconstruction surveys to definitively locate wetland boundaries and confirm habitat types and hydrologic connectivity with adjacent habitat types. Additional minimization strategies may be employed, including micro-siting of B2H Project facilities to affect emergent wetlands in lieu of forested wetlands, thereby minimizing the temporal and habitat class impacts on important forested wetland areas within the study corridor.

Groundwater

The potential for the B2H Project to affect groundwater as a result of contamination, consumptive use, or altered infiltration rates were issues identified for additional analysis in comments on the Draft EIS.

The risk for groundwater contamination exists where geotechnical boreholes or excavations for structural foundations encounter groundwater. A geotechnical investigation, conducted as one of the initial phases of construction, would be used to characterize the geologic composition of areas where B2H Project facilities are proposed and identify areas of shallow groundwater. Temporary piezometers may be installed in areas where high groundwater is encountered and information collected would be used to better understand seasonal groundwater fluctuations and inform structure design considerations.

A potential impact on groundwater resources would occur from construction dewatering. The Applicant has committed to using, for the construction of the B2H Project, water that would be procured from existing municipal sources, from commercial sources, or under a temporary water-use agreement with landowners holding existing water rights. No new water rights or water wells would be required. Therefore, water necessary for the construction of the B2H Project is not anticipated to affect existing groundwater levels.

Adverse impacts on groundwater quality would be avoided through the use of spill prevention measures, as established in the SPCC Plan. These spill prevention measures would help avoid an accidental chemical spill near an open excavation. Materials such as fuels and other petroleum products; chemicals; and hazardous materials, including wastes, would be located in upland areas away from streams or wells. The Applicant also has proposed to compensate any well owner for damage to the well or provide an acceptable alternative water source.

Section 3.2.1 provides a detailed analysis of potential B2H Project effects on earth resources. Compaction and water ponding are soil disturbances that result in the loss of soil structure, possibly leading to a decrease in water infiltration rates and groundwater recharge. Compaction of soils would be mitigated where access roads are temporary but could remain on permanent access roads and at towers. The Water Resources Protection Plan, to be developed for the POD, will contain standard measures that would be implemented for avoiding potential adverse effects on groundwater as a result of soil disturbance. A Reclamation, Revegetation, and Monitoring Framework Plan identifying reclamation stipulations designed to alleviate soil compaction and ponding also would be developed and incorporated into the POD. Overall, soil compaction and water ponding would be minimized by the design features of the B2H Project for environmental protection and resource protection plans. Water infiltration and groundwater recharge is at a landscape scale and the area affected by the B2H Project would be limited to the area of construction and would result in negligible changes in infiltration rates and effects on groundwater resources.

Groundwater Drinking Water Source Areas

The Applicant will comply with applicable regulations for managing surface disturbances and land uses and materials in groundwater DSWAs. Idaho (IDAPA 39-3600 et seq.) and Oregon (ORS 448.131) state statutes for drinking water protection and standards for abandoning drill holes would be adhered to wherever groundwater is encountered (Design Feature 14). Spill prevention and containment measures would be incorporated as needed (Design Feature 21). The Water Resources Protection Plan (Design Feature 1), to be developed for the POD, will contain standard measures that would be implemented for avoiding potential adverse effects on groundwater resources. These design features and protection plans are anticipated to sufficiently protect groundwater resources; therefore, impacts on groundwater resources as the result of contamination are not further assessed in this EIS.

Water Wells

B2H Project construction has the potential to cause adverse impacts on groundwater wells in areas of shallow bedrock as a result of blasting. Uncased groundwater wells would be the most vulnerable to disturbance from blasting. Many groundwater wells in southern Idaho are constructed as “open holes,”

meaning they are not cased along their entire interval. If nearby blasting causes the dislodging of a rock from the boring sidewall, the rock could fall down the well and trap the submersible pump. This circumstance could result in damage to the well. The effects of well damage could be loss of a potable water supply or loss of irrigation water flow to farmland.

Typically, contact with construction equipment would not affect groundwater quality except to increase turbidity temporarily in a limited area because most of the B2H Project's support structures (towers, H-frames, and monopole tangent and dead-end structures) would be 15 feet or less. Heavy dead-end, H-frame structures, if used, would require the deepest (40-foot) foundations and would have a greater likelihood of contacting shallow groundwater. The B2H Project temporarily could affect groundwater quality in localized drinking water wells to a limited extent from excess sediment influx into groundwater wells located near B2H Project excavations.

Floodplains

Placement of B2H Project facilities or structures into designated floodplains could result in flooding of or erosional damage to the encroaching structure, diversion of flows and increased flood risk for adjacent or upstream property, or increased erosion on adjacent or upstream property. During operations, right-of-way repairs would include spot repair of sites subject to flooding or scouring to prevent damage to both B2H Project structures and nearby property.

No Action Alternative

Under the No Action Alternative, the environment would remain as it presently exists and no identifiable impacts are expected on any water resource.

Segment 1—Morrow-Umatilla

Streams and Impaired Waters

Table 3-81 summarizes the total miles crossed and residual impacts on streams for all alternative routes and variations in Segment 1. Impacts on impaired waters are not anticipated as impaired waters are not crossed in Segment 1.

Table 3-81. Streams Inventory Data and Residual Impacts for Segment 1—Morrow-Umatilla

Alternative Route	Total Length (miles)	Perennial Streams (miles)			Intermittent Streams (miles)			Total Miles of Streams Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Low	None		Low	None	
Applicant's Proposed Action	91.9	1.4	1.4	90.5	19.8	19.8	72.1	21.2
Variation S1-B1	*6.4*	*0.2*	*0.2*	*6.2*	*1.8*	*1.8*	*4.6*	*2.0*
Variation S1-B2	*6.4*	*0.4*	*0.4*	*6.0*	*1.8*	*1.8*	*4.6*	*2.2*
East of Bombing Range Road	92.3	1.4	1.4	90.9	19.5	19.5	72.8	20.9
Applicant's Proposed Action – Southern Route	99.1	1.7	1.7	97.4	20.5	20.5	78.6	22.2

Table 3-81. Streams Inventory Data and Residual Impacts for Segment 1—Morrow-Umatilla								
Alternative Route	Total Length (miles)	Perennial Streams (miles)			Intermittent Streams (miles)			Total Miles of Streams Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Low	None		Low	None	
West of Bombing Range Road – Southern Route	95.6	2.4	2.4	93.2	16.6	16.6	79.0	19.0
Longhorn	88.2	1.5	1.5	86.7	17.4	17.4	70.8	18.9
Interstate 84	84.7	1.7	1.7	83.0	13.1	13.1	71.6	14.8
Variation S1-A1	*18.5*	*0.2*	*0.2*	*18.3*	*3.0*	*3.0*	*15.5*	*3.2*
Variation S1-A2	*18.5*	*0.2*	*0.2*	*18.3*	*3.8*	*3.8*	*14.7*	*4.0*
Interstate 84 – Southern Route	93.4	2.0	2.0	91.4	14.4	14.4	79.0	16.4
Table Note: Inventory data columns represent total miles of stream types crossed by the B2H Project and do not equal the total length as the same stream type may be crossed multiple times.								

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative is anticipated to result in low residual impacts on both perennial and intermittent streams.

Direct and indirect effects on streams could include temporary increases in erosion and sedimentation associated with construction, operation, and maintenance of the Applicant's Proposed Action Alternative. The types of potential effects on streams are discussed in greater detail in Section 3.2.2.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through spanning water resources within the limits of standard structure design, avoiding surface-disturbing activities in RCAs, reducing the spatial and temporal extent of disturbance, preventing the introduction of sediment to streams, and limiting removal of streamside vegetation. The application of several selective mitigation measures aimed to reduce the creation of new stream crossings and access roads, and to reduce soil disturbance and vegetation removal also would be applied to reduce impacts on streams. Refer to the list of applicable design features and selective mitigation measures in Section 3.2.2.4.

Low residual impacts could result from permanent increases in stream temperature from the indirect effects of vegetation removal near streams and headwater areas. Low residual impacts also could result from increases in sediment due to removal of streamside vegetation, bank destabilization from erosional conditions created by stream-channel alteration or heavy precipitation events carrying disturbed upslope soils from roadways or construction areas into streams. Table 3-81 summarizes the expected level of initial impacts, applied selective mitigation measures and resulting residual impacts on streams.

Variations S1-B1 and S1-B2

Variations S1-B1 and S1-B2 are anticipated to result in low residual impacts on perennial and intermittent streams. Variation S1-B1 would result in less residual impacts on perennial streams and the same amount of residual impacts on intermittent streams than Variation S1-B2 as a less perennial

streams and the same amount of intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 of the additional action do not cross any streams and would not result in any direct, indirect, or residual impacts on streams.

East of Bombing Range Road Alternative

The East of Bombing Range Road Alternative is anticipated to result in low residual impacts on perennial and intermittent streams. Residual impacts would be similar on perennial streams and less on intermittent streams than the Applicant's Proposed Action Alternative as the same amount of perennial streams and less intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Applicant's Proposed Action – Southern Route Alternative

The Applicant's Proposed Action – Southern Route Alternative is anticipated to result in low residual impacts on perennial and intermittent streams. Residual impacts would be greater on perennial and intermittent streams than the Applicant's Proposed Action Alternative as a greater amount of perennial streams and intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2 and 3

Design Options 1, 2, and 3 of the additional action do not cross any streams and would not result in any direct, indirect, or residual impacts on streams.

West of Bombing Range Road – Southern Route Alternative

The West of Bombing Range Road – Southern Route is anticipated to result in low residual impacts on perennial and intermittent streams. Residual impacts would be greater on perennial streams and less on intermittent streams than the Applicant's Proposed Action Alternative as a greater amount of perennial streams and less intermittent streams are crossed. This alternative route is anticipated to have the greatest amount of residual impacts on perennial streams than any other alternative route in Segment 1. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2 and 3

Design Options 1, 2, and 3 of the additional action do not cross any streams and would not result in any direct, indirect, or residual impacts on streams.

Longhorn Alternative

The Longhorn Alternative is anticipated to result in low residual impacts on perennial and intermittent streams. Residual impacts would be greater on perennial streams and less on intermittent streams than the Applicant's Proposed Action Alternative as a greater amount of perennial streams and less intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Interstate 84 Alternative and Variations

The Interstate 84 Alternative is anticipated to result in low residual impacts on perennial and intermittent streams. Residual impacts would be greater on perennial streams and less on intermittent streams than the Applicant's Proposed Action Alternative as a greater amount of perennial streams and less intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S1-A1 and S1-A2

Variations S1-A1 and S1-A2 are anticipated to result in low residual impacts on perennial and intermittent streams. Variation S1-A1 would result in the same amount of residual impacts on perennial streams and a lesser amount of residual impacts on intermittent streams than Variation S1-A2 as the same amount of perennial streams and less intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams would be similar to those described for the Applicant's Proposed Action Alternative.

Interstate 84 – Southern Route Alternative

The Interstate 84 – Southern Route Alternative is anticipated to result in low residual impacts on perennial and intermittent streams. Residual impacts would be greater on perennial streams and less on intermittent streams than the Applicant's Proposed Action Alternative as a greater amount of perennial streams and less intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Wetlands

The estimates of impacts on wetlands are based on the preliminary location of the B2H Project centerline. As a result, the impacts that would actually occur from construction and operations are overestimated as B2H Project components (including towers, roads, equipment storage yards, fly yards, and laydown areas) would be sited outside of wetland areas whenever possible (as is a standard engineering practice). Avoidance of wetlands and implementing design features listed in Table 2-7 would further reduce impacts on wetlands. Table 3-82 summarizes the total miles crossed and residual impacts on wetlands for all alternative routes and route variation in Segment 1.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative would result in moderate residual impacts on forested wetlands and low residual impacts on scrub-shrub, emergent, and open water wetlands. Direct and indirect effects on wetlands could include temporary impacts on vegetation from construction, temporary increases in erosion and sedimentation associated with construction, operation, and maintenance of the Applicant's Proposed Action, and temporary impacts from clearing of vegetation, including loss of shading and reduction or loss of flood water attenuation availability. The types of potential effects on wetlands are discussed in greater detail in Section 3.2.2.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through spanning wetlands within the limits of standard structure design, avoiding surface-disturbing activities in RCAs, reducing the spatial and temporal extent of disturbance, limiting or avoiding vegetation clearing, and limiting the removal of streamside vegetation. The application of several selective mitigation measures aimed to reduce the spatial and temporal extent of impacts on wetland vegetation, limit the creation of new wetland and access road crossings, and to reduce soil disturbance and vegetation removal also would be applied to reduce impacts on wetlands. Refer to the list of applicable design features and selective mitigation measures in Section 3.2.2.4.

Moderate residual impacts could result from effects on forested wetlands, including complete removal of individual trees or portions of tree stands or construction activities affecting tree health (including soil compaction in near tree roots, soil disturbance near tree roots or trimming of branches).

Low residual impacts could result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the B2H Project in proximity to wetlands. Table 3-82 summarizes the expected level of initial impacts, applied selective mitigation measures, and resulting residual impacts on wetlands.

Variations S1-B1 and S1-B2

Variations S1-B1 and S1-B2 are anticipated to result in low residual impacts on wetlands. Variation S1-B1 only crosses a small emergent wetland while Variation S1-B2 only crosses open water wetlands. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Option 1, 2 and 3

Design Option 1, 2, and 3 of the additional action not cross any mapped wetlands and would not result in any direct, indirect, or residual impacts on wetlands.

Table 3-82. Wetlands Inventory Data and Residual Impacts for Segment 1—Morrow-Umatilla

Alternative Route	Total Length (miles)	Forested Wetlands (miles)			Scrub-Shrub Wetlands (miles)			Emergent Wetlands (miles)			Open Water (miles)			Total Miles of Wetlands Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Moderate	None		Low	None		Low	None		Low	None	
Applicant's Proposed Action	91.9	0.3	0.3	91.6	0.5	0.5	91.4	2.0	2.0	89.9	2.3	2.3	89.6	5.1
Variation S1-B1	*6.4*	*0.0*	*0.0*	*6.4*	*0.0*	*0.0*	*6.4*	*0.1*	*0.1*	*6.3*	*0.0*	*0.0*	*6.4*	*0.1*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*6.4*	*0.0*	*0.0*	*6.4*	*0.0*	*0.0*	*6.4*	*0.4*	*0.4*	*6.0*	*0.4*
East of Bombing Range Road	92.3	0.3	0.3	92.0	0.5	0.5	91.8	2.1	2.1	90.2	2.1	2.1	90.2	5.0
Applicant's Proposed Action – Southern Route	99.1	0.7	0.7	98.4	0.7	0.7	98.4	2.0	2.0	97.1	4.0	4.0	95.1	7.4
West of Bombing Range Road – Southern Route	95.6	0.9	0.9	94.7	0.8	0.8	94.8	2.5	2.5	93.1	3.8	3.8	91.8	8.0
Longhorn	88.2	0.1	0.1	88.1	0.5	0.5	87.7	2.5	2.5	85.7	1.9	1.9	86.3	5.0
Interstate 84	84.7	0.1	0.1	84.6	0.8	0.8	83.9	2.9	2.9	81.8	4.8	4.8	79.9	8.6
Variation S1-A1	*18.5*	*0.0*	*0.0*	*18.5*	*0.0*	*0.0*	*18.5*	*0.0*	*0.0*	*18.5*	*0.6*	*0.6*	*17.9*	*0.6*
Variation S1-A2	*18.5*	*0.0*	*0.0*	*18.5*	*0.1*	*0.1*	*18.4*	*0.1*	*0.1*	*18.4*	*0.9*	*0.9*	*17.6*	*1.1*
Interstate 84 – Southern Route	93.4	0.5	0.5	92.9	1.0	1.0	92.4	2.9	2.9	90.5	6.4	6.4	87.0	10.8

Table Note: Inventory data columns represent total miles of wetland types crossed by the B2H Project and do not equal the total length as the same wetland type may be crossed multiple times.

East of Bombing Range Road Alternative

The East of Bombing Range Road Alternative is anticipated to result in moderate residual impacts on forested wetlands and low residual impacts on scrub-shrub, emergent, and open water wetlands. The East of Bombing Range Road Alternative would result in greater residual impacts on emergent wetlands as compared to the Applicant's Proposed Action Alternative as greater amounts of emergent wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Applicant's Proposed Action – Southern Route Alternative

The Applicant's Proposed Action – Southern Route Alternative is anticipated to result in moderate residual impacts on forested wetlands and low residual impacts on scrub-shrub, emergent, and open water wetlands. The Applicant's Proposed Action – Southern Route Alternative would result in greater residual impacts on forested, scrub-shrub, and open water wetlands as compared to the Applicant's Proposed Action Alternative as greater amounts of these wetland types are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Option 1, 2 and 3

Design Option 1, 2, and 3 of the additional action not cross any mapped wetlands and would not result in any direct, indirect, or residual impacts on wetlands.

West of Bombing Range Road – Southern Route Alternative

The West of Bombing Range Road– Southern Route Alternative is anticipated to result in moderate residual impacts on forested wetlands and low residual impacts on scrub-shrub, emergent, and open water wetlands. The West of Bombing Range Road– Southern Route Alternative would result in greater residual impacts on all wetland types as compared to the Applicant's Proposed Action Alternative as greater amounts of all wetland types are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Option 1, 2 and 3

Design Option 1, 2, and 3 of the additional action not cross any mapped wetland types and would not result in any direct, indirect, or residual impacts on wetlands.

Longhorn Alternative

The Longhorn Alternative is anticipated to result in moderate residual impacts on forested wetlands and low residual impacts on scrub-shrub, emergent, and open water wetlands. The Longhorn Alternative would result in greater residual impacts on emergent wetlands as compared to the Applicant's

Proposed Action Alternative as greater amounts of emergent wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Interstate 84 Alternative and Variations

The Interstate 84 Alternative is anticipated to result in moderate residual impacts on forested wetlands and low residual impacts on scrub-shrub, emergent, and open water wetlands. The Interstate 84 Alternative would result in greater residual impacts on scrub-shrub, emergent, and open water wetlands as compared to the Applicant's Proposed Action Alternative as greater amounts of these wetlands types are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S1-A1 and S1-A2

Variation S1-A1 would have low residual impacts on open water wetlands. Variation S1-A2 would have low residual impacts on emergent, scrub-shrub, and open water wetlands. Variation S1-A1 would result in less residual impacts on open water wetlands than Variation S1-A2 as less open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Interstate 84 – Southern Route Alternative

The Interstate 84 – Southern Route Alternative is anticipated to result in moderate residual impacts on forested wetlands and low residual impacts on scrub-shrub, emergent, and open water wetlands. The Interstate 84 – Southern Route Alternative would result in greater residual impacts on all wetland types as compared to the Applicant's Proposed Action Alternative as greater amounts of all wetlands types are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Conclusions

All alternative routes in Segment 1 would result in low residual impacts on perennial and intermittent streams. The Interstate 84 Alternative crosses the least amount of perennial and intermittent streams, and would therefore result in the least amount residual impacts on streams in Segment 1.

All alternative routes in Segment 1 would result in low residual impacts on scrub-shrub, emergent, and open water wetlands, and moderate residual impacts on forested wetlands. The Longhorn and East of Bombing Range Road Alternatives cross the least amount of wetlands; however, the Longhorn Alternative crosses less forested wetlands than the East of Bombing Range Road Alternative.

SEGMENT 2—BLUE MOUNTAINS

Streams and impaired waters

Table 3-83 presents the total miles crossed and residual impacts on streams and impaired waters for all alternative routes and route variations in Segment 2.

Table 3-83. Streams and Impaired Waters Inventory Data and Residual Impacts for Segment 2—Blue Mountains

Alternative Route	Total Length (miles)	Perennial Streams (miles)			Intermittent Streams (miles)			303(d) Listed/ Temperature-Impaired Waters			Total Miles of Streams Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Low	None		Low	None		Low	None	
Applicant's Proposed Action	33.8	2.2	2.2	31.6	5.6	5.6	28.2	0.2	0.2	33.6	7.8
Variation S2-A1	*2.8*	*0.0*	*0.0*	*2.8*	*0.7*	*0.7*	*2.1*	*0.0*	*0.0*	*2.8*	*0.7*
Variation S2-A2	*2.9*	*0.0*	*0.0*	*2.9*	*1.4*	*1.4*	*1.5*	*0.0*	*0.0*	*2.9*	*1.4*
Variation S2-B1	*3.7*	*0.8*	*0.8*	*2.9*	*0.7*	*0.7*	*3.0*	*0.0*	*0.0*	*3.7*	*1.5*
Variation S2-B2	*3.8*	*0.7*	*0.7*	*3.1*	*0.8*	*0.8*	*3.0*	*0.0*	*0.0*	*3.8*	*1.5*
Variation S2-C1	*9.3*	*0.3*	*0.3*	*9.0*	*0.7*	*0.7*	*8.6*	*0.0*	*0.0*	*9.3*	*1.0*
Variation S2-C2	*8.8*	*0.6*	*0.6*	*8.2*	*0.5*	*0.5*	*8.3*	*0.0*	*0.0*	*8.8*	*1.1*
Variation S2-E1	*2.3*	*0.0*	*0.0*	*2.3*	*0.3*	*0.3*	*2.0*	*0.0*	*0.0*	*2.3*	*0.3*
Variation S2-E2	*2.6*	*0.1*	*0.1*	*2.5*	*0.2*	*0.2*	*2.4*	*0.0*	*0.0*	*2.6*	*0.3*
Variation S2-F1	*12.1*	*0.7*	*0.7*	*11.4*	*2.1*	*2.1*	*10.0*	*0.2*	*0.2*	*11.9*	*2.8*
Variation S2-F2	*12.2*	*1.1*	*1.1*	*11.1*	*1.6*	*1.6*	*10.6*	*0.2*	*0.2*	*12.0*	*2.7*
Glass Hill	33.7	2.6	2.6	31.0	5.5	5.5	28.1	0.2	0.2	33.4	8.1
Variation S2-D1	*4.3*	*0.6*	*0.6*	*3.7*	*0.7*	*0.7*	*3.6*	*0.0*	*0.0*	*4.3*	*1.3*
Variation S2-D2	*4.1*	*0.7*	*0.7*	*3.4*	*0.2*	*0.2*	*3.9*	*0.0*	*0.0*	*4.1*	*0.9*
Mill Creek	34.0	2.4	2.4	31.6	5.4	5.4	28.6	0.2	0.2	33.8	7.8

Table Note: Inventory data columns represent total miles of stream types crossed by the B2H Project and do not equal the total length as the same stream type may be crossed multiple times.

Applicant's Proposed Action Alternative and Variations

The Applicant's Proposed Action Alternative would result in low residual impacts on perennial, intermittent, and 303(d) listed temperature-impaired streams.

Direct and indirect effects on streams could include temporary increases in erosion and sedimentation associated with construction, operation, and maintenance of the Applicant's Proposed Action. The types of potential effects on streams are discussed in greater detail in Section 3.2.2.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through spanning water resources within the limits of standard structure design, avoiding surface-disturbing activities in RCAs, reducing the spatial and temporal extent of disturbance, preventing the introduction of sediment to streams, and limiting removal of streamside vegetation. The application of several

selective mitigation measures aimed to reduce the creation of new stream crossings and access roads, and to reduce soil disturbance and vegetation removal also would be applied to reduce impacts on streams. Refer to the list of applicable design features and selective mitigation measures in Section 3.2.2.4.

Low residual impacts could result from permanent increases in stream temperature from the indirect effects of vegetation removal near streams and headwater areas. Low residual impacts also could result from increases in sediment due to removal of streamside vegetation, bank destabilization from erosional conditions created by stream-channel alteration or heavy precipitation events carrying disturbed upslope soils from roadways or construction areas into streams. Table 3-83 summarizes the expected level of initial impacts, applied selective mitigation measures and resulting residual impacts on streams.

Variations S2-A1 and S2-A2

Variations S2-A1 and S2-A2 are anticipated to result in low residual impacts on intermittent streams. Variation S2-A1 would result in less residual impacts on intermittent streams than Variation S2-A2 as less intermittent streams are crossed. Direct and indirect effects on intermittent streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative. No residual impacts on perennial or 303(d) temperature-impaired streams are anticipated as these stream types are not crossed by these variations.

Variations S2-B1 and S2-B2

Variations S2-B1 and S2-B2 are anticipated to result in low residual impacts on perennial and intermittent streams. Variation S2-B1 would result in a greater amount of residual impacts on perennial streams and less residual impacts on intermittent streams than Variation S2-B2 as a greater amount of perennial streams and less intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative. No residual impacts on 303(d) temperature-impaired streams are anticipated as this stream type is not crossed by these variations.

Variations S2-C1 and S2-C2

Variations S2-C1 and S2-C2 are anticipated to result in low residual impacts on perennial and intermittent streams. Variation S2-C1 would result in less residual impacts on perennial streams and a greater amount of residual impacts on intermittent streams than Variation S2-C2 as less perennial streams and a greater amount of intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative. No residual impacts on 303(d) temperature-impaired streams are anticipated as this stream type is not crossed by these variations.

Variations S2-E1 and S2-E2

Variations S2-E1 and S2-E2 are anticipated to result in low residual impacts on intermittent streams and Variation S2-E2 is anticipated to result in low residual impacts on perennial streams. Variation S2-E1 would result in a greater amount of residual impacts on perennial streams than Variation S2-E2 as a greater amount of perennial streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative. No residual impacts on 303(d) temperature-impaired streams are anticipated as this stream type is not crossed by these variations.

Variations S2-F1 and S2-F2

Variations S2-F1 and S2-F2 are anticipated to result in low residual impacts on perennial, intermittent, and 303(d) temperature-impaired streams. Variation S2-F1 would result in less residual impacts on perennial streams, a greater amount of residual impacts on intermittent streams, and the same amount of residual impacts on 303(d) temperature-impaired streams than Variation S2-F2 as less perennial streams, a greater amount of intermittent streams, and the same amount of 303(d) temperature-impaired streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Glass Hill Alternative and Variations

The Glass Hill Alternative is anticipated to result in low residual impacts on perennial, intermittent, and 303(d) temperature-impaired streams. Residual impacts would be greater on perennial streams than the Applicant's Proposed Action Alternative as a greater amount of perennial streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S2-D1 and S2-D2

Variations S2-D1 and S2-D2 are anticipated to result in low residual impacts on perennial and intermittent streams. Variation S2-D1 would result in less residual impacts on perennial streams and a greater amount of residual impacts on intermittent streams than Variation S2-D2 as less perennial streams and a greater amount of intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams would be similar to those described for the Applicant's Proposed Action Alternative.

Mill Creek Alternative

The Mill Creek Alternative is anticipated to result in low residual impacts on perennial, intermittent, and 303(d) temperature-impaired streams. Residual impacts would be greater on perennial streams than the Applicant's Proposed Action Alternative as a greater amount of perennial streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation

measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Wetlands

The estimates of impacts on wetlands are based on the preliminary location of the B2H Project centerline. As a result, the impacts that would actually occur from construction and operations are overestimated as B2H Project components (including towers, roads, equipment storage yards, fly yards, and laydown areas) would be sited outside of wetland areas whenever possible (as is a standard engineering practice). Avoidance of wetlands and implementing design features listed in Table 2-7 would further reduce impacts on wetlands.

Table 3-84 presents the total miles crossed and residual impacts on wetlands for all alternative routes and route variations in Segment 2.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative would result in low residual impacts on scrub-shrub, emergent, and open water wetlands. Direct and indirect effects on wetlands could include temporary impacts on vegetation from construction, temporary increases in erosion and sedimentation associated with construction, operation, and maintenance of the Applicant's Proposed Action Alternative, and temporary impacts from clearing of vegetation, including loss of shading and reduction or loss of flood water attenuation availability. The types of potential effects on wetlands are discussed in greater detail in Section 3.2.2.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through spanning wetlands within the limits of standard structure design, avoiding surface-disturbing activities in RCAs, reducing the spatial and temporal extent of disturbance, limiting or avoiding vegetation clearing, and limiting the removal of streamside vegetation. The application of several selective mitigation measures aimed to reduce the spatial and temporal extent of impacts on wetland vegetation, limit the creation of new wetland and access road crossings, and to reduce soil disturbance and vegetation removal also would be applied to reduce impacts on wetlands. Refer to the list of applicable design features and selective mitigation measures in Section 3.2.2.4.

Low residual impacts could result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the B2H Project in proximity to wetlands. Table 3-84 summarizes the expected level of initial impacts, applied selective mitigation measures and resulting residual impacts on wetlands.

Variations S2-A1 and S2-A2

Variation S2-A1 is anticipated to result in no residual impacts on any wetland types as no wetlands are crossed. Variation S2-A2 is anticipated to result in low residual impacts on open water wetlands. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S2-B1 and S2-B2

Variation S2-B1 is anticipated to result in low residual impacts on emergent and open water wetlands, and Variation S2-B1 is anticipated to result in low residual impacts on open water wetlands. Variation S2-B2 would result in less residual impacts on open water wetlands than Variation S2-B2 as less open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S2-C1 and S2-C2

Variation S2-C1 is anticipated to result in low residual impacts on emergent and open water wetlands, and Variation S2-C2 is anticipated to result in low residual impacts on scrub-shrub and open water wetlands. Variation S2-C1 would result in less residual impacts on open water wetlands than Variation S2-C2 as less open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S2-E1 and S2-E2

Variation S2-E1 is anticipated to result in low residual impacts on open water wetlands, and Variation S2-E2 is anticipated to result in low residual impacts on scrub-shrub and emergent wetlands. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S2-F1 and S2-F2

Variations S2-F1 and S2-F2 are anticipated to result in low residual impacts on scrub-shrub, emergent, and open water wetlands. Variation S2-F1 would result in a greater amount of residual impacts on scrub-shrub and emergent wetlands, and the same amount of residual impacts on open water wetlands than Variation S2-F2 as a greater amount of scrub-shrub and emergent wetlands, and the same amount of open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Glass Hill Alternative

The Glass Hill Alternative is anticipated to result in low residual impacts on scrub-shrub, emergent and open water wetlands. The Glass Hill Alternative would result in a greater amount of residual impacts on scrub-shrub wetlands and the same amount of residual impacts on emergent and open water wetlands as compared to the Applicant's Proposed Action Alternative as a greater amount of scrub-shrub wetlands and the same amount of emergent and open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Table 3-84. Wetlands Inventory Data and Residual Impacts for Segment 2—Blue Mountains

Alternative Route	Total Length (miles)	Forested Wetlands (miles)			Scrub-Shrub Wetlands (miles)			Emergent Wetlands (miles)			Open Water (miles)			Total Miles of Wetlands Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Moderate	None		Low	None		Low	None		Low	None	
Applicant's Proposed Action - Segment 2	33.8	0.0	0.0	33.8	0.7	0.7	33.1	1.7	1.7	32.1	2.2	2.2	31.6	4.6
Variation S2-A1	*2.8*	*0.0*	*0.0*	*2.8*	*0.0*	*0.0*	*2.8*	*0.0*	*0.0*	*2.8*	*0.0*	*0.0*	*2.8*	*0.0*
Variation S2-A2	*2.9*	*0.0*	*0.0*	*2.9*	*0.0*	*0.0*	*2.9*	*0.0*	*0.0*	*2.9*	*0.1*	*0.1*	*2.8*	*0.1*
Variation S2-B1	*3.7*	*0.0*	*0.0*	*3.7*	*0.0*	*0.0*	*3.7*	*0.5*	*0.5*	*3.2*	*0.5*	*0.5*	*3.2*	*1.0*
Variation S2-B2	*3.8*	*0.0*	*0.0*	*3.8*	*0.0*	*0.0*	*3.8*	*0.0*	*0.0*	*3.8*	*0.7*	*0.7*	*3.1*	*0.7*
Variation S2-C1	*9.3*	*0.0*	*0.0*	*9.3*	*0.0*	*0.0*	*9.3*	*0.1*	*0.1*	*9.2*	*0.2*	*0.2*	*9.1*	*0.3*
Variation S2-C2	*8.8*	*0.0*	*0.0*	*8.8*	*0.1*	*0.1*	*8.7*	*0.0*	*0.0*	*8.8*	*0.3*	*0.3*	*8.5*	*0.4*
Variation S2-E1	*2.3*	*0.0*	*0.0*	*2.3*	*0.0*	*0.0*	*2.3*	*0.0*	*0.0*	*2.3*	*0.1*	*0.1*	*2.2*	*0.1*
Variation S2-E2	*2.6*	*0.0*	*0.0*	*2.6*	*0.1*	*0.1*	*2.5*	*0.1*	*0.1*	*2.5*	*0.0*	*0.0*	*2.6*	*0.2*
Variation S2-F1	*12.1*	*0.0*	*0.0*	*12.1*	*0.6*	*0.6*	*11.5*	*1.1*	*1.1*	*11.0*	*1.0*	*1.0*	*11.1*	*2.7*
Variation S2-F2	*12.2*	*0.0*	*0.0*	*12.2*	*0.1*	*0.1*	*12.1*	*0.3*	*0.3*	*11.9*	*1.0*	*1.0*	*11.2*	*1.4*
Glass Hill	33.7	0.0	0.0	33.7	1.0	1.0	32.7	1.7	1.7	32.0	2.2	2.2	31.5	4.9
Variation S2-D1	*4.3*	*0.0*	*0.0*	*4.3*	*0.1*	*0.1*	*4.2*	*0.0*	*0.0*	*4.3*	*0.4*	*0.4*	*3.9*	*0.5*
Variation S2-D2	*4.1*	*0.0*	*0.0*	*4.1*	*0.1*	*0.1*	*4.0*	*0.0*	*0.0*	*4.1*	*0.5*	*0.5*	*3.6*	*0.6*
Mill Creek	34.0	0.0	0.0	34.0	0.6	0.6	33.4	0.9	0.9	33.1	2.5	2.5	31.5	4.0

Table Note: Inventory data columns represent total miles of wetland types crossed by the B2H Project and do not equal the total length as the same wetland type may be crossed multiple times.

Variation S2-D1 and S2-D2

Variations S2-D1 and S2-D2 are anticipated to result in low residual impacts on scrub-shrub and open water wetlands. Variation S2-D1 would result in the same amount of residual impacts on scrub-shrub wetlands and less residual impacts on open water wetlands than Variation S2-D2 as the same amount of scrub-shrub wetlands and less open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Mill Creek Alternative

The Mill Creek Alternative is anticipated to result in low residual impacts on scrub-shrub, emergent and open water wetlands. The Mill Creek Alternative would result in less residual impacts on scrub-shrub and emergent wetlands and a greater amount of residual impacts on open water wetlands as compared to the Applicant's Proposed Action Alternative as less scrub-shrub and emergent wetlands and greater amounts of open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Conclusions

All alternative routes in Segment 2 would result in low residual impacts on perennial, intermittent, and 303(d) temperature-impaired streams. The Applicant's Proposed Action Alternative and the Mill Creek Alternatives cross the least amount of streams; therefore less residual impacts on streams would be anticipated with these alternative routes as compared to the Glass Hill Alternative.

All alternative routes in Segment 2 would result in low residual impacts on scrub-shrub, emergent, and open water wetlands. No forested wetlands are crossed in Segment 2. The Mill Creek Alternative crosses the least amount of wetlands; therefore less residual impacts on wetlands would be anticipated with the Mill Creek Alternative compared to the other two alternative routes.

SEGMENT 3—BAKER VALLEY

Streams and impaired waters

Table 3-85 presents the total miles crossed and residual impacts on streams and impaired waters for all alternative routes and route variations in Segment 3. Residual impacts on 303(d) listed sediment-impaired waters are not anticipated as none are crossed by the B2H Project in Segment 3.

Table 3-85. Streams and Impaired Waters Inventory Data and Residual Impacts for Segment 3—Baker Valley											
Alternative Route	Total Length (miles)	Perennial Streams (miles)			Intermittent Streams (miles)			303(d) Listed/ Temperature-Impaired Waters			Total Miles of Streams Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Low	None		Low	None		Low	None	
Applicant's Proposed Action	55.2	4.6	4.6	50.6	7.0	7.0	48.2	1.4	1.4	53.8	13.0
Variation S3-A1	*12.4*	*1.1*	*1.1*	*11.3*	*2.2*	*2.2*	*10.2*	*0.0*	*0.0*	*12.4*	*3.3*
Variation S3-A2	*12.2*	*0.1*	*0.1*	*12.1*	*2.2*	*2.2*	*10.0*	*0.0*	*0.0*	*12.2*	*2.3*
Variation S3-B1	*13.9*	*0.6*	*0.6*	*13.3*	*0.7*	*0.7*	*13.2*	*0.0*	*0.0*	*13.9*	*1.3*
Variation S3-B2	*14.4*	*0.6*	*0.6*	*13.8*	*3.1*	*3.1*	*11.3*	*0.0*	*0.0*	*14.4*	*3.7*
Variation S3-B3	*14.7*	*0.6*	*0.6*	*14.1*	*2.7*	*2.7*	*12.0*	*0.0*	*0.0*	*14.7*	*3.3*
Variation S3-B4	*14.3*	*0.5*	*0.5*	*13.8*	*2.2*	*2.2*	*12.1*	*0.0*	*0.0*	*14.3*	*2.7*
Variation S3-B5	*14.0*	*0.5*	*0.5*	*13.5*	*2.7*	*2.7*	*11.3*	*0.0*	*0.0*	*14.0*	*3.2*
Variation S3-C1	*21.1*	*2.6*	*2.6*	*18.5*	*2.2*	*2.2*	*18.9*	*1.4*	*1.4*	*19.7*	*6.2*
Variation S3-C2	*21.7*	*2.7*	*2.7*	*19.0*	*2.3*	*2.3*	*19.4*	*1.5*	*1.5*	*20.2*	*6.5*
Variation S3-C3	*21.1*	*2.8*	*2.8*	*18.3*	*3.1*	*3.1*	*18.0*	*1.5*	*1.5*	*19.6*	*7.4*
Variation S3-C4	*21.4*	*2.3*	*2.3*	*19.1*	*2.4*	*2.4*	*19.0*	*1.5*	*1.5*	*19.9*	*6.2*
Variation S3-C5	*21.0*	*1.7*	*1.7*	*19.3*	*3.7*	*3.7*	*17.3*	*0.4*	*0.4*	*20.6*	*5.8*
Variation S3-C6	*24.7*	*2.0*	*2.0*	*22.7*	*5.5*	*5.5*	*19.2*	*0.7*	*0.7*	*24.0*	*8.2*
Flagstaff A	55.3	4.5	4.5	50.8	9.0	9.0	46.3	1.4	1.4	53.9	14.9
Timber Canyon	70.3	6.8	6.8	63.5	12.5	12.5	57.8	1.8	1.8	68.5	21.1
Flagstaff A – Burnt River Mountain	55.3	4.7	4.7	50.6	9.9	9.9	45.4	1.5	1.5	53.8	16.1
Flagstaff B	56.0	4.6	4.6	51.4	9.0	9.0	47.0	1.4	1.4	54.6	15.0
Flagstaff B – Burnt River West	55.7	2.7	2.7	53.0	10.5	10.5	45.2	0.4	0.4	55.3	13.6
Flagstaff B – Durkee	59.6	4.0	4.0	55.6	12.3	12.3	47.3	0.7	0.7	58.9	17.0
Table Note: Inventory data columns represent total miles of stream types crossed by the B2H Project and do not equal the total length as the same stream type may be crossed multiple times.											

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative is anticipated to result in low impacts on perennial, intermittent and 303(d) listed temperature-impaired streams.

Direct and indirect effects on streams could include temporary increases in erosion and sedimentation associated with construction, operation, and maintenance of the Applicant's Proposed Action Alternative. The types of potential effects on streams are discussed in greater detail in Section 3.2.2.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through spanning water resources within the limits of standard structure design, avoiding surface-disturbing activities in RCAs, reducing the spatial and temporal extent of disturbance,

preventing the introduction of sediment to streams and limiting removal of streamside vegetation. The application of several selective mitigation measures aimed to reduce the creation of new stream crossings and access roads, and to reduce soil disturbance and vegetation removal also would be applied to reduce impacts on streams. Refer to the list of applicable design features and selective mitigation measures in Section 3.2.2.4.

Low residual impacts could result from permanent increases in stream temperature from the indirect effects of vegetation removal near streams and headwater areas. Low residual impacts also could result from increases in sediment due to removal of streamside vegetation, bank destabilization from erosional conditions created by stream-channel alteration or heavy precipitation events carrying disturbed upslope soils from roadways or construction areas into streams. Table 3-85 summarizes the expected level of initial impacts, applied selective mitigation measures and resulting residual impacts on streams.

Variations S3-A1 and S3-A2

Variations S3-A1 and S3-A2 are anticipated to result in low residual impacts on perennial and intermittent streams. Variation S3-A2 would result in a greater amount of residual impacts on perennial streams and the same amount of residual impacts on intermittent streams than Variation S3-A2 as a greater amount of perennial streams and the same amount of intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S3-B1 through S3-B5

All S3-B variations are anticipated to result in low residual impacts on perennial and intermittent streams. Variation S3-B1 would result in the least amount of residual impacts of all S3-B variations as the least amount of streams are crossed. Variation S3-B2 would result in the greatest amount of residual impacts of all variations as the greatest amount of streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S3-C1 through S3-C6

All S3-C variations are anticipated are anticipated to result in low residual impacts on perennial, intermittent, and 303(d) listed streams. Variation S3-C5 would result in the least amount of residual impacts of all variations as the least amount of streams are crossed. Variation S3-C6 would result in the greatest amount of residual impacts of all variations as the greatest amount of streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Flagstaff A Alternative

The Flagstaff A Alternative is anticipated to result in low residual impacts on perennial, intermittent, and 303(d) listed temperature-impaired streams. Residual impacts would be less on perennial streams, greater on intermittent streams, and similar on 303(d) listed temperature-impaired streams than the Applicant's Proposed Action Alternative as less perennial streams, a greater amount of intermittent streams, and the same amount of 303(d) listed temperature-impaired streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Timber Canyon Alternative

The Timber Canyon Alternative is anticipated to result in low residual impacts on perennial, intermittent, and 303(d) listed temperature-impaired streams. Residual impacts would be greater on perennial streams, intermittent streams, and 303(d) listed temperature-impaired streams than the Applicant's Proposed Action Alternative as a greater amount of these stream types are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Flagstaff A – Burnt River Mountain Alternative

The Flagstaff A – Burnt River Mountain Alternative is anticipated to result in low residual impacts on perennial, intermittent, and 303(d) listed temperature-impaired streams. Residual impacts would be greater on perennial streams, intermittent streams, and 303(d) listed temperature-impaired streams than the Applicant's Proposed Action Alternative as a greater amount of these stream types are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Flagstaff B Alternative

The Flagstaff B Alternative is anticipated to result in low residual impacts on perennial, intermittent, and 303(d) listed temperature-impaired streams. Residual impacts would be greater on perennial streams, and similar on intermittent and 303(d) listed temperature-impaired streams than the Applicant's Proposed Action Alternative as a greater amount of perennial streams and the same amount of intermittent and 303(d) listed temperature-impaired streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Flagstaff B – Burnt River West Alternative

The Flagstaff B – Burnt River West Alternative is anticipated to result in low residual impacts on perennial, intermittent, and 303(d) listed temperature-impaired streams. Residual impacts would be less on perennial and 303(d) listed temperature-impaired streams, and greater on intermittent streams than the Applicant's Proposed Action Alternative as less perennial and 303(d) listed temperature-impaired

streams and a greater amount of intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Flagstaff B - Durkee

The Flagstaff B – Durkee Alternative is anticipated to result in low residual impacts on perennial, intermittent, and 303(d) listed temperature-impaired streams. Residual impacts would be less on perennial and 303(d) listed temperature-impaired streams, and greater on intermittent streams than the Applicant's Proposed Action Alternative as less perennial and 303(d) listed temperature-impaired streams and a greater amount of intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Wetlands

The estimates of impacts on wetlands are based on the preliminary location of the B2H Project centerline. As a result, the impacts that would actually occur from construction and operations are overestimated as B2H Project components (including towers, roads, equipment storage yards, fly yards, and laydown areas) would be sited outside of wetland areas whenever possible (as is a standard engineering practice). Avoidance of wetlands and implementing design features listed in Table 2-7 would further reduce impacts on wetlands.

Table 3-86 presents the total miles crossed and residual impacts on wetlands for all alternative routes and route variations in Segment 3.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative would result in moderate residual impacts on forested wetlands and low residual impacts on scrub-shrub, emergent and open water wetlands. Direct and indirect effects on wetlands could include temporary impacts on vegetation from construction, temporary increases in soil erosion and sedimentation associated with construction, operation, and maintenance of the Applicant's Proposed Action Alternative, and temporary impacts from clearing of vegetation, including loss of shading and reduction or loss of flood water attenuation availability. The types of potential effects on wetlands are discussed in greater detail in Section 3.2.2.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through spanning wetlands within the limits of standard structure design, avoiding surface-disturbing activities in RCAs, reducing the spatial and temporal extent of disturbance, limiting or avoiding vegetation clearing, and limiting removal of streamside vegetation.

The application of several selective mitigation measures aimed to reduce the spatial and temporal extent of impacts on wetland vegetation, limit the creation of new wetland and access road crossings, and to reduce soil disturbance and vegetation removal also would be applied to reduce impacts on wetlands. Refer to the list of applicable design features and selective mitigation measures in Section 3.2.2.4.

Table 3-86. Wetlands Inventory Data and Residual Impacts for Segment 3—Baker Valley

Alternative Route	Total Length (miles)	Forested Wetlands (miles)			Scrub-Shrub Wetlands (miles)			Emergent Wetlands (miles)			Open Water (miles)			Total Miles of Wetlands Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Moderate	None		Low	None		Low	None		Low	None	
Applicant's Proposed Action	55.2	0.5	0.5	54.7	0.4	0.4	54.8	3.2	3.2	52.0	5.0	5.0	50.2	9.1
Variation S3-A1	*12.4*	*0.0*	*0.0*	*12.4*	*0.0*	*0.0*	*12.4*	*1.1*	*1.1*	*11.3*	*0.9*	*0.9*	*11.5*	*2.0*
Variation S3-A2	*12.2*	*0.0*	*0.0*	*12.2*	*0.0*	*0.0*	*12.2*	*0.2*	*0.2*	*12.0*	*0.8*	*0.8*	*11.4*	*1.0*
Variation S3-B1	*13.9*	*0.0*	*0.0*	*13.9*	*0.0*	*0.0*	*13.9*	*0.0*	*0.0*	*13.9*	*0.7*	*0.7*	*13.2*	*0.7*
Variation S3-B2	*14.4*	*0.0*	*0.0*	*14.4*	*0.0*	*0.0*	*14.4*	*1.1*	*1.1*	*13.3*	*1.5*	*1.5*	*12.9*	*2.6*
Variation S3-B3	*14.7*	*0.0*	*0.0*	*14.7*	*0.0*	*0.0*	*14.7*	*1.1*	*1.1*	*13.6*	*1.5*	*1.5*	*13.2*	*2.6*
Variation S3-B4	*14.3*	*0.0*	*0.0*	*14.3*	*0.0*	*0.0*	*14.3*	*1.0*	*1.0*	*13.3*	*1.7*	*1.7*	*12.6*	*2.7*
Variation S3-B5	*14.0*	*0.0*	*0.0*	*14.0*	*0.0*	*0.0*	*14.0*	*1.6*	*1.6*	*12.4*	*1.6*	*1.6*	*12.4*	*3.2*
Variation S3-C1	*21.1*	*0.5*	*0.5*	*20.6*	*0.4*	*0.4*	*20.7*	*1.0*	*1.0*	*20.1*	*2.3*	*2.3*	*18.8*	*4.2*
Variation S3-C2	*21.7*	*0.5*	*0.5*	*21.2*	*0.7*	*0.7*	*21.0*	*0.9*	*0.9*	*20.8*	*2.4*	*2.4*	*19.3*	*4.5*
Variation S3-C3	*21.1*	*0.4*	*0.4*	*20.7*	*0.6*	*0.6*	*20.5*	*2.0*	*2.0*	*19.1*	*3.7*	*3.7*	*17.4*	*6.7*
Variation S3-C4	*21.4*	*0.4*	*0.4*	*21.0*	*0.6*	*0.6*	*20.8*	*1.1*	*1.1*	*20.3*	*3.1*	*3.1*	*18.3*	*5.2*
Variation S3-C5	*21.0*	*0.5*	*0.5*	*20.5*	*0.1*	*0.1*	*20.9*	*0.5*	*0.5*	*20.5*	*3.1*	*3.1*	*17.9*	*4.2*
Variation S3-C6	*24.7*	*1.2*	*1.2*	*23.5*	*0.4*	*0.4*	*24.3*	*0.7*	*0.7*	*24.0*	*4.2*	*4.2*	*20.5*	*6.5*
Flagstaff A	55.3	0.5	0.5	54.8	0.4	0.4	54.9	4.8	4.8	50.5	5.9	5.9	49.4	11.6
Timber Canyon	70.3	1.5	1.5	68.8	2.1	2.1	68.2	4.0	4.0	66.3	6.6	6.6	63.7	14.2
Flagstaff A – Burnt River Mountain	55.3	0.4	0.4	54.9	0.6	0.6	54.7	5.8	5.8	49.5	7.3	7.3	48.0	14.1
Flagstaff B	56.0	0.5	0.5	55.5	0.4	0.4	55.6	4.3	4.3	51.7	5.8	5.8	50.2	11.0
Flagstaff B – Burnt River West	55.7	0.5	0.5	55.2	0.1	0.1	55.6	2.9	2.9	52.8	6.5	6.5	49.2	10.0
Flagstaff B – Durkee	59.6	1.2	1.2	58.4	0.4	0.4	59.2	4.0	4.0	55.6	7.7	7.7	51.9	13.3

Table Note: Inventory data columns represent total miles of wetland types crossed by the B2H Project and do not equal the total length as the same wetland type may be crossed multiple times.

Moderate residual impacts could result from effects on forested wetlands, including complete removal of individual or stands of trees or construction activities affecting tree health (including soil compaction in near tree roots, soil disturbance near tree roots or trimming of branches).

Low residual impacts could result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the B2H Project in proximity to wetlands. Table 3-86 summarizes the expected level of initial impacts, applied selective mitigation measures and resulting residual impacts on wetlands.

Variations S3-A1 and S3-A2

Variations S3-A1 and S3-A2 are anticipated to result in low residual impacts on emergent and open water wetlands. Variation S3-A1 would result in a greater amount of residual impacts on emergent and open water wetlands than Variation S3-A2 as a greater amount of emergent and open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S3-B1 through S3-B5

Variations S3-B1 through S3-B5 are anticipated to result in low residual impacts on open water wetlands. Additionally, Variations S3-B2 through S3-B5 are anticipated to result in low residual impacts on emergent wetlands. Variation S3-B4 would result in the greatest amount of residual impacts of all variations as the greatest amount of wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S3-C1 through S3-C6

Variations S3-C1 through S3-C6 are anticipated to result in low residual impacts on scrub-shrub, emergent, and open water wetlands, and moderate residual impacts on forested wetlands. Variation S3-C2 would result in the greatest amount of residual impacts of all variations as the greatest amount of wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Flagstaff A Alternative

The Flagstaff A Alternative is anticipated to result in low residual impacts on scrub-shrub, emergent, and open water wetlands, and moderate residual impacts on forested wetlands. The Flagstaff A Alternative would result in the same amount of residual impacts on forested and scrub-shrub wetlands and a greater amount of residual impacts on emergent and open water wetlands as compared to the Applicant's Proposed Action Alternative as the same amount of forested and scrub-shrub wetlands and a greater amount of emergent and open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Timber Canyon Alternative

The Timber Canyon Alternative is anticipated to result in low residual impacts on scrub-shrub, emergent, and open water wetlands, and moderate residual impacts on forested wetlands. The Timber Canyon Alternative would result in a greater amount of residual impacts on all wetland types as compared to the Applicant's Proposed Action Alternative as a greater amount of all wetland types are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Flagstaff A – Burnt River Mountain Alternative

The Flagstaff A – Burnt River Mountain Alternative is anticipated to result in low residual impacts on scrub-shrub, emergent, and open water wetlands, and moderate residual impacts on forested wetlands. The Flagstaff A – Burnt River Mountain Alternative would result in less residual impacts on forested wetlands and a greater amount of residual impacts on scrub-shrub, emergent, and open water wetlands as compared to the Applicant's Proposed Action Alternative as less forested wetlands and a greater amount of scrub-shrub, emergent, and open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Flagstaff B Alternative

The Flagstaff B Alternative is anticipated to result in low residual impacts on scrub-shrub, emergent, and open water wetlands, and moderate residual impacts on forested wetlands. The Flagstaff B Alternative would result in the same amount of residual impacts on forested and scrub-shrub wetlands and a greater amount of residual impacts on emergent and open water wetlands as compared to the Applicant's Proposed Action Alternative as the same amount of forested and scrub-shrub wetlands and a greater amount of emergent and open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Flagstaff B – Burnt River West Alternative

The Flagstaff B – Burnt River West Alternative is anticipated to result in low residual impacts on scrub-shrub, emergent, and open water wetlands, and moderate residual impacts on forested wetlands. The Flagstaff B – Burnt River West Alternative would result in the same amount of residual impacts on forested wetlands, less residual impacts on scrub-shrub and emergent wetlands, and a greater amount of residual impacts on open water wetlands as compared to the Applicant's Proposed Action Alternative as the same amount forested wetlands, less scrub-shrub and emergent wetlands, and a greater amount of open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Flagstaff B - Durkee

The Flagstaff B – Durkee Alternative is anticipated to result in low residual impacts on scrub-shrub, emergent, and open water wetlands, and moderate residual impacts on forested wetlands. The Flagstaff B – Durkee Alternative would result in the same amount of residual impacts on scrub-shrub wetlands, and a greater amount of residual impacts on forested, emergent, and open water wetlands as compared to the Applicant's Proposed Action Alternative as the same amount of scrub-shrub wetlands, and a greater amount of forested, emergent, and open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Conclusions

All alternative routes in Segment 3 would result in low residual impacts on perennial, intermittent, and 303(d) temperature-impaired streams. The Applicant's Proposed Action Alternative crosses the least amount of streams; therefore less residual impacts on streams would be anticipated with the Applicant's Proposed Action Alternative as compared to the other alternative routes.

All alternative routes in Segment 3 would result in low residual impacts on scrub-shrub, emergent, and open water wetlands, and moderate residual impacts on forested wetlands. The Applicant's Proposed Action Alternative crosses the least amount of wetlands; therefore less residual impacts on wetlands would be anticipated with the Applicant's Proposed Action Alternative compared to the other alternative routes.

SEGMENT 4—BROGAN

Streams and Impaired Waters

Table 3-87 presents the total miles crossed and residual impacts on streams and impaired waters for all alternative routes and variations in Segment 4. Impacts on 303(d) listed/sediment-impaired waters are not anticipated as none are crossed by alternative routes in Segment 4.

Table 3-87. Streams and Impaired Waters Inventory Data and Residual Impacts for Segment 4—Brogan											
Alternative Route	Total Length (miles)	Perennial Streams (miles)			Intermittent Streams (miles)			303(d) Listed/Temperature-Impaired Waters			Total Miles of Streams Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Low	None		Low	None		Low	None	
Applicant's Proposed Action	40.1	1.9	1.9	38.2	11.4	11.4	28.7	0.0	0.0	40.1	13.3
Variation S4-A1	*5.9*	*0.6*	*0.6*	*5.3*	*0.6*	*0.6*	*5.3*	*0.0*	*0.0*	*5.9*	*1.2*
Variation S4-A2	*6.0*	*0.6*	*0.6*	*5.4*	*0.4*	*0.4*	*5.6*	*0.0*	*0.0*	*6.0*	*1.0*
Variation S4-A3	*6.1*	*0.6*	*0.6*	*5.5*	*0.4*	*0.4*	*5.7*	*0.1*	*0.1*	*6.0*	*1.0*
Tub Mountain South	40.5	1.9	1.9	38.6	8.9	8.9	31.6	0.0	0.0	40.5	10.8
Willow Creek	34.6	1.4	1.4	33.2	9.1	9.1	25.5	0.0	0.0	34.6	10.5
Table Note: Inventory data columns represent total miles of stream types crossed by the B2H Project and do not equal the total length as a similar stream type may be crossed multiple times.											

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative is anticipated to result in low residual impacts on perennial and intermittent streams. No residual impacts are anticipated to 303(d) listed temperature-impaired streams as none are crossed by the Applicant's Proposed Action Alternative.

Direct and indirect effects on perennial and intermittent streams could include temporary increases in erosion and sediment associated with construction, operation, and maintenance of the Applicant's Proposed Action. The types of potential effects on streams are discussed in greater detail in Section 3.2.2.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through spanning water resources within the limits of standard structure design, avoiding surface-disturbing activities in RCAs, reducing the spatial and temporal extent of disturbance, preventing the introduction of sediment to streams, and limiting removal of streamside vegetation. The application of several selective mitigation measures aimed to reduce the creation of new stream crossings and access roads, and to reduce soil disturbance and vegetation removal would be applied to reduce impacts on streams. Refer to the list of applicable design features and selective mitigation measures in Section 3.2.2.4.

Low residual impacts could result from permanent increases in stream temperature from the indirect effects of vegetation removal near streams and headwater areas. Low residual impacts also could result from increases in sediment due to removal of streamside vegetation, bank destabilization from erosional conditions created by stream-channel alteration or heavy precipitation events carrying disturbed upslope soils from roadways or construction areas into the stream. Table 3-87 summarizes the expected level of initial impacts, applied selective mitigation measures and resulting residual impacts on streams.

Variations S4-A1 through S4-A3

Variations S4-A1 through S4-A3 are anticipated to result in low residual impacts on perennial and intermittent streams. Additionally, Variation S4-A3 is anticipated to result in low residual impacts on 303(d) listed temperature-impaired streams. Variation S4-A1 would result in the same amount of residual impacts on perennial streams and a greater amount of residual impacts on intermittent streams than the other variations as the same amount of perennial streams and a greater amount of intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Tub Mountain South Alternative

The Tub Mountain South Alternative is anticipated to result in low residual impacts on perennial and intermittent streams. Residual impacts would be the same on perennial streams and less on intermittent streams than the Applicant's Proposed Action Alternative as the same amount of perennial streams and less intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Willow Creek Alternative

The Willow Creek Alternative is anticipated to result in low residual impacts on perennial and intermittent streams. Residual impacts would be less on perennial and intermittent streams than the Applicant's Proposed Action Alternative as less perennial and intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Wetlands

The estimates of impacts on wetlands are based on the preliminary location of the B2H Project centerline. As a result, the impacts that would actually occur from construction and operations are overestimated as B2H Project components (including towers, roads, equipment storage yards, fly yards, and laydown areas) would be sited outside of wetland areas whenever possible (as is a standard engineering practice). Avoidance of wetlands and implementing design features listed in Table 2-7 would further reduce impacts on wetlands.

Table 3-88 presents the total miles crossed and residual impacts on wetlands for all alternative routes and route variations in Segment 4.

Table 3-88. Wetlands Inventory Data and Residual Impacts for Segment 4—Brogan

Alternative Route	Total Length (miles)	Forested Wetlands (miles)			Scrub-Shrub Wetlands (miles)			Emergent Wetlands (miles)			Open Water (miles)			Total Miles of Wetlands Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Moderate	None		Low	None		Low	None		Low	None	
Applicant's Proposed Action	40.1	0.4	0.4	39.7	0.1	0.1	40.0	0.9	0.9	39.2	5.2	5.2	34.9	6.6
Variation S4-A1	*5.9*	*0.1*	*0.1*	*5.8*	*0.0*	*0.0*	*5.9*	*0.4*	*0.4*	*5.5*	*0.1*	*0.1*	*5.8*	*0.6*
Variation S4-A2	*6.0*	*0.3*	*0.3*	*5.7*	*0.3*	*0.3*	*5.7*	*0.0*	*0.0*	*6.0*	*0.3*	*0.3*	*5.7*	*0.9*
Variation S4-A3	*6.1*	*0.3*	*0.3*	*5.8*	*0.3*	*0.3*	*5.8*	*0.0*	*0.0*	*6.1*	*0.3*	*0.3*	*5.8*	*0.9*
Tub Mountain South	40.5	1.0	1.0	39.5	0.9	0.9	39.6	0.9	0.9	39.6	5.1	5.1	35.4	7.9
Willow Creek	34.6	0.4	0.4	34.2	0.1	0.1	34.5	0.7	0.7	33.9	5.5	5.5	29.1	6.7

Table Note: Inventory data columns represent total miles of wetland types crossed by the B2H Project and do not equal the total length as a similar wetland type may be crossed multiple times.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative would result in moderate residual impacts on forested wetlands and low residual impacts on scrub-shrub, emergent and open water wetlands. Direct and indirect effects on wetlands could include temporary impacts on vegetation from construction, temporary increases in soil erosion and sedimentation associated with construction, operation, and maintenance of the Applicant's Proposed Action Alternative, and temporary impacts from removal of vegetation, including loss of shading and reduction or loss of flood water attenuation. The types of potential effects on wetlands are discussed in greater detail in Section 3.2.2.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through spanning wetlands within the limits of standard structure design, avoiding surface-disturbing activities in RCAs, reducing the spatial and temporal extent of disturbance, limiting or avoiding vegetation clearing, and limiting removal of streamside vegetation. The application of several selective mitigation measures aimed to reduce the spatial and temporal extent of impacts on wetland vegetation, limit the creation of new wetland and access road crossings, and to reduce soil disturbance and vegetation removal also would be applied to reduce impacts on wetlands. Refer to the list of applicable design features and selective mitigation measures in Section 3.2.2.4.

Moderate residual impacts could result from effects on forested wetlands, including complete removal of individual trees or portions of tree stands or construction activities affecting tree health (including soil compaction in near tree roots, soil disturbance near tree roots or trimming of branches).

Low residual impacts could result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the B2H Project in proximity to wetlands. Table 3-88 summarizes the expected level of initial impacts, applied selective mitigation measures and resulting residual impacts on wetlands.

Variation S4-A1 through S4-A3

Variations S4-A1 through S4-A3 are anticipated to result in low residual impacts on open water wetlands and moderate residual impacts on forested wetlands. Additionally, Variations S4-A2 and S4-A3 are anticipated to result in low residual impacts on scrub-shrub wetlands, and Variation S4-A1 is anticipated to result in low residual impacts on emergent wetlands. Variation S4-A1 would result in less residual impacts on forested and open water wetlands than the other variations as less forested and open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Tub Mountain South Alternative

The Tub Mountain South Alternative is anticipated to result in low residual impacts on scrub-shrub, emergent, and open water wetlands, and moderate residual impacts on forested wetlands. The Tub Mountain South Alternative would result in a greater amount of residual impacts on forested and scrub-shrub wetlands, the same amount of residual impacts on emergent wetlands, and less residual impacts on open water wetlands as compared to the Applicant's Proposed Action Alternative as a greater

amount of forested and scrub-shrub wetlands, the same amount of emergent wetlands, and less open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Willow Creek Alternative

The Willow Creek Alternative is anticipated to result in low residual impacts on scrub-shrub, emergent, and open water wetlands, and moderate residual impacts on forested wetlands. The Willow Creek Alternative would result in the same amount of residual impacts on forested and scrub-shrub wetlands, less residual impacts on emergent wetlands, and a greater amount of residual impacts on open water wetlands as compared to the Applicant's Proposed Action Alternative as the same amount of forested and scrub-shrub wetlands, less emergent wetlands, and a greater amount of open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Conclusions

All alternative routes in Segment 4 would result in low residual impacts on perennial and intermittent streams. The Willow Creek Alternative crosses the least amount of streams; therefore less residual impacts on streams would be anticipated with the Willow Creek Alternative as compared to the other alternative routes.

All alternative routes in Segment 4 would result in low residual impacts on scrub-shrub, emergent, and open water wetlands, and moderate residual impacts on forested wetlands. The Applicant's Proposed Action Alternative crosses the least amount of wetlands; therefore less residual impacts on wetlands would be anticipated with the Applicant's Proposed Action Alternative compared to the other alternative routes.

SEGMENT 5—MALHEUR AREA

Streams and Impaired Waters

Table 3-89 presents the total miles crossed and residual impacts on streams and impaired waters for all alternative routes and route variations in Segment 5. Impacts on 303(d) listed/sediment-impaired waters are not anticipated as none are crossed by alternative routes in Segment 5.

Table 3-89. Streams and Impaired Waters Inventory Data and Residual Impacts for Segment 5—Malheur

Alternative Route	Total Length (miles)	Perennial Streams (miles)			Intermittent Streams (miles)			303(d) Listed/ Temperature-Impaired Waters			Total Miles of Streams Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Low	None		Low	None		Low	None	
Applicant's Proposed Action	40.4	1.5	1.5	38.9	10.7	10.7	29.7	0.0	0.0	40.4	12.2
Variation S5-A1	*7.4*	*0.1*	*0.1*	*7.3*	*1.6*	*1.6*	*5.8*	*0.0*	*0.0*	*7.4*	*1.7*
Variation S5-A2	*7.4*	*0.2*	*0.2*	*7.2*	*2.0*	*2.0*	*5.4*	*0.0*	*0.0*	*7.4*	*2.2*
Variation S5-B1	*2.5*	*0.6*	*0.6*	*1.9*	*0.2*	*0.2*	*2.3*	*0.0*	*0.0*	*2.5*	*0.8*
Variation S5-B2	*2.8*	*0.3*	*0.3*	*2.5*	*0.1*	*0.1*	*2.7*	*0.0*	*0.0*	*2.8*	*0.4*
Malheur S	43.5	1.3	1.3	42.2	11.4	11.4	32.1	0.1	0.1	43.4	12.7
Malheur A	43.1	1.3	1.3	41.8	11.2	11.2	31.9	0.1	0.1	43.0	12.5

Table Note: Inventory data columns represent total miles of stream types crossed by the B2H Project and do not equal the total length as the same stream type may be crossed multiple times.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative is anticipated to result in low residual impacts on perennial and intermittent streams. No residual impacts are anticipated to 303(d) listed temperature-impaired streams, as none are crossed by the Applicant's Proposed Action Alternative.

Direct and indirect effects on perennial and intermittent streams could include temporary increases in erosion and sediment associated with construction, operation, and maintenance of the Applicant's Proposed Action Alternative. The types of potential effects on streams are discussed in greater detail in Section 3.2.2.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through spanning water resources within the limits of standard structure design, avoiding surface-disturbing activities in RCAs, reducing the spatial and temporal extent of disturbance, preventing the introduction of sediment to streams, and limiting removal of streamside vegetation. The application of several selective mitigation measures aimed to reduce the creation of new stream crossings and access roads, and to reduce soil disturbance and vegetation removal would be applied to reduce impacts on streams. Refer to the list of applicable design features and selective mitigation measures in Section 3.2.2.4.

Low residual impacts could result from permanent increases in stream temperature from the indirect effects of vegetation removal near streams and headwater areas. Low residual impacts also could result from increases in sediment due to removal of streamside vegetation, bank destabilization from erosional conditions created by stream-channel alteration or heavy precipitation events carrying disturbed upslope soils from roadways or construction areas into the stream. Table 3-89 summarizes

the expected level of initial impacts, applied selective mitigation measures and resulting residual impacts on streams.

Variations S5-A1 and S5-A2

Variations S5-A1 and S5-A2 are anticipated to result in low residual impacts on perennial and intermittent streams. Variation S5-A1 would result in less residual impacts on perennial and intermittent streams than Variation S5-A2 as less perennial and intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S5-B1 and S5-B2

Variations S5-B1 and S5-B2 are anticipated to result in low residual impacts on perennial and intermittent streams. Variation S5-B1 would result in a greater amount of residual impacts on perennial and intermittent streams than Variation S5-B2 as a greater amount of perennial and intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Malheur S Alternative

The Malheur S Alternative is anticipated to result in low residual impacts on perennial, intermittent, and 303(d) listed temperature-impaired streams. Residual impacts would be less on perennial streams, and greater on intermittent and 303(d) listed temperature-impaired streams than the Applicant's Proposed Action Alternative as less perennial streams and a greater amount of intermittent and 303(d) listed temperature-impaired streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Malheur A Alternative

The Malheur A Alternative is anticipated to result in low residual impacts on perennial, intermittent, and 303(d) listed temperature-impaired streams. Residual impacts would be less on perennial streams, and greater on intermittent and 303(d) listed temperature-impaired streams than the Applicant's Proposed Action Alternative as less perennial streams and a greater amount of intermittent and 303(d) listed temperature-impaired streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Wetlands

The estimates of impacts on wetlands are based on the preliminary location of the B2H Project centerline. As a result, the impacts that would actually occur from construction and operations are overestimated as B2H Project components (including towers, roads, equipment storage yards, fly yards, and laydown areas) would be sited outside of wetland areas whenever possible (as is a standard

engineering practice). Avoidance of wetlands and implementing design features listed in Table 2-7 would likely further reduce impacts on wetlands.

Table 3-90 presents the total miles crossed and residual impacts on wetlands for all alternative routes and route variations in Segment 5.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative is anticipated to result in low residual impacts on scrub-shrub, emergent and open water wetlands. Direct and indirect effects on wetlands could include temporary impacts on vegetation from construction, temporary increases in soil erosion and sedimentation associated with construction, operation, and maintenance of the Applicant's Proposed Action Alternative, and temporary impacts from removal of vegetation, including loss of shading and reduction or loss of flood water attenuation. The types of potential effects on wetlands are discussed in greater detail in Section 3.2.2.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through spanning wetlands within the limits of standard structure design, avoiding surface-disturbing activities in RCAs, reducing the spatial and temporal extent of disturbance, limiting or avoiding vegetation clearing, and limiting removal of streamside vegetation. The application of several selective mitigation measures aimed to reduce the spatial and temporal extent of impacts on wetland vegetation, limit the creation of new wetland and access road crossings, and to reduce soil disturbance and vegetation removal also would be applied to reduce impacts on wetlands. Refer to the list of applicable design features and selective mitigation measures in Section 3.2.2.4.

Low residual impacts could result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the B2H Project in proximity to wetlands. Table 3-90 summarizes the expected level of initial impacts, applied selective mitigation measures and resulting residual impacts on wetlands.

Variations S5-A1 and S5-A2

Variations S5-A1 through S5-A2 are anticipated to result in low residual impacts on open water wetlands. Additionally, Variation S5-A1 is anticipated to result in low residual impacts on emergent wetlands. Variation S5-A1 would result in a greater amount of residual impacts on open water wetlands than Variation S5-A2 as a greater amount of open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Table 3-90. Wetlands Inventory Data and Residual Impacts for Segment 5—Malheur

Alternative Route	Total Length (miles)	Forested Wetlands (miles)			Scrub-Shrub Wetlands (miles)			Emergent Wetlands (miles)			Open Water (miles)			Total Miles of Wetlands Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Moderate	None		Low	None		Low	None		Low	None	
Applicant's Proposed Action	40.4	0.0	0.0	40.4	0.1	0.1	40.3	0.6	0.6	39.8	3.6	3.6	36.8	12.2
Variation S5-A1	*7.4*	*0.0*	*0.0*	*7.4*	*0.0*	*0.0*	*7.4*	*0.2*	*0.2*	*7.2*	*1.0*	*1.0*	*6.4*	*1.7*
Variation S5-A2	*7.4*	*0.0*	*0.0*	*7.4*	*0.0*	*0.0*	*7.4*	*0.0*	*0.0*	*7.4*	*0.9*	*0.9*	*6.5*	*2.2*
Variation S5-B1	*2.5*	*0.0*	*0.0*	*2.5*	*0.1*	*0.1*	*2.4*	*0.1*	*0.1*	*2.4*	*0.7*	*0.7*	*1.8*	*0.8*
Variation S5-B2	*2.8*	*0.1*	*0.1*	*2.7*	*0.6*	*0.6*	*2.2*	*0.4*	*0.4*	*2.4*	*0.8*	*0.8*	*2.0*	*1.4*
Malheur S	43.5	0.0	0.0	43.5	0.2	0.2	43.3	0.3	0.3	43.2	4.7	4.7	38.8	12.7
Malheur A	43.1	0.0	0.0	43.1	0.0	0.0	43.1	0.3	0.3	42.8	4.7	4.7	38.4	12.5

Table Note: Inventory data columns represent total miles of wetland types crossed by the B2H Project and do not equal the total length as a similar wetland type may be crossed multiple times.

Variations S5-B1 and S5-B2

Variations S5-B1 through S5-B2 are anticipated to result in low residual impacts on scrub-shrub, emergent, and open water wetlands. Additionally, Variation S5-B2 is anticipated to result in moderate residual impacts on forested wetlands. Variation S5-B1 would result in less residual impacts on scrub-shrub, emergent, and open water wetlands than Variation S5-B2 as less of these wetland types are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Malheur S Alternative

The Malheur S Alternative is anticipated to result in low residual impacts on scrub-shrub, emergent, and open water wetlands. The Malheur S Alternative would result in a greater amount of residual impacts on scrub-shrub and open water wetlands and less residual impacts on emergent wetlands as compared to the Applicant's Proposed Action Alternative as a greater amount of scrub-shrub and open water wetlands and less emergent wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Malheur A Alternative

The Malheur A Alternative is anticipated to result in low residual impacts on emergent and open water wetlands. The Malheur A Alternative would result in less residual impacts on emergent wetlands and a greater amount of residual impacts on open water wetlands as compared to the Applicant's Proposed Action Alternative as less emergent wetlands and a greater amount of open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Conclusions

All alternative routes in Segment 5 would result in low residual impacts on perennial and intermittent streams. Additionally, the Malheur S and Malheur A Alternatives would result in low residual impacts on 303(d) listed temperature-impaired streams. The Applicant's Proposed Action Alternative crosses the least amount of streams; therefore less residual impacts on streams would be anticipated with the Applicant's Proposed Action Alternative as compared to the other alternative routes.

All alternative routes in Segment 5 would result in low residual impacts on emergent and open water wetlands. Additionally, the Applicant's Proposed Action Alternative and the Malheur S Alternative would result in low residual impacts on scrub-shrub wetlands. The Applicant's Proposed Action Alternative crosses the least amount of wetlands; therefore less residual impacts on wetlands would be anticipated with the Applicant's Proposed Action Alternative compared to the other alternative routes. None of the alternative routes in Segment 5 cross forested wetlands.

SEGMENT 6—TREASURE VALLEY

Streams and Impaired Waters

Table 3-91 presents the total miles crossed and residual impacts on streams and impaired waters for all alternative routes and route variations in Segment 6. Impacts on 303(d) listed/temperature-impaired waters are not anticipated as none are crossed by the alternative routes in Segment 6.

Table 3-91. Streams and Impaired Waters Inventory Data and Residual Impacts for Segment 6—Treasure Valley

Alternative Route	Total Length (miles)	Perennial Streams (miles)			Intermittent Streams (miles)			303(d) Listed/Sediment-Impaired Waters			Total Miles of Streams Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Low	None		Low	None		Low	None	
Applicant's Proposed Action	28.0	0.7	0.7	27.3	5.7	5.7	22.3	0.2	0.2	27.8	6.4
Variation S6-A1	*9.3*	*0.2*	*0.2*	*9.1*	*2.3*	*2.3*	*7.0*	*0.0*	*0.0*	*9.3*	*2.5*
Variation S6-A2	*8.9*	*0.1*	*0.1*	*8.8*	*2.2*	*2.2*	*6.7*	*0.0*	*0.0*	*8.9*	*2.3*
Variation S6-B1	*14.4*	*0.2*	*0.2*	*14.2*	*3.1*	*3.1*	*11.3*	*0.2*	*0.2*	*14.2*	*3.3*
Variation S6-B2	*14.1*	*0.3*	*0.3*	*13.8*	*3.0*	*3.0*	*11.1*	*0.1*	*0.1*	*14.0*	*3.3*

Table Note: Inventory data columns represent total miles of stream types crossed by the B2H Project and do not equal the total length as the same stream type may be crossed multiple times.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative is anticipated to result in low residual impacts on perennial, intermittent, and 303(d) listed sediment-impaired streams. Direct and indirect effects on perennial and intermittent streams could include temporary increases in erosion and sediment associated with construction, operation, and maintenance of the Applicant's Proposed Action Alternative. Direct and indirect effects on 303(d) listed sediment-impaired streams could include temporary fluctuations in sediment load and turbidity due to removal of sediment controlling vegetation. The types of potential effects on wetlands are discussed in Section 3.2.2.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through spanning water resources within the limits of standard structure design, avoiding surface-disturbing activities in RCAs, reducing the spatial and temporal extent of disturbance, preventing the introduction of sediment to streams and limiting removal of streamside vegetation. The application of several selective mitigation measures aimed to reduce the creation of new stream crossings and access roads, and to reduce soil disturbance and vegetation removal also would be applied to reduce impacts on streams. Refer to the list of applicable design features and selective mitigation measures in Section 3.2.2.4.

Low residual impacts could result from permanent increases in stream temperature from the indirect effects of vegetation removal near streams and headwater areas. Low residual impacts also could result from increases in sediment due to removal of streamside vegetation, bank destabilization from

erosional conditions created by stream-channel alteration or heavy precipitation events carrying disturbed upslope soils from roadways or construction areas into the stream. Table 3-91 summarizes the expected level of initial impacts, applied selective mitigation measures and resulting residual impacts on streams.

Variations S6-A1 and S6-A2

Variations S6-A1 and S6-A2 are anticipated to result in low residual impacts on perennial and intermittent streams. Variation S6-A1 would result in a greater amount of residual impacts on perennial and intermittent streams than Variation S6-A2 as a greater amount of perennial and intermittent streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S6-B1 and S6-B2

Variations S6-B1 and S6-B2 are anticipated to result in low residual impacts on perennial, intermittent, and 303(d) listed sediment-impaired streams. Variation S6-B1 would result in less residual impacts on perennial streams and a greater amount of residual impacts on intermittent and 303(d) listed sediment-impaired streams than Variation S6-B2 as less perennial streams and a greater amount of intermittent and 303(d) listed sediment-impaired streams are crossed. Direct and indirect effects on streams, and the application of design features and selective mitigation measures to minimize impacts on streams, would be similar to those described for the Applicant's Proposed Action Alternative.

Wetlands

The estimates of impacts on wetlands are based on the preliminary location of the B2H Project centerline. As a result, the impacts that would actually occur from construction and operations are overestimated as B2H Project components (including towers, roads, equipment storage yards, fly yards, and laydown areas) would be sited outside of wetland areas whenever possible (as is a standard engineering practice). Avoidance of wetlands and implementing design features listed in Table 2-7 would likely further reduce the impact on wetlands.

Table 3-92 presents the total miles crossed and residual impacts on wetlands for all alternative routes and route variations in Segment 6.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative is anticipated to result in moderate residual impacts on forested wetlands and low residual impacts on scrub-shrub, emergent and open water wetlands.

Table 3-92. Wetlands Inventory Data and Residual Impacts for Segment 6—Treasure Valley

Alternative Route	Total Length (miles)	Forested Wetlands (miles)			Scrub-Shrub Wetlands (miles)			Emergent Wetlands (miles)			Open Water (miles)			Total Miles of Wetlands Crossed
		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		Inventory Data	Residual Impacts		
			Moderate	None		Low	None		Low	None		Low	None	
Applicant's Proposed Action	28.0	0.2	0.2	27.8	0.3	0.3	27.7	0.4	0.4	27.6	2.3	2.3	25.7	3.2
Variation S6-A1	*9.3*	*0.0*	*0.0*	*9.3*	*0.2*	*0.2*	*9.1*	*0.3*	*0.3*	*9.0*	*1.2*	*1.2*	*8.1*	*1.7*
Variation S6-A2	*8.9*	*0.0*	*0.0*	*8.9*	*0.0*	*0.0*	*8.9*	*0.3*	*0.3*	*8.6*	*0.4*	*0.4*	*8.5*	*0.7*
Variation S6-B1	*14.4*	*0.2*	*0.2*	*14.2*	*0.1*	*0.1*	*14.3*	*0.1*	*0.1*	*14.3*	*0.3*	*0.3*	*14.1*	*0.7*
Variation S6-B2	*14.1*	*0.2*	*0.2*	*13.9*	*0.0*	*0.0*	*14.1*	*0.1*	*0.1*	*14.0*	*0.3*	*0.3*	*13.8*	*0.6*

Table Note: Inventory data columns represent total miles of wetland types crossed by the B2H Project and do not equal the total length as a similar wetland type may be crossed multiple times.

Direct and indirect effects on wetlands could include temporary impacts on vegetation from construction, temporary increases in soil erosion and sedimentation associated with construction, operation, and maintenance of the Applicant's Proposed Action Alternative, and temporary impacts from removal of vegetation, including loss of shading and reduction or loss of flood water attenuation availability. The types of potential effects on wetlands are discussed in greater detail in Section 3.2.2.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through spanning wetlands within the limits of standard structure design, avoiding surface-disturbing activities in RCAs, reducing the spatial and temporal extent of disturbance, limiting or avoiding vegetation clearing, and limiting removal of streamside vegetation. The application of several selective mitigation measures aimed to reduce the spatial and temporal extent of impacts on wetland vegetation, limit the creation of new wetland and access road crossings, and to reduce soil disturbance and vegetation removal also would be applied to reduce impacts on wetlands. Refer to the list of applicable design features and selective mitigation measures in Section 3.2.2.4.

Moderate residual impacts could result from effects on forested wetlands, including complete removal of individual trees or portions of tree stands or construction activities affecting tree health (including soil compaction in near tree roots, soil disturbance near tree roots or trimming of branches). Low residual impacts could result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the B2H Project in proximity to wetlands. Table 3-92 summarizes the expected level of initial impacts, applied selective mitigation measures and resulting residual impacts on wetlands.

Variations S6-A1 and S6-A2

Variations S6-A1 and S6-A2 are anticipated to result in low residual impacts on emergent and open water wetlands. Additionally, Variation S6-A1 is anticipated to result in low residual impacts on scrub-shrub wetlands. Variation S6-A1 would result in the same amount of residual impacts on emergent wetlands and a greater amount of residual impacts on open water wetlands than Variation S6-A2 as the same amount of emergent wetlands and a greater amount of open water wetlands are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Variations S6-B1 and S6-B2

Variations S6-B1 and S6-B2 are anticipated to result in low residual impacts on emergent and open water wetlands and moderate residual impacts on forested wetlands. Additionally, Variation S6-B1 is anticipated to result in low residual impacts on scrub-shrub wetlands. Variation S6-B1 would result in the same amount of residual impacts on emergent, open water, and forested wetlands as Variation S6-B2 as the same amount of these wetland types are crossed. Direct and indirect effects on wetlands, and the application of design features and selective mitigation measures to minimize impacts on wetlands, would be similar to those described for the Applicant's Proposed Action Alternative.

Conclusions

All variations of the Applicant's Proposed Action Alternative in Segment 6 would result in low residual impacts on perennial and intermittent streams. Additionally, Variations S6-B1 and S6-B2 would result in low residual impacts on 303(d) listed temperature-impaired streams. Variation S6-A2 crosses less streams than Variation S6-A1; therefore less residual impacts on streams would be anticipated with Variation S6-A2 as compared to Variation S6-A1. Variation S6-B2 crosses less streams than Variation S6-B1; therefore less residual impacts on streams would be anticipated with Variation S6-B2 as compared to Variation S6-B1.

All variations of the Applicant's Proposed Action Alternative in Segment 6 would result in low residual impacts on emergent and open water wetlands. Additionally, Variations S6-B1 and S6-B2 would result in low residual impacts on forested wetlands and Variation S6-B1 would result in low residual impacts on scrub-shrub wetlands. Variation S6-A2 crosses less wetlands than Variation S6-A1; therefore less residual impacts on wetlands would be anticipated with Variation S6-A2 as compared to Variation S6-A1. Variation S6-B2 crosses less wetlands than Variation S6-B1; therefore less residual impacts on wetlands would be anticipated with Variation S6-B2 as compared to Variation S6-B1.

3.2.3 VEGETATION

3.2.3.1 INTRODUCTION

Vegetation resources discussed in this section include vegetation communities, special status plant species, traditional foods and ethnobotanical resources, and noxious weeds that occur or have the potential to occur within the B2H Project area. This section describes the existing conditions and trends of the vegetation communities and special status plant species within the B2H Project area and the potential effects of siting, construction, and operation of the B2H Project on these resources. In addition, this section also discusses the presence of noxious weeds in the vegetation resources study corridor and the potential for their spread due to B2H Project activities. Species that warrant increased management attention that will be discussed in detail below include USFWS candidate, proposed, and threatened and endangered plant species; BLM and USFS sensitive plant species; Oregon endangered or threatened; and noxious weed species.

3.2.3.2 REGULATORY FRAMEWORK

Implementation of the B2H Project would need to be consistent with appropriate statutes, regulations, plans, programs, and policies of federal agencies, state and local governments, and affiliated tribes.

FEDERAL

Endangered Species Act

The ESA was enacted in 1973. This law established a regulatory system to protect species that are at risk of extinction. Plant species listed under the ESA are protected from any acts prohibited under Section 9(a)(2); these acts include import and export, removal and possession from areas under federal jurisdictions, malicious damage to areas under federal jurisdiction, transport or carry by any means in the course of a commercial activity, and sale or offer for sale in interstate or foreign commerce (ESA, as amended, section 9(a)(2) 50 CFR 17.61 and 50 CFR 17.71).

The USFWS oversees administration of the ESA, maintains and reviews the list of plant species protected under the ESA, designates areas of critical habitat that are crucial for species recovery, and establishes species recovery plans.

Bureau of Land Management 6840 Manual and Policy

The BLM's objective regarding sensitive species is to provide protections that are consistent with the ESA to conserve or recover listed species and their associated ecosystems and to ultimately achieve long-term recovery and delisting. The authority for this policy is provided to the BLM by a number of regulations, including the ESA, the Sikes Act, the Federal Land Policy and Management Act (FLPMA), and departmental manuals. It is the BLM's policy that “actions authorized by the BLM shall further the conservation and/or recovery of federally listed species and conservation of Bureau sensitive species,” and, “Bureau listed species shall be managed consistent with species and habitat management objectives in land-use and implementation plans to promote their conservation and to minimize the likelihood and need for listing under the ESA” (BLM 2008).

U.S. Forest Service Manual 2672: Planning for Management and Recovery

To ensure that USFS actions do not affect listed species, the USFS Manual, through a series of policies, directs the management of sensitive species on USFS lands. Pursuant to this goal, USFS Manual 2672 Chapter 2672.41 directs biological evaluations with the objective of ensuring “that the Forest Service actions do not contribute to loss of viability of threatened, endangered, proposed, or sensitive plant and animal species, or contribute to a trend towards federal listing under the Endangered Species Act of any species.” Additionally, the USFS is to incorporate in its biological evaluations "concerns for sensitive species throughout the planning process, identifying opportunities for enhancement and reducing any potentially negative impacts" (USFS 2006).

Federal Land Policy and Management Act

The FLPMA (43 U.S.C. 1701) as amended, consolidates and articulates BLM and USFS management responsibilities and governs most uses of federal lands, including authorization to grant or renew rights-of-way. In accordance with FLPMA, BLM, and USFS must make land-use decisions based on principles of multiple use and sustained yield. As such, a grant of right-of-way must be limited to its necessary use and must contain terms and conditions that reflect the agencies’ management responsibilities under the FLPMA, including minimizing impacts on fish and wildlife habitat.

National Forests Management Act

The National Forests Management Act (NFMA), as amended, and its implementing regulations under 36 CFR 219, consolidate and articulate USFS management responsibilities for lands and resources of the National Forest System. The NFMA requires that each national forest develop a management program based on multiple-use, sustained-yield principles and implement a land-management plan for each unit of the National Forest System. The implementing regulations at the time the current forest plans were approved required the identification of Management Indicator Species (MIS) 36 CFR 219.19). MIS were selected because their population changes were believed to indicate the effects of management activities on habitats or other species of selected major biological communities or water quality. The land-management plan established objectives for the maintenance and improvement of habitat for the MIS.

Forest and Rangeland Renewable Resources Planning Act

The Forest and Rangeland Renewable Resources Planning Act, (FRRRPA), as amended by the NFMA consolidates and articulates USFS management responsibilities similar to those described under the NFMA. The FRRRPA requires the assessment, planning, and monitoring of national forest resources with periodic display to Congress facilitating the direction of goods and services to be produced from the nation’s forests.

Federal Invasive/Noxious Species Laws and Regulations

The Federal Noxious Weed Act of 1974, as amended in 1990 (7 U.S.C. 2814), requires federal land-managing agencies to develop a management program for the control of plants classified under federal

or state law as undesirable, noxious, or harmful and to cooperate with state governments in the control of undesirable plants on federal lands. The Carlson-Foley Act of 1968 (Public Law 90-583, 43 U.S.C. 1241) also provides for the control of noxious plants on federal lands by permitting the appropriate state agency to enter such lands to destroy noxious plants. The U.S. Department of Agriculture Noxious Plant List, the BLM National List of Noxious Weed Species of Concern, and individual BLM RMPs and USFS LRMPs provide additional direction for the designation and management of invasive and noxious weed species on lands they manage.

In 2005, Region 6 of the USFS published a ROD for the Invasive Plant Program. This plan provides invasive plant management direction for all National Forest LRMPs in the Pacific Northwest Region. The management direction includes invasive plant prevention and treatment/restoration standards intended to help achieve stated desired future conditions, goals and objectives (USFS 2005).

In 2009 the Department of the Interior amended the BLM's land-use plans (LUPs) in 11 contiguous western states to designate energy transport corridors (West-wide Energy Corridors), consistent with the requirements of Section 368 of the Energy Policy Act of 2005 (USFS 2009a). This decision also adopted a series of Interagency Operating Procedures, which include management practices and specific requirements related to invasive plant species to approve right-of-way grants within the designated corridors.

State Threatened and Endangered Species

Oregon passed ORS 564.105 with the goal of conservation of threatened or endangered vegetation species through "the use of methods and procedures necessary to bring a species to the point at which [protective] measures are no longer necessary" (ORS 496.171[1]). Species listed as threatened or endangered by Oregon include all native species listed under the Federal ESA as of May 15, 1987, as well as any additional native species determined by the appropriate state agency to be in danger of extinction throughout a large portion of the species' range within Oregon. For facilities that are regulated by the Energy Facility Siting Council (EFSC), such as the B2H Project, jurisdiction and rules for Oregon endangered and threatened plant species extend to all lands in Oregon, regardless of land ownership. The B2H Project and other facilities that are regulated by EFSC must comply with the EFSC Threatened and Endangered Species standard (OAR 345-022-0070) which requires that EFSC find the facilities are not likely to cause a significant reduction in the likelihood of survival or recovery of the species. In addition to federal protections for special status plants on federal land, OAR 345-022-0070 is applicable to all threatened and endangered plant species in Oregon, throughout the life of the project, on all land in Oregon regardless of land ownership, including federal, state, county, city, or private lands. Applicants must be in compliance with these and other applicable state statutes to receive a site certificate from EFSC to construct and operate the facility. Enforcement and management for the state law is the responsibility of EFSC as well as state agencies with implementing authority over their own rules and statutes, such as Oregon Department of Agriculture for threatened and endangered plant species.

Unlike Oregon, the State of Idaho does not have State threatened and endangered species. The Idaho Department of Species Conservation oversees protection of federally listed threatened and endangered plants on state, county and city lands. The State of Idaho does not have rules or regulations protecting other categories of special status plant species on state, county, city, or private land. The Idaho Department of Fish and Game maintains site-specific data on Idaho's sensitive plant species and other rare plants, but does not regulate plant species on state lands. Owyhee County encourages protections for other special status plants but does not have requirements for protections on county lands.

Noxious Weeds

Oregon

The Oregon State Weed Board, established under ORS 561.650, provides direction to control noxious weeds at the state level and develops and maintains the state noxious weed list. The State Weed Board and the ODA classify noxious weeds in Oregon in accordance with the ODA Noxious Weed Classification System. There are three designations under the state's system:

- Class "A" State Noxious Weed: A weed of known economic importance that is not known to occur in Oregon or is in small enough infestations to make eradication/containment possible; however, its presence in neighboring states make future occurrence seem imminent
- Class "B" State Noxious Weed: A weed of economic importance that is regionally abundant but may have limited distribution in some counties
- Class "T" State Noxious Weed: A priority noxious weed designated by the State Weed Board as a target species on which the ODA would develop and implement a statewide management plan; "T"- designated noxious weeds are species selected from either the "A" or "B" list

In addition to the ODA Noxious Weed Classification System used by the state, each county in Oregon uses a separate weed classification system and maintains a separate list of county noxious weeds. These lists also use a 3-point designation classification system; however, the definition of each designation differs slightly from the state classification system. The county classification system is as follows:

- Class "A" County Noxious Weed: A weed of known economic/environmental importance that is known to occur in the county in small enough numbers to make eradication practicable or that is not known to occur but its status in surrounding counties makes future occurrence seem imminent
- Class "B" County Noxious Weed: A weed of known economic/environmental importance that is of moderate to wide distribution, is highly invasive, and is subject to intensive control or eradication, where feasible, at the county level
- Class "C" County Noxious Weed: A weed of known economic/environmental importance and of general distribution that is subject to control or eradication as local conditions warrant

Idaho

The Idaho Noxious Weed Law (Idaho Code and Statutes, Title 22, Chapter 24) is the basis for the management and control of noxious weeds by Idaho. The Idaho State Department of Agriculture (ISDA) is responsible for administering the state noxious weed law. Noxious Weeds Rules (Idaho Administrative Procedures Act, 02.06.22) designate weeds as noxious statewide. Idaho's noxious weeds are divided into three categories defined as follows (ISDA 2012):

- Statewide Early Detection and Rapid Response Noxious Weed List: If any of these weeds are found in Idaho, they shall be reported to the ISDA within 10 days of positive identification by the University of Idaho or another qualified authority as approved by the ISDA director. These weeds shall be eradicated during the same growing season as the one in which they are identified.
- Statewide Control Noxious Weed List: These weeds are known to exist in varying populations throughout the state. The concentration of these weeds is at a level where control and/or eradication may be possible. The weed-control authority shall develop a written plan for weeds on the list that specifies active control methods to reduce the known population in no more than 5 years. The plan shall be available to the ISDA on request.
- Statewide Containment Noxious Weed List: These weeds are known to exist in various populations throughout the state. Weed-control efforts may be directed at reducing or eliminating new or expanding weed populations, while known and established weed populations, as determined by the weed-control authority, may be managed by any approved weed-control method, as determined by the weed-control authority.

3.2.3.3 Issues Identified for Analysis

The following summarizes (1) vegetation resources-related issues that were raised by the public, Native American tribes, or federal and state agencies during scoping or (2) vegetation resources-related issues that must be considered as stipulated by law or regulation.

- What would be the effects of the B2H Project on plant species that are federally listed (under the ESA), state listed, or listed as a sensitive plant species by the USFS or BLM?
- What effects would the B2H Project have on old-growth forests and riparian areas?
- Will disturbed areas be restored after construction?
- What effects would the B2H Project have on fire regimes in the B2H Project area?
- Could the B2H Project result in the introduction or spread of noxious weeds?
- How will vegetation be managed within the transmission line corridor? Will herbicide be the primary mode of vegetation management? What will be the effects of herbicide applications?

3.2.3.4 Methods

The general study methods used to analyze the impacts of the B2H Project in this EIS are described in Sections 3.1.2 and 2.5.1. This section discusses how the study methods are applied to assess the impacts of the B2H Project on vegetation.

DATA SOURCES

Several data sources were used to identify and analyze B2H Project impacts on vegetation communities, traditional foods and other ethnobotanical resources, noxious weeds, and special status plant species. Vegetation communities were identified from the Regional NWGAP Analysis Program dataset, as well as from several aquatic feature datasets that were used to identify vegetation communities associated with aquatic systems. Traditional foods and potential ethnobotanical resources were identified from ethnographic studies. A list of noxious weeds likely to exist in the B2H Project area was compiled from federal, state, and county lists of noxious weeds. Known locations of noxious weed infestations were determined from weed databases maintained by federal or state agencies. Special status plant species included USFWS endangered, threatened, proposed, and candidate species occurring in Oregon and Idaho; species determined by the BLM to be sensitive in Oregon or Idaho; species determined by the USFS to be sensitive in Oregon; and species listed as endangered or threatened in Oregon by the ODA. Occurrence datasets for the special status plant species were collected from several sources, including BLM and USFS databases, the ORBIC, the IDFG, and preliminary plant surveys of the B2H Project area.

This initial coarse-filter assessment of vegetation resources was conducted using planning documents, BLM RMPs, USFS LRMP, B2H Project-specific field studies, existing digital data sources both publicly available like ODA Weedmapper and agency internal databases like GeoBOB, and previously conducted studies. Specific sources reviewed included:

- Vegetation Communities
  - Northwest Regional GAP Analysis Program (NWGAP)
  - Terrestrial Ecological Systems Mapper (NatureServe)
  - Fire Boundary Data (USGS)
- Riparian Conservation Areas
  - Oregon Wetlands Cover (Institute for Natural Resources and The Wetlands Conservancy)
  - National Wetlands Inventory Wetlands Mapper (USFWS)
  - StreamNet (BLM)
  - National Hydrography Dataset (NHD; USGS)
  - NWGAP
- Federally Listed and Sensitive Plant Species
  - Environmental Conservation Online System (USFWS)
  - ORBIC (Institute for Natural Resources)
  - Idaho Fish and Wildlife Information System (IFWIS; IDFG)
  - Geographic Biotics Observation System (GeoBOB; BLM)
  - Natural Resource Manager – Threatened, Endangered, & Sensitive Plants – Invasive Species (NRM TESP-IS; USFS)
  - Preconstruction surveys (Tetratech 2011-2014)

- Noxious Weeds
  - National Invasive Species Information Management System (NISIMS; BLM)
  - Weedmapper (ODA)
  - NRM TESP-IS (USFS)
- Resource Management Plans
  - Baker Resource Management Plan (BLM 1989)
  - Southeastern Oregon Resource Management Plan (BLM 2002)
  - Owyhee Resource Management Plan (BLM 1999)
  - Wallowa-Whitman National Forest LRMP (USFS 1990)

Analysis Area

In general, the study corridor for vegetation resources was defined as a 1-mile-wide analysis corridor: 0.5 mile on either side of the alternative route centerlines. The 1-mile-wide analysis corridor was chosen because it is large enough to encapsulate the existing vegetation communities in the vicinity of the B2H Project area, as well as the extent of potential direct and indirect impacts on vegetation communities that could occur during construction and operation. The 1-mile-wide vegetation resources study corridor also was used for the analysis of traditional foods and other ethnobotanical resources and noxious weeds because these resources were analyzed within the context of the vegetation communities. Traditional foods and ethnobotanical resources include plants important to tribal groups for subsistence, economic, medical and ceremonial purposes.

A 10-mile-wide analysis corridor (5 miles on either side of the alternative route centerlines) also was defined for identification of special status plant species that could be affected by the B2H Project. Special status plant species include all plant species listed as endangered, threatened, or a candidate to be listed under the ESA, listed as endangered or threatened by Oregon, or considered sensitive by the BLM or USFS. This larger study corridor was chosen to account for the potential uncertainty of the presence (limited survey coverage) and locations (inaccurate or historical mapping techniques) of many special status plant species populations in the vicinity of the B2H Project area. Any species with known or suspected occurrences within the 10-mile-wide special status plant species study corridor were considered potentially present and could be affected by the Proposed Action and the alternatives.

Vegetation Community Classification

A multitude of vegetation communities ranging from semi-desert Grasslands and shrub-steppe to montane and subalpine Conifer Forests occur within the B2H Project area. For the purposes of this analysis, a variety of ecological systems and vegetation community subtypes that occur within the vegetation resources study corridor were compiled into eight primary vegetation communities and 17 vegetation community subtypes.

The primary vegetation communities were based on the relative abundance of the physiognomy of the major life forms (i.e., grass, forb, shrub, and tree) and degree of anthropogenic modification or disturbance. Primary vegetation communities were further separated into vegetation community

subtypes based on the dominant species and shared biotic and abiotic factors (i.e., soils, precipitation, temperature, elevation, and topography) which shape them.

Vegetation community subtypes comprise various ecological systems described in *Ecological Systems of the Columbia Plateau, Blue Mountains, and Snake River Plain* (NatureServe 2006) that correspond to a number of macrogroups defined in the National Vegetation Classification System (NVCS). Instruction Memorandum 2013-111, *The National Vegetation Classification and Associated Mapping Standards for Bureau of Land Management Planning Documents and Assignment of State-level Vegetation Classification Data Stewards*, directs the BLM to use or crosswalk and reference the NVCS for all fine-scale assessments and project-level documents to describe existing vegetation. A crosswalk between the primary vegetation communities, subtypes, and ecological systems is presented in Table D-2 in Appendix D.

The eight primary vegetation communities and 17 vegetation community subtypes within the 1-mile analysis corridor are:

- Agriculture
  - Agriculture
- Bare Ground, Cliffs, Talus
  - Bare Ground, Cliffs and Talus
- Developed/Disturbed Lands
  - Developed/Disturbed
- Forest/Woodlands
  - Aspen
  - Forest-Other
  - Juniper and Mahogany Woodlands
  - Mixed Conifer Forest
  - Riparian Woodlands
- Grasslands
  - Native Grasslands
  - Non-native Grasslands
- Open Water
  - Open Water
- Riparian Conservation Areas
  - Riparian Conservation Areas
- Shrublands
  - Desert Shrub
  - Dwarf Sagebrush Steppe

- Mountain Shrub
- Shrubland-Other
- Tall Sagebrush Steppe

The Riparian Woodland and Shrubland-Other are very minor subtypes occurring as small, discontiguous patches generally less than one acre in extent. Although both community subtypes occur in the 1-mile study corridor for vegetation resources, no alternative routes considered for the B2H Project cross either subtype. As such, impacts on these vegetation community subtypes are not expected and neither vegetation community subtype is discussed further in Sections 3.2.3.4 and 3.2.3.6.

The Mixed Conifer Forest vegetation community subtype may contain areas that display old-growth forest characteristics. Data identifying areas with old-growth characteristics is not available for all alternative routes considered for the B2H Project, therefore impacts on forests with old-growth characteristics is described qualitatively in 3.2.3.6. Additional information about potential effects of the B2H Project on old-growth forests in areas under USFS jurisdiction is presented in Section 3.4.

Due to the scale and complexity of the B2H Project, RCAs were used to define and analyze impacts on wetlands and riparian resources. RCAs encompass traditional riparian corridors, wetlands, intermittent streams, and waterbodies, as well as upland areas that maintain the integrity of aquatic ecosystems by: (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams; (2) providing root strength for channel stability; (3) shading streams; and (4) protecting water quality. In addition, riparian-associated plants and animals rely on these areas for critical life functions (e.g., reproduction) and to provide connectivity and dispersal corridors. RCAs are considered portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines (USFS and BLM 1995) and are consistent with the Decision Notices for Pacific Anadromous Fish Strategy (PACFISH) and Inland Native Fish Strategy (INFISH), the Updated Interior Columbia Basin Strategy, and the proposed federal agency RMPs covering lands within the vegetation resources study corridor.

RCAs were defined as areas occurring within specified distances from streams, wetlands, and waterbodies (Table 3-93). The RCA widths listed in Table 3-93 are based on those recommended in PACFISH. The 2014 Updated Interior Columbia Basin Strategy concluded that RCA widths and delineation criteria prescribed in PACFISH and INFISH would be sufficient to provide for riparian function (Quigley and Arbelbide 1997). For some sites within the 1-mile analysis corridor, the default RCA widths may be greater or less than needed for protection of associated aquatic and riparian systems. However, for purposes of consistency in analysis of B2H Project effects, the default RCA widths were applied.

Table 3-93. Riparian Conservation Area Widths		
Category	**Category Type**	**Riparian Conservation Area Default Width[1]**
1	Fish-bearing streams	**300 feet** slope distance on either side of the stream, or to the extent of additional delineation criteria, whichever is greatest
2	Perennial non-fish-bearing streams	**150 feet** slope distance on either side of the stream, or to the extent of additional delineation criteria, whichever is greatest
3	Ponds, lakes, reservoirs, and wetlands greater than 1 acre	**150 feet** slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs, or from the edge of the wetland, from the edge of the pond or lake, or to the extent of additional delineation criteria, whichever is greatest
4	Intermittent or seasonally flowing streams[2] and wetlands less than 1 acre	In watersheds that support ESA-listed fish species or critical habitat, or both, **100 feet** slope distance from the edge of the stream channel or wetland to the outer edge of riparian vegetation, whichever is greatest In watersheds that do not have current documented presence of ESA-listed fish species or critical habitat, or both, **50 feet** slope distance from the edge of the stream channel or wetland to the outer edge of riparian vegetation, whichever is greatest

Table Notes:
[1]For the Environmental Impact Statement analysis, Riparian Conservation Areas were delineated using horizontal straight line distance rather than slope distance. Slope distances will be used in B2H Project implementation.
[2]For the Environmental Impact Statement Analysis, intermittent or seasonally flowing stream data were included only if they intersected land cover types associated with aquatic features.

The presence of fish species within fish-bearing streams was determined using StreamNet datasets for redband trout, bull trout, steelhead trout, and Chinook and Coho salmon. Perennial, intermittent, and seasonally flowing streams, as well as ponds, lakes, and reservoirs, were identified using the NHD. For this analysis, all perennial streams identified by the NHD were considered fish-bearing and delineated as a Category 1 RCAs.

For this analysis, RCAs were delineated using horizontal straight line distances from each water feature rather than the slope distances indicated in Table 3-93. Local fine-scale topographic data, which were not available for the vegetation resources study corridor at the time of document development, are necessary to accurately measure slope distance. The use of horizontal straight line buffer distances assumes the greatest buffer length possible and conservatively estimates the extent of RCAs in the vegetation resources study corridor. Characterization of RCAs during B2H Project implementation will be based on slope distances.

For this analysis, RCAs associated with intermittent or seasonally flowing streams were identified as the intersection of the intermittent and ephemeral streams from the NHD and land cover types associated with aquatic features from the NWGAP dataset. The RCAs at these intersections were delineated using 50-foot or 100-foot horizontal straight line distances, depending on the presence of ESA-listed fish species. This approach was taken to more accurately represent the extent of aquatic ecosystems in the B2H Project area. Delineating RCAs as all areas within 50 or 100 feet of the intermittent or ephemeral streams included in the NHD vastly overestimates the extent of aquatic ecosystems in the B2H Project area. Any use of RCAs during B2H Project implementation will be consistent with the conditions set in PACFISH and INFISH.

RCAs approximate the areas of aquatic ecosystems, vegetation communities dependent on aquatic ecosystems, and upland vegetation influencing the aquatic ecosystems. They do not represent specific aquatic features, including jurisdictional wetlands. Specific aquatic features present in the B2H Project area and potential impacts on these features resulting from B2H Project activities are discussed in the Section 3.2.2.

Identification of Federally Listed and Sensitive Plant Species in the B2H Project Area

Federally listed species are those listed as endangered or threatened, are proposed to be listed, or are candidates for review. In response to a request from the BLM, the USFWS provided information from its Endangered Species Program on plant species that may occur in the B2H Project area or may be affected by the B2H Project (USFWS 2016), or both. After considering the ranges, distributions, and habitats of the species provided by the USFWS, it was determined that one plant species, Howell's spectacular thelypody (*Thelypodium howellii* ssp. *spectabilis*), listed as threatened occurs within the special status plant species study corridor and could potentially be affected by the B2H Project. A detailed description of Howell's spectacular thelypody is included in Appendix D. Updates to the federally listed species potentially occurring in the B2H Project area are checked regularly using the Information for Planning and Conservation database (USFWS 2016).

Several plant species identified by the USFWS as potentially occurring in the B2H Project area or that may be affected by the B2H Project were not carried forward for analysis in this EIS. These species include northern wormwood (*Artemisia campestris* var. *workskioldii*), Macfarlane's four-o'clock (*Mirabilis macfarlenei*), Spalding's catchfly (*Silene spaldingii*), whitebark pine (*Pinus albicaulis*), and slickspot peppergrass (*Lepidium papilliferum*) (USFWS 2016). Northern wormwood was not carried forward because the species is not known in proximity to any alternative route, known habitat in the floodplain of the Columbia River would not be affected by the B2H Project (USFWS 2013), and the species is considered extirpated from Oregon (USFWS 2013). Spalding's catchfly and Macfarlane's four-o'clock were not carried forward due to their known ranges being restricted to northeastern basins of the Wallowa Mountain Range and the Snake River Canyon, neither of which is crossed by any alternative route, nor are occurrences known in the special status plants study corridor for any alternative route. Whitebark pine was not carried forward for analysis despite the known range, including the B2H Project area, because mapped habitat does not occur in the special status plants study corridor and B2H Project-related impacts are not expected in the high-elevation ridges typical of whitebark pine habitat (Aubry et al. 2008). Slickspot peppergrass was not carried forward for similar reasons, neither known occurrences nor proposed critical habitat exist in the special status plants study corridor for any alternative route (FR Doc. 2014-03134).

Sensitive species include those listed by the BLM and USFS as sensitive, or listed by Oregon as endangered or threatened. A preliminary list of sensitive plant species potentially occurring within the 10-mile analysis corridor for special status plant species was developed based on (1) state lists of state endangered and threatened species in Oregon (ODA 2014); (2) BLM statewide lists of sensitive plant

species (BLM 2016; ISSSSP 2015a); and (3) the USFS Region 6 list of sensitive species (ISSSSP 2015b). In addition to vascular plants, these lists include bryophytes, lichens, and fungi.

The preliminary special status plant species list was narrowed to a list of special status species likely to occur in the B2H Project area by identifying special status species with documented occurrences in the 10-mile-wide special status plant species analysis corridor. The 10-mile-wide corridor was chosen to account for both uncertainties in the spatial information of the documented occurrences and the possibility of undocumented occurrences existing in the right-of-way. Potential synonymy between the lists and the occurrence data was corrected by using the accepted scientific name from the taxonomic authority, the Integrated Taxonomic Information System.

Special status species occurrence data was compiled from several datasets, including GeoBOB (BLM), NRM TESP-IS (USFS), IFWIS (IDFG), ORBIC (Institute for Natural Resources), and preconstruction surveys (Tetratech). Preconstruction surveys for special status plant species were conducted for the B2H Project from 2011 to 2014. However, because the alignments of several alternative routes were revised between the Draft and Final EIS, results of the preconstruction surveys do not fully represent the distribution of special status plant in the B2H Project area.

Because special status plant occurrences were compiled from several sources and some of the datasets contained data that overlapped with data from other sources, numerous occurrences were duplicated when the data were compiled. In the 10-mile special status species analysis corridor, duplicate occurrences were identified and eliminated from consideration in the analysis. In general, preference was given to the more recent occurrence mapped at a finer scale. Where several smaller occurrences were mapped as a single occurrence by another source, preference was given to the larger, more inclusive occurrence. Duplicate occurrences were not identified and eliminated across the entire range of the species; therefore, estimates of total occurrences in this analysis likely represent an overestimation. Additionally, the occurrences known from Idaho were determined from a subset of the IFWIS dataset which included only occurrences in the 16-mile B2H Project area; thus, the number of known occurrences is likely an underestimation of the number of occurrences in Idaho. The total number of occurrences reported for the ORBIC and IFWIS datasets in this analysis was determined without using a separation distance and may differ slightly from the total occurrences reported by ORBIC or IFWIS in their ranking documents. The initial list of sensitive plant species identified using occurrence data was further refined by consulting with agency personnel. The refined sensitive species list includes 42 species known to occur in the 10-mile-wide special status plant species analysis corridor. Species accounts, including habitat requirements, known distribution, recent and historical observations, and the likelihood of occurrence in the special status plant species analysis corridor, were prepared for special status species and are presented in Appendix D.

Impact Assessment and Mitigation Planning

Criteria for Assessing Impacts

The criteria used to assess impacts were developed collaboratively with the cooperating agencies to assess the level of potential impacts on vegetation resources associated with B2H Project

implementation and allow comparison among alternative routes. Impact criteria were determined with consideration of relative abundance and importance of the vegetation resources, the nature and magnitude of expected impacts, length of time needed to recover from disturbance, and federal and state laws protecting resources. Table 3-94 summarizes the criteria used to assess impacts on vegetation resources.

Table 3-94. Criteria for Assessing Level of Initial Impacts on Vegetation Resources

Level of Impacts	Description
High	• Mortality of a federally endangered, threatened, or candidate plant species • Loss or adverse modification to habitat occupied by federally endangered, threatened, or candidate plant species • Irreversible or difficult to reverse modification of vegetation communities that are rare, regenerate slowly, and would require substantial modification of vegetation during construction • Loss or adverse modification of vegetation communities crucial for ecosystem function and biodiversity • Mortality of agency sensitive or state endangered or threatened plant species resulting in the extirpation of a local population trending the species toward listing under the ESA • Loss or irreversible modification of sites or areas culturally important for the gathering of traditional foods or other ethnobotanical resources
Moderate	• Loss or adverse modification of uncommon native vegetation communities • Mortality of agency sensitive or state endangered or threatened plant species contributing to the extirpation of local populations but not trending the species toward listing under the ESA • Long-term disturbance to agency sensitive and state endangered or threatened plant species • Disturbance of common native vegetation communities that regenerate slowly • Short-term disturbance to rare vegetation communities • Disturbance to native vegetation communities that results in the long-term reductions in the availability of traditional foods or other ethnobotanical resources
Low	• Short-term disturbance of agency sensitive; state endangered or threatened; or federally endangered, threatened, or candidate plant species • Limited or incidental mortality of agency sensitive; state endangered or threatened plant species that does not result in population- or species-level effects • Short-term disturbance of uncommon native vegetation communities • Loss, adverse modification, or disturbance of common vegetation communities • Loss, adverse modification, or disturbance of vegetation communities that regenerate rapidly or are not a component of the natural landscape • Disturbance to native vegetation communities that results in short-term reductions in the availability of traditional foods or other ethnobotanical resources

Effects Analysis

Assessment of Initial Impacts

Initial impacts are those effects resulting from the implementation of the B2H Project, with consideration of the design features B2H Project for environmental protection. These design features would be implemented throughout the B2H Project and are expected to reduce initial impacts on vegetation resources. Initial impacts on vegetation resources were assigned using the criteria for assessing impacts identified in Table 3-94. A list and description of all B2H Project design features is provided in Table 2-7. The design features relevant to vegetation resources are summarized below.

- **Design Feature 1 (Plan of Development)**. A POD would be prepared for implementation and maintenance of the B2H Project to provide direction to the Applicant's construction personnel, construction contractors and crews, compliance inspection contractor (CIC), environmental monitors, and agency personnel regarding specification of construction; and provide direction to the agencies and Applicant's personnel for operation and maintenance of the B2H Project. The POD would contain implementation plans and detailed mapping to facilitate execution of environmental protection, mitigation measures, and conservation measures. Implementation plans (also refer to EIS Table 2-3) relevant to vegetation resources would include:
  - Environmental and Safety Training Plan
  - Environmental Compliance Management Plan
  - Biological Resources Conservation Plan
  - Noxious Weed Management Plan
  - Water Resources Protection Plan
  - Erosion, Dust Control, and Air Quality Plan
  - Reclamation, Revegetation, and Monitoring Framework Plan
  - Stormwater Pollution Prevention Plan
  - Spill Prevention, Containment, and Countermeasures Plan Framework
  - Fire Protection Plan
  - Vegetation Management Plan

  The Noxious Weed Management Plan establishes an adaptable plan where the results of preconstruction surveys will determine the types and extent of weed-control methods. Postconstruction monitoring will determine the effectiveness of weed-control measures and determine where additional control would be required. The Applicant is responsible for ensuring that all federal, state, county, and other local agreements are satisfied. Application of the Noxious Weed Management Plan is expected to identify areas infested by invasive plants, control infestations, and prevent the further spread and establishment of invasive plants.
- **Design Feature 2 (Environmental Training for All Personnel)**. Prior to construction, the CIC would instruct all personnel on the protection of ecological and natural resources, such as (a) federal and state laws regarding special status plants, including collection and removal; (b) the importance of ecological and natural resources; (c) the purpose and necessity of protecting ecological and natural resources; and (d) reporting and procedures for stop work. This design feature would minimize effects on special status plant habitats and populations.
- **Design Feature 4 (Preconstruction Surveys for Sensitive Species)**. Preconstruction surveys for special status species, threatened and endangered species, or other species of particular concern would be considered in accordance with the B2H Biological Survey Work Plan. In cases for which such species are identified, appropriate action would be taken to avoid adverse impacts on the species and its habitat. This design feature would minimize effects on special status plant habitats and populations.
- **Design Feature 5 (Spatial Extent of Construction Activities)**. The spatial limits of construction activities, including vehicle movement, would be predetermined with activity

restricted to and confined within those limits. This design feature would minimize effects on vegetation resources by restricting disturbance to a predefined extent.

- **Design Feature 6 (Reclaim Construction Areas)**. In construction areas (e.g., staging areas, material laydown yards, fly yards, and wire pulling/splicing sites) where there is ground disturbance and where recontouring is required, surface reclamation would occur as required by the Reclamation, Revegetation, and Monitoring Plan or the landowner. The method of reclamation may consist of, but may not be limited to, returning disturbed areas to their natural contour, reseeding, installing cross drains for erosion control, placing water bars in permanent roads, and filling ditches where they were installed for temporary roads. All areas disturbed as a part of the construction and/or maintenance of the proposed transmission line would be seeded with a seed mixture appropriate for those areas as identified in the Reclamation, Revegetation, and Monitoring Plan. The federal land-managing agency or landowner(s) would approve a seed mixture that is compatible with the affected Ecological Site Description.

  In construction areas where disturbing the existing contours is not required, vegetation would be left in place wherever possible, and original contours would be maintained to avoid excessive root damage and allow for resprouting in accordance with the Reclamation, Revegetation, and Monitoring Plan or landowner approval. This design feature would minimize effects on vegetation resources by preventing permanent loss of vegetation communities and reducing indirect effects associated with weed invasion and degradation of special status plant habitat.
- **Design Feature 7 (Salvage Topsoil for Revegetation)**. In work areas where ground-disturbing activities would occur, topsoil would be salvaged and segregated prior to construction, to be redistributed and contoured evenly over the surface of the disturbed area to be removed following completion of construction. The soil surface would be seeded with an agency- or landowner-approved seed mix and left rough to help reduce the potential for erosion and loss of seeded surface as specified in the reclamation plan. This design feature would minimize effects on vegetation communities by preserving the seedbank and preventing permanent loss of vegetation communities.
- **Design Feature 8 (Overland Travel in Construction Work Areas)**. Grading would be minimized by driving overland in areas approved in advance by the land-managing agency or land owner, or both, in predesignated work areas (e.g., staging areas, material laydown yards, fly yards, and wire pulling/splicing sites) whenever possible. This would minimize effects on vegetation resources by minimizing disturbance.
- **Design Feature 9 (Use of Access Routes Outside of Right-of-Way)**. All vehicle movement outside the right-of-way would be restricted to predesignated access, contractor-acquired access, public roads, or overland travel routes approved in advance by the applicable land-managing agency or landowner. This would minimize effects on vegetation resources by minimizing disturbance and reducing the potential of weed invasion.
- **Design Feature 15 (Reduce Impacts on Riparian Areas)**. Consistent with the BLM and USFS riparian management policies, surface-disturbing activities would be avoided in defined segments of RCAs, using the following delineation criteria, unless exception criteria defined by

the BLM are met or with agency approval of acceptable measures to protect riparian resources and habitats by avoiding or minimizing stormwater runoff, sedimentation, and disturbance of riparian vegetation, habitats, and wildlife species:

- Fish-bearing streams: 300 feet slope distance on either side of the stream, or to the extent of additional delineation criteria, whichever is greatest.
- Perennial non-fish-bearing streams: 150 feet slope distance on either side of the stream, or to the extent of additional delineation criteria, whichever is greatest.
- Ponds, lakes, reservoirs, and wetlands greater than 1 acre: 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond, or lake, or to the extent of additional delineation criteria, whichever is greatest.
- Intermittent or seasonally flowing streams and wetlands greater than 1 acre: In watersheds that support ESA-listed fish species or designated critical habitat, or both, 100 feet slope distance from the edge of the stream channel or wetland to the outer edge of riparian vegetation, whichever is greatest. In watersheds that do not have current documented presence of ESA-listed fish species and /or designated critical habitat, 50 feet slope distance from the edge of the stream channel or wetland to the outer edge of riparian vegetation, whichever is greatest.

Mitigation measures, such as micro-siting road locations, would be developed on a site-specific basis, in consultation and coordination with the BLM and other federal land-managing agencies, and incorporated into the POD. This would minimize effects on vegetation resources by minimizing disturbance to sensitive vegetation communities.

- **Design Feature 16 (Span Riparian Communities/Water Courses)**. Based on biological resources surveys and results of Section 7 consultation, state and federally designated sensitive plants, habitat, wetlands, riparian areas, springs, wells, water courses, or rare/slow regenerating vegetation communities would be flagged and structures would be placed to allow spanning of these features, where feasible, within the limits of standard structure design. This would minimize effects on vegetation resources by minimizing disturbance to sensitive vegetation communities.
- **Design Feature 17 (Work during Wet Periods)**. If work were required during wet periods with saturated soil conditions, vehicles would not be allowed to travel when soils are moist enough for deep rutting (4 or more inches deep) to occur unless prefabricated equipment pads (matting) was installed over the saturated areas or other measures were implemented to prevent rutting. Equipment with low-ground-pressure tires, wide tracks, or balloon tires would be used when possible. This would minimize effects on sensitive vegetation resources by reducing soil disturbance or alterations to hydrologic regimes.
- **Design Feature 20 (Reduce Potential for Aquatic Invasive Species)**. Interagency-developed methods of avoidance, inspection, and sanitization as described in the *Operational Guidelines for Aquatic Invasive Species Prevention and Equipment Cleaning* (USFS 2009b) would be adhered to. If control of fugitive dust near sensitive waterbodies is necessary, water would be

obtained from treated municipal sources or drafted from sources known to contain no aquatic invasive species. Support vehicles, drill rigs, water trucks, and drafting equipment would be inspected and sanitized, as needed, following interagency-approved operational guidelines. This design feature would minimize effects on sensitive vegetation resources by reducing the potential for weed introductions to sensitive vegetation communities.

Mitigation Planning and Effectiveness

In addition to the design features of the B2H Project for environmental protection, selective mitigation measures would be applied where feasible to reduce potential impacts on vegetation resources or where required to comply with law, regulation, or agency policy. For any alternative route selected, the Applicant would coordinate with the BLM, other land-managing agencies, or private landowners, as appropriate, to refine the implementation of mitigation for vegetation resources at specific locations. A list and description of all selective mitigation measures is provided in (Table 2-13). The selective mitigation measures that would be applied to vegetation resources are summarized below:

- **Selective Mitigation Measure 2 (Use Existing Access or Stream Crossings, or both, for Sensitive Resources Avoidance)**. Existing access or stream crossings, or both, would be used as much as possible or practicable for construction and maintenance to avoid disturbance of sensitive resources crossed by the B2H Project. Where applied, this measure is expected to reduce impacts on sensitive vegetation communities by limiting disturbance associated with new access roads.
- **Selective Mitigation Measure 3 (Use of Matting [Stabilization] in Sensitive Resource Areas)**. To minimize ground disturbance in sensitive vegetation areas, matting or another similar practice for ground stabilization could be used for B2H Project access and work areas. Where applied, this measure is expected to reduce impacts on sensitive vegetation communities by limiting soil disturbance that could result in alterations to hydrologic regimes or noxious weed invasion.
- **Selective Mitigation Measure 5 (Minimize Vegetation Clearing for Operational Clearances)**. Removal of vegetation in the right-of-way would be minimized to limit disturbance to timber resources and slow-growing vegetation communities and to protect sensitive habitat that is subject to structure- and conductor-clearance requirements. Trees and other vegetation would be removed selectively (e.g., edge feathering) to blend the edge of the right-of-way into adjacent vegetation patterns, as practicable and appropriate. Where applied, this measure is expected to reduce impacts on slow-growing vegetation communities by limiting clearing and disturbance of slow-growing vegetation.
- **Selective Mitigation Measure 8 (Span or Avoid Sensitive Features)**. Within the limits of standard tower design, structures would be located to allow conductors to avoid identified sensitive features, such as special status plant species and habitats. This could be accomplished through methods such as selective tower placement, spanning sensitive features, or realigning the B2H Project centerline (micro-siting). Application of this selective mitigation measure is expected to limit disturbance to and reduce impacts on special status plants.

- **Selective Mitigation Measure 13 (Spatial Plant Restrictions)**. To minimize disturbance to identified plant species, construction, operation, and maintenance activities would be restricted in designated areas unless exceptions are granted by the authorized officer or his/her designated representative and other applicable regulatory agencies (e.g., the USFWS or state wildlife agencies). Application of this selective mitigation measure is expected to limit disturbance to and reduce impacts on special status plants.

Residual Impacts

Residual impacts are the impacts on resources anticipated to occur from B2H Project activities after the application of selective mitigation measures described in the Mitigation Planning and Effectiveness section. The application of selective mitigation measures is anticipated to reduce the level of residual impacts associated with B2H Project construction and maintenance from the initial levels. The level of anticipated residual impacts on vegetation resources was assessed using the criteria presented in Table 3-94.

Vegetation Communities

Table 3-95 summarizes the level of anticipated initial and residual impacts on vegetation communities, as well as the relevant design features and selective mitigation measures. The level of impacts on vegetation communities are quantified and reported as a function of miles crossed of mapped vegetation communities.

Table 3-95. Summary of Initial and Residual Impact Levels For Vegetation

Common Name	Design Features of the B2H Project for Environmental Protection	Initial Impact	Selective Mitigation Measures	Residual Impact
Native Grasslands	2, 5, 6, 7, 8, 9	Moderate	None	Moderate
Non-native Grasslands	2, 5, 6, 7, 8, 9	Low	None	Low
Desert Shrub	2, 5, 6, 7, 8, 9	Moderate	None	Moderate
Dwarf Sagebrush Steppe	2, 5, 6, 7, 8, 9	Moderate	None	Moderate
Tall Sagebrush Steppe	2, 5, 6, 7, 8, 9	Moderate	None	Moderate
Mountain Shrub	2, 5, 6, 7, 8, 9	Moderate	None	Moderate
Mixed Conifer Forest	2, 5, 6, 7, 8, 9	Moderate	5	Moderate
Aspen	2, 5, 6, 7, 8, 9	Moderate	5	Moderate
Juniper and Mahogany Woodland	2, 5, 6, 7, 8, 9	Moderate	5	Moderate
Bare Ground, Cliffs, and Talus	2, 5, 6, 8, 9	Low	None	Low
Agriculture	2, 5, 6, 7, 8, 9, 36	Low	None	Low
Developed/Disturbed	2, 5, 6, 7, 8, 9	Low	None	Low
Riparian Conservation Area	2, 5, 6, 7, 8, 9, 15, 16, 17, 20	High	2, 3, 5	Moderate
Forest – Other	2, 5, 6, 7, 8, 9	Low	None	Low
Open Water	2, 5, 6, 7, 8, 9	Low	None	Low

Federal Listed, Candidate Plant Species, and Other Sensitive Plant Species

The level of initial and residual impacts on special status plant species were not assessed quantitatively due to data limitations. The level of initial impacts, the application of selective mitigation measures, and the anticipated residual impacts will be discussed qualitatively for special status plant species.

Additional Analysis

In addition to the assessment of residual impacts on vegetation resources, the extent of disturbance to vegetation communities was estimated based on the B2H Project description. Prior to final engineering design, the location of B2H Project features, such as new access roads, upgrades to existing roads, overland travel areas, transmission line structures, or other B2H Project facilities, are not identified. The total extent of disturbance (in acres) due to construction of features such as the access network (construction of new roads, upgrades to existing roads, and overland travel), transmission line structures, and other B2H Project facilities was estimated over the entire length of an alternative route using the access model developed for the B2H Project and the Applicant's B2H Project description (refer to Chapter 2, Section 2.5.1). Disturbance associated with the construction of the B2H Project was assumed to occur at a constant density per mile of transmission line and was calculated for each alternative route based on the total estimated disturbance and total length of each alternative route. The estimated density of disturbance (in acres per mile) for each alternative route was used to calculate the extent of disturbance on vegetation communities (in acres) that could occur for each specific length of vegetation community crossed by an alternative route.

B2H Project impacts on federally listed, candidate, sensitive, and other plant species were considered using known occurrence data compiled from several different sources. Locations of known occurrences of special status plants in the 10-mile-wide special status plant species analysis corridor and the 1-mile vegetation resources analysis corridor were identified by segment for each alternative route. The jurisdiction of special status species occurrences in the 1-mile vegetation resources corridor and the state natural heritage ranking for each species also were determined. The number of occurrences by jurisdiction was considered in the analysis due to the lack of reliable survey data and legal protection for occurrences on private lands. Oregon State threatened and endangered plants have some protection on private land while BLM and Forest Service sensitive plants are not protected on private land unless they are also listed as Oregon threatened and endangered. Any potential B2H Project effect on occurrences of sensitive plant species on private land may have an outsized impact, depending on pre-existing disturbance or individual landowner preferences regarding survey access or herbicide application during B2H Project construction, operation, and maintenance. This information guided the qualitative analysis of B2H Project impacts on the species using the criteria presented in Table 3-94.

Noxious weeds are plants considered by a governmental organization to be injurious to public health, agriculture, recreation, environment, or property. Most plants designated as noxious weeds are non-native, but some designated noxious weeds are native plant species. Several plant species, such as cheatgrass or bulbous bluegrass, are capable of invading native vegetation communities and displacing native plant species, but are not designated as noxious weeds. In this analysis, the broader term

invasive plants is used to describe all non-native plants that may adversely affect vegetation communities, and the more specific term noxious weeds is used to describe plant species designated by the states of Oregon and Idaho, as well as Baker, Union, Morrow, Umatilla, and Malheur counties in Oregon.

The presence and threat of noxious weed invasion was determined for each B2H Project segment using a desktop analysis identifying groupings of known weed locations in the B2H Project area, as well as areas with few known weed locations. This desktop analysis guided the qualitative analysis of B2H Project impacts related to increased risk of weed invasion. The known weed locations were determined from the most current datasets available from the BLM, USFS, and ODA.

Because the NWGAP datasets used to analyze impacts on vegetation communities do not contain information about several large wildfires that burned in 2015, fire boundary data were obtained from the Geospatial Multi-Agency Coordination Group (USGS 2015). Wildfire boundaries were used to identify the extent of the fires and determine which alternative routes cross recently burned areas. Wildfire boundaries also were used in the qualitative analysis of B2H Project impacts on recently burned areas and fire regimes. The quantitative analysis for vegetation communities assumes recently burned areas will recover to the pre-existing vegetation communities. Recovery from wildfires depends on the amount of time since the occurrence, precipitation amounts, vegetation community type, degree of associated degradation (weed invasion, soil loss, and alteration of community structure), and amount of reclamation effort by the land-managing agencies.

Potential B2H Project impacts on areas supporting traditional foods and ethnobotanical resources, availability of these resources, and changes in accessibility were analyzed in the context of the vegetation communities defined by the NWGAP dataset. This approach was taken due to the variety of these resources and the habitats supporting them, as well as to avoid disclosing locations of traditional food gathering areas, which often have cultural, historic, and spiritual importance.

To satisfy USFS requirements set in USFS Manual 2672 regarding biological evaluations and the "concerns for sensitive species throughout the planning process, identifying opportunities for enhancement and reducing any potentially negative impacts", the distribution, potential impacts, and mitigation of potential impacts of the B2H Project on USFS sensitive plant species on USFS-administered land are discussed under a separate subheading in each segment.

3.2.3.5 Affected Environment

Regional Setting

The B2H Project is situated in four level III ecoregions: the Columbia River Basin, Blue Mountains, Northern Great Basin, and Snake River Floodplain (EPA 2013). Ecoregions are distinguished from each other by the patterns and composition of biotic and abiotic characteristics, including geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology (Omernik 1987, 1995). Table 3-96 summarizes the distribution of the four ecoregions in the B2H Project area.

Table 3-96. Distribution of Ecoregions in the B2H Project Area	
Segment	**Ecoregion**
1	Columbia Plateau
2	Blue Mountains
3	Blue Mountains
4	Blue Mountains Northern Basin and Range Snake River Plain
5	Northern Basin and Range Snake River Plain
6	Northern Basin and Range Snake River Plain

The Columbia Plateau ecoregion covers central and southeastern Washington and north-central Oregon and is characterized by broad expanses of semi-arid sagebrush-covered volcanic plains and valleys. This ecoregion is influenced heavily by the presence of the Columbia River, and ecological processes over time have created deep soils that are highly suited for agricultural use. Historically, vegetation in this ecoregion was dominated by grassland and shrub-steppe, but the majority of the area has since been converted to agricultural use and pasturelands. In fact, most of Oregon's grain production is in this ecoregion.

The Blue Mountains ecoregion encompasses much of northeastern Oregon and is characterized by steep to rolling mountain habitat; vegetation ranges from shrubland- to bunchgrass-dominated grasslands to conifer-dominated woodlands. The area of the Blue Mountains ecoregion in the 1-mile-wide vegetation resources analysis corridor is a low, open complex of mountains substantially vegetated with coniferous forests. Snow accumulates to depths of 3 to 6 feet in the winter in this area due to its higher elevation.

The Northern Basin and Range ecoregion is located in southeastern Oregon and southwestern Idaho. Sagebrush dominates the landscape in this arid ecoregion, and its topography consists of flat basins, isolated mountain ranges, and basalt cliffs. The primary land use for this ecoregion is range and pastureland.

The Snake River Plain ecoregion extends across southern Idaho into eastern Oregon. Sagebrush steppe was historically the dominant vegetation type in this ecoregion; scattered barren lava fields and saltbush (*Atriplex canescens*)-greasewood (*Sarcobatus vermiculatus*) communities also are present. The availability of water for irrigation has resulted in the conversion of a large percentage of the alluvial valleys bordering the Snake River to agricultural use, while most of the surrounding plains and low hills are used for livestock grazing.

Vegetation Communities

There are 80 ecological systems identified by the NWGAP dataset that exist in the 1-mile-wide vegetation resources analysis corridor (USGS 2011). These ecological systems were reclassified into 17 vegetation community subtypes and 8 primary vegetation communities. Each primary vegetation

community, vegetation community subtype, and the associated ecological systems are described below. The vegetation community and ecological system descriptions are adapted from the ODFW Conservation Strategy habitat types and from NatureServe's Ecological System classification descriptions, respectively (NatureServe 2012; ODFW 2006). The classification of primary vegetation communities, subtypes, and ecological systems is summarized in Table D-2 in Appendix D. The distribution of the vegetation community subtypes across the B2H Project area is displayed on MV-7.

Agriculture

Agricultural areas within Oregon and Idaho vary annually in composition. Major crops produced in this area include wheat, barley, alfalfa, hay, potatoes, onions, sugar beets, carrots, and corn. Cultivated croplands and modified grasslands are plowed and harvested seasonally, while pastures are mowed, hayed, or grazed one or more times a year. The agricultural land cover within the B2H Project area includes irrigated agriculture, dryland farming, dairy operations, and grazing pastures on private lands.

The Agriculture community subtype is discussed and analyzed as a landcover type in this section of the EIS. A more detailed analysis of B2H Project impacts on agricultural land, activities, and production is contained in Section 3.2.7.

Bare Ground, Cliffs, and Talus

Bare Ground, Cliffs, and Talus vegetation communities are sparsely vegetated areas where the predominant habitat features are more related to geologic substrates than vegetation components. These areas, especially cliffs and Talus fields, are essential habitat features for many animal species that use them for nesting substrate or hiding cover. Cliffs provide rock crevices and ledges raised above the ground, away from predators and somewhat protected from the elements. Talus fields extend out from below cliff faces and steep slopes, providing hiding cover and microhabitat conditions. Many special status plant species present in the B2H Project area occur in these sparsely vegetated communities.

Developed/Disturbed

The Developed/Disturbed land cover typically results from the complete conversion of a site or an area from its natural condition. Developed areas typically contain non-native vegetation in the form of landscaping around buildings and homes, as well as weed lots with invasive plants that have become established in disturbed landscapes. Nevertheless, scattered and isolated blocks of native or non-native vegetation may remain in Developed/Disturbed areas, and wildlife species that are more tolerant of human activity may use these areas (e.g., greenbelts, parks, and backyards). Throughout the B2H Project area, Developed/Disturbed communities are primarily associated with rural residences and agricultural operations.

Forests/Woodlands

Forests/Woodland communities are found throughout the B2H Project area. Forests/Woodlands are the most dominant vegetation communities found in the Blue Mountains ecoregion, with Juniper and

Mahogany Woodlands occurring primarily in the Northern Basin and Range and the Snake River Plain ecoregions. The following Forests/Woodlands subtypes occur within the B2H Project vegetation resources analysis corridor:

Aspen

The Aspen subtype is found in montane and subalpine zones. This subtype is dominated by quaking Aspen and lacks a significant conifer component (CNHP 2005). This subtype provides an important wildlife habitat and occurs in portions of the B2H Project area in the Blue Mountains region.

Forest-Other

The Forest-Other community subtype includes Harvested Forest, Introduced Upland Vegetation–Treed, and Recently Burned Forest ecological systems. In general, this subtype represents other Forests/Woodlands vegetation communities that have been altered by fire or anthropogenic disturbance. The assemblage of species found in this subtype varies greatly depending on original vegetation community, extent of disturbance, and time since disturbance. In the vegetation resources study corridor, Forest-Other is a minor subtype occurring as small, discontiguous patches generally less than 20 acres in extent.

Juniper and Mahogany Woodland

The Juniper and Mahogany Woodland subtype includes western juniper and mountain mahogany woodland communities. Western juniper woodlands in the vegetation resources study corridor is composed of widely spaced western juniper trees, a discontinuous shrub layer, and an herbaceous layer dominated by grasses. These woodlands occur in a very dry zone located between the shrub-steppe and ponderosa pine forests. Western juniper is the dominant tree species and dominant shrubs may include big sagebrush, antelope bitterbrush, rubber rabbitbrush, and wax currant (*Ribes cereum*). The herbaceous layer is dominated by bluebunch wheatgrass and Idaho fescue (Franklin and Dyrness 1988). The mountain mahogany community is described by Franklin and Dyrness (1988) as a transition zone between the lower edge of ponderosa pine communities and the upper edge of the sagebrush-dominated shrub-steppe communities. This community is dominated by curl-leaf mountain mahogany with scattered ponderosa pine and western juniper as well. The understory is dominated by big sagebrush and yellow rabbitbrush.

Mixed Conifer Forest

The Mixed Conifer Forest subtype is very diverse, comprising several tree species in differing compositions, including, grand fir (*Abies grandis*), Douglas-fir (*Pseudotsuga menziesii*), western larch (*Larix occidentalis*), subalpine fir (*Abies lasiocarpa*), ponderosa pine (*Pinus ponderosa*), and lodgepole pine (*Pinus contorta*) (Franklin and Dyrness 1988).

Typical compositions include mixed grand fir/Douglas-fir (and mixed tamarack [*Larix spp.*]). Mixed grand fir/Douglas-fir communities occur in the Blue Mountains and are the most common forest composition found within the B2H Project area. Douglas-fir typically dominates at middle elevations but

is replaced by subalpine fir at higher elevations and ponderosa pine or big sagebrush at lower elevations (Franklin and Dyrness 1988). NatureServe (2013) describes this vegetation community subtype as a seral matrix of large patches dominated or codominated by one, or combinations, of the above species. Grand fir (a fire-sensitive, shade-tolerant species) has increased on many sites once dominated by Douglas-fir and ponderosa pine due to fire regime changes. Western larch can form homogenous stands consisting entirely of itself, especially after fires, but other tree species typically can be found co-occurring with western larch, including Douglas-fir, ponderosa pine, grand fir and lodgepole pine (Franklin and Dyrness 1988). At higher elevations, dominant tree species within the Mixed Conifer Forest subtype include subalpine fir, Engelmann's spruce (*Picea engelmannii*), mountain hemlock (*Tsuga mertensiana*) and lodgepole pine. However, these species typically dominate at elevations higher than those found in the B2H Project area.

Sites dominated by a single species include those composed of ponderosa pine and lodgepole pine. Sites dominated by ponderosa pine typically occur as open woodland and contain a variety of common tree species that vary based on elevation and moisture regime, including Douglas-fir, grand fir, lodgepole pine, western larch, western juniper, and quaking Aspen (*Populus tremuloides*) (Franklin and Dyrness 1988). These sites are common in much of the Blue Mountains.

Recently disturbed sites are often dominated by lodgepole pine, but lodgepole pine dominates at other sites, typically broad level pumice flats. Where conditions allow, lodgepole pine is the dominant tree species at these sites and occurs in pure or near pure stands, regardless of the seral stage. Lodgepole pine is capable of growing throughout a wide range of moisture regimes from the edge of the shrub-steppe zone to seasonally flooded wetlands; thus, understory vegetation widely varies with the corresponding moisture regime (Franklin and Dyrness 1988).

Riparian Woodlands

The Riparian Woodlands subtype includes vegetation communities dominated by trees and shrubs typical of riparian areas, but not contained in defined RCAs. These communities occur throughout the B2H Project area, usually as small patches at upper elevations. Riparian Woodlands in the B2H Project area are highly variable with varying cover amounts of tree, shrub and graminoid-dominated understories (NatureServe 2012). In addition to the varying amount of cover, Riparian Woodland species composition changes based on ecoregion and surrounding vegetation. Common tree species include cottonwoods (*Populus spp.*) and conifers like ponderosa pine or Douglas-fir. Commons shrub species include willow (Salix spp.), alder *(Alnus* spp) and red-osier dogwood (*Cornus sericea*). The understory is often dominated by several species of sedges, grasses or rushes (NatureServe 2012).

Riparian Woodlands is a very minor subtype occurring as small, discontiguous patches generally less than one acre in extent. Although the Riparian Woodlands community subtype does occur in the 1-mile study corridor for vegetation resources, no alternative routes considered for the B2H Project cross this subtype. As such, impacts on this vegetation community are not expected and the Riparian Woodlands vegetation community is not discussed further in Sections 3.2.3.4 and 3.2.3.6.

Grasslands

Grassland communities occur throughout the B2H Project area and typically are upland areas dominated by annual or perennial grasses with low shrub or tree cover. Dominant species depend on elevation, soil type, and ecoregion. Agricultural conversion and non-native species have degraded Native Grasslands throughout the region. Periodic fire, soil disturbance by rodent species, and wind all play important roles in maintaining Native Grasslands (ODFW 2006). The following Grassland community subtypes occur within the B2H Project 1-mile-wide vegetation resources analysis corridor:

Native Grasslands

The Native Grassland subtype is no longer common (except near timberline) in eastern Oregon or southwestern Idaho (ODFW 2006). Extensive agricultural conversion and invasion by annual grass species has replaced much of the Native Grassland subtype in the B2H Project area. Degraded soil conditions and short fire-return intervals may prevent Native Grasslands from transitioning into a shrub-dominated community, although they typically have some shrub component (Franklin and Dyrness 1988). Perennial bunchgrasses, such as Idaho fescue (*Festuca idahoensis*) and bluebunch wheatgrass (*Pseudoroegneria spicata*), usually dominate this subtype. The classification of Native Grasslands depends on composition of associated herbaceous species, making this a difficult community subtype to photo-interpret, classify, and map.

Non-Native Grasslands

The Non-native Grassland subtype usually is dominated by cheatgrass, an invasive annual. Other invasive grasses include the annuals medusahead and wire grass (*Ventenata dubia*) and the invasive perennials bulbous bluegrass (*Poa bulbosa*), Kentucky bluegrass (*Poa pratensis*), and intermediate wheatgrass (*Thinopyrum intermedium*) (Harrison et al. 1996; Miller et al. 2013). Non-native Grasslands have extensively replaced native plant communities throughout the region and the B2H Project area.

Open Water

The Open Water community subtype includes areas classified as an Open Water (fresh) ecological system that are not included in RCAs. In general, this community subtype is associated with Agriculture and Developed/Disturbed vegetation communities where irrigation and runoff result in temporary ponding. In the vegetation resources study corridor, Open Water is a minor subtype occurring adjacent to Agriculture or Developed/Disturbed vegetation communities.

Riparian Conservation Areas

RCAs represent the vegetation communities existing near, or within, aquatic ecosystems. The exact community and assemblage of species depend on the type of aquatic ecosystem. In the B2H Project area, RCAs are likely to include riparian corridors dominated by cottonwoods (*Populus* spp.) and willows (*Salix* spp.), wet meadows dominated by sedge (*Carex* spp.) and grasses, or waterbodies dominated by aquatic species in Open Water habitats with emergent vegetation like cattail (*Typha* spp.) or bulrush (*Schoenoplectus* and *Scirpus* spp.) occupying the margins, and other wetlands.

RCAs also include a significant component of upland vegetation, which varies depending on the buffer distance used to determine the RCA. The upland vegetation captured in an RCA influences the nearby aquatic ecosystem by regulating the delivery of coarse sediment, organic matter, and woody debris to streams; providing root strength for channel stability; shading streams; and protecting water quality. The upland vegetation community and assemblage of species depend on the adjacent vegetation communities.

RCAs approximate the areas of aquatic ecosystems, vegetation communities dependent on aquatic ecosystems, and upland vegetation influencing the aquatic ecosystems. They do not represent specific aquatic resources (e.g., jurisdictional wetlands). Specific aquatic features, including wetlands, present in the B2H Project area and potential impacts on these features resulting from B2H Project activities are discussed in the Section 3.2.2.

Shrublands

Shrubland communities dominate much of the landscape in the vegetation resources study corridor. These communities differ in structure and species composition depending on the ecoregion, elevation, soil conditions, moisture regimes, and fire history of the area. However, they typically occur on dry flats and plains, rolling hills, saddles, and ridges where precipitation is low. They are dominated by shrub species with components of forbs and grasses. Historically, fire has played an important role in maintaining these communities and has served as a cyclical disturbance regime (ODFW 2006). The following Shrubland community subtypes occur within the B2H Project vegetation resources study corridor:

Desert Shrub

Desert Shrub communities in the B2H Project area are characterized by saline soils that support desert shrubs, including shadscale (*Atriplex confertifolia*), greasewood (*Sarcobatus vermiculatus*), bud sage (*Picrothamnus desertorum*), winterfat (*Krascheninnikovia lanata*), and hop sage (*Grayia spinosa*), as well as grasses, such as inland salt grass (*Distichlis spicata*) and basin wildrye (*Leymus cinereus*) (Franklin and Dyrness 1988). The Desert Shrub subtype typically occurs at relatively low elevations with limited precipitation.

Dwarf Sagebrush Steppe

Dwarf sagebrush steppe communities occur on a variety of shallow-soil habitats and typically constitute one of the major matrix vegetation community subtypes throughout eastern Oregon and southern Idaho. Dwarf or low sagebrush species, including low sagebrush (*Artemisia arbuscula*) and close relatives, typically occur on mountain ridges, flanks, and broad terraces. Soils are characteristically very stony and derived from volcanic parent material. The herbaceous component found in this subtype normally includes various species of bunchgrasses and can be dominated by low-statured or mat-forming forbs.

Shrubland – Other

This shrub community occurs throughout the B2H Project area and includes shrub communities undergoing invasion from non-native shrub species like Scotch broom (*Cytisus scoparius*)or shrub communities recovering from fire disturbance. The composition of post-fire successional shrub communities depends on several factors: existing state prior to disturbance, time elapsed since disturbance, and various abiotic conditions, including rainfall, post-fire management, and fire severity and return interval (Miller et al. 2013). The typical successional pattern shows an initial dominance by grass and forb species followed by a resurgence of resprouting shrub species like Douglas rabbitbrush and horsebrush (*Tetradymia* spp.) (Miller et al. 2013). Non-sprouting shrub species like big sagebrush or bitterbrush re-establish via seed and may take decades to fully mature (Miller et al. 2013). Recently burned Shrublands have a strong possibility of conversion to Non-native Grasslands dominated by cheatgrass, especially if pre-existing condition at the site was poor.

Shrubland-Other is a very minor subtype in the B2H Project area, occurring as small, discontiguous patches generally less than one acre in extent. Although the Shrubland community subtype does occur in the 1-mile study corridor for vegetation resources, no alternative routes considered for the B2H Project cross this subtype. As such, impacts on this vegetation community are not expected and the Shrubland-other vegetation community is not discussed further in Sections 3.2.3.4 and 3.2.3.6.

Tall Sagebrush Steppe

Tall sagebrush steppe communities are widespread and dominant in eastern Oregon and southwestern Idaho, with the dominant shrub species comprising various subspecies of big sagebrush. This Shrubland community subtype is codominated by bunchgrasses, such as bluebunch wheatgrass, Idaho fescue, and Sandberg bluegrass, as well as other primary shrub species (Franklin and Dyrness 1988). While the commonly occurring Intermountain Basins Semi-Desert Shrub-Steppe ecological system also is included here, Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis*) is characteristically replaced in this ecological system by Greene's rabbitbrush (*Chrysothamnus greenei*), Douglas rabbitbrush (*C. viscidiflorus*), ephedra (*Ephedra viridis*), rubber rabbitbrush (*Ericameria nauseosa*), broom snakeweed (*Gutierrezia sarothrae*), and winterfat.

Mountain Shrub

This shrub community subtype occurs at higher elevations and differs from other Sagebrush Steppe subtypes by being typically dominated by other shrub species, due primarily to elevation and precipitation, such as antelope bitterbrush, chokecherry (*Prunus* spp.), snowberry, serviceberry *(Amelanchier alnifolia*), and soapberry (*Ceanothus* spp.*)*. Due to the higher moisture availability at sites where these communities occur, the herbaceous understory is typically robust with a variety of bunchgrasses and forbs.

FEDERALLY LISTED SPECIES

The only federally listed plant species known to occur in the B2H Project area is Howell's spectacular thelypody, specifically in Segments 2 and 3 in the Baker–Powder River Valley. A detailed description of the life and regulatory history of this species is included in Appendix D. If over the life of the project new

species are federally listed and occur within the project area they will receive the same protections as Howell's spectacular thelypody.

Sensitive Plant Species

The sensitive plant species known to occur in the B2H Project area are identified in Table 3-97 along with their listing status. This list may change through the life of the project. New species added to the agency lists would receive the same protections as the species currently on the list. Species accounts, including habitat requirements, known distribution, and recent and historical observations are presented in Appendix D.

Table 3-97. Sensitive Plant Species Occurring in the B2H Project Area

Common Name[1]	Scientific Name[1]	Agency Listing Status
Aloina Moss	*Aloina bifrons*	Oregon BLM
Bank Monkeyflower	*Mimulus clivicola*	Idaho BLM
Barren Milkvetch	*Astragalus cusickii var. sterilis*	Oregon BLM, Idaho BLM, Oregon State Threatened
Carveseed	*Glyptopleura marginata*	Idaho BLM
Columbian Carpet Moss	*Bryoerythrophyllum columbianum*	Oregon BLM
Cordilleran Sedge	*Carex cordillerana*	Oregon BLM, USFS
Cronquist's Stickseed	*Hackelia cronquistii*	Oregon BLM, Idaho BLM, Oregon State Threatened
Cusick's Pincushion	*Chaenactis cusickii*	Idaho BLM
Doublet	*Dimeresia howellii*	Idaho BLM
Douglas' Clover	*Trifolium douglasii*	Oregon BLM, Idaho BLM, USFS
Esteve's Pincushion	*Chaenactis stevioides*	Idaho BLM
False Naked Buckwheat	*Eriogonum novonudum*	Idaho BLM
Flowery Phlox	*Phlox multiflora*	Oregon BLM, USFS
Greeley's Springparsely	*Cymopterus acaulis var. greeleyorum*	Oregon BLM, Idaho BLM
Hairy Wild Cabbage	*Caulanthus pilosus*	Oregon BLM
Idaho Milkvetch	*Astragalus conjunctus*	Idaho BLM
Janish's Penstemon	*Penstemon janishiae*	Idaho BLM
King's Snapdragon	*Sairocarpus kingii*	Idaho BLM
Laurent's Milkvetch	*Astragalus collinus var. laurentii*	Oregon BLM, Oregon State Threatened
Malheur Cryptantha	*Cryptantha propria*	Idaho BLM
Mingan Moonwort	*Botrychium minganense*	Oregon BLM
Mountain Moonwort	*Botrychium montanum*	Oregon BLM, USFS
Mulford's Milkvetch	*Astragalus mulfordiae*	Oregon BLM, Idaho BLM, Oregon State Endangered
Oregon Princesplume	*Stanleya confertiflora*	Oregon BLM, Idaho BLM
Oregon Semaphore Grass	*Pleuropogon oregonus*	Oregon BLM, USFS, Oregon State Threatened
Owyhee Yellow Phacelia	*Phacelia lutea var. calva*	Idaho BLM
Retrorse Sedge	*Carex retrorsa*	Oregon BLM, USFS
Rigid Threadplant	*Nemacladus rigidus*	Idaho BLM
Salt Heliotrope	*Heliotropium curassavicum*	Oregon BLM, USFS
Saltwort Buckwheat	*Eriogonum salicornioides*	Oregon BLM

Table 3-97. Sensitive Plant Species Occurring in the B2H Project Area		
Common Name[1]	**Scientific Name[1]**	**Agency Listing Status**
Scabland Penstemon	*Penstemon deustus var. variabilis*	Oregon BLM, USFS
Seaside Heliotrope	*Heliotropium curassavicum var. obovatum*	Oregon BLM, USFS
Shining Flatsedge	*Cyperus bipartitus*	Idaho BLM
Simpson Hedgehog Cactus	*Pediocactus simpsonii*	Idaho BLM
Small Phacelia	*Phacelia minutissima*	Oregon BLM, Idaho BLM, USFS
Smooth Stickleaf	*Mentzelia mollis*	Oregon BLM, Idaho BLM, Oregon State Endangered
Snake River Goldenweed	*Pyrrocoma radiata*	Oregon BLM, Idaho BLM, Oregon State Endangered
Tolmie's Onion	*Allium tolmiei var. persimile*	Idaho BLM
Water-Thread Pondweed	*Potamogeton diversifolius*	Oregon BLM, Idaho BLM, USFS
White Wooly Buckwheat	*Eriogonum ochrocephalum var. calcareum*	Idaho BLM
Wishbone Bush	*Mirabilis laevis var. retrorsa*	None
Woolyfruit Sedge	*Carex lasiocarpa var. americana*	Oregon BLM, USFS
Table Note: [1]Nomenclature follows Integrated Taxonomic Information Systems		

Sensitive plant species presence, the number of known occurrences in the 10-mile-wide special status plant species analysis corridor and the 1-mile-wide vegetation resources analysis corridor, and the number of known occurrences on federal or state and private lands are discussed by segment.

Noxious Weeds

Noxious weeds include all species listed on state and county noxious weed lists. Table D-1 in Appendix D identifies the noxious weeds potentially occurring in the vegetation resources analysis corridor.

Some noxious weed species have significant factors that affect their spread and control throughout the B2H Project area. Factors that affect the ability of some noxious weed species to spread or be controlled in the B2H Project area include local density or abundance, statutes dictating mandatory controls, or limits on methods of control (especially herbicides). Other factors, including toxicity to livestock, detrimental effects on the biodiversity of natural communities, or increased production of fuel loads for wildfires, may influence public will to prevent or reduce infestations. Management techniques for noxious weeds are described in the Noxious Weed Management Plan, and Reclamation, Revegetation, and Monitoring Plan Framework (Appendix B and Appendix C of the POD).

Traditional Foods and Ethnobotanical Resources

Traditional foods and ethnobotanical resources include plants important to tribal groups for subsistence and economic, medical, and ceremonial purposes. Ethnohabitats are microhabitats defined by tribal members as having particular importance. A sample of plant species that may have cultural value to tribes and the species' associated primary vegetation community and sites in which they commonly occur is presented in Table 3-98.

Table 3-98. Potential Ethnobotanical Resources		
Primary Vegetation Community	**Specific Habitat/Feature**	**Associated Plants of Cultural Value**
Shrublands	Lithic soils	Sagebrush; roots, including biscuit root (*Lomatium* spp.), bitterroot (*Lewisia* spp.), yampa (*Perieridia* spp.)
Riparian Conservation Areas	Wet/moist meadow	Camas (*Camassia* spp.); bistort (*Polygonum* spp.); sedge; tobacco root (*Valeriana* spp.); cow parsnip (*Heraculum* spp.)
Riparian Conservation Areas	Riparian areas	Chokecherry; currant (*Ribes* spp.); serviceberry; willow; red-osier dogwood (*Cornus sercia*); elderberry (*Sambucus*); hawthorn (*Cretaegus* spp.); rose (*Rosa*); Indian hemp (*Apocynum* spp.)
Riparian Conservation Areas	Wet woodland	Western spring beauty (*Claytonia* spp.); yellow bell (*Fritillaria* spp.)
Grasslands	Dry slope and grassland	Wild onion (*Allium* spp.); sego or mariposa lily (*Calochortus* spp.); balsamroot (*Balsamorhiza* spp.); Hyacinth (*Camassia* spp.)
Forests/Woodlands	Forest	Huckleberry (*Vaccinium* spp.); black tree lichen; mushroom varieties; pine species
Table Source: Baker Resource Management Plan (BLM 1989)		

The BLM has commissioned ethnographic studies among the Shoshone Paiute Tribes of the Duck Valley Indian Reservation, the Burns Paiute Tribe, and the CTUIR to identify botanical resources that may possess important spiritual, cultural, and/or economic values. In 2013, the CTUIR conducted an ethnobotanical survey of the NWSTF Boardman which identified areas of traditional foods and traditional foods less common elsewhere in the region.

The vegetation communities identified in the vegetation resources analysis corridor provide habitat for vegetation that is culturally significant to tribes. Ethnographic studies may reveal more precise information on location, distribution, and condition of plant communities. Exercise of treaty rights could include collection of plants for economic, religious, and cultural use. Treaty rights, and potential impacts on the exercise of treaty rights are discussed in greater detail in the Section 3.2.13. Various historical factors arising from European contact and development within the vegetation resources study corridor have adversely affected the availability of these plants for tribal use. The invasion of invasive plants, road building, fire, and agricultural developments are among the sources of disruption. The affected environment of traditional foods and ethnobotanical resources is discussed in the context of their source vegetation communities, and specific locations of particular ethnobotanical resources will not be evaluated in the segment analyses.

SEGMENT 1—MORROW-UMATILLA

Vegetation Communities

Table 3-99 presents the resource inventory for all alternative routes and route variations in Segment 1. The distribution of these vegetation communities in Segment 1 is displayed on MV-7.

Applicant's Proposed Action Alternative

Vegetation communities crossed by the Applicant's Proposed Action Alternative are summarized in Table 3-99. In the western portion of Segment 1 from the Boardman substation to Pilot Rock, the Applicant's Proposed Action Alternative predominantly crosses Agriculture and Tall Sagebrush Steppe vegetation communities. Where the Applicant's Proposed Action Alternative travels east of Pilot Rock into the foothills of the Blue Mountains (Links 1-63, 1-65, 1-71, 1-77), it crosses Mixed Conifer Forest and Aspen vegetation communities. The Applicant's Proposed Action Alternative crosses both Native and Non-native Grasslands and RCAs across the entire alternative route.

The Applicant's Proposed Action Alternative crosses areas burned during the 2015 Boardman fire (Link 1-27). The vegetation communities affected by this wildfire may no longer reflect the vegetation community description identified from the NWGAP dataset, particularly areas of Tall Sagebrush Steppe. Tall Sagebrush Steppe vegetation communities can take decades to recover from fire disturbance and may be in an early seral stage dominated by perennial bunchgrasses or shrubs other than big sagebrush, or have transitioned into a community more typical of a Non-native Grassland if invasion by annual grasses and long-term alterations to the fire regime occur (Miller et al. 2013). In the western portion of Segment 1 (Link 1-27), the Applicant's Proposed Action Alternative crosses a Research Natural Area (RNA; RNA-B) along the eastern boundary of NWSTF Boardman established to preserve remnant high-quality sagebrush vegetation communities in a region largely disturbed by agriculture and historic grazing.

Variation S1-B1

Variation S1-B1 follows the same alignment as the Applicant's Proposed Action Alternative at the eastern end of the segment and predominantly crosses Mixed Conifer Forest and RCA vegetation communities.

Variation S1-B2

Variation S1-B2 follows a more northerly alignment than the Variation S1-B1 but crosses similar types of vegetation communities and similar extents (Table 3-99).

Additional Action – 69-Kilovolt Line Replacement

As part of the Applicant's Proposed Action Alternative, an existing 69-kV transmission line on the NWSTF Boardman would be decommissioned and rebuilt east of the Bombing Range Road with an existing 115-kV transmission line as a 230-kV transmission line. The decommissioning and replacement of the 69-kV transmission line would follow one of three design options. Under any of the design options considered, the rebuilt 230-kV transmission line would not be located on the NWSTF Boardman and would not cross any RNAs on the NWSTF Boardman.

Table 3-99. Vegetation Resources Inventory Data for Segment 1—Morrow-Umatilla (miles crossed)

Alternative Route	Total Length (miles)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Applicant's Proposed Action	91.9	31.5	0.3	0.0	0.4	1.9	0.1	0.1	0.0	13.6	0.2	7.5	4.4	0.0	5.3	26.6
Variation S1-B1	*6.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*5.7*	*0.0*	*0.1*	*0.0*	*0.0*	*0.5*	*0.1*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.0*	*5.1*	*0.0*	*0.0*	*0.0*	*0.0*	*1.0*	*0.2*
East of Bombing Range Road	92.3	37.7	0.3	0.0	0.6	0.5	0.1	0.1	0.0	13.6	0.2	7.4	4.7	0.1	5.3	21.7
Applicant's Proposed Action – Southern Route	99.1	27.6	0.3	0.0	0.4	1.9	0.4	0.1	0.2	14.7	0.3	11.1	4.9	0.0	6.8	30.4
West of Bombing Range Road – Southern Route	95.6	18.9	0.3	0.0	0.3	1.8	0.5	0.1	0.2	14.7	0.3	14.2	5.8	0.0	7.4	31.1
Longhorn	88.2	33.4	0.3	0.0	0.2	0.9	0.1	0.1	0.0	13.6	0.2	7.6	5.4	0.2	5.4	20.8
Interstate 84	84.7	22.0	0.3	0.0	0.0	12.4	0.1	0.1	0.0	13.6	0.2	6.8	3.9	1.8	10.0	13.5
Variation S1-A1	*18.5*	*5.2*	*0.0*	*0.0*	*0.0*	*8.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.2*	*1.7*	*0.0*	*1.1*	*1.9*
Variation S1-A2	*18.5*	*5.5*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.8*	*0.0*	*0.9*	*10.3*
Interstate 84 – Southern Route	93.4	19.5	0.3	0.0	0.0	12.4	0.4	0.1	0.2	14.7	0.3	10.5	4.5	1.8	11.5	17.2

Design Option 1

The first design option requires decommissioning approximately 12 miles of the existing 69-kV transmission line on the NWSTF Boardman, which would be rebuilt east of Bombing Range Road with the existing 115-kV transmission line for approximately 3.5 miles north of Homestead Lane and as a new double circuit 230-kV transmission line for approximately 8.5 miles south of Homestead Lane. The new 230-kV transmission line would rejoin the existing 69-kV transmission line just south of where the proposed B2H 500-kV transmission line turns east off the NWSTF Boardman (Links 1-33 and 1-35). The portion of the existing 69-kV transmission line to be decommissioned crosses Tall Sagebrush Steppe, while the new 230-kV transmission line would primarily cross Agriculture vegetation communities.

Design Option 2

The second design option requires decommissioning approximately 15.6 miles of the existing 69-kV transmission line on the NWSTF Boardman, which would be rebuilt east of Bombing Range Road with an existing 115-kV transmission line as a double circuit 230-kV transmission line for approximately 17.7 miles traveling south of the NWSTF Boardman before rejoining the existing 69-kV transmission line. The portion of the new 230-kV transmission line south of Homestead Lane would initially be energized at 69-kV and would not require the construction of a step-down station where it rejoins the existing 69-kV transmission line south of the NWSTF Boardman. The portion of the existing 69-kV transmission line to be decommissioned crosses Tall Sagebrush Steppe, while the new 230-kV transmission line would primarily cross Agriculture vegetation communities east of Bombing Range Road and Tall Sagebrush Steppe vegetation communities south of the NWSTF Boardman.

Design Option 3

The third design option requires decommissioning approximately 15.6 miles of the existing 69-kV transmission line on the NWSTF Boardman and assumes a new 230-kV transmission line has been built east of Bombing Range Road to support wind energy development in the region. South of the NWSTF Boardman, the existing 69-kV transmission line would connect to the built 230-kV transmission line and would require the construction of a new step-down station at this location. The portion of the existing 69-kV transmission line to be decommissioned crosses Tall Sagebrush Steppe, while the new 230-kV transmission line would primarily cross Agriculture vegetation communities east of Bombing Range Road and Tall Sagebrush Steppe vegetation communities south of the NWSTF Boardman. The new step-down station would be built in Tall Sagebrush Steppe vegetation communities.

East of Bombing Range Road Alternative

Vegetation communities crossed by the East of Bombing Range Road Alternative are summarized in Table 3-99. The types and extents of vegetation communities crossed are similar to the Applicant's Proposed Action Alternative, but the East of Bombing Range Road Alternative crosses greater amounts of Agriculture vegetation communities where the alternative route would be sited east of Bombing Range Road (Links 1-25 and 1-33). The East of Bombing Range Road Alternative does not cross any areas burned by wildfires in the 2015 fire season, or the NWSTF Boardman.

Applicant's Proposed Action – Southern Route Alternative

Vegetation communities crossed by the Applicant's Proposed Action-Southern Route Alternative are summarized in Table 3-99. The types and extents of vegetation communities crossed are similar to the Applicant's Proposed Action Alternative, although the Applicant's Proposed Action-Southern Route Alternative crosses greater amounts of Mixed Conifer Forest, Native Grasslands, RCAs, and Tall Sagebrush Steppe than the Applicant's Proposed Action Alternative where the Applicant's Proposed Action – Southern Route Alternative diverges south across Butter Creek into the less developed landscape south of Pilot Rock (Links 1-36, 1-38, 1-62, 1-64, and 1-66). The Applicant's Proposed Action-Southern Route Alternative also crosses Juniper and Mahogany vegetation communities.

The Applicant's Proposed Action-Southern Route Alternative does cross areas burned in the 2015 Boardman fire. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by these wildfires and crossed by the Applicant's Proposed Action – Southern Route Alternative may no longer reflect the vegetation communities identified in the NWGAP dataset. In the northern portion of Segment 1 (Link 1-27), the Applicant's Proposed Action-Southern Route Alternative crosses the NWSTF Boardman and an RNA (RNA-B) established to preserve remnant high-quality sagebrush vegetation communities in a region largely disturbed by agriculture and historic grazing.

Additional Action – 69-Kilovolt Line Replacement

The Applicant's Proposed Action – Southern Route Alternative also would require the additional action of decommissioning and replacing the existing 69-kV transmission on the NWSTF Boardman. The types of vegetation communities crossed, as well as the design options of the additional action, would be the same as the Applicant's Proposed Action Alternative.

West of Bombing Range Road – Southern Route Alternative

Vegetation communities crossed by the West of Bombing Range Road-Southern Route Alternative are summarized in Table 3-99. The types of vegetation communities crossed are similar to the Applicant's Proposed Action Alternative, although the West of Bombing Range Road-Southern Alternative also crosses Juniper and Mahogany vegetation communities. The West of Bombing Range Road-Southern Route crosses less Agriculture vegetation communities than the Applicant's Proposed Action Alternative, but does cross greater amounts of Mixed Conifer Forest, Native Grasslands, RCAs, and Tall Sagebrush Steppe vegetation communities where the alternative route diverges south across Butter Creek into the less developed landscape south of Pilot Rock (Links 1-36, 1-38, 1-62, 1-64, and 1-66). The West of Bombing Range Road-Southern Route Alternative does cross areas burned by the 2015 Boardman fire (Link 1-27). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by these wildfires and crossed by the West of Bombing Range Road – Southern Route Alternative may no longer reflect the vegetation communities identified in the NWGAP dataset. In the northern portion of Segment 1 (Link 1-27), the West of Bombing Range Road-Southern Route Alternative crosses the NWSTF Boardman and a RNA (RNA-B) established to preserve remnant high-quality sagebrush vegetation communities in a region largely disturbed by agriculture and historic grazing.

Additional Action – 69-Kilovolt Line Replacement

The West of Bombing Range Road – Southern Route Alternative also would require the additional action of decommissioning and replacing the existing 69-kV transmission on the NWSTF Boardman. The types of vegetation communities crossed, as well as the design options of the additional action, would be the same as the Applicant's Proposed Action Alternative.

Longhorn Alternative

Vegetation communities crossed by the Longhorn Alternative are summarized in Table 3-99. The types and extents of vegetation communities crossed are similar to the Applicant's Proposed Action Alternative. The Longhorn Alternative does not cross any areas burned by wildfires during the 2015 fire season, or the NWSTF Boardman.

Interstate 84 Alternative

Vegetation communities crossed by the Interstate 84 Alternative are summarized in Table 3-99. West of Pendleton, the Interstate 84 Alternative predominantly crosses Agriculture, Developed/Disturbed, and Tall Sagebrush Steppe vegetation communities. In the eastern portion of Segment 1 where the alternative route crosses the Blue Mountain foothills, the Interstate 84 Alternative also crosses Mixed Conifer Forests and Aspen vegetation communities. The Interstate 84 Alternative crosses the greatest amount of Developed/Disturbed vegetation communities. The Interstate 84 Alternative does not cross any areas burned by wildfires during the 2015 fire season, or the NWSTF Boardman.

Variation S1-A1

Variation S1-A1 follows the same alignment as the Interstate 84 Alternative in the area where the alternative route crosses the Umatilla River and crosses the same vegetation communities.

Variation S1-A2

Variation S1-A2 follows a more southerly alignment than Variation S1-A1 to allow colocation with an existing transmission line and crosses predominantly Tall Sagebrush Steppe where Variation S1-A1 crosses Developed/Disturbed vegetation communities.

Interstate 84 – Southern Route Alternative

Vegetation communities crossed by the Interstate 84 – Southern Route Alternative are summarized in Table 3-99. Vegetation communities crossed by the alternative route are similar to the Interstate 84 Alternative. The Interstate 84 – Southern Route Alternative does not cross any areas burned by wildfires during the 2015 fire season, or the NWSTF Boardman.

Federally Listed and Candidate Plant Species

Applicant's Proposed Action Alternative and All Other Alternatives

Federally listed and candidate plant species are not known to occur in the special status plant species study corridor of any alternative route in Segment 1.

Other Sensitive Plant Species

Tables 3-100 and 3-101 summarize the extent and distribution of sensitive plant species occurrences in the 1-mile and 10-mile analysis corridors.

Table 3-100. Number of Sensitive Plant Species Occurrences in the 1-mile Corridor for Segment 1—Morrow-Umatilla

Alternative Route	Laurent's Milkvetch	Retrorse Sedge
Applicant's Proposed Action	10	0
Variation S1-B1	*0*	*0*
Variation S1-B2	*0*	*0*
East of Bombing Range Road	10	0
Applicant's Proposed Action – Southern Route	10	0
West of Bombing Range Road – Southern Route	1	0
Longhorn	9	0
Interstate 84	2	0
Variation S1-A1	*2*	*0*
Variation S1-A2	*1*	*1*
Interstate 84 – Southern Route	2	0

Table 3-101. Number of Sensitive Plant Species Occurrences in the 10-mile Analysis Corridor for Segment 1—Morrow-Umatilla

Alternative Route	Aloina Moss	Laurent's Milkvetch	Mingan Moonwort	Columbian Carpet Moss	Retrorse Sedge	Shining Flatsedge	Salt Heliotrope	Scabland Penstemon	Flowery Phlox
Applicant's Proposed Action	1	16	2	1	0	0	0	1	1
Variation S1-B1	*0*	*0*	*2*	*0*	*0*	*0*	*0*	*1*	*1*
Variation S1-B2	*0*	*0*	*2*	*0*	*0*	*0*	*0*	*1*	*1*
East of Bombing Range Road	1	16	2	1	0	0	0	1	1
Applicant's Proposed Action – Southern Route	1	16	2	1	0	0	0	1	1
West of Bombing Range Road – Southern Route	1	9	2	1	0	0	0	1	1
Longhorn	0	16	2	0	0	0	0	1	1
Interstate 84	4	6	2	1	1	1	2	1	1
Variation S1-A1	*0*	*2*	*0*	*0*	*1*	*0*	*1*	*0*	*0*
Variation S1-A2	*0*	*3*	*0*	*0*	*1*	*0*	*1*	*0*	*0*
Interstate 84 – Southern Route	4	6	2	1	1	1	2	1	1

Applicant's Proposed Action Alternative and All Other Alternatives

Several sensitive plant species are known to occur in the 1-mile and 10-mile analysis corridors of the Applicant's Proposed Action Alternative and all other alternative routes (Tables 3-100 and 3-101). The Interstate 84 Alternative and the Interstate 84 - Southern Route Alternative contain the greatest number of species in their respective 10-mile analysis corridors, with Variation S1-A2 to the Interstate 84

Alternative being the only route or variation to contain retrorse sedge in the 1-mile corridor. Only Laurent's milkvetch occurs in the 1-mile corridor for all other alternative routes, but is not known to exist in the 1-mile corridor of either variation to the Applicant's Proposed Action Alternative.

USFS Sensitive Plant Species

The Applicant's Proposed Action Alternative and all other alternative routes cross USFS-administered lands at the eastern portion of Segment 1 along the same alignment (Link 1-77). Additionally, Variation S1-B1 and Variation S1-B2 cross USFS-administered lands at the similar locations, with Variation S1-B2 following a more northerly alignment than Variation S1-B1, which follows the same alignment as the Applicant's Proposed Action and all other alternative routes. Several USFS sensitive plant species occurrences are contained in the 10-mile analysis corridor of the alternatives and variations, including salt heliotrope, scabland penstemon, retrorse sedge, and flowery phlox. However, no known occurrences of USFS sensitive plant species exist in the 1-mile analysis corridor of any alternative route or variation crossing USFS-administered land in Segment 1. Retrorse sedge is known to occur in the 1-mile analysis corridor of Variation S1-A2, but the occurrence is west of Pendleton and not located near USFS-administered land.

Noxious Weeds

Applicant's Proposed Action Alternative and All Other Alternatives

Twenty species of noxious, state, or county listed weeds are known to occur in the vegetation resources analysis corridor of Segment 1. Most mapped weed occurrences are located in the Agriculture vegetation communities along Interstate 84 and near Pendleton. Tall Sagebrush Steppe and Grassland vegetation communities, both native and non-native, along the Applicant's Proposed Alternative have relatively few known mapped weed occurrences. Large infestations of both yellow star-thistle and diffuse knapweed occur along the Interstate 84 Alternative and Interstate 84 – Southern Route Alternative routes. Both species are aggressive invaders of arid landscapes and can cause significant economic impacts on range and agricultural lands as well as displace native vegetation (ODA 2015). Other common noxious weeds, rush skeleton weed (*Chondrilla juncea*), St. John's wort (*Hypericum perforatum*), and whitetop (*Cardaria draba*) also are present in the vegetation resources study corridor in Segment 1.

The identified weeds with mapped occurrences include those listed on state and country noxious weed lists. They do not represent a comprehensive list of all invasive plant species or noxious weeds that could potentially occur in Segment 1. A list compiled from state and county noxious weed lists of weeds potentially occurring in the B2H Project area is available in Table D-1 in Appendix D.

Traditional Foods and Ethnobotanical Resources

Applicant's Proposed Action Alternative and All Other Alternatives

Traditional foods and ethnobotanical resources have the potential to occur along all alternative routes and variations where appropriate vegetation communities exist. Ethnobotanical surveys conducted by the CTUIR in 2013 on the NWSTF Boardman identified areas of abundant traditional foods and other ethnobotanical resources, as well as remnant populations of ethnobotanical resources, which have

become less common in the region as a result of ongoing agricultural and urban development. Much of the vegetation in Segment 1, especially the portion west of Pendleton, is dominated by Agriculture and Developed/Disturbed vegetation communities which are unlikely to support these resources. However, all alternative routes and variations do cross several native vegetation communities in the Pilot Rock region and east. These vegetation communities are predominantly Tall Sagebrush Steppe, Native Grasslands, or Mixed Conifer Forest vegetation communities likely to support various traditional foods like cous, berries, and various mosses and fungi. In addition, RCA vegetation communities crossed by the B2H Project also are likely to provide several traditional foods and ethnobotanical resources.

SEGMENT 2—BLUE MOUNTAINS

Vegetation Communities

Table 3-102 presents the resource inventory for all alternative routes and route variations in Segment 2. The distribution of these vegetation communities in Segment 2 is displayed on MV-7.

Applicant's Proposed Action Alternative

Vegetation communities crossed by the Applicant's Proposed Action Alternative are summarized in Table 3-102. In the northern portion of Segment 2 from Hilgard to south of Ladd Marsh (Links 2-1, 2-5, 2-30, 2-35, 2-45, and 2-47), the Applicant's Proposed Action Alternative predominantly crosses Mixed Conifer Forest and Mountain Shrub vegetation communities. Where the Applicant's Proposed Action Alternative travels north of Clover Creek Valley in Segment 2 (Links 2-75, 2-85, and 2-95), it predominantly crosses Tall Sagebrush Steppe vegetation communities. The Applicant's Proposed Action Alternative also crosses Native Grassland and RCA vegetation communities throughout the alternative route. The Applicant's Proposed Action Alternative does not cross any areas burned by wildfires in the 2015 fire season.

Variation S2-A1

Variation S2-A1 follows the same alignment as the Applicant's Proposed Action Alternative at the northern end of Segment 2 and predominantly crosses Mixed Conifer Forest and Native Grassland vegetation communities.

Variation S2-A2

Variation S2-A2 follows a more southerly alignment than Variation S2-A1 and predominantly crosses Mixed Conifer Forest and RCA vegetation communities.

Variation S2-B1

Variation S2-B1 follows the same alignment as the Applicant's Proposed Action Alternative at the northern end of Segment 2 and predominantly crosses Mixed Conifer Forest, Mountain Shrub and RCA vegetation communities.

Table 3-102. Vegetation Resources Inventory Data for Segment 2—Blue Mountains (miles crossed)

Alternative Route	Total Length (miles)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Applicant's Proposed Action	33.8	0.3	0.2	0.0	0.0	0.0	0.1	0.0	1.1	10.1	7.1	1.7	0.1	0.0	5.0	8.1
Variation S2-A1	*2.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.4*	*0.2*	*0.9*	*0.0*	*0.0*	*0.1*	*0.2*
Variation S2-A2	*2.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.5*	*0.2*	*0.6*	*0.0*	*0.0*	*0.6*	*0.0*
Variation S2-B1	*3.7*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*1.2*	*1.4*	*0.0*	*0.0*	*0.0*	*1.0*	*0.0*
Variation S2-B2	*3.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.4*	*0.7*	*0.0*	*0.0*	*0.0*	*1.0*	*0.7*
Variation S2-C1	*9.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.9*	*5.0*	*0.1*	*0.0*	*0.0*	*0.0*	*0.5*	*2.8*
Variation S2-C2	*8.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.7*	*4.7*	*0.1*	*0.0*	*0.0*	*0.0*	*0.8*	*2.4*
Variation S2-E1	*2.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.2*	*0.5*	*0.0*	*0.0*	*0.0*	*0.3*	*0.3*
Variation S2-E2	*2.6*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.4*	*0.8*	*0.3*	*0.0*	*0.0*	*0.0*	*0.2*	*0.9*
Variation S2-F1	*12.1*	*0.3*	*0.2*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.1*	*3.8*	*0.8*	*0.1*	*0.0*	*2.3*	*4.4*
Variation S2-F2	*12.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.2*	*0.0*	*0.2*	*0.0*	*2.7*	*0.6*	*0.1*	*0.0*	*1.6*	*6.7*
Glass Hill	33.7	0.3	0.2	0.2	0.0	0.0	0.1	0.0	1.3	8.9	7.9	1.7	0.1	0.0	5.4	7.6
Variation S2-D1	*4.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.0*	*2.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.7*	*0.4*
Variation S2-D2	*4.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*2.4*	*0.0*	*0.6*	*0.1*	*0.0*	*0.8*	*0.2*
Mill Creek	34.0	0.2	0.0	0.0	0.0	0.1	0.2	0.0	1.3	7.3	6.9	1.8	0.3	0.0	4.6	11.3

Variation S2-B2

Variation S2-B2 follows a more northerly alignment than Variation S2-B1 and crosses Tall Sagebrush Steppe vegetation communities in addition to those crossed by Variation S1-B1. Variation S2-B2 crosses similar extents of Mixed Conifer Forest and RCA vegetation communities but lesser amounts of Mountain Shrub.

Variation S2-C1

Variation S2-C1 follows the same alignment as the Applicant's Proposed Action Alternative in the central portion of Segment 2 near Morgan Lake (Links 2-45, 2-47 and 2-50) and predominantly crosses Mixed Conifer Forest and Tall Sagebrush Steppe vegetation communities.

Variation S2-C2

Variation S2-C2 follows a more easterly alignment than Variation S2-C1 to pass closer to Morgan Lake (Link 2-48), and crosses the Dwarf Sagebrush Steppe in addition to the vegetation communities crossed by Variation S2-C1. The extent of vegetation communities crossed by Variation S2-C2 is similar to Variation S2-C1.

Variation S2-E1

Variation S2-E1 follows the same alignment as the Applicant's Proposed Action Alternative and predominantly crosses Mixed Conifer Forest as well as Mountain Shrub, RCA, and Tall Sagebrush Steppe vegetation communities.

Variation S2-E2

Variation S2-E2 follows a more northeasterly alignment than Variation S2-E2 and crosses Juniper and Mahogany Woodlands in addition to the vegetation communities crossed by Variation S2-E1. Variation S2-E2 crosses greater amounts of Tall Sagebrush Steppe but lesser amounts of Mixed Conifer Forest than Variation S2-E1.

Variation S2-F1

Variation S2-F1 follows the same alignment as the Applicant's Proposed Action Alternative at the southern end of Segment 2 and predominantly crosses Mountain Shrub, RCA, and Tall Sagebrush Steppe vegetation communities. Variation S2-F1 also crosses Agriculture, Aspen, Dwarf Sagebrush Steppe, Mixed Conifer Forest, and Non-native Grassland vegetation communities.

Variation S2-F2

Variation S2-F2 follows a more northerly alignment than Variation S2-F1 to allow colocation with existing transmission lines and predominantly crosses Mountain Shrub, RCA, and Tall Sagebrush Steppe vegetation communities. It also crosses Tall Sagebrush Steppe to a lesser extent than Variation S2-F1. Variation S2-F2 also crosses Developed/Disturbed and Juniper and Mahogany Woodlands.

Glass Hill Alternative

Vegetation communities crossed by the Glass Hill Alternative are summarized in Table 3-102. The types of vegetation communities crossed by the Glass Hill Alternative are similar to those crossed by

the Applicant's Proposed Action Alternative in Segment 2, although the Glass Hill Alternative also crosses minimal amounts of Bare Ground, Cliffs, and Talus vegetation communities. The Glass Hill Alternative crosses lesser amounts of Mixed Conifer Forest and Tall Sagebrush Steppe but greater amounts of Mountain Shrub and RCA vegetation communities. The Glass Hill Alternative does not cross any areas burned by wildfires in the 2015 fire season.

Variation S2-D1

Variation S2-D1 follows the same alignment as the Glass Hill Alternative in the central portion of Segment 2 and predominantly crosses Mixed Conifer Forest vegetation communities, but also cross Juniper and Mahogany Woodland, RCA, and Tall Sagebrush Steppe vegetation communities.

Variation S2-D2

Variation S2-D2 follows a more southerly alignment and predominantly crosses Mixed Conifer Forest vegetation communities. Variation S2-D2 does not cross Juniper and Mahogany Woodland but crosses both Native and Non-native Grassland vegetation communities.

Mill Creek Alternative

Vegetation communities crossed by the Mill Creek Alternative are summarized in Table 3-102. The types of vegetation communities crossed by the Mill Creek Alternative are similar the Applicant's Proposed Action Alternative, although the Mill Creek Alternative crosses minimal amounts of Developed/Disturbed and does not cross Aspen vegetation communities. The Mill Creek Alternative crosses lesser amounts of Mixed Conifer Forest, but greater amounts of Tall Sagebrush Steppe than the Applicant's Proposed Action Alternative. The Mill Creek Alternative does not cross any areas burned by wildfires in the 2015 fire season.

Federally Listed and Candidate Plant Species

Table 3-103 summarizes the extent and distribution of known Howell's spectacular thelypody occurrences in the 10-mile analysis corridor. Howell's spectacular thelypody is not known to occur in the 1-mile analysis corridor for the Applicant's Proposed Action Alternative or any alternative route considered in Segment 2.

Table 3-103. Howell's Spectacular Thelypody Occurrences in the 10-mile Analysis Corridor for Segment 2—Blue Mountains

Alternative Route	Number of Occurrences
Applicant's Proposed Action	9
Variation S2-A1	*0*
Variation S2-A2	*0*
Variation S2-B1	*0*
Variation S2-B2	*0*
Variation S2-C1	*0*
Variation S2-C2	*0*
Variation S2-E1	*0*
Variation S2-E2	*0*

Table 3-103. Howell's Spectacular Thelypody Occurrences in the 10-mile Analysis Corridor for Segment 2—Blue Mountains	
Alternative Route	**Number of Occurrences**
Variation S2-F1	*9*
Variation S2-F2	*9*
Glass Hill	9
Variation S2-D1	*0*
Variation S2-D2	*0*
Mill Creek	9

Applicant's Proposed Action Alternative and All Other Alternatives

Howell's spectacular thelypody is known to occur in the 10-mile analysis corridor for the Applicant's Proposed Action Alternative and all other alternative routes, as well as Variation S2-F1 and Variation S2-F2. All alternative routes, as well as Variation S2-F1 and Variation S2-F2, contain the same nine mapped Howell's spectacular thelypody occurrences located just south of Clover Creek and near North Powder, Oregon. These nine occurrences comprise the entirety of two larger populations, the Clover Creek Valley and North Powder populations (USFWS 2010). The mapped occurrence just south of Clover Creek is the closest to the Applicant's Proposed Action Alternative and all other alternative routes, being approximately 1.4 miles from the Applicant's Proposed Action Alternative, the Glass Hill Alternative, and Variation S2-F1 (Link 2-75) and approximately 1.5 miles from the Mill Creek Alternative and Variation S2-F2 (Link 2-70).

Other Sensitive Plant Species

Tables 3-104 and 3-105 summarize the extent and distribution of sensitive plant species occurrences in the 1-mile and 10-mile analysis corridors.

Table 3-104. Number of Sensitive Plant Species Occurrences in the 1-mile Analysis Corridor for Segment 2—Blue Mountains			
Alternative Route	**Salt Heliotrope**	**Douglas' Clover**	**Oregon Semaphore Grass**
Applicant's Proposed Action	0	2	0
Variation S2-A1	*0*	*0*	*0*
Variation S2-A2	*0*	*0*	*0*
Variation S2-B1	*0*	*0*	*0*
Variation S2-B2	*0*	*0*	*0*
Variation S2-C1	*0*	*0*	*0*
Variation S2-C2	*0*	*1*	*0*
Variation S2-E1	*0*	*0*	*0*
Variation S2-E2	*0*	*0*	*1*
Variation S2-F1	*0*	*2*	*0*
Variation S2-F2	*0*	*0*	*0*

Table 3-104. Number of Sensitive Plant Species Occurrences in the 1-mile Analysis Corridor for Segment 2—Blue Mountains			
Alternative Route	**Salt Heliotrope**	**Douglas' Clover**	**Oregon Semaphore Grass**
Glass Hill	0	2	0
Variation S2-D1	*0*	*0*	*0*
Variation S2-D2	*0*	*0*	*0*
Mill Creek	1	1	1

Table 3-105. Number of Sensitive Plant Species Occurrences in the 10-mile Analysis Corridor for Segment 2—Blue Mountains							
Alternative Route	**Mingan Moonwort**	**Woolyfruit Sedge**	**Salt Heliotrope**	**Scabland Penstemon**	**Flowery Phlox**	**Oregon Semaphore Grass**	**Douglas' Clover**
Applicant's Proposed Action	3	1	1	1	2	4	4
Variation S2-A1	*2*	*1*	*0*	*1*	*2*	*0*	*0*
Variation S2-A2	*2*	*1*	*0*	*1*	*2*	*0*	*0*
Variation S2-B1	*0*	*1*	*1*	*1*	*2*	*0*	*0*
Variation S2-B2	*0*	*1*	*1*	*1*	*2*	*0*	*0*
Variation S2-C1	*1*	*1*	*1*	*1*	*0*	*2*	*2*
Variation S2-C2	*0*	*1*	*1*	*1*	*0*	*2*	*2*
Variation S2-E1	*0*	*0*	*0*	*0*	*0*	*4*	*4*
Variation S2-E2	*0*	*0*	*0*	*0*	*0*	*4*	*4*
Variation S2-F1	*0*	*0*	*0*	*0*	*0*	*4*	*2*
Variation S2-F2	*0*	*0*	*0*	*0*	*0*	*4*	*2*
Glass Hill	3	1	1	1	2	4	4
Variation S2-D1	*0*	*0*	*1*	*0*	*0*	*0*	*2*
Variation S2-D2	*0*	*0*	*1*	*0*	*0*	*0*	*2*
Mill Creek	2	1	1	1	2	4	4

Applicant's Proposed Action Alternative and All Other Alternatives

Several sensitive plant species are known to occur in the 1-mile and 10-miles analysis corridors for the Applicant's Proposed Action Alternative and all other alternative routes (Tables 3-104 and 3-105). The Applicant's Proposed Action Alternative and all other alternative routes contain the same sensitive plant species and similar numbers of occurrences in their respective 10-mile analysis corridors. The 1-mile analysis corridor for the Mill Creek Alternative contains the greatest number of sensitive species and number of mapped occurrences, including salt heliotrope, Douglas' clover, and Oregon semaphore grass, while both the Applicant's Proposed Action Alternative and the Glass Hill Alternative only contain two mapped occurrences of Douglas' clover in the 1-mile analysis corridor.

USFS Sensitive Plant Species

The Applicant's Proposed Action Alternative and all other alternative routes, as well as Variation S2-A1 and Variation S2-A2, cross USFS-administered lands and contain several USFS sensitive plant species in their respective 10-mile analysis corridors, including woolyfruit sedge, salt heliotrope, scabland penstemon, flowery phlox, Oregon semaphore grass, and Douglas' clover. Of these species, only Douglas' clover is contained in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative and all other alternatives, while the 1-mile analysis corridor for the Mill Creek Alternative also contains salt heliotrope and Oregon semaphore grass. Variation S2-A1 and Variation S2-A2 do not contain known occurrences of USFS sensitive plant species in their 1-mile analysis corridors.

Noxious Weeds

Applicant's Proposed Action Alternative and All Other Action Alternatives

Twelve species of noxious federal, state or county listed noxious weeds are known to occur in the vegetation resources study corridor of Segment 2. Most of these mapped occurrences are located in the Mixed Conifer Forest and Mountain Shrubland along the foothills south of La Grande and the I-84 corridor. Mixed Conifer Forests, Mountain Shrub, and Tall Sagebrush Steppe community subtypes found along the Applicant's Proposed Action Alternative and the Glass Hill Alternative deeper in the Wallowa-Whitman National Forest have relatively few known mapped weed occurrences. Infestations of diffuse knapweed and Scotch thistle (*Onopordium acanthium*) occur in the foothills south of La Grande along the Mill Creek Alternative (Links 2-12 and 2-63). Both species are aggressive invaders of arid landscapes and capable of displacing native vegetation, with Scotch thistle well adapted to invade openings in Mixed Conifer Forests (ODA 2015). A large infestation of Dalmatian toadflax (*Linaria dalmatica*) occurs along I-84 in the northern portion of Segment 2 for the Applicant's Proposed Action Alternative and all other alternative routes (Links 2-5 and 2-7). Like Scotch thistle, Dalmatian toadflax commonly invades and displaces native vegetation in arid landscapes and forest openings. Other common noxious weeds, Canada thistle (*Cirsium arvense*) and spotted knapweed (*Centaurea stoebe*) also are present in the study corridor of Segment 2.

The identified weeds with mapped occurrences include those listed on federal, state, and country noxious weed lists. They do not represent a comprehensive list of every invasive plant species or noxious weed that could potentially occur in Segment 2. A list compiled from state and county noxious weed lists of weeds potentially occurring in the B2H Project area is available in Table D-1 in Appendix D.

Traditional Foods and Ethnobotanical Resources

Applicant's Proposed Action Alternative and All Other Alternatives

Traditional foods and ethnobotanical resources have the potential to occur along all alternative routes and variations where appropriate vegetation communities exist. Much of the vegetation crossed by alternative routes in Segment 2, particularly the northern and central portions in the Blue Mountains, is dominated by Mixed Conifer Forest and Mountain Shrub vegetation communities likely to support berries, mosses and fungi, and other important ethnobotanical resources. In Segment 2, all alternative

routes and variations also cross Tall Sagebrush Steppe and RCA vegetation communities likely to provide several traditional foods and ethnobotanical resources.

SEGMENT 3—BAKER VALLEY

Vegetation Communities

Table 3-106 presents the resource inventory for all alternative routes and route variations in Segment 3. The distribution of these vegetation communities in Segment 3 is displayed on MV-7.

Applicant's Proposed Action Alternative

The vegetation communities crossed by the Applicant's Proposed Action Alternative in Segment 3 are summarized in Table 3-106. Throughout Segment 3, the Applicant's Proposed Action Alternative predominantly crosses Tall Sagebrush Steppe vegetation communities, but also crosses Dwarf Sagebrush Steppe southeast of Baker City, Oregon (Link 3-28). The Applicant's Proposed Action Alternative crosses RCA vegetation communities throughout Segment 3. Several miles north of Baker City, the Applicant's Proposed Action crosses Tall Sagebrush Steppe vegetation communities near Magpie Peak (Link 3-12), which were considered for potential designation as an ACEC in the revisions to the Baker RMP due to their high-quality and species composition (BLM 2011). The Applicant's Proposed Action Alternative in Segment 3 does not cross any areas burned by wildfires in the 2015 season, but crosses a few, smaller areas southeast of Baker City that burned in the 2014 Radio Tower Fire (Link 3-28, 3-52, and 3-64) and pass approximately 1.5 miles from areas burned by the 2015 Cornet-Windy Ridge fire (Link 3-54 and 3-58). The vegetation communities affected by these wildfires may no longer reflect the vegetation community description identified from the NWGAP dataset, particularly areas of Tall Sagebrush Steppe. Tall Sagebrush Steppe vegetation communities can take decades to recover from fire disturbance and may be in an early seral stage dominated by perennial bunchgrasses or shrubs other than big sagebrush, or have transitioned into a community more typical of a Non-native Grassland if invasion by annual grasses and long-term alterations to the fire regime occur (Miller et al. 2013).

Variation S3-A1

Variation S3-A1 follows the same alignment as the Applicant's Proposed Action Alternative at the northern end of the segment and predominantly crosses Tall Sagebrush Steppe vegetation communities. Variation S3-A1 does not cross any areas burned by wildfires in the 2015 season.

Variation S3-A2

Variation S3-A2 roughly parallels the Applicant's Proposed Action Alternative following a more northeasterly alignment to better colocate with an existing transmission line. Variation S3-A2 crosses similar types of vegetation communities in similar extents, and also crosses the Tall Sagebrush Steppe vegetation communities considered for ACEC designation near Magpie Peak (Link 3-4). Variation S3-A2 does not cross any areas burned by wildfires in the 2015 season.

Table 3-106. Vegetation Resources Inventory Data for Segment 3—Baker Valley (miles crossed)

Alternative Route	Total Length (miles)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Applicant's Proposed Action	55.2	0.1	0.0	0.4	0.0	0.2	2.1	0.0	0.0	0.0	0.4	2.6	0.7	0.0	6.3	42.4
Variation S3-A1	*12.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.0*	*0.2*	*0.3*	*0.1*	*0.0*	*1.4*	*10.3*
Variation S3-A2	*12.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.2*	*0.3*	*0.0*	*0.8*	*10.8*
Variation S3-B1	*13.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*1.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.7*	*0.0*	*0.0*	*0.8*	*10.9*
Variation S3-B2	*14.4*	*0.5*	*0.0*	*0.0*	*0.0*	*0.1*	*0.3*	*0.0*	*0.3*	*0.0*	*0.3*	*0.0*	*0.0*	*0.0*	*1.7*	*11.2*
Variation S3-B3	*14.7*	*0.5*	*0.0*	*0.0*	*0.0*	*0.1*	*0.6*	*0.0*	*0.3*	*0.0*	*0.3*	*0.0*	*0.2*	*0.0*	*1.6*	*11.1*
Variation S3-B4	*14.3*	*1.7*	*0.0*	*0.0*	*0.0*	*0.0*	*0.6*	*0.0*	*0.3*	*0.0*	*0.1*	*0.0*	*0.2*	*0.0*	*1.6*	*9.8*
Variation S3-B5	*14.0*	*1.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.3*	*0.0*	*0.3*	*0.0*	*0.3*	*0.0*	*0.1*	*0.0*	*1.8*	*9.8*
Variation S3-C1	*21.1*	*0.1*	*0.0*	*0.4*	*0.0*	*0.1*	*0.6*	*0.0*	*0.0*	*0.0*	*0.2*	*1.5*	*0.5*	*0.0*	*3.0*	*14.7*
Variation S3-C2	*21.7*	*0.0*	*0.0*	*0.3*	*0.0*	*0.2*	*0.5*	*0.0*	*0.0*	*0.0*	*0.2*	*1.0*	*1.0*	*0.0*	*3.3*	*15.2*
Variation S3-C3	*21.1*	*0.0*	*0.0*	*0.3*	*0.0*	*0.3*	*1.5*	*0.0*	*0.7*	*0.0*	*1.3*	*1.1*	*0.8*	*0.0*	*4.3*	*10.8*
Variation S3-C4	*21.4*	*0.0*	*0.0*	*0.5*	*0.0*	*0.3*	*1.4*	*0.0*	*0.7*	*0.0*	*1.5*	*1.3*	*0.8*	*0.0*	*3.1*	*11.8*
Variation S3-C5	*21.0*	*0.0*	*0.0*	*0.6*	*0.0*	*0.1*	*0.7*	*0.0*	*0.4*	*0.9*	*1.5*	*1.1*	*1.8*	*0.0*	*2.8*	*11.1*
Variation S3-C6	*24.7*	*0.0*	*0.5*	*0.5*	*0.0*	*0.1*	*0.4*	*0.0*	*0.9*	*1.5*	*1.4*	*1.9*	*1.0*	*0.0*	*4.7*	*11.8*
Flagstaff A	55.3	1.5	0.0	0.4	0.0	0.1	1.0	0.0	0.3	0.0	0.7	1.9	0.8	0.0	7.3	41.3
Timber Canyon	70.3	0.9	0.3	0.2	0.0	0.1	3.9	0.0	0.9	19.4	3.5	2.1	2.2	0.0	12.5	24.3
Flagstaff A – Burnt River Mountain	55.3	1.4	0.0	0.3	0.0	0.3	1.9	0.0	1.0	0.0	1.8	1.5	1.1	0.0	8.6	37.4
Flagstaff B	56.0	0.6	0.0	0.4	0.0	0.2	1.3	0.0	0.3	0.0	0.7	1.9	0.9	0.0	7.1	42.6
Flagstaff B – Burnt River West	55.7	0.5	0.0	0.6	0.0	0.2	1.3	0.0	0.7	0.9	1.9	1.4	2.4	0.0	6.3	39.5
Flagstaff B – Durkee	59.6	0.5	0.5	0.5	0.0	0.2	1.1	0.0	1.2	1.5	1.9	2.3	1.4	0.0	8.8	39.7

Table Note: Miles crossed will not equal the total length as some species are not present for the alternative route or overlap of species.

Variation S3-B1

Variation S3-B1 follows the same alignment as the Applicant's Proposed Action Alternative at the northern end of the segment and predominantly crosses Tall Sagebrush Steppe vegetation communities but also crosses Dwarf Sagebrush Steppe, Native Grassland, and RCA vegetation communities. Variation S3-B1 crosses areas burned in the Radio Tower Fire (Link 3-28), but does not cross any areas burned by wildfires during the 2015 season. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by this wildfire and crossed by the Variation S3-B1 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S3-B2

Variation S3-B2 follows a more westerly alignment than the Applicant's Proposed Action Alternative to pass west of the NHOTIC. Similar to Variation S3-B1, Variation S3-B2 also predominantly crosses Tall Sagebrush Steppe vegetation communities but also crosses Agriculture, Juniper and Mahogany Woodland, Mountain Shrub, and RCA vegetation communities. Variation S3-B2 crosses areas burned in the Radio Tower Fire (Link 3-48), but does not cross any areas burned by wildfires during the 2015 season. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by this wildfire and crossed by the Variation S3-B2 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S3-B3

Variation S3-B3 follows the same alignment as Variation S3-B2 until south of Baker City, Oregon, where it follows a more westerly alignment to better colocate with an existing transmission line. Variation S3-B3 crosses similar types and extents of vegetation communities as Variation S3-B2. Variation S3-B3 crosses Agriculture, Juniper and Mahogany Woodland, Mountain Shrub, RCA, and Tall Sagebrush Steppe vegetation communities to a greater extent, but does not cross Native Grasslands and crosses Dwarf Sagebrush Steppe to a lesser extent than Variation S3-B1. Variation S3-B3 crosses areas burned in the Radio Tower Fire (Link 3-48), but does not cross any areas burned by wildfires during the 2015 season. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by this wildfire and crossed by the Variation S3-B3 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S3-B4

Variation S3-B4 roughly parallels Variation S3-B2, being aligned slightly west near Baker City, Oregon, crosses similar types and extents of vegetation communities as Variation S3-B2. Variation S3-B4 crosses Agriculture, Juniper and Mahogany Woodland, Mountain Shrub, and RCA vegetation communities to a greater extent, but does not cross Native Grasslands and crosses Dwarf Sagebrush Steppe and Tall Sagebrush Steppe to a lesser extent than Variation S3-B1. Variation S3-B4 crosses areas burned in the Radio Tower Fire (Link 3-48), but does not cross any areas burned by wildfires during the 2015 season. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by this wildfire and crossed by the Variation S3-B4 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S3-B5

Variation S3-B5 roughly parallels Variation S3-B2, being aligned slightly west near the NHOTIC, crosses similar types and extents of vegetation communities as Variation S3-B2. Variation S3-B5 crosses Agriculture, Juniper and Mahogany Woodland, Mountain Shrub, and RCAs to a greater extent, but does not cross Native Grasslands and crosses Dwarf Sagebrush Steppe and Tall Sagebrush Steppe to a lesser extent than Variation S3-B1. Variation S3-B5 crosses areas burned in the Radio Tower Fire (Link 3-48), but does not cross any areas burned by wildfires during the 2015 season. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by this wildfire and crossed by the Variation S3-B5 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S3-C1

Variation S3-C1 follows the same alignment of the Applicant's Proposed Action Alternative at the southern end of Segment 3, passing north of Durkee, Oregon. Variation S3-C1 predominantly crosses Tall Sagebrush Steppe, but also crosses RCA, Native Grassland, Dwarf Sagebrush Steppe, and Non-native Grassland. Variation S3-C1 does not cross any areas burned by wildfires during the 2015 season.

Variation S3-C2

Variation S3-C2 follows a more southerly alignment than Variation S3-C1, passing closer to Durkee, but rejoins the Variation S3-C1 alignment northeast of the community. Variation S3-C2 crosses similar types and mostly similar extents of vegetation communities as Variation S3-C1. However, Variation S3-C2 crosses Non-native Grassland, RCA, and Tall Sagebrush Steppe to a greater extent, but Native Grasslands to a lesser extent than Variation S3-C1. Variation S3-C2 does not cross any areas burned by wildfires during the 2015 season.

Variation S3-C3

Variation S3-C3 follows a more southerly alignment than Variation S3-C1, passing south of Durkee, but rejoins the Variation S3-C1 near Weatherby, Oregon. Variation S3-C3 crosses similar types and mostly similar extents of vegetation communities as Variation S3-C1. However, Variation S3-C3 crosses Dwarf Sagebrush Steppe, Juniper and Mahogany Woodlands, Mountain Shrub, and RCA to a greater extent, but Tall Sagebrush Steppe to a lesser extent than Variation S3-C1. Variation S3-C3 does cross areas burned by the 2015 Cornet-Windy Ridge fire west of Durkee (Link 3-64). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by this wildfire and crossed by the Variation S3-C3 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S3-C4

Variation S3-C4 follows a similar alignment as Variation S3-C3, passing west of residences near Burnt River Canyon, Oregon, and rejoining the Variation S3-C1 near Weatherby, Oregon. Variation S3-C4 crosses similar types and mostly similar extents of vegetation communities as Variation S3-C1. However, Variation S3-C4 crosses Dwarf Sagebrush Steppe, Juniper and Mahogany Woodlands, and Mountain Shrub to a greater extent, but Tall Sagebrush Steppe to a lesser extent than Variation S3-C1.

Variation S3-C4 does cross areas burned by the Cornet-Windy Ridge fire west of Durkee (Links 3-68). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by this wildfire and crossed by the Variation S3-C4 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S3-C5

Variation S3-C5 follows a more southerly alignment than Variation S3-C1, passing south of Durkee, Oregon to rejoin the Variation S3-C1 at the end of Segment 3. Variation S3-C5 crosses Mixed Conifer Forest in addition to crossing similar types of vegetation communities as Variation S3-C1. Variation S3-C5 crosses Juniper and Mahogany Woodlands, Mixed Conifer Forest, Mountain Shrub, and Non-native Grasslands to a greater extent, but Tall Sagebrush Steppe to a lesser extent than Variation S3-C1. Variation S3-C5 does cross areas burned by the Cornet-Windy Ridge fire west of Durkee (Links 3-66 and 3-71). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by this wildfire and crossed by the Variation S3-C5 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S3-C6

Variation S3-C6 follows a more southeasterly alignment than Variation S3-C1, passing due south of Durkee to Pedro Mountain before traveling east to rejoin the Variation S3-C1 at the end of Segment 3. Variation S3-C6 crosses Mixed Conifer Forest and Aspen in addition to crossing similar types of vegetation communities as Variation S3-C1. Variation S3-C5 crosses Aspen, Juniper and Mahogany Woodlands, Mixed Conifer Forest, Mountain Shrub, and RCA vegetation communities to a greater extent, but Tall Sagebrush Steppe to a lesser extent than Variation S3-C1. Variation S3-C6 does cross areas burned by the Cornet-Windy Ridge fire west of Durkee (Link 3-74). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by this wildfire and crossed by the Variation S3-C6 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Flagstaff A Alternative

Vegetation communities crossed by the Flagstaff A Alternative are summarized in Table 3-106. The types of vegetation communities crossed by the Flagstaff A Alternative are similar to those crossed by the Applicant's Proposed Action Alternative, although the Flagstaff A Alternative also crosses Juniper and Mahogany Woodland vegetation communities. The Flagstaff A Alternative crosses lesser amounts of Dwarf Sagebrush Steppe, but greater amounts of Agriculture vegetation communities. The Flagstaff A Alternative crosses areas burned in the Radio Tower Fire (Links 3-48, 3-52, and 3-54), but does not cross any areas burned by wildfire in the 2015 season. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by this wildfire and crossed by the Flagstaff A Alternative may no longer reflect the vegetation communities identified in the NWGAP dataset.

Timber Canyon Alternative

Vegetation communities crossed by the Timber Canyon Alternative are summarized in Table 3-106. The types of vegetation communities crossed by the Timber Canyon Alternative are similar to those crossed by the Applicant's Proposed Action Alternative, although the Timber Canyon Alternative also

crosses Juniper and Mahogany Woodland, Aspen, and Mixed Conifer Forest vegetation communities. The Timber Canyon Alternative crosses lesser amounts of Tall Sagebrush Steppe, but greater amounts of Agriculture, Dwarf Sagebrush Steppe, Mountain Shrub, Non-native Grassland, and RCA vegetation communities. The Timber Canyon Alternative does not cross any areas burned by wildfire during the 2015 season, but passes approximately 0.5 mile from the 2015 Dry Gulch Fire (Link 3-8).

Flagstaff A – Burnt River Mountain Alternative

Vegetation communities crossed by the Flagstaff A – Burnt River Mountain Alternative are summarized in Table 3-106. The types of vegetation communities crossed by the Flagstaff A – Burnt River Mountain Alternative are similar to those crossed by the Applicant's Proposed Action Alternative, although the Flagstaff A – Burnt River Mountain Alternative also crosses Juniper and Mahogany Woodland vegetation communities. The Flagstaff A – Burnt River Mountain Alternative crosses lesser amounts of Native Grassland, but greater amounts of Agriculture, Mountain Shrub, and RCA vegetation communities. The Flagstaff A – Burnt River Mountain Alternative crosses areas burned in the Radio Tower (Links 3-48, 3-52, and 3-54) and Cornet-Windy Ridge fires (Link 3-64). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by these wildfires and crossed by the Flagstaff A – Burnt River Mountain Alternative may no longer reflect the vegetation communities identified in the NWGAP dataset.

Flagstaff B Alternative

Vegetation communities crossed by the Flagstaff B Alternative are summarized in Table 3-106. The types of vegetation communities crossed by the Flagstaff B Alternative are similar to those crossed by the Applicant's Proposed Action Alternative, although the Flagstaff B Alternative also crosses Juniper and Mahogany Woodland vegetation communities. The Flagstaff B Alternative crosses lesser amounts of Dwarf Sagebrush Steppe, but greater amounts of Agriculture vegetation communities. The Flagstaff B Alternative crosses the Radio Tower Fire (Links 3-48, 3-52, and 3-54), but does not cross any areas burned by wildfire in the 2015 season.

Flagstaff B – Burnt River West Alternative

Vegetation communities crossed by the Flagstaff B – Burnt River West Alternative are summarized in Table 3-106. The types of vegetation communities crossed by the Flagstaff B – Burnt River West Alternative are similar to those crossed by the Applicant's Proposed Action Alternative, although the Flagstaff B – Burnt River West Alternative also crosses Juniper and Mahogany Woodland and Mixed Conifer Forest vegetation communities. The Flagstaff B – Burnt River West Alternative crosses lesser amounts of Native Grassland and Tall Sagebrush Steppe, but greater amounts of Non-native Grassland vegetation communities. The Flagstaff B – Burnt River West Alternative crosses areas burned in the Radio Tower (Links 3-48, 3-52, and 3-54) and Cornet-Windy Ridge fires (Links 3-66 and 3-71). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by these wildfires and crossed by the Flagstaff B – Burnt River West Alternative may no longer reflect the vegetation communities identified in the NWGAP dataset

Flagstaff B – Durkee

Vegetation communities crossed by the Flagstaff B – Durkee Alternative are summarized in Table 3-106. The types of vegetation communities crossed by the Flagstaff B – Durkee Alternative are similar to those crossed by the Applicant's Proposed Action Alternative, although the Flagstaff B – Durkee Alternative also crosses Juniper and Mahogany Woodland, Aspen, and Mixed Conifer Forest vegetation communities. The Flagstaff B – Durkee Alternative crosses lesser amounts of Dwarf Sagebrush Steppe and Tall Sagebrush Steppe, but greater amounts of Non-native Grassland, Mountain Shrub, and RCA vegetation communities. The Flagstaff B – Durkee Alternative crosses areas burned in the Radio Tower (Links 3-48, 3-52, and 3-54) and Cornet-Windy Ridge (Link 3-74) fires. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by these wildfires and crossed by the Flagstaff B – Durkee Alternative may no longer reflect the vegetation communities identified in the NWGAP dataset.

Federally Listed and Candidate Plant Species

Table 3-107 summarizes the extent and distribution of known Howell's spectacular thelypody occurrences in the 10-mile analysis corridor. Howell's spectacular thelypody is not known to occur in the 1-mile analysis corridor for the Applicant's Proposed Action Alternative or any alternative route considered in Segment 3.

Table 3-107. Howell's Spectacular Thelypody Occurrences in the 10-mile Analysis Corridor for Segment 3—Baker Valley

Alternative Route	Number of Occurrences
Applicant's Proposed Action	16
Variation S3-A1	*16*
Variation S3-A2	*16*
Variation S3-B1	*8*
Variation S3-B2	*8*
Variation S3-B3	*8*
Variation S3-B4	*8*
Variation S3-B5	*8*
Variation S3-C1	*0*
Variation S3-C2	*0*
Variation S3-C3	*0*
Variation S3-C4	*0*
Variation S3-C5	*0*
Variation S3-C6	*0*
Flagstaff A	16
Timber Canyon	8
Flagstaff A – Burnt River Mountain	16
Flagstaff B	16
Flagstaff B – Burnt River West	16
Flagstaff B – Durkee	16

Applicant's Proposed Action Alternative and All Other Alternatives

Howell's spectacular thelypody is known to occur in the 10-mile analysis corridor for the Applicant's Proposed Action Alternative and other alternative routes considered in Segment 3. The Applicant's Proposed Action Alternative, Variation S3-A1, Variation S3-A2, and all other alternatives except the Timber Canyon Alternative, contain the same eight mapped Howell's spectacular thelypody occurrences in the North Baker Population discussed in Segment 2 as well as an additional eight occurrences located north of Baker, Oregon. These 16 occurrences comprise the entirety of three larger populations, the North Powder, North Baker, and Baldock Slough introduction site populations (USFWS 2010). The Timber Canyon Alternative passes northwest of the North Baker and Baldock Slough introduction site populations and the 10-mile analysis corridor only contains the eight occurrences composing the North Powder population. Similarly, the variations near Baker (Variation S3-B1, Variation S3-B2, Variation S3-B3, Variation S3-B4, and Variation S3-B5) are south of the North Powder population and only include the eight occurrences composing the North Baker and Baldock Slough introduction site populations. The mapped occurrences near Baldock Slough are the closest to the Applicant's Proposed Action Alternative and all other alternative routes except the Timber Canyon Alternative, being approximately 1.9 miles from the Applicant's Proposed Action Alternative (Link 3-4). The closest mapped occurrences to the Timber Canyon Alternative belong to the North Powder population and are located approximately 2.2 miles to the west (Link 3-1).

Other Sensitive Plant Species

Tables 3-108 and 3-109 summarize the extent and distribution of sensitive plant species occurrences in the 1-mile and 10-mile analysis corridors.

Table 3-108. Number of Sensitive Plant Species Occurrences in the 1-mile Analysis Corridor for Segment 3—Baker Valley

Alternative Route	Mingan Moonwort	Cordilleran Sedge	Retrorse Sedge	Hairy Wild Cabbage	White Wooly Buckwheat	Salt Heliotrope	Snake River Goldenweed	Oregon Princesplume
Applicant's Proposed Action	0	0	0	0	8	0	20	5
Variation S3-A1	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-A2	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-B1	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-B2	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-B3	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-B4	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*
Variation S3-B5	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-C1	*0*	*0*	*0*	*0*	*8*	*0*	*20*	*5*
Variation S3-C2	*0*	*0*	*0*	*1*	*8*	*0*	*20*	*5*
Variation S3-C3	*0*	*0*	*0*	*0*	*0*	*0*	*20*	*0*
Variation S3-C4	*0*	*0*	*0*	*0*	*0*	*0*	*20*	*0*

Table 3-108. Number of Sensitive Plant Species Occurrences in the 1-mile Analysis Corridor for Segment 3—Baker Valley

Alternative Route	Mingan Moonwort	Cordilleran Sedge	Retrorse Sedge	Hairy Wild Cabbage	White Wooly Buckwheat	Salt Heliotrope	Snake River Goldenweed	Oregon Princesplume
Variation S3-C5	*0*	*0*	*0*	*0*	*0*	*0*	*7*	*0*
Variation S3-C6	*0*	*0*	*0*	*0*	*0*	*0*	*18*	*0*
Flagstaff A	0	0	0	0	8	0	20	5
Timber Canyon	1	4	1	0	3	0	20	2
Flagstaff A – Burnt River Mountain	0	0	0	0	0	0	20	0
Flagstaff B	0	0	0	0	8	0	20	5
Flagstaff B – Burnt River West	0	0	0	0	0	0	7	0
Flagstaff B – Durkee	0	0	0	0	0	0	18	0

Table 3-109. Number of Sensitive Plant Species Occurrences in the 10-mile Analysis Corridor for Segment 3—Baker Valley

Alternative Route	Mingan Moonwort	Mountain Moonwort	Cordilleran Sedge	Retrorse Sedge	Hairy Wild Cabbage	Malheur Cryptantha	White Wooly Buckwheat	Salt Heliotrope	Bank Monkeyflower	Small Phacelia	Snake River Goldenweed	Oregon Princesplume
Applicant's Proposed Action	0	0	0	0	3	1	9	1	0	0	68	5
Variation S3-A1	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-A2	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-B1	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*
Variation S3-B2	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*
Variation S3-B3	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*
Variation S3-B4	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*
Variation S3-B5	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*
Variation S3-C1	*0*	*0*	*0*	*0*	*3*	*1*	*9*	*0*	*0*	*0*	*68*	*5*
Variation S3-C2	*0*	*0*	*0*	*0*	*3*	*1*	*9*	*0*	*0*	*0*	*68*	*5*
Variation S3-C3	*0*	*0*	*0*	*0*	*3*	*1*	*9*	*0*	*0*	*0*	*68*	*5*
Variation S3-C4	*0*	*0*	*0*	*0*	*3*	*1*	*9*	*0*	*0*	*0*	*68*	*5*
Variation S3-C5	*0*	*0*	*0*	*0*	*3*	*1*	*5*	*0*	*0*	*0*	*60*	*2*
Variation S3-C6	*0*	*0*	*10*	*0*	*3*	*1*	*2*	*0*	*0*	*0*	*61*	*0*
Flagstaff A	0	0	0	0	3	1	9	1	0	0	68	5
Timber Canyon	6	3	27	1	0	0	8	0	5	7	69	5
Flagstaff A – Burnt River Mountain	0	0	0	0	3	1	9	1	0	0	68	5

Table 3-109. Number of Sensitive Plant Species Occurrences in the 10-mile Analysis Corridor for Segment 3—Baker Valley												
Alternative Route	**Mingan Moonwort**	**Mountain Moonwort**	**Cordilleran Sedge**	**Retrorse Sedge**	**Hairy Wild Cabbage**	**Malheur Cryptantha**	**White Wooly Buckwheat**	**Salt Heliotrope**	**Bank Monkeyflower**	**Small Phacelia**	**Snake River Goldenweed**	**Oregon Princesplume**
Flagstaff B	0	0	0	0	3	1	9	1	0	0	68	5
Flagstaff B – Burnt River West	0	0	0	0	3	1	5	1	0	0	60	2
Flagstaff B – Durkee	0	0	10	0	3	1	2	1	0	0	61	0

Applicant's Proposed Action Alternative and All Other Alternatives

Several sensitive plant species are known to occur in the 1-mile and 10-mile analysis corridors for the Applicant's Proposed Action Alternative and all other alternative routes (Tables 3-108 and 3-109). Several of these species are known to occur in the 1-mile and 10-mile analysis corridor only for the Timber Canyon Alternative, while others, including Snake River goldenweed, are present in the 1-mile and 10-mile analysis corridor for every alternative route. The Timber Canyon Alternative contains the greatest number of sensitive species of any alternative route in both the 1-mile and 10-mile analysis corridors. In general, few sensitive species occurrences are known near Baker, Oregon and the route variations in the area (Variation S3-A1, Variation S3-A2, Variation S3-B1, Variation S3-B2, Variation S3-B3, Variation S3-B4, and Variation S3-B5) only contain one occurrence of salt heliotrope in their respective 1-mile and 10-mile analysis corridors.

USFS Sensitive Plant Species

Of the alternative routes and route variations considered in Segment 3, only the Timber Canyon Alternative crosses USFS-administered lands along the foothills of the Wallowa Mountains. Four USFS sensitive plant species are contained in the 10-mile analysis corridor of this alternative, including mountain moonwort, cordilleran sedge, retrorse sedge, and small phacelia. Of these species, only cordilleran and retrorse sedge are known to occur in the 1-mile analysis corridor of the Timber Canyon Alternative.

Noxious Weeds

Applicant's Proposed Action Alternative and All Other Alternatives

Twenty-one species of federal, state, or county listed noxious weeds are known to occur in the study corridor of Segment 3. Many of the mapped weed occurrences are located near Durkee in the southern portion of Segment 3, but also are located throughout Segment 3 in the vegetation resources study corridor for every alternative route. Mapped weed occurrences exist on several vegetation community subtypes, without a clear pattern of distribution based on vegetation community. Large infestations of rush skeletonweed, whitetop, and leafy spurge (*Euphorbia esula*) exist in Segment 3. Both rush skeletonweed and leafy spurge are aggressive invaders of arid, open landscapes, displace native

vegetation, and can cause significant economic impacts on range and agricultural lands (ODA 2015). Most mapped occurrences of rush skeletonweed in Segment 3 are located south of Richland, while most mapped occurrences of leafy spurge are located northeast of Durkee. Whitetop invades a variety of vegetation communities and can form large, monotypic stands where conditions allow (ODA 2015). Mapped whitetop occurrences exist throughout Segment 3, but are mostly near two locations: along the Timber Canyon Alternative near the Wallowa-Whitman National Forest and along I-84 near Burnt River. Other common noxious weeds, Scotch thistle and diffuse knapweed, also are present in the study corridor in Segment 3.

The identified weeds with mapped occurrences include those listed on federal, state, and country noxious weed lists. They do not represent a comprehensive list of every invasive plant species or noxious weed that could potentially occur in Segment 3. A list compiled from state and county noxious weed lists of weeds potentially occurring in the B2H Project area is available in Table D-1 in Appendix D.

Traditional Foods and Ethnobotanical Resources

Applicant's Proposed Action Alternative and All Other Alternatives

Traditional foods and ethnobotanical resources have the potential to occur along all alternative routes and variations where appropriate vegetation communities exist. Much of the vegetation crossed by alternative routes in Segment 3, particularly the portions near Baker and Durkee, is dominated by Tall Sagebrush vegetation communities likely to support roots, tubers, bulbs and other important ethnobotanical resources. In Segment 3, all alternative routes also cross Native Grassland, Mountain Shrub, and RCA vegetation communities likely to provide several traditional foods and ethnobotanical resources. The Timber Canyon Alternative predominantly crosses Tall Sagebrush Steppe, but also crosses substantial amounts of Mixed Conifer Forest likely to support berries, various moss and fungi, and other ethnobotanical resources.

SEGMENT 4—BROGAN

Vegetation Communities

Table 3-110 presents the resource inventory for all alternative routes and route variations in Segment 4. The distribution of these vegetation communities in Segment 4 is displayed on MV-7.

Applicant's Proposed Action Alternative

The vegetation communities crossed by the Applicant's Proposed Action Alternative in Segment 4 are summarized in Table 3-110. Throughout Segment 4, the Applicant's Proposed Action Alternative predominantly crosses Tall Sagebrush Steppe vegetation communities, but also crosses Native and Non-native Grasslands where the alternative travels north and west of the Willow Creek Valley near Jamieson, Oregon (Links 4-50 and 4-65). The Applicant's Proposed Action Alternative also crosses Bare Ground, Cliffs, Talus, Dwarf Sagebrush Steppe, and Mountain Shrub vegetation communities. The Applicant's Proposed Action Alternative crosses RCA vegetation communities throughout Segment 4, but does not cross any Agriculture or Developed/Disturbed vegetation communities.

Table 3-110. Vegetation Resources Inventory Data for Segment 4—Brogan (miles crossed)

Alternative Route	Total Length (miles)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Applicant's Proposed Action	40.1	0.0	0.0	1.5	0.0	0.0	1.3	0.0	0.0	0.0	1.3	7.3	8.6	0.0	3.9	16.2
Variation S4-A1	*5.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.2*	*0.0*	*0.0*	*0.0*	*0.4*	*0.3*	*1.7*	*0.0*	*0.7*	*2.6*
Variation S4-A2	*6.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.5*	*0.0*	*0.0*	*0.0*	*0.7*	*0.2*	*1.7*	*0.0*	*0.6*	*2.3*
Variation S4-A3	*6.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.4*	*0.0*	*0.0*	*0.0*	*0.7*	*0.4*	*1.5*	*0.0*	*0.6*	*2.5*
Tub Mountain South	40.5	2.1	0.0	1.8	0.5	0.1	1.3	0.0	0.0	0.0	0.9	1.0	16.3	0.0	4.4	12.1
Willow Creek	34.6	1.0	0.0	1.2	0.0	0.0	0.3	0.0	0.0	0.0	0.4	0.8	9.8	0.0	4.3	16.8

The Applicant's Proposed Action Alternative in Segment 4 crosses areas burned by the 2015 Lime Hill wildfire (Links 4-13, 4-25, and 4-45), as well as smaller areas northwest of Jamieson that burned in the 2014 Brogan Hill wildfire (Link 4-65). The vegetation communities affected by these wildfires may no longer reflect the vegetation community description identified from the NWGAP dataset, particularly areas of Tall Sagebrush Steppe. Tall Sagebrush Steppe vegetation communities can take decades to recover from fire disturbance and may be in an early seral stage dominated by perennial bunchgrasses or shrubs other than big sagebrush, or have transitioned into a community more typical of a Non-native Grassland if invasion by annual grasses and long-term alterations to the fire regime occur (Miller et al. 2013).

Variation S4-A1

Variation S4-A1 follows the same alignment as the Applicant's Proposed Action Alternative at the northern end of the segment and predominantly crosses Tall Sagebrush Steppe and Non-native Grassland vegetation communities. Variation S4-A1 crosses areas burned by the Lime Hill wildfire, as well as several smaller past wildfires (Link 4-13). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by wildfire and crossed by the Variation S4-A1 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S4-A2

Variation S4-A2 follows a more easterly alignment to allow colocation with an existing transmission line than Variation S4-A1. The types and extents of vegetation communities crossed are similar to Variation S4-A1. Variation S4-A2 also crosses areas burned by the Lime Hill wildfire (Link 4-17), as well as several smaller past wildfires. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by wildfire and crossed by the Variation S4-A2 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S4-A3

Variation S4-A3 starts west of Variation S4-A2, but travels east and follows the same alignment as Variation S4-A2 for most of the variation. The types and extents of vegetation communities crossed are similar to Variation S4-A1. Variation S4-A3 also crosses areas burned by the Lime Hill wildfire (Link 4-17), as well as several smaller past fires. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by wildfire and crossed by the Variation S4-A3 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Tub Mountain South Alternative

The vegetation communities crossed by the Tub Mountain South Alternative are summarized in Table 3-110. The types of vegetation communities crossed are similar to the Applicant's Proposed Action Alternative, but the Tub Mountain South Alternative also crosses small amounts of Desert Shrub, Agriculture, and Developed/Disturbed. The Tub Mountain South Alternative would predominantly cross Non-native Grasslands where the alternative route travels east of Jamieson (Link 4-75), and crosses Native Grasslands and Tall Sagebrush Steppe in lesser amounts than the Applicant's Proposed Action Alternative. The Tub Mountain South Alternative crosses areas burned by the 2015 Lime Hill wildfire

(Links 4-13, 4-25, and 4-45), as well as areas near Tub Mountain burned by several large past fires, including the Tub Mountain, Jackson, and Mud Springs wildfires (Link 4-75). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by these wildfires and crossed by the Tub Mountain South Alternative may no longer reflect the vegetation communities identified in the NWGAP dataset.

Willow Creek Alternative

The vegetation communities crossed by the Willow Creek Alternative are summarized in Table 3-110. The types of vegetation communities crossed are similar to the Applicant's Proposed Action Alternative, but the Willow Creek Alternative also crosses Agriculture vegetation communities near Jamieson (Link 4-70). Similar to the Applicant's Proposed Action Alternative, Willow Creek predominantly crosses Tall Sagebrush Steppe and Non-native Grasslands vegetation communities but crosses Native Grasslands to a lesser extent. The Willow Creek Alternative crosses areas burned by the 2015 Lime Hill wildfire (Links 4-13, 4-25, and 4-45), as well as several smaller past fires. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by these wildfires and crossed by the Willow Creek Alternative may no longer reflect the vegetation communities identified in the NWGAP dataset.

Federally Listed and Candidate Plant Species

Applicant's Proposed Action Alternative and All Other Alternatives

Federally listed and candidate plant species are not known to occur in the special status plant species study corridor of any alternative in Segment 4.

Other Sensitive Plant Species

Tables 3-111 and 3-112 summarize the extent and distribution of sensitive plant species occurrences in the 1-mile and 10-mile analysis corridors.

Table 3-111. Number of Sensitive Plant Species Occurrences in the 1-mile Analysis Corridor for Segment 4—Brogan

Alternative Route	White Wooly Buckwheat	Cronquist's Stickseed	Janish's Penstemon	Snake River Goldenweed	Oregon Princesplume
Applicant's Proposed Action	1	0	0	9	0
Variation S4-A1	*1*	*0*	*0*	*9*	*0*
Variation S4-A2	*1*	*0*	*0*	*9*	*0*
Variation S4-A3	*1*	*0*	*0*	*8*	*0*
Tub Mountain South	5	7	0	17	0
Willow Creek	1	0	1	13	2

Table 3-112. Number of Sensitive Plant Species Occurrence in the 10-mile Analysis Corridor for Segment 4—Brogan										
Alternative Route	**Tolmie's Onion**	**Mulford's Milkvetch**	**Malheur Cryptantha**	**Shining Flatsedge**	**White Wooly Buckwheat**	**Cronquist's Stickseed**	**Salt Heliotrope**	**Janish's Penstemon**	**Snake River Goldenweed**	**Oregon Princesplume**
Applicant's Proposed Action	0	0	0	0	1	0	0	1	83	7
Variation S4-A1	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*73*	*3*
Variation S4-A2	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*73*	*3*
Variation S4-A3	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*73*	*3*
Tub Mountain South	1	12	1	2	6	38	2	0	78	18
Willow Creek	0	0	0	1	1	1	1	1	77	7

Applicant's Proposed Action Alternative and All Other Alternatives

Several sensitive plant species are known to occur in the 1-mile and 10-mile analysis corridors for the Applicant's Proposed Action Alternative and all other alternative routes (Tables 3-111 and 3-112). Several of these species are known to occur in the 1-mile and 10-mile analysis corridor only for the Tub Mountain South or Willow Creek alternatives, while known occurrences of white wooly buckwheat and Snake River goldenweed exist in the 1-mile and 10-mile analysis corridors for all alternative routes and variations in Segment 4. Oregon princesplume exists in the 10-mile analysis corridor for all alternatives, but only in the 1-mile analysis corridor of the Willow Creek Alternative.

Noxious Weeds

Applicant's Proposed Action Alternative and All Other Alternatives

Fourteen species of federal, state, or county listed noxious weeds are known to occur in the study corridor of Segment 4. Most of these mapped weed occurrences are located near Huntington and the extensive Non-native Grassland vegetation communities along the eastern portion of Segment 4. The Tall Sagebrush Steppe and Native Grassland vegetation communities along the Applicant's Proposed Action Alternative and Willow Creek alternatives have relatively few known mapped weed occurrences. Large infestations of whitetop, spotted knapweed (*Centaurea stoebe*), and rush skeletonweed exist in Segment 4. The whitetop and spotted knapweed infestations occur along Durbin Creek in the northern portion of Segment 4 (Links 4-45, 4-35, and 4-30). Both species can be aggressive and cause significant economic impacts on range and agricultural lands (ODA 2015). Mapped occurrences of rush skeletonweed exist throughout the vegetation resources analysis corridor for the South Tub Mountain Alternative. Other common noxious weeds, Scotch thistle and perennial pepperweed (*Lepidium latifolium*) also are present in the study corridor in Segment 4.

The identified weeds with mapped occurrences include those listed on state and country noxious weed lists. They do not represent a comprehensive list of every invasive plant species or noxious weed that

could potentially occur within Segment 4. A list compiled from federal, state and county noxious weed lists of weeds potentially occurring in the B2H Project area is available in Table D-1 in Appendix D.

Traditional Foods and Ethnobotanical Resources

Applicant's Proposed Action Alternative and All Other Alternatives

Traditional foods and ethnobotanical resources have the potential to occur along all alternative routes and variations where appropriate vegetation communities exist. Much of the vegetation crossed by alternative routes in Segment 4, particularly the areas south and west of Jamieson, is dominated by Tall Sagebrush Steppe vegetation communities likely to support roots, tubers, bulbs and other important ethnobotanical resources. Large portions of vegetation in Segment 4 have been burned in recent and historic fires, particularly along the Tub Mountain South Alternative, and replaced by Non-native Grassland vegetation communities less likely to support traditional foods and ethnobotanical resources. However, areas supporting traditional foods and ethnobotanical resources may still in exist in areas less affected by fire or in vegetation communities with greater resilience to wildfire disturbance. In Segment 4, all alternative routes also cross Native Grassland, Mountain Shrub, and RCA vegetation communities likely to provide several traditional foods and ethnobotanical resources.

SEGMENT 5—MALHEUR

Vegetation Communities

Table 3-113 presents the resource inventory for all alternative routes and route variations in Segment 5. The distribution of these vegetation communities in Segment 5 is displayed on MV-7.

Applicant's Proposed Action Alternative

The vegetation communities crossed by the Applicant's Proposed Action Alternative in Segment 5 are summarized in Table 3-113. Throughout Segment 5, the Applicant's Proposed Action Alternative predominantly crosses Tall Sagebrush Steppe, but also crosses Non-native Grassland where the alternative route travels southwest of Vale, Oregon (Link 5-1). The Applicant's Proposed Action Alternative also crosses Bare Ground, Cliffs, and Talus and Native Grassland vegetation communities. The Applicant's Proposed Action Alternative crosses RCA vegetation communities throughout Segment 5, and crosses RCAs associated with the Owyhee River downstream of the Lake Owyhee (Link 5-55).

The Applicant's Proposed Action does not cross any areas burned by wildfires in the 2015 season but does cross large areas burned by historic wildfires, including the 2005 Double Mountain, and 2013 Owyhee fires (Links 5-15 and 5-70). The vegetation communities affected by these wildfires may no longer reflect the vegetation community description identified from the NWGAP dataset, particularly areas of Tall Sagebrush Steppe. Tall Sagebrush Steppe vegetation communities can take decades to recover from fire disturbance and may be in an early seral stage dominated by perennial bunchgrasses or shrubs other than big sagebrush, or have transitioned into a community more typical of a Non-native Grassland if invasion by annual grasses and long-term alterations to the fire regime occur (Miller et al. 2013).

Table 3-113. Vegetation Resources Inventory Data for Segment 5—Malheur (miles crossed)

Alternative Route	Total Length (miles)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Applicant's Proposed Action	40.4	0.0	0.0	7.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.0	10.3	0.0	2.9	18.9
Variation S5-A1	*7.4*	*0.0*	*0.0*	*0.6*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*4.9*	*0.0*	*0.5*	*1.4*
Variation S5-A2	*7.4*	*0.0*	*0.0*	*0.9*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*3.8*	*0.0*	*0.7*	*1.9*
Variation S5-B1	*2.5*	*0.0*	*0.0*	*0.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.0*	*0.7*	*1.4*
Variation S5-B2	*2.8*	*0.6*	*0.0*	*0.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.9*	*1.1*
Malheur S	43.5	0.0	0.0	6.9	0.2	0.1	0.0	0.0	0.0	0.0	0.0	1.2	7.9	0.0	3.9	23.3
Malheur A	43.1	0.0	0.0	6.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	2.0	6.5	0.0	3.8	24.2

Variation S5-A1

Variation S5-A1 follows the same alignment as the Applicant's Proposed Action Alternative in the northern portion of the segment south of Vale and predominantly crosses Non-native Grassland, but also crosses Tall Sagebrush Steppe, RCA, and Bare Ground, Cliffs, and Talus vegetation communities. Variation S4-A1 crosses areas burned by the Double Mountain fire (Link 5-15) for almost the entirety of the variation. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by wildfire and crossed by the Variation S5-A1 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S5-A2

Variation S5-A2 follows a more southerly alignment than the Applicant's Proposed Action Alternative and predominantly crosses Non-native Grassland, but also crosses Desert Shrub, Tall Sagebrush Steppe, RCA, and Bare Ground, Cliffs, and Talus vegetation communities. Variation S5-A2 also crosses areas burned by the Double Mountain fire (Link 5-20), for almost the entirety of the variation. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by wildfire and crossed by the Variation S5-A2 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S5-B1

Variation S5-B1 follows the same alignment as the Applicant's Proposed Action Alternative and predominantly crosses Tall Sagebrush Steppe and RCA, but also crosses Bare Ground, Cliffs, and Talus as well as Native and Non-native Grassland vegetation communities. Variation S5-B1 crosses areas burned by the Owyhee fire (Link 5-45), but only for approximately 0.2 mile. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by wildfire and crossed by the Variation S5-B1 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S5-B2

Variation S5-B2 follows a more northeast alignment to cross the Owyhee River further downriver than the Applicant's Proposed Action Alternative and predominantly crosses Tall Sagebrush Steppe and RCA, but also crosses Bare Ground, Cliffs, and Talus as well Agriculture vegetation communities. Variation S5-B2 crosses areas burned by the Owyhee fire (Link 5-50), but only for approximately 0.4 mile. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by wildfire and crossed by the Variation S5-B2 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Malheur S Alternative

The vegetation communities crossed by the Malheur S Alternative are summarized in Table 3-113. The types of vegetation communities crossed are similar to the Applicant's Proposed Action Alternative, but the Malheur S Alternative also crosses small amounts of Desert Shrub. The Malheur S Alternative would predominantly cross Tall Sagebrush Steppe, but also cross Non-native Grassland and Bare Ground, Cliff and Talus vegetation communities to a lesser extent than the Applicant's Proposed Action Alternative. The Malheur S Alternative crosses the Owyhee River Below the Dam ACEC (Link 5-30),

which was designated as an ACEC in part due to the rare presence of black cottonwood (*Populus nigra*) galleries in a riverine system. The extent and potential effects on this ACEC are described in greater detail in the Land Use section, Section 3.2.6. The Malheur S Alternative crosses areas burned by the Double Mountain and Owyhee fires (Link 5-25 and 5-30), as well as several smaller past fires. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by these wildfires and crossed by the Malheur S Alternative may no longer reflect the vegetation communities identified in the NWGAP dataset.

Malheur A Alternative

The vegetation communities crossed by the Malheur A Alternative are summarized in Table 3-113. The types of vegetation communities crossed are similar to the Applicant's Proposed Action Alternative, but the Malheur S Alternative also crosses small amounts of Desert Shrub and Dwarf Sagebrush Steppe vegetation communities. The Malheur A Alternative predominantly crosses Tall Sagebrush Steppe, but also cross Non-native Grassland and Bare Ground, Cliff and Talus vegetation communities to a lesser extent than the Applicant's Proposed Action Alternative. The Malheur A Alternative also crosses the Owyhee River Below the Dam ACEC (Link 5-35). The extent and potential effects on this ACEC are described in greater detail in the Land Use section, Section 3.2.6.

The Malheur A Alternative crosses areas burned by the Double Mountain and Owyhee fires Link 5-25 and 5-35), as well as several smaller past fires. Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by these wildfires and crossed by the Malheur A Alternative may no longer reflect the vegetation communities identified in the NWGAP dataset.

Federally Listed and Candidate Plant Species

Applicant's Proposed Action Alternative and All Other Alternatives

Federally listed and candidate plant species are not known to occur in the special status plant species study corridor of any alternative route in Segment 5.

Other Sensitive Plant Species

Tables 3-114 and 3-115 summarize the extent and distribution of sensitive plant species occurrences in the 1-mile and 10-mile analysis corridors.

Table 3-114. Number of Sensitive Plant Species Occurrences in the 1-mile Analysis Corridor for Segment 5—Malheur								
Alternative Route	**Mulford's Milkvetch**	**Cusick's Pincushion**	**Malheur Cryptantha**	**Greeley's Springparsley**	**Saltwort Buckwheat**	**Cronquist's Stickseed**	**Smooth Stickleaf**	**Wishbone Bush**
Applicant's Proposed Action	3	0	4	4	0	6	0	3
Variation S5-A1	*0*	*0*	*0*	*0*	*0*	*2*	*0*	*0*
Variation S5-A2	*0*	*0*	*0*	*0*	*1*	*2*	*0*	*0*
Variation S5-B1	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*2*
Variation S5-B2	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*2*
Malheur S	0	2	4	4	0	4	0	2
Malheur A	0	2	0	4	0	4	1	2

Applicant's Proposed Action Alternative and All Other Alternatives

Several sensitive plant species are known to occur in the 1-mile and 10-mile analysis corridors for the Applicant's Proposed Action Alternative and all other alternative routes (Tables 3-114 and 3-115). Several species are known to occur in the 10-mile and 1-mile analysis corridor for only the Applicant's Proposed Action Alternative, while the 1-mile and 10-mile analysis corridors for Malheur S and Malheur A alternatives contain many of the same species and occurrences due to the similar alignment of these two alternative routes. Several sensitive plant species are known to occur in the 1-mile and 10-mile analysis corridor for all alternative routes, usually at the northern and southern ends of the segment where all alternatives follow a similar alignment. The Malheur S and Malheur A alternative routes cross the Owyhee River Below the Dam ACEC established partly to manage Mulford's milkvetch. Potential B2H Project effects on the Owyhee River Below the Dam ACEC are discussed in greater detail in the Land Use section, Section 3.2.6.

Noxious Weeds

Applicant's Proposed Action Alternative and All Other Alternatives

Five species of federal, state, or county listed noxious weeds are known to occur in the vegetation resources study corridor of Segment 5, with mapped occurrences of these weeds located along every alternative route. However, relatively few known weed occurrences are located along the Malheur S and Malheur A alternatives from the junction with the Applicant's Proposed Action Alternative near US Highway 20 south to Grassy Mountain (Link 5-25). Mapped weed occurrences exist in several vegetation communities, without a clear pattern of distribution based on vegetation community. Large infestations of whitetop, rush skeletonweed, and saltcedar (*Tamarix* spp.) exist in the study corridor for all alternative routes in Segment 5. Other common noxious weeds, Scotch thistle and Mediterranean sage (*Salvia aethiopis*) also are present in the vegetation resources study corridor in Segment 5.

Table 3-115. Number of Sensitive Plant Species Occurrences in the 10-mile Analysis Corridor for Segment 5—Malheur

Alternative Route	Barren Milkvetch	Mulford's Milkvetch	Hairy Wild Cabbage	Cusick's Pincushion	Malheur Cryptantha	Greeley's Springparsely	White Wooly Buckwheat	Saltwort Buckwheat	Cronquist's Stickseed	Salt Heliotrope	Seaside Heliotrope	Smooth Stickleaf	Wishbone Bush	Janish's Penstemon	Oregon Princesplume
Applicant's Proposed Action	0	13	1	3	6	9	2	1	39	1	1	7	6	2	3
Variation S5-A1	*0*	*7*	*0*	*0*	*1*	*0*	*0*	*1*	*30*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S5-A2	*0*	*6*	*0*	*1*	*1*	*0*	*0*	*1*	*29*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S5-B1	*0*	*6*	*0*	*0*	*0*	*0*	*0*	*0*	*7*	*1*	*1*	*0*	*6*	*0*	*0*
Variation S5-B2	*0*	*6*	*0*	*0*	*0*	*0*	*0*	*0*	*7*	*1*	*1*	*0*	*6*	*0*	*0*
Malheur S	2	5	1	7	9	9	2	1	15	1	1	7	6	2	3
Malheur A	2	4	1	7	9	9	2	1	15	0	0	7	5	2	3

The identified weeds with mapped occurrences include those listed on federal, state, and country noxious weed lists. They do not represent a comprehensive list of every invasive plant species or noxious weed that could potentially occur within Segment 5. A list compiled from state and county noxious weed lists of weeds potentially occurring in the B2H Project area is available in Table D-1 in Appendix D.

Traditional Foods and Ethnobotanical Resources

Applicant's Proposed Action Alternative and All Other Alternatives

Traditional foods and ethnobotanical resources have the potential to occur along all alternative routes and variations where appropriate vegetation communities exist. Much of the vegetation crossed by alternative routes in Segment 5 is dominated by Tall Sagebrush Steppe vegetation communities likely to support roots, tubers, bulbs and other important ethnobotanical resources. Large portions of vegetation in Segment 5 have been burned in recent fires, particularly along the Applicant's Proposed Action Alternative southwest of Vale (Link 5-15), and replaced by Non-native Grassland vegetation communities less likely to support traditional foods and ethnobotanical resources. However, areas supporting traditional foods and ethnobotanical resources may still in exist in areas less affected by fire or in vegetation communities with greater resilience to wildfire disturbance. In Segment 5, all alternative routes also cross Native Grassland and Bare Ground, Cliffs and Talus vegetation communities likely to provide several traditional foods and ethnobotanical resources. All alternative routes also cross RCA communities along the Malheur and Owyhee rivers.

SEGMENT 6—TREASURE VALLEY

Vegetation Communities

Table 3-116 presents the resource inventory for all alternative routes and route variations in Segment 6. The distribution of these vegetation communities in Segment 6 is displayed on MV-7.

Applicant's Proposed Action Alternative

The vegetation communities crossed by the Applicant's Proposed Action Alternative in Segment 6 are summarized in Table 3-116. Throughout Segment 6, the Applicant's Proposed Action Alternative predominantly crosses Non-native Grasslands, but also crosses Tall Sagebrush Steppe vegetation communities along the entirety of the alternative. The Applicant's Proposed Action Alternative also crosses Bare Ground, Cliffs, and Talus and RCA vegetation communities throughout Segment 6. The Applicant's Proposed Action Alternative crosses Developed/Disturbed vegetation communities at the Highway 95 crossing (Link 6-25) and Agriculture vegetation communities at the Hemingway terminus near Wilson, Idaho (Link 6-35).

Table 3-116. Vegetation Resources Inventory Data for Segment 6—Treasure Valley (miles crossed)

Alternative Route	Total Length (miles)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Applicant's Proposed Action	28.0	0.2	0.0	0.9	2.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	11.8	0.0	2.2	10.5
Variation S6-A1	*9.3*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*4.2*	*0.0*	*1.0*	*4.0*
Variation S6-A2	*8.9*	*0.0*	*0.0*	*0.2*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*3.7*	*0.0*	*0.3*	*4.6*
Variation S6-B1	*14.4*	*0.0*	*0.0*	*0.9*	*1.3*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*5.5*	*0.0*	*0.7*	*5.9*
Variation S6-B2	*14.1*	*0.0*	*0.0*	*1.5*	*0.7*	*0.2*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.3*	*2.9*	*0.0*	*0.8*	*7.6*

The Applicant's Proposed Action crosses areas burned during the 2015 Soda fire for almost the entirety of the route (Links 6-10, 6-25, and 6-35). The burned areas crossed by the Applicant's Proposed Action Alternative were identified as predominantly Non-native Grasslands and Tall Sagebrush steppe in the NWGAP dataset, but the current vegetation communities may no longer match the vegetation communities identified in the NWGAP dataset. Tall Sagebrush Steppe can take decades to recover from fire disturbance and may be in an early seral stage dominated by perennial bunchgrasses or shrubs other than big sagebrush, or transitioning to a stable vegetation community dominated by invasive annual grasses if invasion and reduction in fire-return intervals occurs. The extensive portions of Non-native Grasslands burned by the Soda fire are likely to return to predisturbance conditions within a few years (Miller et al. 2013). However, management efforts by the BLM to restore these areas through treatment of invasive plants, reseeding, grazing management, and other adaptive management strategies are intended to re-establish vegetation communities similar to Native Grasslands or Tall Sagebrush Steppe (BLM 2015).

Variation S6-A1

Variation S6-A1 follows the same alignment as the Applicant's Proposed Action Alternative in the western portion of the segment south of Homedale, Idaho and predominantly crosses Non-native Grassland and Tall Sagebrush Steppe, but also crosses RCA and Desert Shrub vegetation communities. Similar to the Applicant's Proposed Action, almost the entirety of Variation S6-A1 crosses areas burned during the 2015 Soda fire (Links 6-10 and 6-25). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by wildfire and crossed by the Variation S6-A1 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S6-A2

Variation S6-A2 follows a more northerly alignment than Variation S6-A1 in the western portion of the segment south of Homedale, Idaho but also predominantly crosses Non-native Grassland and Tall Sagebrush Steppe. Variation S6-A2 also crosses Bare Ground, Cliffs, and Talus as well as RCA and Desert Shrub vegetation communities. Similar to Variation S6-A1, almost the entirety of Variation S6-A2 crosses areas burned during the 2015 Soda fire (Links 6-5 and 6-15). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by wildfire and crossed by the Variation S6-A2 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S6-B1

Variation S6-B1 follows the same alignment as the Applicant's Proposed Action Alternative in the eastern portion of the segment south of Marsing, Idaho, and predominantly crosses Non-native Grassland and Tall Sagebrush Steppe but also crosses Bare Ground, Cliffs, and Talus, Developed/Disturbed, RCA and Desert Shrub vegetation communities. Variation S6-B1 does cross areas burned during the 2015 Soda fire (Link 6-25). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by wildfire and crossed by the Variation S6-B1 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Variation S6-B2

Variation S6-B2 follows a more southerly alignment than Variation S6-B1 in the eastern portion of the segment south of Marsing, Idaho and also predominantly crosses Non-native Grassland and Tall Sagebrush Steppe, but crosses Tall Sagebrush Steppe to a greater extent than Variation S6-B1. Variation S6-B2 also crosses Juniper and Mahogany Woodland and Native Grasslands, as well as Bare Ground, Cliffs, and Talus, Developed/Disturbed, RCA and Desert Shrub vegetation communities. Variation S6-B2 crosses areas burned during the 2015 Soda fire to a greater extent than Variation S6-B1 (Link 6-30). Similar to the Applicant's Proposed Action Alternative, the vegetation communities affected by wildfire and crossed by the Variation S6-B1 may no longer reflect the vegetation communities identified in the NWGAP dataset.

Federally Listed and Candidate Plant Species

Applicant's Proposed Action Alternative and All Variations

Federally listed and candidate plant species are not known to occur in the special status plant species study corridor of alternative route or route variation in Segment 6.

Other Sensitive Plant Species

Tables 3-117 and 3-118 summarize the extent and distribution of sensitive plant species occurrences in the 1-mile and 10-mile analysis corridors.

Table 3-117. Number of Sensitive Plant Species Occurrences in the 1-mile Analysis Corridor for Segment 6—Treasure Valley

Alternative Route	Mulford's Milkvetch	Cusick's Pincushion	Malheur Cryptantha	Greeley's Springparsely	False Naked Buckwheat	Carveseed	Smooth Stickleaf	Janish's Penstemon
Applicant's Proposed Action	1	3	1	8	1	1	4	1
Variation S6-A1	*0*	*2*	*0*	*4*	*0*	*0*	*0*	*0*
Variation S6-A2	*0*	*2*	*0*	*4*	*0*	*0*	*0*	*2*
Variation S6-B1	*0*	*2*	*1*	*0*	*1*	*1*	*4*	*1*
Variation S6-B2	*0*	*2*	*1*	*0*	*1*	*1*	*4*	*1*

Table 3-118. Number of Sensitive Plant Species Occurrences in the 10-mile Analysis Corridor for Segment 6—Treasure Valley

Alternative Route	Idaho Milkvetch	Mulford's Milkvetch	Cusick's Pincushion	Esteve's Pincushion	Malheur Cryptantha	Greeley's Springparsely	Doublet	False Naked Buckwheat	Carveseed	Cronquist's Stickseed	Smooth Stickleaf	Rigid Threadplant	Simpson Hedgehog Cactus	Janish's Penstemon	Owyhee Yellow Phacelia	Water-Thread Pondweed	King's Snapdragon
Applicant's Proposed Action	6	2	6	1	8	9	2	1	5	2	12	1	1	5	2	1	1
Variation S6-A1	*2*	*0*	*4*	*0*	*4*	*9*	*0*	*1*	*2*	*2*	*9*	*0*	*0*	*3*	*0*	*1*	*0*
Variation S6-A2	*2*	*0*	*3*	*0*	*4*	*9*	*0*	*1*	*2*	*2*	*8*	*0*	*0*	*3*	*0*	*0*	*0*
Variation S6-B1	*6*	*1*	*4*	*1*	*4*	*0*	*2*	*1*	*4*	*0*	*4*	*1*	*1*	*2*	*1*	*0*	*1*
Variation S6-B2	*7*	*1*	*4*	*1*	*4*	*0*	*2*	*1*	*4*	*0*	*4*	*1*	*1*	*2*	*1*	*0*	*1*

Applicant's Proposed Action Alternative and All Variations

Several sensitive plant species are known to occur in the 1-mile and 10-mile analysis corridors for the Applicant's Proposed Action Alternative and all other alternative routes (Tables 3-117 and 3-118). All sensitive plant species identified in Segment 6 are known to occur in the 1-mile and 10-mile analysis corridor of the Applicant's Proposed Action. Mulford's milkvetch is known to occur only in the 1-mile analysis corridor of the Applicant's Proposed Action, but all other sensitive plant species also are known to occur in the 1-mile analysis corridor of at least two variations. The 1-mile and 10-mile analysis corridors of Variation S6-B1 and Variation S6-B2 contain the same species and many of the same occurrences due to the similar alignment of these two variations. Similarly, 1-mile and 10-mile analysis corridors of Variation S6-A1 and S6-B1 contain many of the same species and occurrences; however, Variation S6-B2 also contains known occurrences of Janish's penstemon.

Noxious Weeds

Applicant's Proposed Action Alternative and All Variations

11 species of federal, state, or county listed noxious weeds are known to occur in the vegetation resources study corridor of Segment 6. Mapped occurrences of these weeds are located throughout Segment 6 in the study corridor for every alternative route or route variation. Mapped weed occurrences exist in several vegetation community subtypes, without a clear pattern of distribution based on vegetation community. Large infestations of whitetop, Canada thistle, and perennial pepperweed exist in the study corridor for all alternative and variations in Segment 6. Other common noxious weeds, Russian knapweed (*Acroptilon repens*) and Russian olive (*Elaeagnus angustifolia*), also are present in the study corridor in Segment 6.

The identified weeds with mapped occurrences include those listed on federal, state, and country noxious weed lists. They do not represent a comprehensive list of every invasive plant species or noxious weed that could potentially occur in Segment 6. A list compiled from state and county noxious weed lists of weeds potentially occurring in the B2H Project area is available in Table D-1 in Appendix D.

Traditional Foods and Ethnobotanical Resources

Applicant's Proposed Action Alternative and All Variations

Traditional foods and ethnobotanical resources have the potential to occur along all alternatives and all variations where appropriate vegetation communities exist. Much of the vegetation crossed by alternative routes in Segment 6 is dominated by Tall Sagebrush Steppe vegetation communities likely to support roots, tubers, bulbs and other important ethnobotanical resources. The Applicant's Proposed Action Alternative and all variations also cross RCA, Desert Shrub, and Bare Ground, Cliffs and Talus communities that also may support traditional foods or ethnobotanical resources. Large portions of vegetation in Segment 6 have been burned in recent fires or replaced by Non-native Grassland vegetation communities and are less likely to support traditional foods or ethnobotanical resources than undisturbed native vegetation communities. However, areas supporting traditional foods and

ethnobotanical resources may still in exist in areas less affected by fire or in vegetation communities with greater resistance and resilience to wildfire disturbance.

3.2.3.6 Environmental Consequences (Results of Analysis)

Types of Potential Effects

Typical direct effects on vegetation resources could include the removal of vegetation communities, loss of vegetation communities supporting traditional foods and other ethnobotanical resources, loss of special status plant species habitat, loss of individuals, and degradation of special status plant habitat through isolation and reduction of patch size. A majority of the direct effects are expected to result from temporary disturbance associated with the initial clearing of construction areas, but permanent loss of vegetation would occur where B2H Project infrastructure (i.e., tower pads, access roads used for maintenance, substation expansion, and communications sites) is expected to exist throughout the lifetime of the B2H Project. As proposed, areas of temporary disturbance will be reclaimed with desirable vegetation communities. However, direct effects on vegetation resources could persist long term, as many species and vegetation communities take decades to recover from disturbance.

The clearing and development of temporary construction areas, as well as construction of B2H Project infrastructure such as access roads, could change local topography and alter hydrologic flow patterns. Any changes to the hydrologic flow patterns may affect vegetation communities or special status plant species dependent on certain hydrologic regimes, where reduced water availability or concentrated flow patterns could adversely affect sensitive vegetation communities or special status plant species and their habitats.

A permanent 250-foot-wide right-of-way would be used for the construction of the 500-kV portions of the line, a 125-foot-wide right-of-way would be used for relocation of an existing 230-kV transmission line in the vicinity of Baker City, Oregon, a 100-foot-wide right-of-way would be used for the 138-kV portions of the line, and a 55-foot-wide right-of-way would be used for the relocation and rebuilding of transmission lines on the NWSTF Boardman (these same widths would be maintained during operation). These widths were established to ensure that sufficient clearance is maintained during high-wind events, when conductors could be blown toward the right-of-way edge, and to allow sufficient room to perform transmission line maintenance. Because the majority of the B2H Project would pass through vegetation communities dominated by low-growing plants (e.g., Agricultural, Grassland, and Shrubland vegetation communities) the entire right-of-way would not be cleared of vegetation in most areas. With the exception of forested areas, construction clearing would be limited to the footprint of B2H Project facilities (e.g., tower bases and substations), access road footprints (i.e., 14 feet wide along straight segments and 16 to 20 feet wide at corners), areas directly adjacent to B2H Project facilities (i.e., an approximately 25-foot perimeter around tower bases), and extra work spaces required for construction (e.g., staging areas, fly yards, and pulling/tensioning sites).

Vegetation maintenance in the right-of-way would be conducted using the wire-border zone method, which controls tall vegetation to different clearance distances based on position within the right-of-way. In general, vegetation at the edge of the right-of-way would grow to greater heights, minimizing the

amount of trees removed. For the most part, the permanent right-of-way would not need maintenance for sufficient clearance, as the majority of the B2H Project crosses through low-lying vegetation. Vegetation maintenance would be needed where the B2H Project crosses woodlands and forested areas and would result in permanent loss of these communities within the 250-foot-wide transmission line right-of-way. The harvest of trees during vegetation clearing and maintenance of the B2H Project right-of-way or other ancillary facilities would be conducted in a manner that meets federal standards on public lands and Oregon's Forest Practices Act standards on private and state lands. Vegetation clearing to maintain the right-of-way would affect Forests/Woodlands vegetation communities but could result in disproportionate impacts on forested wetlands, riparian areas, or old-growth forests, where large, mature trees are crucial to maintaining ecosystem function. The structure of these communities would be altered permanently and habitat values or ecosystem services, or both, of these communities may be affected. Traditional foods or other ethnobotanical resources found in these vegetation communities would also be affected and their availability reduced as a result of vegetation maintenance. Additional indirect effects associated with vegetation maintenance could include increased weed invasion and edge effects, such as increased light availability or increased ambient temperatures and decreased relative humidity associated with removal of canopy shading (Young and Mitchell 1994).

Vegetation clearing and the development of new access roads could promote access to areas previously inaccessible by livestock, vehicles, or general public. Increased public access, vehicle traffic or livestock use could affect native vegetation communities, traditional foods or other ethnobotanical resources and special status by contributing to grazing pressure, soil compaction, illegal collection of special status plants, or increased gathering of traditional foods or other ethnobotanical resources. Additionally, increased vehicle traffic and livestock use could increase the risk of invasive plant species invasion and spread.

The Applicant has committed to not use herbicides to control native vegetation, but herbicides may be used to control invasive plant populations. Herbicide applications could affect native vegetation communities, traditional foods and ethnobotanical resources, and special status plant individuals and habitat through herbicide drift, inadvertent application to nontarget species, or possible spills resulting in site contamination or habitat degradation. Any herbicide application would comply with applicable federal, state, county, or agency guidelines. The herbicides approved for use for all B2H Project activities, as well as herbicide specific buffers for streams, are presented in Section 3.2.5.

Fugitive dust resulting from construction activities and use of B2H Project access roads could result in indirect effects on vegetation resources. Prolonged exposure of plant communities to fugitive dust may affect the growth and reproductive habits of vegetation by reducing photosynthetic abilities and preventing pollen transfer. Fugitive dust could result in decreased availability traditional foods and other ethnobotanical resources by reducing development of roots, leaves, stems, or fruit, as well as rendering some foods unpalatable. Fugitive dust could result in disproportionate effects on federally listed and sensitive plant species due to their limited distribution, small population sizes, or dependence on successful annual reproduction to maintain population sizes. Dust production is expected only during

construction activities and during use of access roads that have not yet revegetated; operation and regular maintenance of the transmission line are not expected to produce significant amounts of dust.

Alterations to soil structure, chemistry, nutrients, hydrology, light availability, and species composition following vegetation clearing or other surface-disturbing activities increase the risk of invasive plant invasion and associated indirect effects on vegetation resources. B2H Project-related construction activities and resulting increased vehicle use on new and improved access roads in the B2H Project area, both by construction machinery and private vehicles, could increase the risk of invasive plants invasion by transporting weed seeds. Seeds may be transported by being lodged directly in vehicles, transported in mud attached to vehicles, and in straw or seed mixes used to reclaim disturbed areas. Noxious weeds and other invasive plants have the potential to displace native vegetation, reduce availability of traditional foods and other ethnobotanical resources, and reduce habitat quality for several federally listed or sensitive plant species (Harrison et al. 1996).

Noxious weeds and other invasive plants invasion can result in permanent alterations in plant community structure, diversity, and function. Indirect effects from weed invasion also may continue long term, as some weed species have the ability to form persistent alternate vegetation communities (Miller et al. 2013). B2H Project disturbance would increase the risk of weed invasion in all vegetation communities and special status plant habitats. The risk and likelihood of weed invasion depends on several factors, including: the extent of B2H Project disturbance, preconstruction condition of native vegetation communities, and distribution of invasive plants in the surrounding area. Relatively intact vegetation communities with low abundances of existing invasive plant infestations would be susceptible to the potential effects of alterations in plant community structure and composition as a result of invasive plant invasion. The risk also varies depending on vegetation community type, as some vegetation communities are highly susceptible to invasion by common invasive plants. Native Grassland and Shrubland communities in the B2H Project area are particularly susceptible to weed invasion based on general high levels of pre-existing disturbance to these communities and abundance of weed species adapted to semi-arid grasslands and shrub-steppe environments.

Common invaders of semi-arid Grassland and Shrubland communities in the B2H Project area of particular concern include cheatgrass (*Bromus tectorum*), medusahead (*Taeniatherum caput-medusae*), diffuse knapweed (*Centaurea diffusa*), and yellow star-thistle (*Centaurea solstitialis*). Riparian and wetland areas identified as RCA vegetation communities also are highly susceptible to weed invasion for similar reasons, and alteration to vegetation composition and structure within these communities could affect other resources as well. Right-of-way clearing and maintenance could increase the weed invasion risk in forested vegetation communities by creating areas favorable to weed establishment and spread not typically found in these communities. Common invaders of RCA and forested vegetation communities in the B2H Project area of particular concern include garlic mustard (*Alliaria petiolate*), Canada thistle (*Cirsium arvense*), and sulfur cinquefoil (*Potentilla recta*). In general, special status plant species and habitat are particularly sensitive to weed invasion based on limited distribution and abundance where any adverse effect or reduced habitat quality could result in larger population effects.

In areas affected by recent fires, vegetation clearing and ground disturbance would be expected to have minimal impacts on the structure of vegetation communities. However, introduction of flammable, invasive annual grasses like cheatgrass or medusahead, in conjunction with ignition risk from increased vehicle use, could increase wildfire frequencies (Whisenant 1990) and sizes (Balch et al. 2012). Frequent fires further increase the susceptibility of an area to invasion by and continued dominance of annual grasses, creating a positive feedback loop. Implementation of the B2H Project could affect local fire regimes through other means, including piling of slash associated with right-of-way clearing and addition of ignition sources from increased traffic on access roads. Wildfire ignition from conductor discharge is not likely with the B2H Project due to the use of steel towers and large conductor spans required for a 500-kV transmission line and ongoing vegetation maintenance in the right-of-way to maintain set clearance distances (CPUC and BLM 2011).

Old-growth forests are rare vegetation communities potentially present in the B2H Project area that provide unique habitats for plant, fungi, and wildlife species and significantly contribute to biodiversity. B2H Project activities that require substantial modification of old-growth forests (i.e., limbing, felling, and clearing of individual trees) would result in changes in forest structure that are either irreversible or persist for several decades. In addition to changes in old-growth forest structure, the types of potential effects on old-growth forests would be similar to those described throughout this section. Any B2H Project-related disturbance to old-growth forests could result in high impacts as they would represent the loss of vegetation communities that are rare, regenerate slowly, or are crucial for maintaining biodiversity (Table 3-94). Additional information about potential effects of the B2H Project on old-growth forests in areas under USFS jurisdiction is presented in Section 3.4.

No Action Alternative

Under the No Action Alternative, the environment would remain as it presently exists and no identifiable impacts are expected on any vegetation resource.

Effects Common to All Action Alternatives

Disturbance to soil and vegetation in habitat for special status plants could occur as a result of overland vehicle access or foot traffic during geotechnical surveys and preconstruction special status species surveys. Overland vehicle access for geotechnical surveys will be restricted to routes designated in the POD, and special status species surveys would follow agency-approved protocol and would minimize ground disturbance to the extent possible. However, even minimal disturbance in habitat that is rare, highly erodible, or otherwise particularly sensitive could have detrimental effects on a species.

Resource-avoidance measures for the geotechnical investigation would include (1) monitor geotechnical investigation activities, (2) adjust activities to occur outside of seasonal restrictions, (3) use alternative access or drilling methods, (4) relocate the borehole, and (5) abandon the geotechnical site.

SEGMENT 1—MORROW-UMATILLA

Vegetation Communities

Table 3-119 presents the miles crossed and residual impacts on vegetation communities for all alternative routes and route variations in Segment 1. Table 3-120 presents the anticipated amounts of disturbance to vegetation communities in Segment 1. The distribution of vegetation communities in the B2H Project area is displayed on MV-7.

Applicant's Proposed Action Alternative

The vegetation communities crossed, the extent of residual impacts, and the estimated disturbance resulting from the Applicant's Proposed Action Alternative are summarized in Table 3-119. Based on the impact criteria used in this analysis, the Applicant's Proposed Action Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush Steppe and Mixed Conifer Forest vegetation communities. Low residual impacts on vegetation communities are expected where the Applicant's Proposed Action Alternative crosses Agriculture and Non-native Grassland communities.

Several wildfires have affected vegetation communities crossed by the Applicant's Proposed Action Alternative on the NWSTF Boardman (Link 1-27), and the current vegetation communities may no longer reflect the vegetation communities identified from the NWGAP data and the assessment of initial and residual impacts. Vegetation communities affected by wildfires can take decades to recover to predisturbance conditions, but are assumed to eventually return to predisturbance conditions, unless weed invasion and fire regime alteration cause native vegetation communities to transition to communities more typical of Non-native Grasslands. The departure from normal of native vegetation communities affected by wildfire is heavily influenced by pre-existing conditions, as well as other factors, including vegetation community type, fire severity, and weather. Vegetation communities with abundant and diverse native plant species, particularly those with high cover of perennial bunchgrasses, are more likely to recruit and resprout with native vegetation similar to predisturbance conditions (Miller et al. 2013). However, without detailed knowledge of the pre-existing conditions across the entirety of the alternative route for each wildfire to predict the departure from normal, the assessment of impacts assumes areas affected by recent wildfires will return to predisturbance conditions. Several B2H Project design features aimed to reduce erosion and the extent of disturbance, prevent the introduction and spread of invasive plants, and establish desirable vegetation are anticipated to minimize the risk of recently burned native vegetation communities transitioning to non-native communities as a result of B2H Project activities.

Table 3-119. Alternative Route Comparison for Vegetation Resources Inventory Data and Residual Impacts on Segment 1—Morrow-Umatilla (miles crossed)

Alternative Route	Total Length (miles)	Inventory															Residual Impacts[1]	
		Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe	Moderate	Low
Applicant's Proposed Action	91.9	31.5	0.3	0.0	0.4	1.9	0.1	0.1	0.0	13.6	0.2	7.5	4.4	0.0	5.3	26.6	54.0	37.9
Variation S1-B1	*6.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*5.7*	*0.0*	*0.1*	*0.0*	*0.0*	*0.5*	*0.1*	*6.4*	*0.0*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.0*	*5.1*	*0.0*	*0.0*	*0.0*	*0.0*	*1.0*	*0.2*	*6.3*	*0.1*
East of Bombing Range Road	92.3	37.7	0.3	0.0	0.6	0.5	0.1	0.1	0.0	13.6	0.2	7.4	4.7	0.1	5.3	21.7	49.2	43.1
Applicant's Proposed Action – Southern Route	99.1	27.6	0.3	0.0	0.4	1.9	0.4	0.1	0.2	14.7	0.3	11.1	4.9	0.0	6.8	30.4	64.6	34.5
West of Bombing Range Road – Southern Route	95.6	18.9	0.3	0.0	0.3	1.8	0.5	0.1	0.2	14.7	0.3	14.2	5.8	0.0	7.4	31.1	69.0	26.6
Longhorn	88.2	33.4	0.3	0.0	0.2	0.9	0.1	0.1	0.0	13.6	0.2	7.6	5.4	0.2	5.4	20.8	48.2	40.0
Interstate 84	84.7	22.0	0.3	0.0	0.0	12.4	0.1	0.1	0.0	13.6	0.2	6.8	3.9	1.8	10.0	13.5	44.5	40.2
Variation S1-A1	*18.5*	*5.2*	*0.0*	*0.0*	*0.0*	*8.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.2*	*1.7*	*0.0*	*1.1*	*1.9*	*3.2*	*15.3*
Variation S1-A2	*18.5*	*5.5*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.8*	*0.0*	*0.9*	*10.3*	*11.2*	*7.3*
Interstate 84 – Southern Route	93.4	19.5	0.3	0.0	0.0	12.4	0.4	0.1	0.2	14.7	0.3	10.5	4.5	1.8	11.5	17.2	55.1	38.3

Table Note: [1]High residual impacts on vegetation communities are not anticipated to occur.

Table 3-120. Anticipated Disturbance for Vegetation Resources for Segment 1—Morrow-Umatilla (acres)

Alternative Route	Total Disturbance (acres)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Applicant's Proposed Action	1,907	654	6	0	8	39	2	2	0	282	4	156	91	0	110	552
Variation S1-B1	*142*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*126*	*0*	*2*	*0*	*0*	*11*	*2*
Variation S1-B2	*136*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*109*	*0*	*0*	*0*	*0*	*21*	*4*
East of Bombing Range Road	1,913	782	6	0	12	10	2	2	0	282	4	154	98	2	110	450
Applicant's Proposed Action – Southern Route	2,090	581	6	0	8	40	8	2	4	310	6	234	103	0	143	640
West of Bombing Range Road – Southern Route	2,111	417	7	0	7	40	11	2	4	325	7	314	128	0	163	687
Longhorn	1,867	706	6	0	4	19	2	2	0	288	4	161	114	4	114	440
Interstate 84	1,784	463	6	0	0	261	2	2	0	286	4	143	82	38	210	284
Variation S1-A1	*360*	*101*	*0*	*0*	*0*	*164*	*0*	*0*	*0*	*0*	*0*	*4*	*33*	*0*	*21*	*37*
Variation S1-A2	*408*	*121*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*40*	*0*	*20*	*227*
Interstate 84 – Southern Route	1,989	415	6	0	0	264	9	2	4	313	6	223	96	38	245	366

Table Note: Acres in the table are rounded and, therefore, columns may not sum exactly.

Direct and indirect effects on vegetation communities would include loss of vegetation, alterations to vegetation community structure, and increased risks of invasive plant invasion. The types of potential effects on vegetation communities are described in greater detail in Section 3.2.3.6. Several B2H Project design features are anticipated to limit these effects through reducing the extent of disturbance, preventing the spread and establishment of invasive plants, and reclaiming disturbed areas with desirable native vegetation. Refer to the list of design features applicable to vegetation communities in Table 2-7 in Section 2.3.4.

The Applicant's Proposed Action Alternative crosses RNA-B located on the NWSTF Boardman and would result in disturbance to primarily Tall Sagebrush Steppe vegetation communities in the RNA. The types of effects, initial impacts, and residual impacts on these communities in the RNA would be similar to those described for other vegetation communities in Segment 1. Any development in RNA-B would be inconsistent with the Navy management for the area as identified in the INRMP and underlying governing requirements of designated ecological reserves. Refer to the Land Use section, Section 3.2.6, for a detailed discussion of potential effects regarding Navy management plans.

Where the Applicant's Proposed Action Alternative crosses RCAs, disturbance to these vegetation communities is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible, as described by B2H Project Design Features 15 and 16. Where spanning would not be feasible, the application of several selective mitigation measures aimed to reduce the creation of new access roads, soil disturbance, and vegetation removal in the right-of-way are expected to reduce impacts from a high initial level to a moderate residual level. Reducing vegetation removal in the right-of-way (Selective Mitigation Measure 5) also would be applied to Mixed Conifer Forest, Aspen, and Juniper and Mahogany Woodlands, but is not anticipated to reduce residual impacts. Table 3-116 summarizes the expected level of initial impacts, selective mitigation measures that would be applied, and resulting residual impacts on vegetation communities.

Variation S1-B1

Variation S1-B1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mixed Conifer Forest and RCA vegetation communities. Moderate residual impacts also are expected where Variation S1-B1 crosses Tall Sagebrush Steppe vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S1-B2

Variation S1-B2 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mixed Conifer Forest and RCA vegetation communities. Variation S1-B2 would disturb greater amounts of RCAs than Variation S1-B1. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Option 1

The types of effects associated with the relocation of the existing transmission line would be similar to those described in Section 3.2.3.6. Direct and indirect effects from Design Option 1 will result in impacts on vegetation communities, but B2H Project design features and selective mitigation measures are expected to limit and reduce residual impacts. The anticipated levels of residual impacts on vegetation communities and applicable design features and selective mitigation measures are summarized in Table 3-95. The types of vegetation communities affected and the extent of impacts resulting from the additional action will depend on the several factors, including the amount of ground clearing needed to safely address unexploded ordnance on the NWSTF Boardman while decommissioning the line and the relocation area.

Design Option 2

The types of effects associated with the relocation of the existing transmission line would be similar to those described in Section 3.2.3.6. Direct and indirect effects from the additional action according to Design Option 2 will result in greater amounts of impacts on vegetation communities than Design Option 1. Design Option 2 requires decommissioning more of the existing 69-kV transmission line and constructing a longer transmission line to replace the 69-kV transmission line. B2H Project design features and selective mitigation measures are expected to limit and reduce residual impacts. The anticipated levels of residual impacts on vegetation communities and applicable design features and selective mitigation measures are summarized in Table 3-95. The types of vegetation communities affected and the extent of impacts resulting from the additional action will depend on the several factors, including the amount of ground clearing needed to safely address unexploded ordnance on the NWSTF Boardman while decommissioning the line and the relocation area.

Design Option 3

The types of effects associated with the relocation of the existing transmission line would be similar to those described in (Section 3.2.3.6. Direct and indirect effects from Design Option 3 would result in greater amounts of impacts on vegetation communities than either Design Option 1 or Design Option 2. Design Option 3 requires the same extent of decommissioning for the existing 69-kV transmission line and construction of a replacement transmission line as Design Option 2, but also requires the additional construction of a new step-down station. The disturbance to vegetation communities associated with constructing the 230-kV transmission line required by Design Option 3 would occur regardless of whether the Applicant or another entity constructs the transmission line and, therefore, is included this analysis. B2H Project design features and selective mitigation measures are expected to limit and reduce residual impacts. The anticipated levels of residual impacts on vegetation communities and applicable design features and selective mitigation measures are summarized in Table 3-95. The types of vegetation communities affected and the extent of impacts resulting from the additional action will depend on the several factors, including the amount of ground clearing needed to safely address unexploded ordnance on the NWSTF Boardman while decommissioning the line and the relocation area.

East of Bombing Range Road Alternative

The East of Bombing Range Road Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush Steppe and Mixed Conifer Forest vegetation communities. Moderate impacts also are anticipated where the alternative route crosses RCAs and Native Grasslands. Low residual impacts on vegetation communities are expected where the East of Bombing Range Road Alternative crosses Agriculture and Non-native Grassland communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Applicant's Proposed Action – Southern Route Alternative

The Applicant's Proposed Action – Southern Route Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush Steppe, Mixed Conifer Forest, and Native Grassland vegetation communities. Moderate impacts also are anticipated where the alternative route crosses RCAs. Low residual impacts on vegetation communities are expected where the Applicant's Proposed Action – Southern Route Alternative crosses Agriculture and Non-native Grassland communities. The Applicant's Proposed Action – Southern Route Alternative crosses RNA-B on the NWSTF along the same alignment as the Applicant's Proposed Action Alternative and would result in the same impacts on vegetation communities in RNA-B. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

The types of effects associated with the relocation of the existing transmission line for the Applicant's Proposed Action – Southern Route Alternative would be similar to those described for the Applicant's Proposed Action Alternative.

West of Bombing Range Road – Southern Route Alternative

The West of Bombing Range Road – Southern Route Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush Steppe, Mixed Conifer Forest, and Native Grassland vegetation communities. Moderate impacts also are anticipated where the alternative route crosses RCAs. Low residual impacts on vegetation communities are expected where the West of Bombing Range Road – Southern Route Alternative crosses Agriculture and Non-native Grassland communities. The West of Bombing Range Road – Southern Route Alternative crosses RNA-B on the NWSTF along the same alignment as the Applicant's Proposed Action Alternative and would result in the same impacts on vegetation communities in the RNA. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to

reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

The types of effects associated with the relocation of the existing transmission line for the West of Bombing Range Road – Southern Route Alternative would be similar to those described for the Applicant's Proposed Action Alternative.

Longhorn Alternative

The Longhorn Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush Steppe and Mixed Conifer Forest vegetation communities. Moderate impacts also are anticipated where the alternative route crosses RCAs and Native Grasslands. Low residual impacts on vegetation communities are expected where the Longhorn Alternative crosses Agriculture and Non-native Grassland communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Interstate 84 Alternative

The Interstate 84 Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush Steppe, Mixed Conifer Forest, and RCA vegetation communities. Low residual impacts on vegetation communities are expected where the Interstate 84 Alternative crosses Agriculture and Non-native Grassland communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative. As a result of the greater amounts of disturbance to non-native vegetation communities, the Interstate 84 Alternative is anticipated to have lower levels of residual impacts on vegetation communities than the Applicant's Proposed Action Alternative.

Variation S1-A1

Variation S1-A1 is anticipated to result in predominantly low residual impacts on vegetation communities as it primarily crosses Developed/Disturbed and Agriculture vegetation communities. Moderate residual impacts are anticipated where Variation S1-A1 crosses Tall Sagebrush Steppe and RCAs. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S1-A2

Variation S1-A2 is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush Steppe and RCA vegetation communities. Low residual impacts are anticipated where Variation S1-A2 crosses Agriculture vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and

selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Interstate 84 – Southern Route Alternative

The Interstate 84 – Southern Route Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush Steppe, Mixed Conifer Forest, and RCA vegetation communities. Low residual impacts on vegetation communities are expected where the Interstate 84 – Southern Route Alternative crosses Agriculture and Non-native Grassland communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Federally Listed and Candidate Plant Species

Applicant's Proposed Action Alternative and All Other Alternatives

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor. As such, impacts resulting from short-term disturbance, loss or adverse modification of habitat occupied by federally listed or candidate species, or individual mortality to federally listed or candidate species are not anticipated for any alternative routes considered in Segment 1. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance and prevent individual mortality in occupied habitat is anticipated to reduce residual impacts on federally listed or candidate plant species to low levels.

Other Sensitive Plant Species

Table 3-121 identifies the sensitive plant species known to occur in the 1-mile analysis corridor for all alternative routes and route variations in Segment 1, and summarizes the occurrence data by land-management jurisdiction and known occurrences in the 10-mile analysis corridor.

Table 3-121. Potentially Affected Sensitive Plant Species for Segment 1—Morrow-Umatilla

Alternative Route	Total Acres of Disturbance	Laurent's Milkvetch					Retrorse Sedge				
		Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile			
			Federal	State	Private	Total		Federal	State	Private	Total
Applicant's Proposed Action	1,907	16	1	0	10	10	0	0	0	0	0
Variation S1-B1	*142*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S1-B2	*136*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
East of Bombing Range Road	1,913	16	1	0	10	10	0	0	0	0	0
Applicant's Proposed Action – Southern Route	2,090	16	1	0	10	10	0	0	0	0	0

Table 3-121. Potentially Affected Sensitive Plant Species for Segment 1—Morrow-Umatilla											
Alternative Route	Total Acres of Disturbance	Laurent's Milkvetch					Retrorse Sedge				
		Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile			
			Federal	State	Private	Total		Federal	State	Private	Total
West of Bombing Range Road – Southern Route	2,111	9	1	0	1	1	0	0	0	0	0
Longhorn	1,867	16	0	0	9	9	0	0	0	0	0
Interstate 84	1,784	6	0	0	2	2	1	0	0	0	0
Variation S1-A1	*360*	*2*	*0*	*0*	*2*	*2*	*1*	*0*	*0*	*0*	*0*
Variation S1-A2	*408*	*3*	*0*	*0*	*1*	*1*	*1*	*0*	*0*	*1*	*1*
Interstate 84 – Southern Route	1,989	6	0	0	2	2	1	0	0	0	0
Table Note: Some sensitive plant species occurrences may exist on multiple jurisdictions, and the sum of occurrences on federal, state, and private lands may be greater than the total											

Applicant's Proposed Action Alternative

One sensitive plant species occurs in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative, Laurent's milkvetch (Table 3-121).

If disturbance from B2H Project activities occurs in sensitive plant species habitats, several direct and indirect effects may occur, including loss of habitat; mortality or other adverse effects on individuals; and habitat degradation through weed invasion or reduction and isolation of patch size. These effects are described in greater detail in Section 3.2.3.6. The criteria used to assess impacts are presented in Table 3-94.

Temporary disturbance to sensitive plant species and habitats, such as dust deposition or decreased pollinator attractiveness, could result in effects on individuals through reduced reproductive and photosynthetic activities which would adversely affect the ability of sensitive plant species to recover from disturbance. Where disturbance results in these temporary effects, low levels of impacts are expected. Disturbance to sensitive plant species and habitats could result in long-term effects where habitat loss and degradation through isolation or increased risk of weed invasion adversely affect the species ability to recover from disturbance and reduce available habitat. Where disturbance results in these long-term effects, moderate levels of impacts are expected.

Disturbance to sensitive plant species resulting in the mortality of individuals and loss of habitat could reduce local populations, leading to (1) increased vulnerability to stochastic events, (2) genetic inbreeding and depression, (3) limited effectiveness of future restoration actions, and (4) decreased ability of local populations to persist in the long term. Where disturbance results in limited or incidental mortality of sensitive plant species that does not affect the long-term persistence of local populations, low levels of impacts are expected. If reduction of the local population is severe and contributes the extirpation of a local sensitive plant species population, moderate impacts are expected. If the extirpation of a local sensitive plant species population occurs and adversely affects sensitive plants

species contributing to the listing of the species under the ESA for additional protection, high levels of impact are expected.

If impacts on sensitive plant species and their habitat do occur, the severity of impacts would also depend on the sensitive plant species affected and the broader distribution of known occurrences throughout the range of the species. In general, sensitive plant species are rare, with relatively few known occurrences, and any disturbance to sensitive species and their habitat will disproportionately impact the species. Similarly, disturbance to sensitive plant species with limited distribution or few known occurrences are likely to result in greater impacts than disturbance to a more broadly distributed species.

The severity of potential impacts also depends on the species affected; as different life histories and adaptations will determine the sensitive plant species tolerance and ability to recover from disturbance. Disturbance to sensitive plant species that are less tolerant to disturbance through adaptations such as required cross-pollination through insects for successful reproduction, are likely to be more severely affected by dust deposition than self-pollinating plant species. Similarly, disturbance to sensitive plant species with life histories reducing the species' ability to recover from disturbance, such as slow-maturing perennial species, are likely to be more severely affected by disturbance or individual mortality.

Due to the complicated nature of assessing impacts on sensitive plant species, the state rank as determined by the state natural heritage program, as well as the number of known occurrences for each species, is provided as an estimate of the species' vulnerability to disturbance. Species ranked as higher conservation concern, or with fewer known occurrences, are assumed to be more sensitive, and any B2H Project-related disturbance would have greater impacts on these species.

However, impacts on sensitive plant species are anticipated to be largely avoided through application of design features of the B2H Project for environmental protection and selective mitigation measures. Design Feature 4 requires that preconstruction surveys be conducted for sensitive plant species. In areas determined to be occupied by sensitive plant species, Selective Mitigation Measures 8 and 13 would be applied to span, avoid, or reduce disturbance in sensitive plant species habitat and limit any mortality of individuals. In addition, design features of the B2H Project for environmental protection aimed to reduce the amounts of disturbance and prevent the establishment of invasive plants would limit residual impacts on sensitive plant species.

Several known occurrences of these species in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative exist on federally managed lands where resource management plans require the conservation of sensitive species and implementation of the B2H Project will be designed to reduce, avoid or mitigate any potential impacts on sensitive plant species (Table 3-121). However, some occurrences are primarily on private land where pre-existing disturbance may have increased the occurrence's vulnerability to disturbance through loss and degradation of suitable habitat or population reductions. On privately owned lands, implementation of the B2H Project may not need to comply with resource management plans requiring the reduction of impacts on sensitive plant species. Depending

on the amount of pre-existing disturbance and individual landowner preferences regarding survey access, placement of B2H Project features, and herbicide application during B2H Project construction, operation, and maintenance, impacts on sensitive plant species occurring on privately owned lands may be greater than expected on federally managed lands and result in loss of habitat; mortality or other adverse effects on individuals; habitat degradation through weed invasion, and severe reductions in local populations. Due to EFSC regulation, the B2H Project would comply with state of Oregon regulations protecting sensitive plant species considered endangered or threatened by the state of Oregon regardless of land jurisdiction. As a result, implementation of the B2H Project on private lands would be managed to prevent a significant reduction in the likelihood of survival or recovery of the species.

Laurent's milkvetch is a perennial forb considered critically imperiled by ORBIC (G5T1S1) due to the few known occurrences limited to north-central Oregon (ORBIC 2013a). Most known occurrences are small, with fewer than 100 individuals per occurrence and patchily distributed in a landscape with extensive agricultural development. Population trends are unknown, but due to the small number of known occurrences and existing threats from agricultural development would be sensitive to disturbance. ORBIC recognizes 29 occurrences of Laurent's milkvetch in Oregon. However, 12 occurrences were identified preconstruction surveys. Of the total 41 known Laurent's milkvetch occurrences, 10 are known to occur in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. All 10 of these occurrences exist on privately owned lands. However this species is considered threatened by the state of Oregon; and potential impacts resulting from the B2H Project implementation would be avoided or minimized to the greatest extent possible to prevent a significant reduction in the likelihood of survival or recovery of the species. Based on the total number of occurrences, compliance with state of Oregon regulations on private lands, and the mitigation measures to avoid or reduce disturbance there would be limited impacts on the species. Implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance to Laurent's milkvetch and moderate residual impacts, but is not likely to contribute to the need to list the species under the ESA.

Until the final engineering design and preconstruction surveys completed is available, the exact location of sensitive plant species in relation to B2H Project features is not available and a quantitative determination of the number of individuals affected, acres of habitat disturbed, or anticipated amount of impacts on sensitive plant species cannot be provided.

Variation S1-B1

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S1-B1, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S1-B2

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S1-B2, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Additional Action – 69-Kilovolt Line Replacement

Direct and indirect effects from the additional action may result in impacts on sensitive plant species similar to those described for the Applicant's Proposed Action Alternative. Application of selective mitigation measures based on the results of preconstruction surveys is anticipated to reduce impacts on sensitive plant species.

East of Bombing Range Road Alternative

The 1-mile analysis corridor for the East of Bombing Range Road Alternative contains the same sensitive species and number of known occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of the East of Bombing Range Alternative could result in moderate residual impacts on Laurent's milkvetch, but is not likely to contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Applicant's Proposed Action – Southern Route Alternative

The 1-mile analysis corridor for the Applicant's Proposed Action – Southern Route Alternative contains the same sensitive species and number of known occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of the Applicant's Proposed Action – Southern Route Alternative could result in moderate residual impacts on Laurent's milkvetch, but is not likely to contribute to the need to list the species under the ESA.

The types of potential effects, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Additional Action – 69-Kilovolt Line Replacement

The types of effects associated with the relocation of the existing transmission line for the Applicant's Proposed Action – Southern Route Alternative would be similar to those described for the Applicant's Proposed Action Alternative.

West of Bombing Range Road – Southern Route Alternative

The 1-mile analysis corridor for the West of Bombing Range Road – Southern Route Alternative contains the same sensitive species but fewer known occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of the West of Bombing Range Road – Southern Route Alternative could result in moderate residual impacts on Laurent's milkvetch, but is not likely to contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Additional Action – 69-Kilovolt Line Replacement

The types of effects associated with the relocation of the existing transmission line for the West of Bombing Range Road – Southern Route Alternative would be similar to those described for the Applicant's Proposed Action Alternative.

Longhorn Alternative

The 1-mile analysis corridor for the Longhorn Alternative contains the same sensitive species but fewer known occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of the Longhorn Alternative could result in moderate residual impacts on Laurent's milkvetch, but is not likely to contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Interstate 84 Alternative

The 1-mile analysis corridor for the Interstate 84 Alternative contains the same sensitive species but eight fewer known occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of the Interstate 84 Alternative could result in moderate residual impacts on Laurent's milkvetch, but is not likely to contribute to the

need to list the species under the ESA. However, given the fewer number of occurrences contained in the 1-mile analysis corridor of the Interstate 84 Alternative, the likelihood of moderate residual impacts resulting from implementation is less than the Applicant's Proposed Action Alternative.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S1-A1

The 1-mile analysis corridor for Variation S1-A1 contains the same sensitive species but fewer known occurrences as the Interstate 84 Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S1-A1 could result in moderate residual impacts on Laurent's milkvetch, but is not likely to contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Interstate 84 Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys

Variation S1-A2

The analysis corridor for Variation S1-A2 contains two species: Laurent's milkvetch and retrorse sedge.

Retrorse sedge is a perennial graminoid considered critically imperiled (G5S1) due to the limited number of occurrences in Oregon (ORBIC 2013a). Population trends are unknown in Oregon. Retrorse sedge is known from only a few locations in Oregon with only two located east of the Cascades, but broadly distributed across northern North America. ORBIC recognizes 9 occurrences of retrorse sedge. However, 1 other occurrence was identified during other USFS surveys and none known from Idaho. Of the 10 total occurrences, one is known to occur in the 1-mile analysis corridor and may be affected by implementation of Variation S1-A2. This occurrence exists on privately owned land where impacts resulting from the B2H Project may be greater. However, based on the number of total known occurrences and the broader distribution of the species beyond the B2H Project area, implementation of Variation S1-A2 could result in long-term disturbance to retrorse sedge and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S1-A2 could result in moderate residual impacts on Laurent's milkvetch, but is not likely to contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's

Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Interstate 84 – Southern Route Alternative

The 1-mile analysis corridor for the Interstate 84 – Southern Route Alternative contains the same sensitive species but fewer known occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of the Interstate 84– Southern Route Alternative could result in moderate residual impacts on Laurent's milkvetch, but is not likely to contribute to the need to list the species under the ESA. However, given the fewer number of occurrences contained in the 1-mile analysis corridor of the Interstate 84 – Southern Alternative, the likelihood of moderate residual impacts resulting from implementation is less than the Applicant's Proposed Action Alternative.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

USFS Sensitive Plant Species

The Applicant's Proposed Action Alternative and all other alternative routes cross USFS-administered land and contain USFS sensitive plant species in their respective 10-mile analysis corridors. However, of the four USFS sensitive plant species known to occur in the 10 mile analysis corridor of alternatives and variations crossing USFS-administered lands, only scabland penstemon and flowery phlox occur in the Blue Mountains region where the alternatives and variations cross USFS-administered lands. The known occurrences of salt heliotrope and retrorse sedge are north and west of Pendleton and are more than 40 miles from USFS-administered lands. Scabland penstemon and flowery phlox are not known to occur in the 1-mile analysis corridor of any alternative or variation crossing USFS-administered lands, and direct or indirect effects resulting from B2H Project-related activities are not expected to affect these known occurrences.

Unknown occurrences of USFS sensitive plant species may exist on USFS-administered lands that would be crossed by the B2H Project. As required by B2H Project Design Feature 4, preconstruction surveys to identify USFS sensitive species and determine habitat extents would be conducted along the right-of-way, as well as any areas requiring ground disturbance (e.g., building or upgrading of access roads, temporary work areas, and multi-use areas) outside the right-of-way.

If disturbance resulting from B2H Project activities occurs in USFS sensitive plant species habitats, several direct and indirect effects may occur, including loss of habitat; mortality or other adverse effects on individuals; and habitat degradation through weed invasion or reduction and isolation of patch size. These effects are described in greater detail in Section 3.2.3.6. Based on the impact criteria, moderate levels of residual impacts are anticipated if B2H Project activities result in the mortality of individuals

and low levels of residual impacts are anticipated if temporary disturbance to sensitive plant species occurs. However, impacts on USFS sensitive plant species are anticipated to be largely avoided through application of design features of the B2H Project for environmental protection and selective mitigation measures. Design Feature 4 requires that preconstruction surveys be conducted for sensitive plant species. In areas determined to be occupied by USFS sensitive plant species, Selective Mitigation Measures 8 and 13 would be applied to span, avoid, or reduce disturbance in occupied habitat. In addition, design features of the B2H Project for environmental protection aimed to reduce the amounts of disturbance and prevent the establishment of invasive plants would limit direct and indirect effects on USFS sensitive plant species.

However, until the final engineering design and the results of preconstruction surveys are available, the exact location of USFS sensitive plant species in relation to B2H Project features is not available and a quantitative determination of the number of individuals affected, acres of habitat disturbed, or anticipated amount of impacts on sensitive plant species cannot be provided. The application of several B2H Project design features and selective mitigation measures is anticipated minimize direct and indirect effects on USFS sensitive plant species. Implementation of the B2H Project may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species for any of the USFS sensitive plant species considered in Segment 1.

Noxious Weeds

Applicant's Proposed Action Alternative and All Other Alternatives

The Applicant's Proposed Action Alternative and all other alternative routes would result in disturbance to native vegetation communities, which could alter vegetation community structure, soil properties, and water availability creating conditions favorable for noxious weed establishment and spread. Where this disturbance is in areas without weed infestations, the B2H Project may introduce noxious weed species through the transport of plant materials. In Segment 1, these areas exist mostly south of Pendleton and Interstate 84 and are crossed by the Applicant's Proposed Action – Southern Route, West of Bombing Range Road – Southern Route, and Interstate 84 – Southern Route alternative routes (Links 1-62, 1-64, and 1-66). Noxious weeds can displace native vegetation, reduce habitat quality for plant and wildlife species, and adversely affect agricultural operations by contaminating crops or degrading range and pastures. The potential impacts associated with noxious weeds on vegetation resources are described in greater detail in Section 3.2.3.6.

The extent of noxious weed invasion would be influenced by several factors, including the extent of B2H Project disturbance, preconstruction condition of native vegetation communities, and the distribution of noxious weeds in the surrounding area. The anticipated amounts of B2H Project disturbance to vegetation communities are summarized in Table 3-120. Several design features of the B2H Project for environmental protection aimed to limit disturbance extent or reclaim disturbed areas are expected to reduce noxious weed invasion potential. In addition to the design features, the Applicant has committed to developing a Noxious Weed Management Plan that will detail preconstruction surveys, weed-control measures, and postconstruction monitoring. Implementation of

this plan would be expected to prevent the spread and establishment of noxious weeds and reduce impacts on vegetation resources associated with noxious weeds.

Traditional Foods and Ethnobotanical Resources

Applicant's Proposed Action Alternative and All Other Alternatives

The Applicant's Proposed Action Alternative and all other alternative routes would result in disturbance and potential impacts on native vegetation communities (Table 3-120). The Applicant's Proposed Action, West of Bombing Range Road, Applicant's Proposed Action – Southern Alternative crosses the NWSTF Boardman (Link 1-27) and could result in disturbance to vegetation communities supporting traditional foods and other ethnobotanical resources identified in the 2013 CTUIR ethnobotanical surveys. The types of potential impacts are described in greater detail in Section 3.2.3.6, but could include permanent and temporary loss of native vegetation communities, increased risk of weed invasion, and increased dust deposition. These types of effects could adversely affect an areas' ability to support traditional food or ethnobotanical resources and may result in temporary decreases in their abundance. Design features of the B2H Project aimed to reduce the amounts of disturbance and prevent the establishment of invasive plants would limit impacts on traditional foods and ethnobotanical resources. Additional design features requiring spanning, avoidance, and minimizing disturbance to RCA vegetation communities are anticipated to largely avoid impacts on traditional foods and ethnobotanical resources found in these vegetation communities. Once final engineering design is available, mitigation specific to areas important for the gathering of traditional foods and ethnobotanical resources can be identified and addressed in the government to government consultation process.

Conclusion

The Applicant's Proposed Action Alternative and all other alternative routes considered in Segment 1 would result in predominantly moderate residual impacts on vegetation communities, with the Interstate 84 Alternative resulting in the least moderate residual impacts as it affects Developed/Disturbed vegetation communities to the greatest extent. Several alternative routes would result in impacts on the NWSTF Boardman and the RNA (RNA-B) established to protect the few remaining intact native vegetation communities in the region. These alternative routes include: the Applicant's Proposed Action Alternative, the Applicant's Proposed Action – Southern Route Alternative, and the West of Bombing Range Road – Southern Route Alternative. The above alternative routes would also impact traditional foods and ethnobotanical resources on the NWSTF Boardman important to tribal groups.

Impacts on federally listed species are not expected for any of the alternative routes in Segment 1. Moderate residual impacts on sensitive plant species could occur for all alternative routes considered. The 1-mile analysis corridors of Interstate 84 and Interstate 84 – Southern Route alternatives contain the fewest occurrences of Laurent's milkvetch and have the lowest likelihood of moderate residual impacts on sensitive plant species. Variation S1-A1 would result in fewer impacts on sensitive plant species than Variation S1-A2, which could affect the only occurrence of retrorse sedge in Segment 1.

All alternative routes would result in disturbance to native vegetation communities and increase the potential establishment and spread of noxious weeds and other invasive plants. The Applicant's

Proposed Action – Southern Route, West of Bombing Range Road – Southern Route, and Interstate 84 – Southern Route alternative routes cross areas with few identified noxious weed infestations, and could introduce noxious weeds and other invasive plants to these areas.

The Interstate 84 Alternative would result in the least impacts on vegetation resources overall compared to the other alternative routes in Segment 1 due to (1) the fewest anticipated impacts on vegetation communities, (2) the lowest likelihood of moderate impacts on sensitive plants, and (3) the lower potential of introducing noxious weeds or other invasive plants to undisturbed areas.

SEGMENT 2—BLUE MOUNTAINS

Vegetation Communities

Table 3-122 presents the miles crossed and residual impacts on vegetation communities for all alternative routes and route variations in Segment 2. Table 3-123 presents the anticipated amounts of disturbance to vegetation communities in Segment 2. The distribution of vegetation communities in the B2H Project area is displayed on MV-7.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Mixed Conifer, Mountain Shrub, and Tall Sagebrush vegetation communities. Low residual impacts on vegetation communities are expected where the Applicant's Proposed Action Alternative crosses Agriculture and Non-native Grassland communities.

Direct and indirect effects on vegetation communities would include loss of vegetation, alterations to vegetation community structure, and increased risks of invasive plant invasion. The types of potential effects on vegetation communities are described in greater detail in Section 3.2.3.6. Several design features of the B2H Project for environmental protection are anticipated to limit these effects through reducing the extent of disturbance, preventing the spread and establishment of invasive plants, and reclaiming disturbed areas with desirable native vegetation. Refer to the list of design features applicable to vegetation communities in Section 3.2.3.4.

Where the Applicant's Proposed Action Alternative crosses RCAs, disturbance to these vegetation communities is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible, as described by B2H Project Design Features 15 and 16. Where spanning would not be feasible, the application of several selective mitigation measures aimed to reduce the creation of new access roads, soil disturbance, and vegetation removal in the right-of-way are expected to reduce impacts from a high initial level to a moderate residual level. Reducing vegetation removal in the right-of-way (Selective Mitigation Measure 5) also would be applied to Mixed Conifer Forest, Aspen, and Juniper and Mahogany Woodlands but is not anticipated to reduce residual impacts. Table 3-95 summarizes the expected level of initial impacts, selective mitigation measures that would be applied, and resulting residual impacts on vegetation communities.

Table 3-122. Vegetation Resources Inventory Data and Residual Impacts on Segment 2—Blue Mountains (miles crossed)

Alternative Route	Total Length (miles)	Inventory															Residual Impacts[1]	
		Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe	Moderate	Low
Applicant's Proposed Action	33.8	0.3	0.2	0.0	0.0	0.0	0.1	0.0	1.1	10.1	7.1	1.7	0.1	0.0	5.0	8.1	33.4	0.4
Variation S2-A1	*2.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.4*	*0.2*	*0.9*	*0.0*	*0.0*	*0.1*	*0.2*	*2.8*	*0.0*
Variation S2-A2	*2.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.5*	*0.2*	*0.6*	*0.0*	*0.0*	*0.6*	*0.0*	*2.9*	*0.0*
Variation S2-B1	*3.7*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*1.2*	*1.4*	*0.0*	*0.0*	*0.0*	*1.0*	*0.0*	*3.7*	*0.0*
Variation S2-B2	*3.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.4*	*0.7*	*0.0*	*0.0*	*0.0*	*1.0*	*0.7*	*3.8*	*0.0*
Variation S2-C1	*9.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.9*	*5.0*	*0.1*	*0.0*	*0.0*	*0.0*	*0.5*	*2.8*	*9.3*	*0.0*
Variation S2-C2	*8.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.7*	*4.7*	*0.1*	*0.0*	*0.0*	*0.0*	*0.8*	*2.4*	*8.8*	*0.0*
Variation S2-E1	*2.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.2*	*0.5*	*0.0*	*0.0*	*0.0*	*0.3*	*0.3*	*2.3*	*0.0*
Variation S2-E2	*2.6*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.4*	*0.8*	*0.3*	*0.0*	*0.0*	*0.0*	*0.2*	*0.9*	*2.6*	*0.0*
Variation S2-F1	*12.1*	*0.3*	*0.2*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.1*	*3.8*	*0.8*	*0.1*	*0.0*	*2.3*	*4.4*	*11.7*	*0.4*
Variation S2-F2	*12.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.2*	*0.0*	*0.2*	*0.0*	*2.7*	*0.6*	*0.1*	*0.0*	*1.6*	*6.7*	*12.0*	*0.2*
Glass Hill	33.7	0.3	0.2	0.2	0.0	0.0	0.1	0.0	1.3	8.9	7.9	1.7	0.1	0.0	5.4	7.6	33.1	0.6
Variation S2-D1	*4.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.0*	*2.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.7*	*0.4*	*4.3*	*0.0*
Variation S2-D2	*4.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*2.4*	*0.0*	*0.6*	*0.1*	*0.0*	*0.8*	*0.2*	*4.0*	*0.1*
Mill Creek	34.0	0.2	0.0	0.0	0.0	0.1	0.2	0.0	1.3	7.3	6.9	1.8	0.3	0.0	4.6	11.3	33.4	0.6

Table Note: [1]High residual impacts on vegetation communities are not anticipated to occur.

Table 3-123. Anticipated Disturbance for Vegetation Resources for Segment 2—Blue Mountains (acres)

Alternative Route	Total Disturbance (acres)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Applicant's Proposed Action	764	7	5	0	0	0	2	0	25	230	161	39	2	0	114	184
Variation S2-A1	*58*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*28*	*4*	*18*	*0*	*0*	*2*	*4*
Variation S2-A2	*60*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*31*	*4*	*12*	*0*	*0*	*12*	*0*
Variation S2-B1	*85*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*2*	*28*	*33*	*0*	*0*	*0*	*24*	*0*
Variation S2-B2	*85*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*31*	*16*	*0*	*0*	*0*	*22*	*16*
Variation S2-C1	*221*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*21*	*119*	*2*	*0*	*0*	*0*	*12*	*67*
Variation S2-C2	*191*	*0*	*0*	*0*	*0*	*0*	*2*	*0*	*15*	*102*	*2*	*0*	*0*	*0*	*17*	*52*
Variation S2-E1	*52*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*27*	*11*	*0*	*0*	*0*	*7*	*7*
Variation S2-E2	*58*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*9*	*18*	*7*	*0*	*0*	*0*	*4*	*20*
Variation S2-F1	*260*	*6*	*4*	*0*	*0*	*0*	*2*	*0*	*0*	*2*	*82*	*17*	*2*	*0*	*49*	*95*
Variation S2-F2	*266*	*0*	*0*	*0*	*0*	*2*	*4*	*0*	*4*	*0*	*59*	*13*	*2*	*0*	*35*	*146*
Glass Hill	752	7	4	4	0	0	2	0	29	199	177	38	2	0	121	170
Variation S2-D1	*109*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*25*	*56*	*0*	*0*	*0*	*0*	*18*	*10*
Variation S2-D2	*98*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*58*	*0*	*14*	*2*	*0*	*19*	*5*
Mill Creek	784	5	0	0	0	2	5	0	30	168	159	42	7	0	106	261

NOTE: Acres in the table are rounded and, therefore, columns may not sum exactly.

Variation S2-A1

Variation S2-A1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mixed Conifer Forest and Native Grassland vegetation communities. Moderate residual impacts also are expected where Variation S2-A1 crosses Mountain Shrub, Tall Sagebrush Steppe, and RCA vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S2-A2

Variation S2-A2 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mixed Conifer Forest and Native Grassland vegetation communities. Moderate residual impacts also are expected where Variation S2-A2 crosses Mountain Shrub, Tall Sagebrush Steppe, and RCA vegetation communities. Variation S2-A2 would disturb greater amounts of RCA vegetation communities than Variation S2-A1. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S2-B1

Variation S2-B1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mixed Conifer Forest, Mountain Shrub, and RCA vegetation communities. Moderate residual impacts also are expected where Variation S2-B1 crosses Juniper and Mahogany Woodland vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S2-B2

Variation S2-B2 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mixed Conifer Forest, Mountain Shrub, and RCA vegetation communities. Moderate residual impacts also are expected where Variation S2-B2 crosses Tall Sagebrush Steppe vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S2-C1

Variation S2-C1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mixed Conifer Forest, Juniper and Mahogany Woodland, and Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S2-C1 crosses Mountain Shrub and RCA vegetation communities. Direct and indirect effects on vegetation

communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S2-C2

Variation S2-C2 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mixed Conifer Forest, Juniper and Mahogany Woodland, and Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S2-C2 crosses Mountain Shrub, Dwarf Sagebrush, and RCA vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S2-E1

Variation S2-E1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mixed Conifer Forest and Mountain Shrub vegetation communities. Moderate residual impacts also are expected where Variation S2-E1 crosses RCA and Tall Sagebrush Steppe vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S2-E2

Variation S2-E2 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mixed Conifer Forest, Juniper and Mahogany Woodland, and Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S2-E2 crosses Mountain Shrub and RCA vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S2-F1

Variation S2-F1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mountain Shrub and Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S2-F1 crosses Dwarf Sagebrush, Native Grassland, Juniper and Mahogany Woodlands, and RCA vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S2-F2

Variation S2-F2 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mountain Shrub and Tall Sagebrush Steppe vegetation communities. Moderate residual

impacts also are expected where Variation S2-F2 crosses Dwarf Sagebrush, Native Grassland, Juniper and Mahogany Woodlands, and RCA vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Glass Hill Alternative

The Glass Hill Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush Steppe, Mountain Shrub, and Mixed Conifer Forest vegetation communities. Moderate impacts also are anticipated where the alternative route crosses RCAs, Aspen, Dwarf Sagebrush Steppe, Juniper and Mahogany Woodlands, and Native Grasslands. Low residual impacts on vegetation communities are expected where the Glass Hill Alternative crosses Agriculture, Bare Ground, Cliffs, Talus, and Non-native Grassland communities. Direct and indirect effects on vegetation communities and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S2-D1

Variation S2-D1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mixed Conifer Forest and RCA vegetation communities. Moderate residual impacts also are expected where Variation S2-D1 crosses Tall Sagebrush Steppe vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S2-D2

Variation S2-D2 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Mixed Conifer Forest and RCA vegetation communities. Moderate residual impacts also are expected where Variation S2-D2 crosses Tall Sagebrush Steppe vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Mill Creek Alternative

The Mill Creek Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush Steppe, Mountain Shrub, and Mixed Conifer Forest vegetation communities. Moderate impacts also are anticipated where the alternative route crosses RCA, Dwarf Sagebrush Steppe, Juniper and Mahogany Woodlands, and Native Grasslands. Low residual impacts on vegetation communities are expected where the Mill Creek Alternative crosses Agriculture, Bare Ground, Cliffs, Talus, and Non-native Grassland communities. Direct and indirect effects on vegetation communities and the application of design features and

selective mitigation measures to reduce the anticipated levels of impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Federally Listed and Candidate Plant Species

Table 3-124 identifies the federally listed or candidate plant species known to occur in the 10-mile analysis corridor for all alternatives considered in Segment 2. All known occurrences of federally listed and candidate plant species exist only on privately owned land, and none exist in the 1-mile analysis corridor of any alternative considered in Segment 2.

Table 3-124. Federally Listed Plant Occurrences in the 10-mile Analysis Corridor for Segment 2—Blue Mountains

Alternative Route	Howell's Spectacular Thelypody
Applicant's Proposed Action	9
Variation S2-A1	*0*
Variation S2-A2	*0*
Variation S2-B1	*0*
Variation S2-B2	*0*
Variation S2-C1	*0*
Variation S2-C2	*0*
Variation S2-E1	*0*
Variation S2-E2	*0*
Variation S2-F1	*9*
Variation S2-F2	*9*
Glass Hill	9
Variation S2-D1	*0*
Variation S2-D2	*0*
Mill Creek	9

Applicant's Proposed Action Alternative

Nine occurrences of Howell's spectacular thelypody are known to exist south of the alternative route with the nearest occurrence at Clover Creek being approximately 1.4 miles from the centerline of the Applicant's Proposed Action Alternative. None of these occurrences exist in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative. All nine Howell's spectacular thelypody occurrences exist on privately owned lands, however one occurrence south of North Powder, Oregon is located on land protected by a conservation easement with USFWS for protection and enhancement of plant and animal habitat and populations (USFWS 2010). With the exception of the conservation easement protected occurrence, none of these nine occurrences have been surveyed since 1998, and the USFWS considers the species possibly extirpated from two occurrences near North Powder (USFWS 2010).

All known occurrences of Howell's spectacular thelypody exist outside the 1-mile analysis corridor and are unlikely to be affected by implementation of the Applicant's Proposed Action Alternative. Vegetation clearing and soil disturbance in areas contributing to watersheds occupied by Howell's spectacular

thelypody could result in alteration to runoff patterns, hydrologic regimes, or introduction of invasive plants. These effects are described in greater detail in Section 3.2.3.6. High levels of residual impacts are anticipated if B2H Project activities result in the mortality of individuals or adverse modification of occupied habitat, and low levels of residual impacts are anticipated if temporary disturbance to federally listed or candidate plant species occurs (Table 3-94). If occurrences of Howell's spectacular thelypody have been extirpated, any impacts on extant occurrences resulting from implementation of the Applicant's Proposed Action Alternative would have greater effects on long-term sustainability of the species. However, given the distance between the Applicant's Proposed Action Alternative and the nearest occurrence at Clover Creek, any disturbance implementation of the Applicants Proposed Action Alternative to Howell's spectacular thelypody or occupied habitat will likely be limited in intensity and unlikely to result in mortality of individuals or adverse modification disturbance to occupied habitat. Low impacts resulting from short-term disturbance, such as dust deposition or minor, temporary alteration to runoff patterns in occupied habitat, could potentially occur in known occurrences. These potential low impacts on known occurrences are unlikely to affect the long-term sustainability of Howell's spectacular thelypody. If occurrences of Howell's spectacular thelypody have been extirpated, any impacts on extant occurrences resulting from implementation of the Applicant's Proposed Action Alternative could have greater effects on long-term sustainability of the species. However, given the expected intensity of disturbance to known occurrences and the presence of two large, protected occurrences near Haines and North Powder, implementation of the Applicant's Proposed Action Alternative would be unlikely to affect the long-term sustainability of Howell's spectacular thelypody. Complete clearance surveys for Howell's spectacular thelypody have not been conducted for the Applicant's Proposed Action Alternative or other alternative routes considered in Segment 2. If new Howell's spectacular thelypody occurrences or other federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, and disturbance resulting from B2H Project activities is in or adjacent to habitat, several direct and indirect effects may occur, including loss of habitat; mortality or other adverse effects on individuals; and habitat degradation through weed invasion, reduction and isolation of patch size, or alteration of runoff patterns. These effects are described in greater detail in Section 3.2.3.6. High levels of residual impacts are anticipated if B2H Project activities result in the mortality of individuals or adverse modification of occupied habitat, and low levels of residual impacts are anticipated if temporary disturbance to federally listed or candidate plant species occurs.

However, impacts on federally listed species are anticipated to be largely avoided through application of design features of the B2H Project for environmental protection and selective mitigation measures. Design Feature 4 requires that preconstruction surveys be conducted for federally listed species. In areas determined to be occupied by federally listed species, Selective Mitigation Measures 8 and 13 would be applied to span, avoid, or reduce disturbance in federally listed plant species habitat. In addition, design features of the B2H Project for environmental protection aimed to reduce the amounts of disturbance and prevent the establishment of invasive plants would limit impacts on federally listed species. Additional measures to limit adverse modification of federally listed plant habitat and effects on individuals developed through the Section 7 consultation process could include species specific avoidance buffers, herbicide application restrictions, and multi-year surveys.

The extent of impacts on federally listed or candidate plant species would depend on the exact location of the B2H Project features in relation to federally listed or candidate plant species and habitats, which would be determined from the results of preconstruction surveys. Given the Applicant's Proposed Action Alternative neither crosses nor contains occurrences in the 1-mile analysis corridor, the potential direct and indirect effects resulting from vegetation clearing, increased risk of invasive plant invasion, and dust deposition are likely to be limited in intensity and the resulting impacts limited in extent.

Variation S2-A1

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S2-A1. As such, impacts on these resources are not anticipated this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S2-A2

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S2-A2. As such, impacts on these resources are not anticipated this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S2-B1

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S2-B1. As such, impacts on these resources are not anticipated for this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S2-B2

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S2-B2. As such, impacts on these resources are not anticipated this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S2-C1

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S2-C1. As such, impacts on these resources are not anticipated this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by

Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S2-C2

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S2-C2. As such, impacts on these resources are not anticipated for this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S2-E1

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S2-E1. As such, impacts on these resources are not anticipated for this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S2-E2

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S2-E2. As such, impacts on these resources are not anticipated for this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S2-F1

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of Variation S2-F1, which contains the same nine occurrences of Howell's spectacular thelypody as the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Variation S2-F2

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of Variation S2-F2, which contains the same nine occurrences of Howell's spectacular thelypody as the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Glass Hill Alternative

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of the Glass Hill Alternative, which contains the same nine occurrences of Howell's spectacular thelypody as the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Variation S2-D1

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S2-D1. As such, impacts on these resources are not anticipated this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S2-D2

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S2-D2. As such, impacts on these resources are not anticipated for this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Mill Creek Alternative

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of the Mill Creek Alternative, which contains the same nine occurrences of Howell's spectacular thelypody as the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Other Sensitive Plant Species

Table 3-125 identifies the sensitive plant species known to occur in the 10-mile analysis corridor for all alternatives considered in Segment 2, and summarizes the occurrences data by land-management jurisdiction and known occurrences in the 10-mile analysis corridor.

Table 3-125. Potentially Affected Sensitive Plant Species for Segment 2—Blue Mountains																
Alternative Route	Total Acres of Disturbance	Salt Heliotrope					Douglas' Clover					Oregon Semaphore Grass				
		Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile			
			Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total
Applicant's Proposed Action	764	1	0	0	0	0	4	0	0	2	2	4	0	0	0	0
Variation S2-A1	*58*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S2-A2	*60*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S2-B1	*85*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S2-B2	*85*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S2-C1	*221*	*1*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*0*
Variation S2-C2	*191*	*1*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*1*	*1*	*2*	*0*	*0*	*0*	*0*
Variation S2-E1	*52*	*0*	*0*	*0*	*0*	*0*	*4*	*0*	*0*	*0*	*0*	*4*	*0*	*0*	*0*	*0*
Variation S2-E2	*58*	*0*	*0*	*0*	*0*	*0*	*4*	*0*	*0*	*0*	*0*	*4*	*0*	*0*	*1*	*1*
Variation S2-F1	*260*	*0*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*2*	*2*	*4*	*0*	*0*	*0*	*0*
Variation S2-F2	*266*	*0*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*0*	*4*	*0*	*0*	*0*	*0*
Glass Hill	752	1	0	0	0	0	4	0	0	2	2	4	0	0	0	0
Variation S2-D1	*109*	*1*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S2-D2	*98*	*1*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Mill Creek	784	1	0	0	1	1	4	0	0	1	1	4	0	0	1	1

Table Note: Some sensitive plant species occurrences may exist on multiple jurisdictions, and the sum of occurrences on federal, state, and private lands may be greater than the total

Applicant's Proposed Action Alternative

One sensitive plant species is in the 1-mile analysis corridor for the Applicant's Proposed Action Alternative, Douglas' clover (Table 3-125).

If disturbance from B2H Project activities occurs in sensitive plant species habitats, several direct and indirect effects may occur, including loss of habitat; mortality or other adverse effects on individuals; and habitat degradation through weed invasion or reduction and isolation of patch size. These effects are described in greater detail in Section 3.2.3.6. The criteria used to assess impacts are presented in (Table 3-94). The potential impacts unique to sensitive plant species including population reduction, factors influencing severity of impacts, and the application of design features and selective mitigation measures to reduce impacts on sensitive plant species would be similar to that described for the Applicant's Proposed Action Alternative in Segment 1.

Douglas' clover is a perennial forb considered imperiled by ORBIC (G2S1) due to the few known occurrences limited to a roughly 100 square mile area in central Oregon and ongoing threats from grazing and timber harvesting (ORBIC 2013b). It has been identified as a Type 2 BLM species in Idaho. However, Douglas' clover is known from Washington and Idaho as well. Oregon population trends are

not fully understood, but trends at most occurrences are relatively stable. Numerous occurrences are large, contain over a 1,000 individuals, and several are considered to have excellent viability. ORBIC recognizes 43 occurrences of Douglas' clover in Oregon. However, 81 occurrences were identified during preliminary and other USFS surveys in the region, and no occurrences were identified in Idaho. Of the total 124 known occurrences, two are known to occur in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. Both of these occurrences exist on privately owned lands where impacts resulting from the B2H Project may be greater. Based on the number of total known occurrences and the broader distribution of the species outside the B2H Project area, implementation of the Applicant's Proposed Action could result in long-term disturbance to Douglas' clover and moderate residual impacts, but is not likely to contribute to the need to list the species under the ESA.

Until the final engineering design and preconstruction surveys completed is available, the exact location of sensitive plant species in relation to B2H Project features is not available and a quantitative determination of the number of individuals affected, acres of habitat disturbed, or anticipated amount of impacts on sensitive plant species cannot be provided.

Variation S2-A1

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S2-A1, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S2-A2

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S2-A2, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S2-B1

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S2-B1, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S2-B2

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S2-B2, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures

discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S2-C1

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S2-C1, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S2-C2

The 1-mile analysis corridor of Variation S2-C2 contains one occurrence of Douglas' clover located on private land adjacent to, and commonly included in studies on, the Rebarrow Research Forest.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S2-C2 could result in long-term disturbance to Douglas' clover and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S2-E1

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S2-E1, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S2-E2

The 1-mile analysis corridor of Variation S2-E2 contains one occurrence of Oregon semaphore grass located on private land.

Oregon semaphore grass is a perennial graminoid considered critically imperiled by ORBIC (G1S1) due to the few known occurrences existing mostly on private land and current threats from grazing and alteration to hydrology affecting habitat for this species (ORBIC 2012a). The species is endemic to Oregon and known from only two areas in the state. Population trends are not fully understood and based on limited data, but indicate declining population trends at some occurrences. ORBIC recognizes 9 occurrences, and an additional 3 are known from other BLM surveys in the Oregon. Of the 12 total known occurrences, one is known to occur in the 1-mile analysis corridor and may be affected by implementation of Variation S2-E2. This occurrence exists on privately owned land. However this species is considered threatened by the state of Oregon; and potential impacts resulting from the B2H

Project implementation would be avoided or minimized to the greatest extent possible to prevent a significant reduction in the likelihood of survival or recovery of the species. Based on the compliance with state of Oregon regulations on private lands and the mitigation measures to avoid or reduce disturbance there would be limited impacts on the species. Implementation of Variation S2-E2 could result in long term disturbance to Oregon semaphore grass and moderate residual impacts, but would not likely contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S2-F1

The 1-mile analysis corridor for Variation S2-F1 contains the same sensitive species and number of occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S2-F1 could result in long-term disturbance to Douglas' clover and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S2-F2

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S2-F2, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Glass Hill Alternative

The 1-mile analysis corridor for the Glass Hill Alternative contains the same sensitive species and number of occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of the Glass Hill Alternative could result in long-term disturbance to Douglas' clover and moderate residual impacts, but will not contribute to the need to list the species.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's

Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S2-D1

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S2-D1, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S2-D2

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S2-D2, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Mill Creek Alternative

The 1-mile analysis corridor for the Mill Creek Alternative contains the greatest number of sensitive species and occurrences of any alternative route considered in Segment 2. It includes salt heliotrope, Douglas' clover and Oregon semaphore grass. Salt heliotrope exists in the 10-mile corridor for all alternative routes, but only is in the 1-mile analysis corridor for the Mill Creek Alternative.

Salt heliotrope is a perennial forb considered imperiled by ORBIC (G5S2) in Oregon due to the limited number of known occurrences in Oregon, however the species is known throughout southern Oregon and broadly distributed across North America (ORBIC 2013a). ORBIC recognizes 37 occurrences of salt heliotrope in Oregon. However, 10 occurrences were identified during other BLM surveys, and no occurrences are known from Idaho. Of the 47 total known occurrences, one is known to occur in the 1-mile analysis corridor and may be affected implementation of the Mill Creek Alternative. The one occurrence exists on private land where impacts resulting from the B2H Project may be greater. Based on the total number of known occurrences and the broad distribution of the species, implementation of the Mill Creek Alternative could result in long-term disturbance to salt heliotrope and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

Similar to the Applicant's Proposed Action Alternative and Variation S2-E2, implementation of the Mill Creek Alternative could result in long-term disturbance and moderate residual impacts on Douglas' clover and Oregon semaphore grass and would not contribute to the need to list the species under the ESA, but may result in high residual impacts on Oregon semaphore grass and contribute to the need to list the species under the ESA..

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's

Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

USFS Sensitive Plant Species

The Applicant's Proposed Action Alternative and all other alternatives cross USFS-administered land and contain USFS sensitive plant species in their respective 10-mile analysis corridors. However, of the six USFS sensitive plant species known to occur in the 10-mile analysis corridor of alternatives and variations crossing USFS-administered lands, only salt heliotrope, scabland penstemon, woolyfruit sedge, and flowery phlox are within 5 miles of where the B2H Project would cross USFS-administered lands near Railroad Canyon. Known occurrences of Douglas' clover and Oregon semaphore grass are more than 10 miles south and east from this location. Scabland penstemon, woolyfruit sedge, and flowery phlox are not are not known to occur in the 1-mile analysis corridor of any alternative or variation crossing USFS-administered lands, and direct or indirect effects resulting from B2H Project-related activities are not expected to affect these known occurrences. Individuals and habitat at the salt heliotrope occurrence located in the 1-mile analysis corridor of the Mill Creek Alternative could be affected by B2H Project-related disturbance.

Unknown occurrences of USFS sensitive plant species may exist on USFS-administered lands crossed by the Applicant's Proposed Action Alternative and all other alternatives. As required by B2H Project Design Feature 4, preconstruction surveys to identify USFS sensitive species and determine habitat extents would be conducted along the right-of-way, as well as any areas requiring ground disturbance (e.g., building or upgrading of access roads, temporary work areas, and multi-use areas) outside the right-of-way.

The types of potential direct and indirect effects, Applicant-committed design features and selective mitigation measures to minimize impacts on USFS sensitive plant species, and extent of impacts on USFS sensitive plant species would be similar to that described for Segment 1. Implementation of the B2H Project may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species for any of the USFS sensitive plant species considered in Segment 2.

Noxious Weeds

Applicant's Proposed Action Alternative and All Other Alternatives

The Applicant's Proposed Action Alternative and all other alternative routes in Segment 2 would result in disturbance to native vegetation communities, which could alter vegetation community structure, soil properties, and water availability creating conditions favorable for noxious weed establishment and spread. Where this disturbance occurs in areas without weed infestations, the B2H Project may introduce noxious weed species through the transport of plant materials. In Segment 2, these areas exist mostly in the Mixed Conifer and Mountain Shrub-dominated vegetation communities located in the Blue Mountains south and west of La Grande, Oregon and are crossed by the Applicant's Proposed Action Alternative and the Glass Hill alternatives. The Mill Creek Alternative avoids crossing the

majority of these areas as it travels along the foothills nearer to La Grande. The extent of noxious weed invasion would be influenced by several factors, including the extent of B2H Project disturbance, preconstruction condition of native vegetation communities, and the distribution of noxious weeds in the surrounding area. The anticipated amounts of B2H Project disturbance to vegetation communities are summarized in Table 3-123. The types of potential effects and impacts on vegetation resources associated with noxious weed invasion, and Applicant-committed design features to reduce noxious weed invasion potential would be similar to that described for Segment 1.

Traditional Foods and Ethnobotanical Resources

Applicant's Proposed Action Alternative and All Other Proposed Actions

The Applicant's Proposed Action Alternative and all other alternative routes would result in disturbance and potential impacts on native vegetation communities (Table 3-123). The types of potential effects and impacts on traditional foods and ethnobotanical resources associated with B2H Project implementation, as well as the application of Applicant-committed design features to reduce disturbance to native vegetation communities and development of site-specific mitigation during government to government consultation would be similar to that described for Segment 1.

Conclusion

The Applicant's Proposed Action Alternative and all other alternative routes considered in Segment 2 would result in predominantly moderate residual impacts on vegetation communities, with all alternatives resulting in similar amounts of impacts. All alternative routes would have similar impacts on traditional foods and other ethnobotanical resources important to tribal groups.

All alternative routes could affect known occurrences of the federally listed Howell's spectacular thelypody, but any impacts are likely to be limited in intensity given the distance between known occurrences and all alternative routes. If new Howell's spectacular thelypody occurrences are identified during preconstruction surveys, application of design features of the B2H Project for environmental protection and selective mitigation measures are expected to avoid individual mortality and adverse modification of occupied habitats. Moderate residual impacts on sensitive plant species could occur for all alternative routes considered.

All alternative routes would result in disturbance to native vegetation communities, increase the potential establishment and spread of noxious weeds and other invasive plants, and cross areas with few identified noxious weed infestations and could introduce noxious weeds and other invasive plants to these areas. The Glass Hill Alternative crosses areas with few identified noxious weed infestations to the greatest extent, and the Applicant's Proposed Action Alternative crosses these areas to the least extent.

The Applicant's Proposed Action Alternative would result in the least impacts on vegetation resources overall compared to the other alternative routes in Segment 2 due to the lower potential of introducing noxious weeds or other invasive plant to undisturbed areas.

SEGMENT 3—BAKER VALLEY

Vegetation Communities

Table 3-126 presents the miles crossed and residual impacts on vegetation communities for all alternative routes and route variations in Segment 3. Table 3-127 presents the anticipated amount of disturbance to vegetation communities in Segment 3. The distribution of vegetation communities in the B2H Project area is displayed on MV-7.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush vegetation communities. Moderate residual impacts also are expected where the Applicant's Proposed Action Alternative crosses RCA, Native Grassland, and Dwarf Sagebrush Steppe vegetation communities. Low residual impacts are expected where the Applicant's Proposed Action Alternative crosses Agriculture and Non-native Grassland communities.

Several wildfires have affected vegetation communities crossed by the Applicant's Proposed Action Alternative, and the current vegetation communities may no longer reflect the vegetation communities identified from the NWGAP data and the assessment of initial and residual impacts. Vegetation communities affected by wildfires can take decades to recover to predisturbance conditions, but are assumed to eventually return to predisturbance conditions, unless weed invasion and fire regime alteration cause native vegetation communities to transition to communities more typical of Non-native Grasslands. The departure from normal of native vegetation communities affected by wildfire is heavily influenced by pre-existing conditions, as well as other factors, including vegetation community type, fire severity, and weather. Vegetation communities with abundant and diverse native plant species, particularly those with high cover of perennial bunchgrasses, are more likely to recruit and resprout with native vegetation similar to predisturbance conditions (Miller et al. 2013). However, without detailed knowledge of the pre-existing conditions across the entirety of the alternative route for each wildfire to predict the departure from normal, the assessment of impacts assumes areas affected by recent wildfires will return to predisturbance conditions. Several design features of the B2H Project for environmental protection aimed to reduce erosion and the extent of disturbance, prevent the introduction and spread of invasive plants, and establish desirable vegetation are anticipated to minimize the risk of recently burned native vegetation communities transitioning to non-native communities as a result of B2H Project activities.

Direct and indirect effects on vegetation communities would include loss of vegetation, alterations to vegetation community structure, and increased risks of invasive plant invasion. The types of potential effects on vegetation communities are described in greater detail in Section 3.2.3.6. Several B2H Project design features are anticipated to limit these effects through reducing the extent of disturbance, preventing the spread and establishment of invasive plants, and reclaiming disturbed areas with desirable native vegetation. Refer to the list of design features applicable to vegetation communities in Section 3.2.3.4.

Table 3-126. Vegetation Resources Inventory Data and Residual Impacts on Segment 3—Baker Valley (miles crossed)

Alternative Route	Total Length (miles)	Inventory (Miles Crossed)															Residual Impacts (miles crossed)[1]	
		Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe	Moderate	Low
Applicant's Proposed Action	55.2	0.1	0.0	0.4	0.0	0.2	2.1	0.0	0.0	0.0	0.4	2.6	0.7	0.0	6.3	42.4	53.8	1.4
Variation S3-A1	*12.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.0*	*0.2*	*0.3*	*0.1*	*0.0*	*1.4*	*10.3*	*12.3*	*0.1*
Variation S3-A2	*12.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.2*	*0.3*	*0.0*	*0.8*	*10.8*	*11.9*	*0.3*
Variation S3-B1	*13.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*1.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.7*	*0.0*	*0.0*	*0.8*	*10.9*	*13.8*	*0.1*
Variation S3-B2	*14.4*	*0.5*	*0.0*	*0.0*	*0.0*	*0.1*	*0.3*	*0.0*	*0.3*	*0.0*	*0.3*	*0.0*	*0.0*	*0.0*	*1.7*	*11.2*	*13.8*	*0.6*
Variation S3-B3	*14.7*	*0.5*	*0.0*	*0.0*	*0.0*	*0.1*	*0.6*	*0.0*	*0.3*	*0.0*	*0.3*	*0.0*	*0.2*	*0.0*	*1.6*	*11.1*	*13.9*	*0.8*
Variation S3-B4	*14.3*	*1.7*	*0.0*	*0.0*	*0.0*	*0.0*	*0.6*	*0.0*	*0.3*	*0.0*	*0.1*	*0.0*	*0.2*	*0.0*	*1.6*	*9.8*	*12.4*	*1.9*
Variation S3-B5	*14.0*	*1.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.3*	*0.0*	*0.3*	*0.0*	*0.3*	*0.0*	*0.1*	*0.0*	*1.8*	*9.8*	*12.5*	*1.5*
Variation S3-C1	*21.1*	*0.1*	*0.0*	*0.4*	*0.0*	*0.1*	*0.6*	*0.0*	*0.0*	*0.0*	*0.2*	*1.5*	*0.5*	*0.0*	*3.0*	*14.7*	*20.0*	*1.1*
Variation S3-C2	*21.7*	*0.0*	*0.0*	*0.3*	*0.0*	*0.2*	*0.5*	*0.0*	*0.0*	*0.0*	*0.2*	*1.0*	*1.0*	*0.0*	*3.3*	*15.2*	*20.2*	*1.5*
Variation S3-C3	*21.1*	*0.0*	*0.0*	*0.3*	*0.0*	*0.3*	*1.5*	*0.0*	*0.7*	*0.0*	*1.3*	*1.1*	*0.8*	*0.0*	*4.3*	*10.8*	*19.7*	*1.4*
Variation S3-C4	*21.4*	*0.0*	*0.0*	*0.5*	*0.0*	*0.3*	*1.4*	*0.0*	*0.7*	*0.0*	*1.5*	*1.3*	*0.8*	*0.0*	*3.1*	*11.8*	*19.8*	*1.6*
Variation S3-C5	*21.0*	*0.0*	*0.0*	*0.6*	*0.0*	*0.1*	*0.7*	*0.0*	*0.4*	*0.9*	*1.5*	*1.1*	*1.8*	*0.0*	*2.8*	*11.1*	*18.5*	*2.5*
Variation S3-C6	*24.7*	*0.0*	*0.5*	*0.5*	*0.0*	*0.1*	*0.4*	*0.0*	*0.9*	*1.5*	*1.4*	*1.9*	*1.0*	*0.0*	*4.7*	*11.8*	*23.1*	*1.6*
Flagstaff A	*55.3*	*1.5*	*0.0*	*0.4*	*0.0*	*0.1*	*1.0*	*0.0*	*0.3*	*0.0*	*0.7*	*1.9*	*0.8*	*0.0*	*7.3*	*41.3*	*52.5*	*2.8*
Timber Canyon	70.3	0.9	0.3	0.2	0.0	0.1	3.9	0.0	0.9	19.4	3.5	2.1	2.2	0.0	12.5	24.3	66.9	3.4
Flagstaff A – Burnt River Mountain	55.3	1.4	0.0	0.3	0.0	0.3	1.9	0.0	1.0	0.0	1.8	1.5	1.1	0.0	8.6	37.4	52.2	3.1

Table 3-126. Vegetation Resources Inventory Data and Residual Impacts on Segment 3—Baker Valley (miles crossed)

Alternative Route	Total Length (miles)	Inventory (Miles Crossed)															Residual Impacts (miles crossed)[1]	
		Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe	Moderate	Low
Flagstaff B	56.0	0.6	0.0	0.4	0.0	0.2	1.3	0.0	0.3	0.0	0.7	1.9	0.9	0.0	7.1	42.6	53.9	2.1
Flagstaff B – Burnt River West	55.7	0.5	0.0	0.6	0.0	0.2	1.3	0.0	0.7	0.9	1.9	1.4	2.4	0.0	6.3	39.5	52.0	3.7
Flagstaff B – Durkee	59.6	0.5	0.5	0.5	0.0	0.2	1.1	0.0	1.2	1.5	1.9	2.3	1.4	0.0	8.8	39.7	57.0	2.6

Table Note: [1]High residual impacts on vegetation communities are not anticipated to occur.

Table 3-127. Anticipated Disturbance for Vegetation Resources for Segment 3—Baker Valley (acres)

Alternative Route	Total Disturbance (acres)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Applicant's Proposed Action	1,238	2	0	9	0	5	47	0	0	0	9	59	16	0	142	954
Variation S3-A1	259	*0*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*4*	*6*	*2*	*0*	*29*	*217*
Variation S3-A2	252	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*2*	*4*	*6*	*0*	*16*	*223*
Variation S3-B1	311	*0*	*0*	*0*	*0*	*2*	*31*	*0*	*0*	*0*	*0*	*16*	*0*	*0*	*18*	*244*
Variation S3-B2	315	*11*	*0*	*0*	*0*	*2*	*7*	*0*	*7*	*0*	*7*	*0*	*0*	*0*	*37*	*245*

Table 3-127. Anticipated Disturbance for Vegetation Resources for Segment 3—Baker Valley (acres)

Alternative Route	Total Disturbance (acres)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Variation S3-B3	*312*	*11*	*0*	*0*	*0*	*2*	*13*	*0*	*6*	*0*	*6*	*0*	*4*	*0*	*34*	*234*
Variation S3-B4	*300*	*36*	*0*	*0*	*0*	*0*	*13*	*0*	*6*	*0*	*2*	*0*	*4*	*0*	*34*	*207*
Variation S3-B5	*301*	*30*	*0*	*0*	*0*	*0*	*7*	*0*	*7*	*0*	*7*	*0*	*2*	*0*	*39*	*212*
Variation S3-C1	*502*	*2*	*0*	*10*	*0*	*2*	*14*	*0*	*0*	*0*	*5*	*36*	*12*	*0*	*71*	*350*
Variation S3-C2	*512*	*0*	*0*	*7*	*0*	*5*	*12*	*0*	*0*	*0*	*5*	*24*	*24*	*0*	*78*	*359*
Variation S3-C3	*515*	*0*	*0*	*7*	*0*	*7*	*37*	*0*	*17*	*0*	*32*	*27*	*20*	*0*	*105*	*265*
Variation S3-C4	*524*	*0*	*0*	*12*	*0*	*7*	*34*	*0*	*17*	*0*	*37*	*32*	*20*	*0*	*76*	*290*
Variation S3-C5	*576*	*0*	*0*	*16*	*0*	*3*	*19*	*0*	*11*	*25*	*41*	*30*	*49*	*0*	*77*	*304*
Variation S3-C6	*685*	*0*	*14*	*14*	*0*	*3*	*11*	*0*	*25*	*42*	*39*	*53*	*28*	*0*	*130*	*327*
Flagstaff A	1,228	33	0	9	0	2	22	0	7	0	16	42	18	0	163	922
Timber Canyon	1,691	22	7	5	0	2	94	0	22	467	84	51	53	0	301	585
Flagstaff A – Burnt River Mountain	1,241	31	0	7	0	7	42	0	22	0	40	33	24	0	192	833
Flagstaff B	1,239	13	0	9	0	4	29	0	7	0	16	42	20	0	157	944
Flagstaff B – Burnt River West	1,305	12	0	14	0	5	30	0	16	21	45	33	56	0	148	925
Flagstaff B – Durkee	1,422	12	12	12	0	5	26	0	29	36	45	55	33	0	210	947

NOTE: Acres in the table are rounded and, therefore, columns may not sum exactly.

Where the Applicant's Proposed Action Alternative crosses RCAs, disturbance to these vegetation communities is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible, as described by B2H Project Design Features 15 and 16. Where spanning would not be feasible, the application of several selective mitigation measures aimed to reduce the creation of new access roads, soil disturbance, and vegetation removal in the right-of-way are expected to reduce impacts from a high initial level to a moderate residual level. Reducing vegetation removal in the right-of-way (Selective Mitigation Measure 5) also would be applied to Mixed Conifer Forest, Aspen, and Juniper and Mahogany Woodlands, but is not anticipated to reduce residual impacts. Table 3-95 summarizes the expected level of initial impacts, selective mitigation measures that would be applied, and resulting residual impacts on vegetation communities.

Variation S3-A1

Variation S3-A1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S3-A1 crosses RCA vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S3-A2

The extent of disturbance to vegetation communities and residual impacts resulting from Variation S3-A2 would be similar to Variation S3-A1. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S3-B1

Variation S3-B1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S3-B1 crosses Dwarf Sagebrush, Native Grassland, and RCA vegetation communities. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S3-B2

Variation S3-B2 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S3-B2 crosses Dwarf Sagebrush, Juniper and Mahogany Woodland, Mountain Shrub, and RCA vegetation communities. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation

measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S3-B3

The extent of disturbance to vegetation communities and residual impacts resulting from Variation S3-B3 would be similar to Variation S3-B2. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S3-B4

The extent of disturbance to vegetation communities and residual impacts resulting from Variation S3-B4 would be similar to Variation S3-B2. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S3-B5

The extent of disturbance to vegetation communities and residual impacts resulting from Variation S3-B5 would be similar to Variation S3-B2. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S3-C1

Variation S3-C1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S3-C1 crosses Dwarf Sagebrush Steppe, Native Grassland, and RCA vegetation communities. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S3-C2

The extent of disturbance to vegetation communities and residual impacts resulting from Variation S3-C2 would be similar to Variation S3-C1. Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S3-C3

Variation S3-C3 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected

where Variation S3-C3 crosses Mountain Shrub, Dwarf Sagebrush Steppe, Native Grasslands, Juniper and Mahogany Woodlands, and RCA vegetation communities. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S3-C4

The extent of disturbance to vegetation communities and residual impacts resulting from Variation S3-C4 would be similar to Variation S3-C3. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S3-C5

Variation S3-C5 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S3-C5 crosses Dwarf Sagebrush Steppe, Mixed Conifer Forest, Mountain Shrub, Native Grasslands, Juniper and Mahogany Woodlands, and RCA vegetation communities. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S3-C6

Variation S3-C6 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S3-C6 crosses Aspen, Dwarf Sagebrush Steppe, Mixed Conifer Forest, Mountain Shrub, Native Grasslands, Juniper and Mahogany Woodlands, and RCA vegetation communities. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Flagstaff A Alternative

The Flagstaff A Alternative is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where the Flagstaff A Alternative crosses Dwarf Sagebrush Steppe, Juniper and Mahogany Woodland, Mountain Shrub, Native Grasslands, and RCA vegetation communities. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of

residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Timber Canyon Alternative

The Timber Canyon Alternative is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe and Mixed Conifer Forest vegetation communities. Moderate residual impacts also are expected where the Timber Canyon Alternative crosses Dwarf Sagebrush Steppe, Juniper and Mahogany Woodland, Mountain Shrub, Native Grasslands, and RCA vegetation communities. The Timber Canyon Alternative is approximately 10 to 15 miles longer than any alternative route considered in Segment 3 and would result in greater amounts of total disturbance and disturbance to RCA and Mixed Conifer Forest vegetation communities than any alternative route considered in Segment 3 (Table 3-127). Direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Flagstaff A – Burnt River Mountain Alternative

The Flagstaff A – Burnt River Mountain Alternative is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where the Flagstaff A – Burnt River Mountain Alternative crosses Dwarf Sagebrush Steppe, Juniper and Mahogany Woodland, Mountain Shrub, Native Grasslands, and RCA vegetation communities. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Flagstaff B Alternative

The Flagstaff B Alternative is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where the Flagstaff B Alternative crosses Dwarf Sagebrush Steppe, Juniper and Mahogany Woodland, Mountain Shrub, Native Grasslands, and RCA vegetation communities. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Flagstaff B – Burnt River West Alternative

The Flagstaff B – Burnt River West Alternative is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where the Flagstaff B – Burnt River West Alternative crosses Mixed Conifer, Dwarf Sagebrush Steppe, Juniper and Mahogany Woodland, Mountain Shrub, Native Grasslands, and RCA vegetation communities. Wildfire effects on native vegetation communities, direct

and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Flagstaff B – Durkee

The Flagstaff B – Durkee Alternative is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where the Flagstaff B – Durkee Alternative crosses Aspen, Mixed Conifer, Dwarf Sagebrush Steppe, Juniper and Mahogany Woodland, Mountain Shrub, Native Grasslands, and RCA vegetation communities. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Federally Listed and Candidate Plant Species

Table 3-128 summarizes the extent and distribution of known Howell's spectacular thelypody occurrences in the 10-mile analysis corridor. Howell's spectacular thelypody is not known to occur in the 1-mile analysis corridor for the Applicant's Proposed Action Alternative or any alternative route considered in Segment 3.

Table 3-128. Howell's Spectacular Thelypody Occurrences in the 10-mile Analysis Corridor for Segment 3—Baker Valley

Alternative Route	Number of Occurrences
Applicant's Proposed Action	16
Variation S3-A1	*16*
Variation S3-A2	*16*
Variation S3-B1	*8*
Variation S3-B2	*8*
Variation S3-B3	*8*
Variation S3-B4	*8*
Variation S3-B5	*8*
Variation S3-C1	*0*
Variation S3-C2	*0*
Variation S3-C3	*0*
Variation S3-C4	*0*
Variation S3-C5	*0*
Variation S3-C6	*0*
Flagstaff A	16
Timber Canyon	8
Flagstaff A – Burnt River Mountain	16
Flagstaff B	16
Flagstaff B – Burnt River West	16
Flagstaff B – Durkee	16

Applicant's Proposed Action Alternative

Sixteen occurrences of Howell's spectacular thelypody are known to exist west of the Applicant's Proposed Action Alternative with the nearest occurrence at Baldock Slough being approximately 1.9 miles from the centerline of the alternative route. None of these occurrences exist in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative. All 16 Howell's spectacular thelypody occurrences exist on privately owned lands, however one occurrence south of North Powder, Oregon is located on land protected by a conservation easement with USFWS for protection and enhancement of plant and animal habitat and populations (USFWS 2010) and the seven occurrences near the Baldock Slough are located on land held in a Wetland Reserve Program easement. Only the conservation easement protected occurrence and the seven occurrences in the Baldock Slough introduction site have been recently surveyed. Occurrences in the Baldock Slough introduction site were found to have few plants and declining population trends at some occurrences (Currin et al. 2010). With the exception of the conservation easement protected occurrence and the occurrences in the Baldock Slough introduction site, none of these nine occurrences have been surveyed since 1998, and the USFWS considers the species possibly extirpated from two occurrences near North Powder (USFWS 2010).

All known occurrences of Howell's spectacular thelypody exist outside the 1-mile analysis corridor and are unlikely to be affected by implementation of the Applicant's Proposed Action Alternative. Vegetation clearing and soil disturbance in areas contributing to watersheds occupied by Howell's spectacular thelypody could result in alteration to runoff patterns, hydrologic regimes, or introduction of invasive plants. These effects are described in greater detail in Section 3.2.3.6. High levels of residual impacts are anticipated if B2H Project activities result in the mortality of individuals or adverse modification of occupied habitat, and low levels of residual impacts are anticipated if temporary disturbance to federally listed or candidate plant species occurs (Table 3-94). If occurrences of Howell's spectacular thelypody have been extirpated, any impacts on extant occurrences resulting from implementation of the Applicant's Proposed Action Alternative would have greater effects on long-term sustainability of the species. However, given the distance between the Applicant's Proposed Action Alternative and the nearest occurrence at the Baldock Slough, any disturbance from vegetation clearing or soil disturbance to Howell's spectacular thelypody or occupied habitat will likely be limited in intensity and unlikely to result in mortality of individuals or adverse modification disturbance to occupied habitat. Low impacts resulting from short-term disturbance, such as dust deposition or minor, temporary alteration to runoff patterns in occupied habitat, could potentially occur in known occurrences. These potential low impacts on known occurrences are unlikely to affect the long-term sustainability of Howell's spectacular thelypody. If occurrences of Howell's spectacular thelypody have been extirpated from occurrences, any impacts on extant occurrences resulting from implementation of the Applicant's Proposed Action Alternative could have greater effects on long-term sustainability of the species. However, given the expected intensity of disturbance to known occurrences and the presence of two large, protected occurrences near Haines and North Powder, implementation of the Applicant's Proposed Action Alternative would be unlikely to affect the long-term sustainability of Howell's spectacular thelypody.

Complete clearance surveys for Howell's spectacular thelypody have not been conducted for the Applicant's Proposed Action Alternative or other alternative routes considered in Segment 3. If new

Howell's spectacular thelypody occurrences or other federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, and disturbance resulting from B2H Project activities is in or adjacent to habitat, several direct and indirect effects may occur, including loss of habitat; mortality or other adverse effects on individuals; and habitat degradation through weed invasion, reduction and isolation of patch size, and alteration of runoff patterns. These effects are described in greater detail in Section 3.2.3.6. High levels of residual impacts are anticipated if B2H Project activities result in the mortality of individuals or adverse modification of occupied habitat, and low levels of residual impacts are anticipated if temporary disturbance, such as dust deposition or decreased pollinator attractiveness, to federally listed or candidate plant species occurs (Table 3-94).).

However, impacts on federally listed species are anticipated to be largely avoided through application of design features of the B2H Project for environmental protection and selective mitigation measures. Design Feature 4 requires that preconstruction surveys be conducted for federally listed species. In areas determined to be occupied by federally listed species, Selective Mitigation Measures 8 and 13 would be applied to span, avoid, or reduce disturbance in federally listed plant species habitat. In addition, design features of the B2H Project for environmental protection aimed to reduce the amounts of disturbance and prevent the establishment of invasive plants would limit impacts on federally listed species. Additional measures to limit adverse modification of federally listed plant habitat and effects on individuals developed through the Section 7 consultation process could include species specific avoidance buffers, herbicide application restrictions, and multi-year surveys.

The extent of impacts on federally listed or candidate plant species would depend on the exact location of the B2H Project features in relation to federally listed or candidate plant species and habitats, which would be determined from the results of preconstruction surveys. Given the Applicant's Proposed Action Alternative neither crosses nor contains occurrences in the 1-mile analysis corridor, the potential direct and indirect effects resulting from vegetation clearing, increased risk of invasive plant invasion, and dust deposition are likely to be limited in intensity and the resulting impacts limited in extent.

Variation S3-A1

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of Variation S3-A1, which contains the same 16 occurrences of Howell's spectacular thelypody as the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Variation S3-A2

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of Variation S3-A2, which contains the same 16 occurrences of Howell's spectacular thelypody as the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Variation S3-B1

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of Variation S3-B1, which contains the eight Howell's spectacular thelypody occurrences in the Baldock Slough introduction site and North Baker populations. These eight occurrences also are contained in the 10-mile analysis corridor of the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Variation S3-B2

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of Variation S3-B2, which contains the eight Howell's spectacular thelypody occurrences in the Baldock Slough introduction site and North Baker populations. These eight occurrences also are contained in the 10-mile analysis corridor of the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Variation S3-B3

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of Variation S3-B3, which contains the eight Howell's spectacular thelypody occurrences in the Baldock Slough introduction site and North Baker populations. These eight occurrences also are contained in the 10-mile analysis corridor of the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Variation S3-B4

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of Variation S3-B4, which contains the eight Howell's spectacular thelypody occurrences in the Baldock Slough introduction site and North Baker populations. These eight occurrences also are contained in the 10-mile analysis corridor of the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Variation S3-B5

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of Variation S3-B5, which contains the eight Howell's spectacular thelypody occurrences in the Baldock Slough introduction site and North Baker populations. These eight occurrences also are contained in the 10-mile analysis corridor of the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual

impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Variation S3-C1

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S3-C1. As such, impacts on these resources are not anticipated for this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S3-C2

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S3-C2. As such, impacts on these resources are not anticipated for this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S3-C3

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S3-C3. As such, impacts on these resources are not anticipated for this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S3-C4

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S3-C4. As such, impacts on these resources are not anticipated for this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S3-C5

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S3-C5. As such, impacts on these resources are not anticipated for this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Variation S3-C6

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor of Variation S3-C6. As such, impacts on these resources are not anticipated for this variation. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species.

Flagstaff A Alternative

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of the Flagstaff A Alternative, which contains the same 16 occurrences of Howell's spectacular thelypody as the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Timber Canyon Alternative

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of Variation S3-B5, which contains the eight Howell's spectacular thelypody occurrences in the North Powder population. These eight occurrences also are contained in the 10-mile analysis corridor of the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Flagstaff A – Burnt River Mountain Alternative

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of the Flagstaff A – Burnt River Mountain Alternative, which contains the same 16 occurrences of Howell's spectacular thelypody as the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Flagstaff B Alternative

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of the Flagstaff B Alternative, which contains the same 16 occurrences of Howell's spectacular thelypody as the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Flagstaff B – Burnt River West Alternative

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of the Flagstaff B – Burnt River West Alternative, which contains the same 16 occurrences of Howell's spectacular thelypody as the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and

extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Flagstaff B – Durkee

Federally listed or candidate plant species are known to occur in the 10-mile analysis corridor of the Flagstaff B – Durkee Alternative, which contains the same 16 occurrences of Howell's spectacular thelypody as the Applicant's Proposed Action Alternative. The types of potential effects, application of mitigation measures based on preconstruction surveys, anticipated residual impacts, and extent of impacts on federally listed plant species would be similar to the Applicant's Proposed Action Alternative.

Other Sensitive Plant Species

Table 3-129 identifies the sensitive plant species known to occur in the 10-mile analysis corridor for all alternatives considered in Segment 3, and summarizes the occurrence data by land-management jurisdiction and known occurrences in the 10-mile analysis corridor.

Applicant's Proposed Action Alternative

Several sensitive plant species are known to exist in the 1-mile analysis corridor for the Applicant's Proposed Action Alternative. These species include white wooly buckwheat, Snake River goldenweed, and Oregon princesplume. The number of known occurrences in the 1-mile and 10-mile analysis corridors, as well as the jurisdiction of those occurrences is presented in Table 3-129.

If disturbance from B2H Project activities occurs in sensitive plant species habitats, several direct and indirect effects may occur, including loss of habitat; mortality or other adverse effects on individuals; and habitat degradation through weed invasion or reduction and isolation of patch size. These effects are described in greater detail in Section 3.2.3.6. The criteria used to assess impacts are presented in Table 3-94. The potential impacts unique to sensitive plant species including population reduction, factors influencing severity of impacts, and the application of design features and selective mitigation measures to reduce impacts on sensitive plant species would be similar to that described for the Applicant's Proposed Action Alternative in Segment 1.

White wooly buckwheat is a perennial forb considered rare, uncommon, or threatened by ORBIC (G4G4T3S3) based on the few known occurrences limited to southeastern Oregon. It has been identified as a Type 3 BLM species in Idaho. Population trends or species specific threats are unknown, but due to the small number of known occurrences would be sensitive to disturbances (ORBIC 2012c). ORBIC recognizes 16 occurrences of white wooly buckwheat in Oregon. However, 17 white wooly buckwheat occurrences were identified during preliminary and other BLM surveys in the region, and at least 2 occurrences are known from Idaho. Of the total 35 known white wooly buckwheat occurrences, eight are known to occur in the 1-mile analysis corridor and may be affected by implementation of the B2H Project. Of these eight occurrences, six exist on privately owned lands where impacts resulting from the B2H Project may be greater.

Based the number of total known occurrences, and the existence of several occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Applicant's Proposed Action Alternative is not likely to result in high levels of impact on white wooly buckwheat or contribute to the need to list the species under the ESA. High levels of impacts on white wooly buckwheat are not likely, but could occur given the possibility of severe disturbance to multiple occurrences on private land, the limited distribution of the species, and lack of knowledge regarding population trends. If implementation of the Applicant's Proposed Action Alternative results in severe disturbance to multiple occurrences on private lands, high residual impacts could occur and contribute to the need to list the species under the ESA.

Snake River goldenweed is a perennial forb also considered rare, uncommon, or threatened by ORBIC (G3S3) for similar reasons as white wooly buckwheat (ORBIC 2010a). It has been identified as a Type 3 BLM species in Idaho. Population trends have been assessed for this species, and indicate declining trends at many occurrences. However, numerous occurrences are estimated to have more than 500 individuals and are considered to have substantial ecological integrity and resistance to minor disturbance (ORBIC 2010a). ORBIC recognizes 42 occurrences of Snake River goldenweed in Oregon. However, preliminary and other BLM surveys in the region identified 233 occurrences, and at least 33 other occurrences of Snake River goldenweed are known from Idaho. Of the total 308 occurrences, 20 are known to occur in the 1-mile analysis corridor and may be affected by implementation of the B2H Project. Of these 20 occurrences, 17 exist on privately owned land where impacts resulting from the B2H Project may be greater. However this species is considered endangered by the state of Oregon; and potential impacts resulting from the B2H Project implementation would be avoided or minimized to the greatest extent possible to prevent a significant reduction in the likelihood of survival or recovery of the species. Based on the total number of occurrences, compliance with state of Oregon regulations on private lands, and the mitigation measures to avoid or reduce disturbance there would be limited impacts on the species. Implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance to Snake River goldenweed and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

Table 3-129. Potentially Affected Sensitive Plant Species for Segment 3—Baker Valley

Alternative Route	Total Acres of Disturbance	Mingan Moonwort					Cordilleran Sedge					Retrorse Sedge					Hairy Wild Cabbage					White Wooly Buckwheat					Salt Heliotrope					Snake River Goldenweed					Oregon Princesplume				
		Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile			
			Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total
Applicant's Proposed Action	1,238	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	9	4	0	6	8	1	0	0	0	0	68	8	0	17	20	5	1	0	5	5
Variation S3-A1	*259*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-A2	*252*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-B1	*311*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-B2	*315*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-B3	*312*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-B4	*300*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*1*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-B5	*301*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-C1	*502*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*3*	*0*	*0*	*0*	*0*	*9*	*4*	*0*	*6*	*8*	*0*	*0*	*0*	*0*	*0*	*68*	*8*	*0*	*17*	*20*	*5*	*1*	*0*	*5*	*5*
Variation S3-C2	*512*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*3*	*1*	*0*	*0*	*1*	*9*	*4*	*0*	*6*	*8*	*0*	*0*	*0*	*0*	*0*	*68*	*8*	*0*	*17*	*20*	*5*	*1*	*0*	*5*	*5*
Variation S3-C3	*515*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*3*	*0*	*0*	*0*	*0*	*9*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*68*	*7*	*0*	*18*	*20*	*5*	*0*	*0*	*0*	*0*
Variation S3-C4	*524*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*3*	*0*	*0*	*0*	*0*	*9*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*68*	*7*	*0*	*18*	*20*	*5*	*0*	*0*	*0*	*0*
Variation S3-C5	*576*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*3*	*0*	*0*	*0*	*0*	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*60*	*1*	*0*	*7*	*7*	*2*	*0*	*0*	*0*	*0*
Variation S3-C6	*685*	*0*	*0*	*0*	*0*	*0*	*10*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*3*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*61*	*11*	*0*	*11*	*18*	*0*	*0*	*0*	*0*	*0*
Flagstaff A	1,228	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	9	4	0	8	8	1	0	0	0	0	68	8	0	17	20	5	1	0	5	5
Timber Canyon	1,691	6	1	0	0	1	27	4	0	0	4	1	2	0	1	1	0	0	0	0	0	8	0	0	3	3	0	0	0	0	0	69	8	0	17	20	5	0	0	2	2
Flagstaff A – Burnt River Mountain	1,241	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	9	0	0	0	0	1	0	0	0	0	68	7	0	18	20	5	0	0	0	0
Flagstaff B	1,239	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	9	4	0	6	8	1	0	0	0	0	68	8	0	17	20	5	1	0	5	5
Flagstaff B – Burnt River West	1,305	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	5	0	0	0	0	1	0	0	0	0	60	1	0	7	7	2	0	0	0	0
Flagstaff B – Durkee	1,422	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	0	0	0	0	1	0	0	0	0	61	11	0	10	18	0	0	0	0	0

Table Note: Some sensitive plant species occurrences may exist on multiple jurisdictions, and the sum of occurrences on federal, state, and private lands may be greater than the total

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Oregon princesplume is a biennial forb considered imperiled by ORBIC (G2S2) due the limited number of known occurrences restricted to southeastern Oregon and western Idaho, of which few have stable population trends. It has been identified as a Type 2 BLM species in Idaho. Ongoing threats to the species include grazing, disturbance associated with mining and OHV traffic, and habitat conversion to annual grasslands (ORBIC 2012b). Population trends at several smaller occurrences have been noted as declining, but multiple occurrences appear to have excellent viability despite ongoing threats. ORBIC recognizes 63 occurrences of Oregon princesplume in Oregon. However, 118 occurrences were identified during preliminary and other BLM surveys in the regions, and at least 5 occurrences are known from Idaho. Of the 186 total known occurrences, five are known to occur in the 1-mile analysis corridor and may be affected by implementation of the B2H Project. Of these five occurrences, all exist on privately owned land where impacts resulting from the B2H Project may be greater. Based the number of total known occurrences, and apparent species resistance to ongoing threats, implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance to Oregon princesplume and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

Until the final engineering design and preconstruction surveys completed is available, the exact location of sensitive plant species in relation to B2H Project features is not available and a quantitative determination of the number of individuals affected, acres of habitat disturbed, or anticipated amount of impacts on sensitive plant species cannot be provided.

Variation S3-A1

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S3-A1, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S3-A2

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S3-A2, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S3-B1

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S3-B1, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S3-B2

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S3-B2, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S3-B3

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S3-B3, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S3-B4

Only one occurrence of salt heliotrope on private land is known in the 1-mile analysis corridor of Variation S3-B4 (Table 3-129).

Salt heliotrope is a perennial forb considered imperiled by ORBIC (G5S2) in Oregon due to the limited number of known occurrences in Oregon, however the species is known throughout southern Oregon and broadly distributed across North America (ORBIC 2013a). ORBIC recognizes 37 occurrences of salt heliotrope in Oregon. However, 10 occurrences were identified during other BLM surveys, and no occurrences are known from Idaho. Of the 47 total known occurrences, one is known to occur in the 1-mile analysis corridor and may be affected by the B2H Project. The one occurrence in the 1-mile analysis corridor of Variation S3-B4 exists on private land where impacts resulting from the B2H Project may be greater. Based on the total number of known occurrences and the broad distribution of the species, implementation of Variation S3-B4 could result in long-term disturbance to salt heliotrope and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S3-B5

There are no known occurrences of sensitive plant species in the 1-mile analysis corridor of Variation S3-B5, and as such, impacts on sensitive plant species are not anticipated. If sensitive plant species are found during preconstruction surveys, the same design features and selective mitigation measures discussed for the Applicant's Proposed Action Alternative would limit impacts on sensitive plant species.

Variation S3-C1

The 1-mile analysis corridor for Variation S3-C1 contains the same sensitive species and number of occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S3-C1 could result in long-term disturbance and moderate residual impacts on Oregon princesplume or Snake River goldenweed but would not contribute to the need to list these species under the ESA, but may result in high residual impacts on white wooly buckwheat and contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S3-C2

The 1-mile analysis corridor for Variation S3-C2 contains the same sensitive species and number of occurrences as the Applicant's Proposed Action Alternative, but also includes one occurrence of hairy wild cabbage.

Hairy wild cabbage is biennial forb species considered imperiled by ORBIC (G4S2) due the limited number of known occurrences limited to southeastern Oregon; however, the species is known throughout the Great Basin region (ORBIC 2013a). Population trends or species specific threats are unknown in Oregon, but most known occurrences contain few individuals and are likely sensitive to disturbance. ORBIC recognizes 3 occurrences in Oregon. However, other BLM surveys in the region identified 7 occurrences and no occurrences are known from Idaho. Of the 10 known occurrences, one is known to occur in the 1-mile analysis corridor and may be affected by the B2H Project. The known occurrence of hairy wild cabbage exists on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based the broader distribution of the species beyond the B2H Project area, and the existence of the occurrence on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of Variation S3-C2 could result in long-term disturbance to hairy wild cabbage and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. Similar to the Applicant's Proposed Action Alternative, implementation of Variation S3-C2 could result in long-term disturbance and moderate residual impacts on Oregon princesplume or Snake River goldenweed but would not contribute to the need to list these species

under the ESA, but may result in high residual impacts on white wooly buckwheat and contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures, and anticipated residual impacts would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S3-C3

The 1-mile analysis corridor for Variation S3-C3 contains occurrences of Snake River goldenweed. Some of these occurrences are different than those contained in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative, but the total number of occurrences is the same.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S3-C3 could result in long-term disturbance to Snake River goldenweed and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S3-C4

The 1-mile analysis corridor for Variation S3-C4 contains occurrences of Snake River goldenweed. Some of these occurrences are different than those contained in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative, but the total number of occurrences is the same.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S3-C4 could result in long-term disturbance to Snake River goldenweed and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S3-C5

The 1-mile analysis corridor for Variation S3-C5 contains occurrences of Snake River goldenweed. The seven occurrences contained in the 1-mile analysis corridor for Variation S3-C5 also are contained in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S3- could result in long-term disturbance to Snake River goldenweed and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S3-C6

The 1-mile analysis corridor for Variation S3-C6 contains occurrences of Snake River goldenweed. Some of these occurrences are different than those contained in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative, but the total number of occurrences is less.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S3-C6 could result in long-term disturbance to Snake River goldenweed and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Flagstaff A Alternative

The 1-mile analysis corridor for the Flagstaff A Alternative contains the same sensitive species and number of occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of the Flagstaff A Alternative could result in long-term disturbance and moderate residual impacts on Oregon princesplume or Snake River goldenweed but would not contribute to the need to list these species under the ESA, but may result in high residual impacts on white wooly buckwheat and contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Timber Canyon Alternative

The 1-mile analysis corridor of the Timber Canyon Alternative contains the greatest number of sensitive plant species, including mingan moonwort, cordilleran sedge, and retrorse sedge in addition to the

white wooly buckwheat, Snake River goldenweed, and Oregon princesplume also contained in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative.

Mingan moonwort a perennial forb that is considered rare, uncommon or threatened by ORBIC (G4G5S3) based on the few known occurrences in Oregon (ORBIC 2013a). Population trends and species specific threats are unknown, but known occurrences are generally composed of fewer than 100 individuals and are likely sensitive to disturbance. However, research suggests that mingan moonwort is associated with intermittent disturbance which maintains light, nutrient, and mycorrhizal availabilities (Ahlenslager and Potash 2007). Occurrences of mingan moonwort are known throughout Oregon and northern North America. ORBIC recognizes 120 occurrences of mingan moonwort in Oregon. However, 194 occurrences were identified during other USFS or BLM surveys, and no occurrences are known from Idaho. Of the total 314 occurrences, one is known to occur in the 1-mile analysis corridor and may be affected by implementation of the B2H Project. This occurrence exists on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the number of total known occurrences, the broader distribution of the species beyond the B2H Project area, and the existence of the occurrence on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Timber Canyon Alternative could result in long-term disturbance to mingan moonwort and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

Cordilleran sedge is a perennial graminoid considered imperiled by ORBIC (G3G4S2) based on the limited number of known occurrences in Oregon and ongoing threats, including grazing and fire suppression (Carex Working Group 2008; ORBIC 2013a). Population trends are unknown. Cordilleran sedge is known from occurrences throughout high-elevation areas in Oregon, as well as western North America. ORBIC recognizes 80 occurrences of cordilleran sedge. However, 133 occurrences were identified during other USFS or BLM surveys, and no occurrences are known from Idaho. Of the total 213 known occurrences, four are known to occur in the 1-mile analysis corridor and may be affected by implementation of the B2H Project. These occurrences exist on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the number of total known occurrences, the broader distribution of the species beyond the B2H Project area, and the existence of the occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Timber Canyon Alternative could result in long-term disturbance to cordilleran sedge and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

Retrorse sedge is a perennial graminoid considered critically imperiled due to the limited number of occurrences in Oregon (ORBIC 2013a). Population trends are unknown in Oregon. Retrorse sedge is known from only a few locations in Oregon with only two located east of the Cascades, but broadly distributed across northern North America. ORBIC recognizes nine occurrences of retrorse sedge.

However, one other occurrence was identified during other USFS surveys and none known from Idaho. Of the 10 total occurrences, one is known to occur in the 1-mile analysis corridor and may be affected by implementation of the B2H Project. This occurrence exists on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the broader distribution of the species beyond the B2H Project area, and the existence of the occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Timber Canyon Alternative could result in long-term disturbance to retrorse sedge and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

Similar to the Applicant's Proposed Action Alternative, implementation of the Timber Canyon Alternative could result in long-term disturbance and moderate residual impacts on Oregon princesplume or Snake River goldenweed but would not contribute to the need to list these species under the ESA, but may result in high residual impacts on white wooly buckwheat and contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Flagstaff A – Burnt River Mountain Alternative

The 1-mile analysis corridor of the Flagstaff A – Burnt River Mountain Alternative contains occurrences of Snake River goldenweed. Some of these occurrences are different than those contained in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative, but the total number of occurrences is the same.

Similar to the Applicant's Proposed Action Alternative, implementation of the Flagstaff A – Burnt River Mountain Alternative could result in long-term disturbance to Snake River goldenweed and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Flagstaff B Alternative

The 1-mile analysis corridor for the Flagstaff B Alternative contains the same sensitive species and number of occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of the Flagstaff B Alternative could result in long-term disturbance and moderate residual impacts on Oregon princesplume or Snake River goldenweed but would not contribute to the need to list these species under the ESA, but may result in high residual impacts on white wooly buckwheat and contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Flagstaff B – Burnt River West Alternative

The 1-mile analysis corridor the Flagstaff B – Burnt River West Alternative contains seven occurrences of Snake River goldenweed. The seven occurrences contained in the 1-mile analysis corridor for the Flagstaff B – Burnt River West Alternative also are contained in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of the Flagstaff B – Burnt River West Alternative could result in long-term disturbance to Snake River goldenweed and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Flagstaff B – Durkee

The 1-mile analysis corridor for the Flagstaff B – Durkee alternative contains occurrences of Snake River goldenweed. Some of these occurrences are different than those contained in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative, but the total number of occurrences is less.

Similar to the Applicant's Proposed Action Alternative, implementation of the Flagstaff B – Durkee Alternative could result in long-term disturbance to Snake River goldenweed and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

U.S. Forest Service Sensitive Plant Species

The Timber Canyon Alternative crosses USFS-administered land and contains several known occurrences of USFS sensitive plant species in the 10-mile and 1-mile analysis corridors, all of which are located on USFS-administered land. Unknown occurrences of USFS sensitive plant species may exist on USFS-administered lands crossed by the Timber Canyon Alternative. As required by B2H Project Design Feature 4, preconstruction surveys to identify USFS sensitive species and determine habitat extents would be conducted along the right-of-way, as well as any areas requiring ground disturbance (e.g., building or upgrading of access roads, temporary work areas, and multi-use areas) outside the right-of-way.

The types of potential direct and indirect effects, Applicant-committed design features and selective mitigation measures to minimize impacts on USFS sensitive plant species, and extent of impacts on USFS sensitive plant species would be similar to that described for Segment 1. Implementation of the B2H Project may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species for any of the USFS sensitive plant species considered in Segment 3.

Noxious Weeds

Applicant's Proposed Action Alternative and All Other Alternatives

The Applicant's Proposed Action Alternative and all other alternative routes in Segment 3 would result in disturbance to native vegetation communities, which could alter vegetation community structure, soil properties, and water availability creating conditions favorable for noxious weed establishment and spread. Where this disturbance is in areas without weed infestations, the B2H Project may introduce noxious weed species through the transport of plant materials. In Segment 3, these areas exist mostly in the Mixed Conifer and Mountain Shrub-dominated vegetation communities located along the foothills of the Wallowa Mountains northeast of Baker, Oregon and are crossed only by the Timber Canyon Alternative. The extent of noxious weed invasion would be influenced by several factors, including the extent of B2H Project disturbance, preconstruction condition of native vegetation communities, and the distribution of noxious weeds in the surrounding area. The anticipated amounts of B2H Project disturbance to vegetation communities are summarized in Table 3-127. The types of potential effects and impacts on vegetation resources associated with noxious weed invasion, and Applicant-committed design features to reduce noxious weed invasion potential would be similar to that described for Segment 1.

Traditional Foods and Ethnobotanical Resources

Applicant's Proposed Action Alternative and All Other Alternatives

The Applicant's Proposed Action Alternative and all other alternative routes would result in disturbance and potential impacts on native vegetation communities (Table 3-127). The types of potential effects and impacts on traditional foods and ethnobotanical resources associated with B2H Project implementation, as well as the application of Applicant-committed design features to reduce

disturbance to native vegetation communities and development of site-specific mitigation during government to government consultation would be similar to that described for Segment 1.

Conclusion

The Applicant's Proposed Action Alternative and all other alternative routes considered in Segment 3 would result in predominantly moderate residual impacts on vegetation communities, with the Timber Canyon Alternative resulting in the greatest moderate residual impacts as it is the longest alternative route considered and would affect Mixed Conifer Forest vegetation communities to a much greater extent. All alternative routes would have similar impacts on traditional foods and other ethnobotanical resources important to tribal groups.

All alternative routes could affect known occurrences of the federally listed Howell's spectacular thelypody, but any impacts are likely to be limited in intensity given the distance between known occurrences and all alternative routes. If new Howell's spectacular thelypody occurrences are identified during preconstruction surveys, application of design features of the B2H Project for environmental protection and selective mitigation measures are expected to avoid individual mortality and adverse modification of occupied habitats. Moderate residual impacts on sensitive species could occur with all alternative routes, and the Applicant's Proposed Action, Flagstaff A, Timber Canyon, and Flagstaff B alternatives, as well as Variations S3-C1 and S3-C2, could result in high residual impacts through disturbance to known white wooly buckwheat occurrences. Based on the available sensitive plant species occurrence data, the Flagstaff B – Burnt River Alternative could affect the fewest sensitive plant occurrences.

All alternative routes would result in disturbance to native vegetation communities and increase the potential establishment and spread of noxious weeds or other invasive plants. The Timber Canyon Alternative crosses areas with few identified noxious weed infestations to the greatest extent of any alternative route considered and could introduce noxious weeds or other invasive plants to these areas.

The Flagstaff B – Burnt River Alternative would result in the least impacts on vegetation resources overall compared to the other alternative routes in Segment 3 due to the low likelihood of high residual impacts on sensitive plant species and the possibility of affecting the fewest sensitive plant occurrences.

SEGMENT 4—BROGAN

Vegetation Communities

Table 3-130 presents the residual impacts on vegetation communities for all alternative routes and route variations in Segment 4. Table 3-131 presents the anticipated amount of disturbance to vegetation communities in Segment 4. The distribution of vegetation communities in the B2H Project area is displayed on MV-7.

Table 3-130. Vegetation Resources Inventory Data and Residual Impacts on Segment 4—Brogan (miles crossed)

Alternative Route	Total Length (miles)	Inventory															Residual Impacts[1]	
		Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe	Moderate	Low
Applicant's Proposed Action	40.1	0.0	0.0	1.5	0.0	0.0	1.3	0.0	0.0	0.0	1.3	7.3	8.6	0.0	3.9	16.2	30.0	10.1
Variation S4-A1	*5.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.2*	*0.0*	*0.0*	*0.0*	*0.4*	*0.3*	*1.7*	*0.0*	*0.7*	*2.6*	*4.2*	*1.7*
Variation S4-A2	*6.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.5*	*0.0*	*0.0*	*0.0*	*0.7*	*0.2*	*1.7*	*0.0*	*0.6*	*2.3*	*4.3*	*1.7*
Variation S4-A3	*6.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.4*	*0.0*	*0.0*	*0.0*	*0.7*	*0.4*	*1.5*	*0.0*	*0.6*	*2.5*	*4.6*	*1.5*
Tub Mountain South	40.5	2.1	0.0	1.8	0.5	0.1	1.3	0.0	0.0	0.0	0.9	1.0	16.3	0.0	4.4	12.1	20.2	20.3
Willow Creek	34.6	1.0	0.0	1.2	0.0	0.0	0.3	0.0	0.0	0.0	0.4	0.8	9.8	0.0	4.3	16.8	22.6	12.0

Table Note: [1]High residual impacts on vegetation communities are not anticipated to occur.

Table 3-131. Anticipated Disturbance for Vegetation Resources for Segment 4—Brogan (acres)

Alternative Route	Total Disturbance (acres)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Applicant's Proposed Action	953	0	0	35	0	0	31	0	0	0	31	173	203	0	92	383
Variation S4-A1	*154*	*0*	*0*	*0*	*0*	*0*	*5*	*0*	*0*	*0*	*10*	*8*	*44*	*0*	*18*	*68*
Variation S4-A2	*149*	*0*	*0*	*0*	*0*	*0*	*13*	*0*	*0*	*0*	*18*	*5*	*43*	*0*	*15*	*58*
Variation S4-A3	*153*	*0*	*0*	*0*	*0*	*0*	*10*	*0*	*0*	*0*	*18*	*10*	*38*	*0*	*15*	*64*
Tub Mountain South	901	47	0	40	11	2	29	0	0	0	20	22	363	0	98	269
Willow Creek	777	22	0	27	0	0	7	0	0	0	9	18	220	0	97	377

NOTE: Acres in the table are rounded and, therefore, columns may not sum exactly.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush and Native Grassland vegetation communities. Moderate residual impacts also are expected where the Applicant's Proposed Action Alternative crosses RCA, Mountain Shrub, and Dwarf Sagebrush Steppe vegetation communities. Low residual impacts are expected where the Applicant's Proposed Action Alternative crosses Non-native Grassland communities. Of the alternative routes considered in Segment 4, the Applicant's Proposed Action Alternative would result in the greatest extent of moderate impacts on vegetation communities.

Several wildfires have affected vegetation communities crossed by the Applicant's Proposed Action Alternative, and the current vegetation communities may no longer reflect the vegetation communities identified from the NWGAP data and the assessment of initial and residual impacts. Vegetation communities affected by wildfires can take decades to recover to predisturbance conditions, but are assumed to eventually return to predisturbance conditions, unless weed invasion and fire regime alteration cause native vegetation communities to transition to communities more typical of Non-native Grasslands. The departure from normal of native vegetation communities affected by wildfire is heavily influenced by pre-existing conditions, as well as other factors, including vegetation community type, fire severity, and weather.

Vegetation communities with abundant and diverse native plant species, particularly those with high cover of perennial bunchgrasses, are more likely to recruit and resprout with native vegetation similar to predisturbance conditions (Miller et al. 2013). However, without detailed knowledge of the pre-existing conditions across the entirety of the alternative route for each wildfire to predict the departure from normal, the assessment of impacts assumes areas affected by recent wildfires will return to predisturbance conditions. Several design features of the B2H Project for environmental protection aimed to reduce erosion and the extent of disturbance, prevent the introduction and spread of invasive plants, and establish desirable vegetation are anticipated to minimize the risk of recently burned native vegetation communities transitioning to non-native communities as a result of B2H Project activities.

Direct and indirect effects on vegetation communities would include loss of vegetation, alterations to vegetation community structure, and increased risks of invasive plant invasion. The types of potential effects on vegetation communities are described in greater detail in Section 3.2.3.6. Several B2H Project design features are anticipated to limit these effects through reducing the extent of disturbance, preventing the spread and establishment of invasive plants, and reclaiming disturbed areas with desirable native vegetation. Refer to the list of design features applicable to vegetation communities in Section 3.2.3.4.

Where the Applicant's Proposed Action Alternative crosses RCAs, disturbance to these vegetation communities is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible, as described by B2H Project Design Features 15 and 16. Where spanning would not be feasible, the application of several selective mitigation measures aimed to reduce the creation of new access roads, soil disturbance, and vegetation removal in the right-of-way are expected to reduce

impacts from a high initial level to a moderate residual level. Table 3-95 summarizes the expected level of initial impacts, selective mitigation measures that would be applied, and resulting residual impacts on vegetation communities.

Variation S4-A1

Variation S4-A1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S4-A1 crosses Dwarf Sagebrush Steppe, RCA, Mountain Shrub, and Native Grassland vegetation communities. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S4-A2

The extent of disturbance to vegetation communities and residual impacts resulting from Variation S4-A2 would be similar to Variation S4-A1. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S4-A3

The extent of disturbance to vegetation communities and residual impacts resulting from Variation S4-A3 would be similar to Variation S4-A1. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Tub Mountain South Alternative

The Tub Mountain South Alternative is expected to result in moderate impacts where the alternative crosses Tall Sagebrush Steppe, Desert Shrub, Native Grassland, and RCA vegetation communities. The Tub Mountain South Alternative is expected to result in fewer residual impacts on vegetation communities than the Applicant's Proposed Action Alternative as the Tub Mountain Alternative crosses Non-native Grassland vegetation communities to a greater extent. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Willow Creek Alternative

The Willow Creek Alternative is expected to result in moderate impacts where the alternative crosses Tall Sagebrush Steppe, Native Grassland, and RCA vegetation communities. The Willow Creek Alternative is expected to result in fewer residual impacts on vegetation communities than the Applicant's Proposed Action Alternative as the Willow Creek Alternative crosses Non-native Grassland

vegetation communities to a greater extent and is shorter in total length. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Federally Listed and Candidate Plant Species

Applicant's Proposed Action Alternative and All Other Alternatives

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor. As such, impacts resulting from short-term disturbance, loss or adverse modification of habitat occupied by federally listed or candidate species or individual mortality to federally listed or candidate species are not anticipated for any alternative routes considered in Segment 4. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance and prevent individual mortality in occupied habitat is anticipated to reduce impacts on federally listed or candidate plant species to low levels.

Other Sensitive Plant Species

Table 3-132 identifies the sensitive plant species known to occur in the 10-mile analysis corridor for all alternative routes and route variations in Segment 4, and summarizes the occurrence data by land-management jurisdiction and known occurrences in the 10-mile analysis corridor.

Applicant's Proposed Action Alternative

Two sensitive plant species are known to occur in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative, Snake River goldenweed and white wooly buckwheat (Table 3-132).

If disturbance from B2H Project activities occurs in sensitive plant species habitats, several direct and indirect effects may occur, including loss of habitat; mortality or other adverse effects on individuals; and habitat degradation through weed invasion or reduction and isolation of patch size. These effects are described in greater detail in Section 3.2.3.6. The criteria used to assess impacts are presented in Table 3-94. The potential impacts unique to sensitive plant species including population reduction, factors influencing severity of impacts, and the application of design features and selective mitigation measures to reduce impacts on sensitive plant species would be similar to that described for the Applicant's Proposed Action Alternative in Segment 1.

Table 3-132. Potentially Affected Sensitive Plant Species for Segment 4—Brogan

Alternative Route	Total Acres of Disturbance	White Wooly Buckwheat					Cronquist's Stickseed					Janish's Penstemon					Snake River Goldenweed					Oregon Princesplume				
		Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile			
			Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total
Applicant's Proposed Action	953	1	1	0	1	1	0	0	0	0	0	1	0	0	0	0	83	4	0	9	9	7	0	0	0	0
Variation S4-A1	*154*	*1*	*1*	*0*	*1*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*73*	*4*	*0*	*9*	*9*	*3*	*0*	*0*	*0*	*0*
Variation S4-A2	*149*	*1*	*1*	*0*	*1*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*73*	*4*	*0*	*9*	*9*	*3*	*0*	*0*	*0*	*0*
Variation S4-A3	*153*	*1*	*1*	*0*	*1*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*73*	*4*	*0*	*8*	*8*	*3*	*0*	*0*	*0*	*0*
Tub Mountain South	901	6	5	0	1	5	38	7	0	1	7	0	0	0	0	0	78	12	0	9	17	18	0	0	0	0
Willow Creek	777	1	1	0	1	1	1	0	0	0	0	1	1	0	0	1	77	7	0	10	13	7	2	0	0	2

Table Note: Some sensitive plant species occurrences may exist on multiple jurisdictions, and the sum of occurrences on federal, state, and private lands may be greater than the total

White wooly buckwheat is a perennial forb considered rare, uncommon or threatened by ORBIC (G5T3S2) based on the few known occurrences limited to southeastern Oregon. It has been identified as a Type 3 BLM species in Idaho. Population trends or species specific threats are unknown, but due to the small number of known occurrences would be sensitive to disturbances (ORBIC 2012c). ORBIC recognizes 16 occurrences of white wooly buckwheat in Oregon. However, 17 white wooly buckwheat occurrences were identified during preliminary and other BLM surveys in the region, and at least 2 occurrences are known from Idaho. Of the total 35 known white wooly buckwheat occurrences, one is known to occur in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative in Segment 4. This occurrence exists at least partially on federal lands where resource management plans require the conservation of sensitive plant species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the extent possible. Based the number of total known occurrences, number of known occurrences in the 1-mile analysis corridor, and the existence of the occurrence on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance and moderate residual impacts, but is not likely to contribute to the need to list the species under the ESA.

Snake River goldenweed is a perennial forb also considered rare, uncommon, or threatened by ORBIC (G3S3) for similar reasons as white wooly buckwheat (ORBIC 2010a). It has been identified as a Type 3 BLM species in Idaho. Population trends have been assessed for this species, and indicate declining trends at many occurrences. However, numerous occurrences are estimated to have more than 500 individuals and are considered to have substantial ecological integrity and resistance to minor disturbance (ORBIC 2010a). ORBIC recognizes 42 occurrences of Snake River goldenweed in Oregon. However, preliminary and other BLM surveys in the region identified 233 occurrences, and at least 33 other occurrences of Snake River goldenweed are known from Idaho. Of the total 308 occurrences, nine are known to occur in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. Of these nine occurrences, all exist on privately owned land where impacts resulting from the B2H Project may be greater. However this species is considered endangered by the state of Oregon; and potential impacts resulting from the B2H Project implementation would be avoided or minimized to the greatest extent possible to prevent a significant reduction in the likelihood of survival or recovery of the species. Based on the total number of occurrences, compliance with state of Oregon regulations on private lands, and the mitigation measures to avoid or reduce disturbance there would be limited impacts on the species. Implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance to Snake River goldenweed and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S4-A1

The 1-mile analysis corridor for Variation S4-A1 contains the same sensitive species and number of occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S4-A1 could result in long-term disturbance to white wooly buckwheat and Snake River goldenweed and moderate residual impacts, but will not contribute to the need to list these species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S4-A2

The 1-mile analysis corridor for Variation S4-A2 contains the same sensitive species and number of occurrences as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S4-A2 could result in long-term disturbance to white wooly buckwheat and Snake River goldenweed and moderate residual impacts, but will not contribute to the need to list these species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S4-A3

The 1-mile analysis corridor for Variation S4-A2 contains the same sensitive species, but one less occurrence of Snake River goldenweed as the Applicant's Proposed Action Alternative.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S4-A3 could result in long-term disturbance to white wooly buckwheat and Snake River goldenweed and moderate residual impacts, but will not contribute to the need to list these species under the ESA.

The types of potential effects, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Tub Mountain South Alternative

The 1-mile analysis corridor for the Tub Mountain South Alternative includes known occurrences of Cronquist's stickseed, as well as white wooly buckwheat and Snake River goldenweed.

Cronquist's stickseed is a perennial forb considered rare, uncommon or threatened by ORBIC (G3S3) as all known occurrences are narrowly restricted to southeastern Oregon and southwestern Idaho, but several occurrences appear to have large populations with stable trends (ORBIC 2010b). It has been identified as a Type 3 BLM species in Idaho. ORBIC recognizes 46 occurrences of Cronquist's stickseed in Oregon. However, 243 occurrences were identified during preconstruction surveys and other BLM surveys in the region, and 5 occurrences were identified in Idaho. Of the 294 identified occurrences, seven are known to occur in the 1-mile analysis corridor and may be affected by implementation of the Tub Mountain South Alternative. All seven of these occurrences are located, at least partially, on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Additionally, this species is considered threatened by the state of Oregon; and potential impacts resulting from the B2H Project implementation would be avoided or minimized to the greatest extent possible to prevent a significant reduction in the likelihood of survival or recovery of the species. Based on the total number of occurrences, compliance with state of Oregon regulations on private lands, and the mitigation measures to avoid or reduce disturbance there would be limited impacts on the species. Implementation of the Tub Mountain South Alternative could result in long-term disturbance and moderate residual impacts on Cronquist's stickseed, but is not likely to contribute to the need to list the species under the ESA.

Similar to the Applicant's Proposed Action Alternative, implementation of the Tub Mountain South Alternative could result in long-term disturbance and moderate residual impacts on Snake River goldenweed and white wooly buckwheat, but will not contribute to the need to list these species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Willow Creek Alternative

The 1-mile analysis corridor the Willow Creek Alternative contains the greatest number of sensitive plant species and includes Janish's penstemon and Oregon princesplume, as well white wooly buckwheat and Snake River goldenweed.

Janish's penstemon is considered imperiled (G4S2) in Idaho by the IDFG based on the few known occurrences in the state and several ongoing threats (IFWIS 2016). It has been identified as a Type 3 BLM species in Idaho. Although the known occurrence of Janish's penstemon in the 1-mile analysis corridor of the Willow Creek Alternative is located in Oregon, impacts on occurrences in Oregon could affect nearby occurrences in Idaho. Janish's penstemon is distributed across several states in the western US, with occurrences known from Oregon, Idaho, Nevada, and California. IFWIS recognizes 13 occurrences in Idaho, and an additional 4 were identified in Oregon from the ORBIC and preconstruction survey datasets. Of the 17 total known occurrences, one is known to exist in the 1-mile

analysis corridor and may be affected by implementation of the Willow Creek Alternative. This occurrence is located on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the broader distribution of the species beyond the B2H Project area and the existence of the occurrence on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Willow Creek Alternative could result in long-term disturbance and moderate residual impacts on Janish's penstemon, but is not likely to contribute to the need to list the species under the ESA.

Oregon princesplume is a biennial forb considered imperiled by ORBIC (G2S2) due the limited number of known occurrences restricted to southeastern Oregon and western Idaho, of which few have stable population trends. Ongoing threats to the species include grazing, disturbance associated with mining and OHV traffic, and habitat conversion to annual grasslands (ORBIC 2012b). Population trends at several smaller occurrences have been noted as declining, but multiple occurrences appear to have excellent viability despite ongoing threats. ORBIC recognizes 63 occurrences of Oregon princesplume in Oregon. However, 118 occurrences were identified during preliminary and other BLM surveys in the regions, and at least 5 occurrences are known from Idaho. Of the 186 total known occurrences, two are known to occur in the 1-mile analysis corridor and may be affected by implementation of the B2H Project. Both of these occurrences are located on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the number of total known occurrences, and apparent species resistance to ongoing threats, implementation of the Willow Creek Alternative could result in long-term disturbance to Oregon princesplume and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Noxious Weeds

Applicant's Proposed Action Alternative and All Other Alternatives

The Applicant's Proposed Action Alternative and all other alternative routes in Segment 4 would result in disturbance to native vegetation communities, which could alter vegetation community structure, soil properties, and water availability creating conditions favorable for noxious weed establishment and spread. Where this disturbance is in areas without weed infestations, the B2H Project may introduce noxious weed species through the transport of plant materials. In Segment 4, these areas exist mostly in the Tall Sagebrush and Native Grassland-dominated vegetation communities located west of Jamieson, Oregon and are crossed by the Applicant's Proposed Action Alternative and Willow Creek

alternatives. The extent of noxious weed invasion would be influenced by several factors, including the extent of B2H Project disturbance, preconstruction condition of native vegetation communities, and the distribution of noxious weeds in the surrounding area. The anticipated amounts of B2H Project disturbance to vegetation communities are summarized in Table 3-131. The types of potential effects and impacts on vegetation resources associated with noxious weed invasion, and Applicant-committed design features to reduce noxious weed invasion potential would be similar to that described for Segment 1.

Traditional Foods and Ethnobotanical Resources

Applicant's Proposed Action Alternative and All Other Alternatives

The Applicant's Proposed Action Alternative and all other alternative routes would result in disturbance and potential impacts on native vegetation communities (Table 3-131). The types of potential effects and impacts on traditional foods and ethnobotanical resources associated with B2H Project implementation, as well as the application of Applicant-committed design features to reduce disturbance to native vegetation communities and development of site-specific mitigation during government to government consultation would be similar to that described for Segment 1.

Conclusion

The Applicant's Proposed Action Alternative and all other alternative routes considered in Segment 4 would result in moderate residual impacts on vegetation communities, with the Tub Mountain South Alternative resulting in the least amount of moderate impacts as it primarily crosses Non-native Grasslands. All alternative routes would affect traditional foods or other ethnobotanical resources important to tribal groups, with the Tub Mountain South Alternative likely to result in the least impacts as it crosses primarily Non-native Grasslands less likely to support traditional foods and other ethnobotanical resources important to tribal groups.

Impacts on federally listed species are not expected for any of the alternative routes considered in Segment 4. High residual impacts on sensitive plant species are not expected for any alternative route, but all alternative routes could result in long-term disturbance and moderate impacts on several sensitive plant species occurrences. Based on the available sensitive plant species occurrence data, the Tub Mountain South Alternative could affect the greatest number of occurrences and the Applicant's Proposed Action Alternative could affect the fewest occurrences.

All alternative routes would result in disturbance to native vegetation communities and increase the potential establishment and spread of noxious weeds or other invasive plants. The Applicant's Proposed Action and Willow Creek alternatives cross areas with few identified noxious weed infestations and could introduce noxious weeds or other invasive plants to these areas.

None of the alternative routes considered in Segment 4 would clearly result in the least overall impacts on vegetation resources. The Tub Mountain South Alternative would result in the least impacts on vegetation communities, traditional foods or other ethnobotanical resources, and the lowest likelihood of introducing noxious weeds or other invasive plants in areas with few identified noxious weed

infestations. However, the Applicant's Proposed Action Alternative could result in the least impacts on sensitive plant species.

SEGMENT 5—MALHEUR

Vegetation Communities

Table 3-133 presents the residual impacts on vegetation communities for alternative routes and route variations in Segment 5. Table 3-134 presents the anticipated amount of disturbance to vegetation communities in Segment 5. The distribution of vegetation communities in the B2H Project area is displayed on MV-7.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush vegetation communities. Moderate residual impacts also are expected where the Applicant's Proposed Action Alternative crosses RCA and Native Grassland vegetation communities. Low residual impacts are expected where the Applicant's Proposed Action Alternative crosses Non-native Grassland and Bare Ground, Cliffs, and Talus communities. Of the alternative routes considered in Segment 5, the Applicant's Proposed Action Alternative would result in the least extent of moderate impacts on vegetation communities as it crosses the greatest extent of Non-native Grassland.

Several wildfires have affected vegetation communities crossed by the Applicant's Proposed Action Alternative, and the current vegetation communities may no longer reflect the vegetation communities identified from the NWGAP data and the assessment of initial and residual impacts. Vegetation communities affected by wildfires can take decades to recover to predisturbance conditions, but are assumed to eventually return to predisturbance conditions, unless weed invasion and fire regime alteration cause native vegetation communities to transition to communities more typical of Non-native Grasslands. The departure from normal of native vegetation communities affected by wildfire is heavily influenced by pre-existing conditions, as well as other factors, including vegetation community type, fire severity, and weather. Vegetation communities with abundant and diverse native plant species, particularly those with high cover of perennial bunchgrasses, are more likely to recruit and resprout with native vegetation similar to predisturbance conditions (Miller et al. 2013). However, without detailed knowledge of the pre-existing conditions across the entirety of the alternative route for each wildfire to predict the departure from normal, the assessment of impacts assumes areas affected by recent wildfires will return to predisturbance conditions. Several B2H Project design features aimed to reduce erosion and the extent of disturbance, prevent the introduction and spread of invasive plants, and establish desirable vegetation are anticipated to minimize the risk of recently burned native vegetation communities transitioning to non-native communities as a result of B2H Project activities.

Table 3-133. Alternative Route Comparison for Vegetation Resources Inventory Data and Residual Impacts on Segment 5—Malheur (miles crossed)

Alternative Route	Total Length (miles)	Inventory															Residual Impacts[1]	
		Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe	Moderate	Low
Applicant's Proposed Action	40.4	0.0	0.0	7.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.0	10.3	0.0	2.9	18.9	22.8	17.6
Variation S5-A1	*7.4*	*0.0*	*0.0*	*0.6*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*4.9*	*0.0*	*0.5*	*1.4*	*1.9*	*5.5*
Variation S5-A2	*7.4*	*0.0*	*0.0*	*0.9*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*3.8*	*0.0*	*0.7*	*1.9*	*2.7*	*4.7*
Variation S5-B1	*2.5*	*0.0*	*0.0*	*0.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.0*	*0.7*	*1.4*	*2.2*	*0.3*
Variation S5-B2	*2.8*	*0.6*	*0.0*	*0.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.9*	*1.1*	*2.0*	*0.8*
Malheur S	43.5	0.0	0.0	6.9	0.2	0.1	0.0	0.0	0.0	0.0	0.0	1.2	7.9	0.0	3.9	23.3	28.6	14.9
Malheur A	43.1	0.0	0.0	6.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	2.0	6.5	0.0	3.8	24.2	30.3	12.8

Table Note: [1]High residual impacts on vegetation communities are not anticipated to occur.

Table 3-134. Anticipated Disturbance for Vegetation Resources for Segment 5—Malheur (acres)

Alternative Route	Total Disturbance (acres)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Applicant's Proposed Action	884	0	0	158	0	2	0	0	0	0	0	22	226	0	63	414
Variation S5-A1	*141*	*0*	*0*	*11*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*93*	*0*	*10*	*27*
Variation S5-A2	*147*	*0*	*0*	*18*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*75*	*0*	*14*	*38*
Variation S5-B1	*56*	*0*	*0*	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*2*	*2*	*0*	*15*	*30*
Variation S5-B2	*57*	*12*	*0*	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*18*	*22*
Malheur S	974	0	0	154	4	2	0	0	0	0	0	27	177	0	87	521
Malheur A	932	0	0	134	4	2	2	0	0	0	0	43	141	0	82	523

Table Note: Acres in the table are rounded and, therefore, columns may not sum exactly.

Direct and indirect effects on vegetation communities would include loss of vegetation, alterations to vegetation community structure, and increased risks of invasive plant invasion. The types of potential effects on vegetation communities are described in greater detail in Section 3.2.3.6. Several B2H Project design features are anticipated to limit these effects through reducing the extent of disturbance, preventing the spread and establishment of invasive plants, and reclaiming disturbed areas with desirable native vegetation. Refer to the list of design features applicable to vegetation communities in Section 3.2.3.4.

Where the Applicant's Proposed Action Alternative crosses RCAs, disturbance to these vegetation communities is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible, as described by Design Features 15 and 16. Where spanning would not be feasible, the application of several selective mitigation measures aimed to reduce the creation of new access roads, soil disturbance, and vegetation removal in the right-of-way are expected to reduce impacts from a high initial level to a moderate residual level. Table 3-95 summarizes the expected level of initial impacts, selective mitigation measures that would be applied, and resulting residual impacts on vegetation communities.

Variation S5-A1

Variation S5-A1 is anticipated to result in predominantly low residual impacts as it primarily crosses Non-native Grassland vegetation communities. Moderate residual impacts are expected where Variation S5-A1 crosses RCA and Tall Sagebrush Steppe vegetation communities. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S5-A2

Variation S5-A2 is anticipated to result in predominantly low residual impacts as it primarily crosses Non-native Grassland vegetation communities. Moderate residual impacts are expected where Variation S5-A1 crosses Desert Shrub, RCA and Tall Sagebrush Steppe vegetation communities. Variation S5-A2 is anticipated to result in greater amounts of moderate impacts on vegetation communities, as it crosses Tall Sagebrush Steppe to a greater extent than Variation S5-A2. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S5-B1

Variation S5-B1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S5-B1 crosses Native Grassland and RCA vegetation communities. Low residual impacts are expected where Variation S5-B1 crosses Non-native Grasslands and Bare Ground, Cliffs, and Talus. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation

communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S5-B2

Variation S5-B2 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe and RCA vegetation communities. Low residual impacts are expected where Variation S5-B2 crosses Agriculture and Bare Ground, Cliffs, and Talus. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Malheur S Alternative

The Malheur S Alternative is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are anticipated where the Malheur S Alternative crosses RCA, Native Grassland, and Desert Shrub vegetation communities. Low residual impacts are expected where the Malheur S Alternative crosses Bare Ground, Cliffs, and Talus and Non-native Grassland vegetation communities. The Malheur S Alternative crosses Tall Sagebrush Steppe to a greater extent than the Applicant's Proposed Action Alternative, and as such is anticipated to result in greater residual impacts.

Where the Malheur S Alternative crosses the Below the Dam ACEC (Link 5-30), long-term or permanent disturbance to the black cottonwood galleries could occur as a result of vegetation clearing for (1) construction of B2H Project features or (2) maintenance of right-of-way clearances. Any disturbance to these rare galleries would cause substantial modification through limbing, felling, and clearing of individual trees and is expected to be either irreversible or persist for the time period required for germination and establishment of black cottonwood. Any disturbance to these black cottonwood galleries could result in high impacts. The extent and potential effects on this ACEC are described in greater detail in the Land Use section, Section 3.2.6. However, disturbance to these black cottonwood galleries is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible, as described by Design Features 15 and 16. Where spanning would not be feasible, the application of several selective mitigation measures aimed to reduce the creation of new access roads, soil disturbance, and vegetation removal in the right-of-way are expected to reduce impacts from a high initial level to a moderate residual level.

Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Malheur A Alternative

The Malheur A Alternative is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are anticipated where the Malheur A Alternative crosses Dwarf Sagebrush Steppe, RCA, Native Grassland, and Desert Shrub vegetation communities. Low residual impacts are expected where the Malheur A Alternative crosses Bare Ground, Cliffs, and Talus and Non-native Grassland vegetation communities. The Malheur A Alternative crosses Tall Sagebrush Steppe to a greatest extent of any alternative in Segment 5, and as such is anticipated to result in greatest residual impacts.

Similar to the Malheur S Alternative, the Malheur A Alternative crosses the Below the Dam ACEC (Link 5-35), and could result in disturbance to black cottonwood galleries. The types of effects, potential impacts, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Malheur S Alternative.

Wildfire effect on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Federally Listed and Candidate Plant Species

Applicant's Proposed Action Alternative and All Other Alternatives

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor. As such, impacts resulting from short-term disturbance, loss or adverse modification of habitat occupied by federally listed or candidate species, or individual mortality to federally listed or candidate species are not anticipated for any alternative route or route variation considered in Segment 5. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, or avoid disturbance and prevent individual mortality in occupied habitat is anticipated to reduce residual impacts on low levels on federally listed or candidate plant species.

Other Sensitive Plant Species

Table 3-135 identifies the sensitive plant species known to occur in the 10-mile analysis corridor for all alternatives considered in Segment 5, and summarizes the occurrence data by land-management jurisdiction and known occurrences in the 10-mile analysis corridor.

Applicant's Proposed Action Alternative

Five sensitive plant species are known to occur in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative, including Mulford's milkvetch, Malheur cryptantha, Greeley's springparsley, Cronquist's stickseed, and wishbone bush (Table 3-135).

If disturbance from B2H Project activities occurs in sensitive plant species habitats, several direct and indirect effects may occur, including loss of habitat; mortality or other adverse effects on individuals;

and habitat degradation through weed invasion or reduction and isolation of patch size. These effects are described in greater detail in Section 3.2.3.6. The criteria used to assess impacts are presented in Table 3-94. The potential impacts unique to sensitive plant species including population reduction, factors influencing severity of impacts, and the application of design features and selective mitigation measures to reduce impacts on sensitive plant species would be similar to that described for the Applicant's Proposed Action Alternative in Segment 1.

Mulford's milkvetch is a perennial forb considered critically imperiled by ORBIC (G2S1) due to the limited number of known extant occurrences restricted to the Snake River Floodplain in southeastern Oregon and southwestern Idaho (Mancuso 1999; ORBIC 2013c). It has been identified as a Type 2 BLM species in Idaho. Recent studies at several occurrences in southeastern Oregon demonstrate decreasing trends with annual fluctuations across seven years of observation (Gray et al. 2015). Several threats to Mulford's milkvetch were also identified, including: invasive plants, shifts in precipitation patterns from climate change and livestock use. ORBIC recognizes 14 occurrences in Oregon. However, 121 occurrences were identified from previous BLM surveys in the region, and 10 were identified in Idaho. Of the total 145 occurrences, three are known to occur in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. All three of these occurrences are located on federally managed land where resource management plans require the conservation of sensitive plant species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Additionally, this species is considered endangered by the state of Oregon; and potential impacts resulting from the B2H Project implementation would be avoided or minimized to the greatest extent possible to prevent a significant reduction in the likelihood of survival or recovery of the species. Based on the total number of occurrences, compliance with state of Oregon regulations on private lands, and the existence of several occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species there would be limited impacts on the species. Implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance and moderate residual impacts on Mulford's milkvetch, but is not likely to contribute to the need to list the species under the ESA.

Table 3-135. Potentially Affected Sensitive Plant Species for Segment 5—Malheur

Alternative Route	Total Acres of Disturbance	Mulford's Milkvetch					Cusick's Pincushion					Malheur Cryptantha					Greeley's Springparsley					Saltwort buckwheat					Cronquist's Stickseed					Smooth Stickleaf					Wishbone Bush				
		Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile			
			Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total
Applicant's Proposed Action	884	13	3	0	0	3	3	0	0	0	0	6	4	0	0	4	9	4	0	0	4	1	0	0	0	0	39	6	0	1	6	7	0	0	0	0	6	3	0	1	3
Variation S5-A1	*141*	*7*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*30*	*2*	*0*	*1*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S5-A2	*147*	*6*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*1*	*0*	*1*	*1*	*29*	*2*	*0*	*1*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Variation S5-B1	*56*	*6*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*7*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*6*	*2*	*0*	*1*	*2*
Variation S5-B2	*57*	*6*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*7*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*6*	*2*	*0*	*1*	*2*
Malheur S	974	5	0	0	0	0	7	2	0	0	2	9	4	0	0	4	9	4	0	0	4	1	0	0	0	0	15	4	0	0	4	7	0	0	0	0	6	2	0	0	2
Malheur A	932	4	0	0	0	0	7	2	0	0	2	9	0	0	0	0	9	4	0	0	4	1	0	0	0	0	15	4	0	0	4	7	1	0	0	1	5	2	0	0	2

Table Note: Some sensitive plant species occurrences may exist on multiple jurisdictions, and the sum of occurrences on federal, state, and private lands may be greater than the total.

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Greeley's springparsley is a perennial forb considered critically imperiled by ORBIC (G5T2S1) due to the few known occurrences limited to southeastern Oregon (ORBIC 2013a). It has been identified as a Type 3 BLM species in Idaho. Population trends and species specific threats are unknown, but due to the small number of known occurrences would be sensitive to disturbances. Greeley's springparsley is a variety of a more broadly distributed species, plains springparsley (*Cymopterus acaulis*), which has been the subject of taxonomic confusion. Sun et al. (2005) proposed recognizing plains springparsley and all varieties as *C. glomeratus.* For the purposes of this analysis, potential impacts on Greeley's springparsley will be considered at the variety level. ORBIC recognizes 4 occurrences of Greeley's springparsley in Oregon. However, 9 occurrences were identified from preconstruction and other BLM surveys in the region, and 12 were identified in Idaho. Of the total 25 known occurrences, four are known to occur in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. All four of these occurrences are located on federally managed land where resource management plans require the conservation of sensitive plant species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the existence of several occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Applicant's Proposed Action Alternative is not likely to result in high levels of impact on Greeley's springparsley or contribute to the need to list the species under the ESA. High levels of impacts on Greeley's springparsley are not likely, but could occur given the limited distribution of the species, few known occurrences, and unknown population trends. If implementation of the Applicant's Proposed Action Alternative results in severe disturbance or affects the long-term persistence of multiple occurrences, high residual impacts could occur and contribute to the need to list the species under the ESA.

Cronquist's stickseed is a perennial forb considered rare, uncommon, or threatened (G3S3) by ORBIC as all known occurrences are narrowly restricted to southeastern Oregon and southwestern Idaho, but several occurrences appear to have large populations with stable trends (ORBIC 2010b). It has been identified as a Type 3 BLM species in Idaho. ORBIC recognizes 46 occurrences of Cronquist's stickseed in Oregon. However, 243 occurrences were identified during preconstruction surveys and other BLM surveys in the region, and 5 occurrences were identified in Idaho. Of the 294 identified occurrences, six are known to occur in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. All six of these occurrences are located, at least partially, on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. However this species is considered threatened by the state of Oregon; and potential impacts resulting from the B2H Project implementation would be avoided or minimized to the greatest extent possible to prevent a significant reduction in the likelihood of survival or recovery of the species. Based on the total number of occurrences, compliance with state of Oregon regulations on private lands, and the mitigation measures to avoid or reduce disturbance there would be limited impacts on the species. Implementation of the Applicant's Proposed Action

Alternative could result in long-term disturbance and moderate residual impacts on Cronquist's stickseed, but is not likely to contribute to the need to list the species under the ESA.

Malheur cryptantha is a perennial forb considered imperiled (G4S2) in Idaho by the IDFG based on the few known occurrences in the state and several ongoing threats (IFWIS 2016). It has been identified as a Type 4 BLM species in Idaho. Although the known occurrences of Malheur cryptantha in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative are located in Oregon, impacts on occurrences in Oregon could affect nearby occurrences in Idaho. Malheur cryptantha is known only from the Snake River and tributaries in Oregon and Idaho. Population trends and species specific threats are unknown, but due to the small number of known occurrences would be sensitive to disturbance (IFWIS 2016). ORBIC recognizes 20 occurrences in Oregon, 24 were identified during preconstruction and other BLM surveys in the region, and 7 were identified in Idaho. Of the 51 total known occurrences, four are known to occur in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. All four occurrences are located, at least partially, on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the number of total known occurrences and the existence of the occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance and moderate residual impacts on Malheur cryptantha, but is not likely to contribute to the need to list the species under the ESA.

Wishbone bush is a perennial species considered rare, uncommon or threatened in Oregon (G4G5T4S3) due to the few known occurrences restricted to southeastern Oregon (ORBIC 2013a). However, wishbone bush is widely distributed across the Great Basin and the occurrences contained in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative represent the northern extreme of the species distribution and the majority of the occurrences in Oregon. Population trends and species specific threats are unknown. ORBIC recognizes 8 occurrences, 2 were identified during other BLM surveys in the region, and none were identified in Idaho. Of the 10 occurrences, three are known to occur in the 1-mile analysis corridor and may be affected by the Applicant's Proposed Action Alternative. All three occurrences are located, at least partially, on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the broader distribution of the species beyond the B2H Project area and the existence of the occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance and moderate residual impacts on wishbone bush, but is not likely to contribute to the need to list the species under the ESA.

Until the final engineering design and preconstruction surveys completed is available, the exact location of sensitive plant species in relation to B2H Project features is not available and a quantitative

determination of the number of individuals affected, acres of habitat disturbed, or anticipated amount of impacts on sensitive plant species cannot be provided.

Variation S5-A1

The 1-mile analysis corridor for Variation S5-A1 contains known occurrences of Cronquist stickseed, all of which are located, at least partially, on federally managed lands.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S5-A1 could result in long-term disturbance to Cronquist's stickseed and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S5-A2

The 1-mile analysis corridor for Variation S5-A2 contains one known occurrence of saltwort buckwheat, as well as the two occurrences of Cronquist stickseed contained in the 1-mile analysis corridor of Variation S5-A1.

Saltwort buckwheat is an annual forb considered imperiled (G3G4S2) by ORBIC due to the limited number of known occurrences restricted to southeastern Oregon (ORBIC 2013a). However, the species is also known from Idaho and Nevada. Population trends and species specific threats are unknown, but due to the small numbers of known occurrences are likely to be sensitive to disturbance. ORBIC recognizes 7 occurrences, 2 were identified during other BLM surveys in the region, and none were identified from Idaho. Of the 9 occurrences, one is known to occur in the 1-mile analysis corridor and may be affected by Variation S5-A2. This occurrence is located on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the broader distribution of the species beyond the B2H Project area and the existence of the occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of Variation S5-A2 could result in long-term disturbance and moderate residual impacts on saltwort buckwheat, but is not likely to contribute to the need to list the species under the ESA.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S5-A2 could result in long-term disturbance to Cronquist's stickseed and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the

exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S5-B1

The 1-mile analysis corridor for Variation S5-B1 contains known occurrences of wishbone bush near the Owyhee River. The two occurrences contained in the 1-mile analysis corridor of Variation S5-B1 also are contained in the 1-mile analysis corridor of the Applicant's Proposed Action.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S5-B1 could result in long-term disturbance to wishbone bush and moderate residual impacts, but will not contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S5-B2

The 1-mile analysis corridor for Variation S5-B2 contains the same sensitive species and number of occurrences as Variation S5-B1. The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Malheur S Alternative

The 1-mile analysis corridor for the Malheur S Alternative includes known occurrences of Cusick's pincushion, as well as Malheur cryptantha, Greeley's springparsley, Cronquist's stickseed, and wishbone bush.

Cusick's pincushion is an annual forb considered imperiled (G3S2) by in Idaho by the IDFG based on the few known occurrences in the area restricted to southwestern Idaho and southeastern Oregon (IFWIS 2016). ORBIC considers Cusick's pincushion to be rare, uncommon or threatened in Oregon (ORBIC 2013a). It has been identified as a Type 4 BLM species in Idaho. Although the known occurrences of Cusick's pincushion in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative are located in Oregon, impacts on occurrences in Oregon could affect nearby occurrences in Idaho. Being an annual species, developing population estimates and determining trends is complicated, but studies of Idaho occurrences found several ongoing threats, including OHV traffic and mineral development, as well as the extirpation of at least one known occurrence (Mosely 1994). ORBIC recognizes 21 occurrences in Oregon, 22 occurrences were identified from preconstruction and other BLM surveys in the region, and 13 occurrences were identified in Idaho. Of the total 56 known

occurrences, two are known to occur in the 1-mile analysis corridor and may be affected by implementation of the Malheur S Alternative. Both these occurrences are located on federally managed lands where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the total number of known occurrences and the existence of the occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Malheur S Alternative could result in long-term disturbance and moderate residual impacts on Cusick's pincushion, but is not likely to contribute to the need to list the species under the ESA.

Similar to the Applicant's Proposed Action Alternative, implementation of the Malheur S Alternative could result in long-term disturbance and moderate residual impacts on Malheur cryptantha, Cronquist's stickseed, and wishbone bush but would not contribute to the need to list these species under the ESA, but may result in high residual impacts on Greeley's springparsley and contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Malheur A Alternative

The 1-mile analysis corridor for the Malheur A Alternative includes known occurrences of smooth stickleaf, as well as Cusick's pincushion, Greeley's springparsley, Cronquist's stickseed, and wishbone bush.

Smooth stickleaf is annual forb considered imperiled (G2S2) by ORBIC due to the limited number of known occurrences restricted ash outcrops in southeastern Oregon and southwestern Idaho (ORBIC 2013a). It has been identified as a Type 2 BLM species in Idaho. Population trends for smooth stickleaf are difficult to determine being an annual species, but the most recent observations of several occurrences identify several with over 1,000 individuals and excellent viability. The species is considered particularly sensitive to soil compaction resulting from grazing and OHV use. ORBIC recognizes 20 occurrences in Oregon, 36 were identified during preconstruction and other BLM surveys in the region, and 15 were identified in Idaho. Of the total 71 known occurrences, one is known to occur in the 1-mile analysis corridor and may be affected by the Malheur A Alternative. This occurrence is located on federally managed lands where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Additionally, this species is considered endangered by the state of Oregon; and potential impacts resulting from the B2H Project implementation would be avoided or minimized to the greatest extent possible to prevent a significant reduction in the likelihood of survival or recovery of the species. Based on the total number of occurrences, compliance with state of Oregon regulations on private lands, and the mitigation measures to avoid or reduce disturbance there

would be limited impacts on the species. Implementation of the Malheur A Alternative could result in long-term disturbance and moderate residual impacts on smooth stickleaf, but is not likely to contribute to the need to list the species under the ESA.

Similar to the Applicant's Proposed Action Alternative and the Malheur S Alternative, implementation of the Malheur A Alternative could result in long-term disturbance and moderate residual impacts on Cusick's pincushion, Cronquist's stickseed, and wishbone bush but would not contribute to the need to list these species under the ESA, but may result in high residual impacts on Greeley's springparsley and contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Noxious Weeds

Applicant's Proposed Action Alternative and All Other Alternatives

The Applicant's Proposed Action Alternative and all other alternative routes in Segment 5 would result in disturbance to native vegetation communities, which could alter vegetation community structure, soil properties, and water availability creating conditions favorable for noxious weed establishment and spread. Where this disturbance is in areas without weed infestations, the B2H Project may introduce noxious weed species through the transport of plant materials. In Segment 5, these areas exist mostly in the Tall Sagebrush-dominated vegetation communities located near Grassy Mountain and are crossed by the Malheur S and Malheur A alternatives. The extent of noxious weed invasion would be influenced by several factors, including the extent of B2H Project disturbance, preconstruction condition of native vegetation communities, and the distribution of noxious weeds in the surrounding area. The anticipated amounts of B2H Project disturbance to vegetation communities are summarized in Table 3-134. The types of potential effects and impacts on vegetation resources associated with noxious weed invasion, and Applicant-committed design features to reduce noxious weed invasion potential would be similar to that described for Segment 1.

Traditional Foods and Ethnobotanical Resources

Applicant's Proposed Action Alternative and All Other Alternatives

The Applicant's Proposed Action Alternative and all other alternative routes would result in disturbance and potential impacts on native vegetation communities (Table 3-134). The types of potential effects and impacts on traditional foods and ethnobotanical resources associated with B2H Project implementation, as well as the application of Applicant-committed design features to reduce disturbance to native vegetation communities and development of site-specific mitigation during government to government consultation would be similar to that described for Segment 1.

Conclusion

The Applicant's Proposed Action Alternative and all other alternative routes considered in Segment 5 would result in predominantly moderate impacts on vegetation communities, with the Applicant's Proposed Action resulting in the least amount of impacts as it is the shortest alternative route considered in Segment 5 and crosses Tall Sagebrush Steppe vegetation communities to the least extent. The Malheur S and Malheur A alternatives cross the Below the Dam ACEC and could impact the rare black cottonwood galleries in the ACEC. All alternative routes would have similar impacts on traditional foods and other ethnobotanical resources important to tribal groups.

Impacts on federally listed species are not expected for any of the alternative routes considered in Segment 5. High and moderate residual impacts on sensitive species could occur for all alternative routes, and the Applicant's Proposed Action Alternative could additionally result in moderate residual impacts on known occurrences of Mulford's milkvetch. Based on available data, the Malheur S and Malheur A alternatives could affect a similar amount of sensitive plant species and occurrences.

All alternative routes would result in disturbance to native vegetation communities and increase the potential establishment and spread of noxious weeds or other invasive plants. The Malheur S and Malheur A alternatives cross areas with few identified noxious weed infestations and could introduce noxious weeds or other invasive plants to these areas.

None of the alternative routes considered in Segment 5 would clearly result in the least overall impacts on vegetation resources. The Applicant's Proposed Action Alternative would result in the least impacts on vegetation communities, traditional foods or other ethnobotanical resources, and the lowest likelihood of introducing noxious weeds or other invasive plants in areas with few identified noxious weed infestations. However, the Malheur S and Malheur A alternatives could result in the least impacts on sensitive plant species.

SEGMENT 6—TREASURE VALLEY

Vegetation Communities

Table 3-136 presents the residual impacts on vegetation communities for alternative routes and route variations in Segment 6. Table 3-137 presents the anticipated amount of disturbance to vegetation communities in Segment 6. The distribution of vegetation communities in the B2H Project area is displayed on MV-7.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative is anticipated to result in predominantly moderate residual impacts on vegetation communities as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where the Applicant's Proposed Action Alternative crosses RCA and Desert Shrub vegetation communities. The Applicant's Proposed Action is anticipated to result in low residual impacts where it crosses Non-native Grassland, Agriculture, Bare Ground, Cliffs and Talus, and Developed/Disturbed vegetation communities.

Table 3-136. Vegetation Resources Inventory Data and Residual Impacts on Segment 6—Treasure Valley (miles crossed)

Alternative Route	Total Length (miles)	Inventory															Residual Impacts[1]	
		Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe	Moderate	Low
Applicant's Proposed Action	28.0	0.2	0.0	0.9	2.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	11.8	0.0	2.2	10.5	15.0	13.0
Variation S6-A1	*9.3*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*4.2*	*0.0*	*1.0*	*4.0*	*5.1*	*4.2*
Variation S6-A2	*8.9*	*0.0*	*0.0*	*0.2*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*3.7*	*0.0*	*0.3*	*4.6*	*5.0*	*3.9*
Variation S6-B1	*14.4*	*0.0*	*0.0*	*0.9*	*1.3*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*5.5*	*0.0*	*0.7*	*5.9*	*7.9*	*6.5*
Variation S6-B2	*14.1*	*0.0*	*0.0*	*1.5*	*0.7*	*0.2*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.3*	*2.9*	*0.0*	*0.8*	*7.6*	*9.5*	*4.6*

Table Note: [1]High residual impacts on vegetation communities are not anticipated to occur.

Table 3-137. Anticipated Disturbance for Vegetation Resources for Segment 6—Treasure Valley (acres)

Alternative Route	Total Disturbance (acres)	Agriculture	Aspen	Bare Ground, Cliffs, Talus	Desert Shrub	Developed/Disturbed	Dwarf Sagebrush Steppe	Forest- Other	Juniper and Mahogany Woodland	Mixed Conifer Forest	Mountain Shrub	Native Grasslands	Non-Native Grasslands	Open Water	Riparian Conservation Area	Tall Sagebrush Steppe
Applicant's Proposed Action	613	4	0	20	50	2	0	0	0	0	0	0	258	0	48	230
Variation S6-A1	*205*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*93*	*0*	*22*	*88*
Variation S6-A2	*196*	*0*	*0*	*4*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*81*	*0*	*7*	*101*
Variation S6-B1	*312*	*0*	*0*	*19*	*28*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*119*	*0*	*15*	*128*
Variation S6-B2	*309*	*0*	*0*	*33*	*15*	*4*	*0*	*0*	*2*	*0*	*0*	*7*	*64*	*0*	*18*	*166*

Table Note: Acres in the table are rounded and, therefore, columns may not sum exactly.

The Soda fire has affected vegetation communities crossed by the Applicant's Proposed Action Alternative, and the current vegetation communities may no longer reflect the vegetation communities identified from the NWGAP data and the assessment of initial and residual impacts. Vegetation communities affected by wildfires can take decades to recover to predisturbance conditions, but are assumed to eventually return to predisturbance conditions, unless weed invasion and fire regime alteration cause native vegetation communities to transition to communities more typical of Non-native Grasslands. The departure from normal of native vegetation communities affected by wildfire is heavily influenced by pre-existing conditions, as well as other factors, including vegetation community type, fire severity, and weather. Vegetation communities with abundant and diverse native plant species, particularly those with high cover of perennial bunchgrasses, are more likely to recruit and resprout with native vegetation similar to predisturbance conditions (Miller et al. 2013). Substantial management efforts to stabilize, rehabilitate and restore areas burned during the Soda fire have been undertaken, including treatment of invasive plants, reseeding, grazing management, and other adaptive management strategies (BLM 2015). Seeding efforts are aimed to promote the re-establishment of vegetation similar to Tall Sagebrush Steppe, Dwarf Sagebrush Steppe, and Native Grassland vegetation communities, and reduce the extent of existing Non-native Grassland vegetation communities in the region. However, without detailed knowledge of the pre-existing conditions across the entirety of the alternative route for each wildfire to predict the departure from normal or current success of rehabilitation activities, the assessment of impacts assumes areas affected by recent wildfires will return to predisturbance conditions.

Several B2H Project design features aimed to reduce erosion and the extent of disturbance, prevent the introduction and spread of invasive plants, and establish desirable vegetation are anticipated to minimize the risk of recently burned native vegetation communities transitioning to non-native communities as a result of B2H Project activities.

Direct and indirect effects on vegetation communities would include loss of vegetation, alterations to vegetation community structure, and increased risks of invasive plant invasion. The types of potential effects on vegetation communities are described in Section 3.2.3.6. Several B2H Project design features are anticipated to limit these effects through reducing the extent of disturbance, preventing the spread and establishment of invasive plants, and reclaiming disturbed areas with desirable native vegetation. Refer to the list of design features applicable to vegetation communities in Section 3.2.3.4.

Where the Applicant's Proposed Action Alternative crosses RCAs, disturbance to these vegetation communities is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible, as described by Design Features 15 and 16. Where spanning would not be feasible, the application of several selective mitigation measures aimed to reduce the creation of new access roads, soil disturbance, and vegetation removal in the right-of-way are expected to reduce impacts from a high initial level to a moderate residual level. Table 3-95 summarizes the expected level of initial impacts, selective mitigation measures that would be applied, and resulting residual impacts on vegetation communities.

Variation S6-A1

Variation S6-A1 is anticipated to result in predominantly moderate residual impacts as it crosses greater amounts of Tall Sagebrush Steppe, Desert Shrub, and RCA vegetation communities than Non-native Grasslands. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S6-A2

The extent of disturbance to vegetation communities and residual impacts resulting from Variation S6-A2 would be similar to Variation S6-A1. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S6-B1

Variation S6-B1 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S6-B1 crosses Desert Shrub and RCA vegetation communities. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Variation S6-B2

Variation S6-B2 is anticipated to result in predominantly moderate residual impacts as it primarily crosses Tall Sagebrush Steppe vegetation communities. Moderate residual impacts also are expected where Variation S6-B1 crosses Desert Shrub and RCA vegetation communities. Variation S6-B2 is expected to result in greater amounts of residual impacts than Variation S6-B1, as it crosses Tall Sagebrush Steppe to a greater extent. Wildfire effects on native vegetation communities, direct and indirect effects on vegetation communities, and the application of design features and selective mitigation measures to reduce the anticipated levels of residual impacts on vegetation communities would be similar to that described for the Applicant's Proposed Action Alternative.

Federally Listed and Candidate Plant Species

Applicant's Proposed Action Alternative and All Variations

Federally listed or candidate plant species are not known to occur within the 10-mile or 1-mile analysis corridor. As such, impacts resulting from short-term disturbance, loss or adverse modification of habitat occupied by federally listed or candidate species, or individual mortality to federally listed or candidate species are not anticipated for the Applicant's Proposed Action Alternative or any variations in Segment 6. If federally listed or candidate plant species are found during preconstruction surveys as required by Design Feature 4, the application of Selective Mitigation Measures 8 and 13 to span, reduce, avoid

disturbance and prevent individual mortality in occupied habitat is anticipated to reduce impacts on low levels on federally listed or candidate plant species.

Other Sensitive Plant Species

Table 3-138 identifies the sensitive plant species known to occur in the 10-mile analysis corridor for all alternatives considered in Segment 6, and summarized the occurrence data by land-management jurisdiction and known occurrences in the 10-mile analysis corridor.

Applicant's Proposed Action Alternative

Eight sensitive plant species are known to occur in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative, including Mulford's milkvetch, Cusick's pincushion, Malheur cryptantha, Greeley's springparsley, false naked buckwheat, carveseed, smooth stickleaf, and Janish's penstemon (Table 3-138). Known occurrences of Greeley's springparsley in the 1-mile analysis corridor of the Applicant's Proposed Action Alternative are located in both Oregon and Idaho. Occurrences of all other species are located only in Idaho.

If disturbance from B2H Project activities occurs in sensitive plant species habitats, several direct and indirect effects may occur, including loss of habitat; mortality or other adverse effects on individuals; and habitat degradation through weed invasion or reduction and isolation of patch size. These effects are described in greater detail in Section 3.2.3.6. The criteria used to assess impacts are presented in Table 3-94. The potential impacts unique to sensitive plant species including population reduction, factors influencing severity of impacts, and the application of design features and selective mitigation measures to reduce impacts on sensitive plant species would be similar to that described for the Applicant's Proposed Action Alternative in Segment 1.

Mulford's milkvetch is a perennial forb considered imperiled (G2S1) by the IDFG due to the limited number of known extant occurrences restricted to the Snake River Floodplain in southeastern Oregon and southwestern Idaho (IFWIS 2016; Mancuso 1999). It has been identified as a Type 2 BLM species in Idaho. Population trends in Idaho are unknown, but recent studies at several occurrences in southeastern Oregon demonstrate decreasing trends with annual fluctuations across seven years of observation (Gray et al. 2015). Several threats to Mulford's milkvetch were also identified, including: invasive plants, shifts in precipitation patterns from climate change, and livestock use. Ten occurrences were identified in Idaho. However, 135 occurrences were identified in Oregon from ORBIC, preconstruction surveys, and other BLM surveys. Of the total 145 occurrences, one is known to occur in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. This occurrence is located, at least partially, on federally managed land where resource management plans require the conservation of sensitive plant species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based the number of total known occurrences, and the existence of several occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance and moderate residual impacts on Mulford's milkvetch, but is not likely to contribute to the need to list the species under the ESA.

Table 3-138. Potentially Affected Sensitive Plant Species for Segment 6—Treasure Valley

Alternative Route	Total Acres of Disturbance	Mulford's Milkvetch					Cusick's Pincushion					Malheur Cryptantha					Greeley's Springparsley					False Naked Buckwheat					Carveseed					Smooth Stickleaf					Janish's Penstemon				
		Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile				Within 10 Miles	Within 1 Mile			
			Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total		Federal	State	Private	Total
Applicant's Proposed Action	884	2	1	0	1	1	6	3	0	0	3	8	1	0	1	1	9	7	0	1	8	1	1	0	1	1	5	1	1	1	1	12	3	1	0	4	5	1	0	0	1
Variation S6-A1	*141*	*0*	*0*	*0*	*0*	*0*	*4*	*2*	*0*	*0*	*2*	*4*	*0*	*0*	*0*	*0*	*9*	*3*	*0*	*1*	*4*	*1*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*0*	*9*	*0*	*0*	*0*	*0*	*3*	*0*	*0*	*0*	*0*
Variation S6-A2	*147*	*0*	*0*	*0*	*0*	*0*	*3*	*2*	*0*	*0*	*2*	*4*	*0*	*0*	*0*	*0*	*9*	*3*	*0*	*1*	*4*	*1*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*0*	*8*	*0*	*0*	*0*	*0*	*3*	*2*	*0*	*0*	*2*
Variation S6-B1	*56*	*1*	*0*	*0*	*0*	*0*	*4*	*2*	*0*	*0*	*2*	*4*	*1*	*0*	*1*	*1*	*0*	*0*	*0*	*0*	*0*	*1*	*1*	*0*	*1*	*1*	*4*	*1*	*1*	*1*	*1*	*4*	*3*	*1*	*0*	*4*	*2*	*1*	*0*	*0*	*1*
Variation S6-B2	*57*	*1*	*0*	*0*	*0*	*0*	*4*	*2*	*0*	*0*	*2*	*4*	*1*	*0*	*1*	*1*	*0*	*0*	*0*	*0*	*0*	*1*	*1*	*0*	*0*	*1*	*4*	*1*	*1*	*1*	*1*	*4*	*3*	*1*	*0*	*4*	*2*	*1*	*0*	*0*	*1*

Table Note: Some sensitive plant species occurrences may exist on multiple jurisdictions, and the sum of occurrences on federal, state, and private lands may be greater than the total

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Greeley's springparsley is a perennial forb considered critically imperiled (G5T2S1) by ORBIC due to the few known occurrences limited to southeastern Oregon, and imperiled (G5T2S2) by the IDFG in Idaho (IFWIS 2016; ORBIC 2013a). It has been identified as a Type 3 BLM species in Idaho. Population trends and species specific threats are unknown, but due to the small number of known occurrences, it would be sensitive to disturbances. Greeley's springparsley is a variety of a more broadly distributed species, plains springparsley (*Cymopterus acaulis*), which has been the subject of taxonomic confusion. Sun et al. (2005) proposed recognizing plains springparsley and all varieties as *C. glomeratus.* For the purposes of this analysis, potential impacts on Greeley's springparsley will be considered at the variety level. ORBIC recognizes 4 occurrences of Greeley's springparsley in Oregon. However, 9 occurrences were identified from preconstruction and other BLM surveys in the region, and 12 were identified in Idaho. Of the total 25 known occurrences, eight are known to occur in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. Seven of these occurrences are located on federally managed land where resource management plans require the conservation of sensitive plant species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. One occurrence exists on privately owned lands where impacts resulting from the B2H Project may be greater. Based on the existence of several occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Applicant's Proposed Action Alternative is not likely to result in high levels of impact on Greeley's springparsley or contribute to the need to list the species under the ESA. High levels of impacts on Greeley's springparsley are not likely, but could occur given the limited distribution of the species, potential severe disturbance to occurrences located on private lands, few known occurrences, and unknown population trends. If implementation of the Applicant's Proposed Action Alternative results in severe disturbance or affects the long-term persistence of multiple occurrences, high residual impacts could occur and contribute to the need to list the species under the ESA.

False naked buckwheat is considered critically imperiled (G4S1) in Idaho by the IDFG based on the sole occurrence in Idaho which faces ongoing threats and declining trends (Wigglesworth 2012). It has been identified as a Type 3 BLM species in Idaho. False naked buckwheat is known to occur in the Leslie Gulch area of southeastern Oregon, but no occurrences were identified by ORBIC, preconstruction surveys, or other surveys in the region. The three occurrences in Idaho recognized by IFWIS are within 0.25 miles of each other and are considered a single occurrence by the IDFG. All known occurrences in Idaho are known to occur in the 1-mile analysis corridor and may be affected by the Applicant's Proposed Action Alternative. All occurrences exist on federally managed land where resource management plans require the conservation of sensitive plant species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the existence of the occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species and assumed distribution of the species in Oregon, implementation of the Applicant's Proposed Action Alternative is not likely to result in high levels of impact on false naked buckwheat or contribute to the need to list the species under the ESA. High levels of impacts on false naked buckwheat are not likely, but could occur given

the limited distribution of the species, unknown distribution in Oregon, and unknown population trends. If implementation of the Applicant's Proposed Action Alternative results in severe disturbance or affects the long-term persistence of multiple occurrences, high residual impacts could occur and contribute to the need to list the species under the ESA.

Smooth stickleaf is annual forb considered imperiled (G2S2) by IFWIS due to the limited number of known occurrences restricted ash outcrops in southeastern Oregon and southwestern Idaho (IFWIS 2016). It has been identified as a Type 2 BLM species in Idaho. Population trends for smooth stickleaf are difficult to determine being an annual species, but the most recent observations of several occurrences identify several with over 1,000 individuals and excellent viability. The species is considered particularly sensitive to soil compaction resulting from grazing and OHV use. IFWIS recognizes 15 occurrences in Oregon and 56 were identified in Oregon by ORBIC, preconstruction surveys, and other BLM surveys in the region. Of the total 71 known occurrences, four are known to occur in the 1-mile analysis corridor and may be affected by the Applicant's Proposed Action Alternative. These occurrences are located on state or federally managed lands where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the total number of known occurrences and the existence of the occurrences on state or federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance and moderate residual impacts on smooth stickleaf, but is not likely to contribute to the need to list the species under the ESA.

Malheur cryptantha is a perennial forb considered imperiled (G4S2) in Idaho by the IDFG based on the few known occurrences in the state and several ongoing threats (IFWIS 2016). It has been identified as a Type 4 BLM species in Idaho. Malheur cryptantha is known only from the Snake River and tributaries in Oregon and Idaho. Population trends and species specific threats are unknown, but due to the small number of known occurrences would be sensitive to disturbance (IFWIS 2016). IFWIS recognizes 7 occurrences in Idaho, 44 were identified in Oregon by ORBIC, preconstruction surveys, other BLM surveys in the region. Of the 51 total known occurrences, one is known to occur in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. This occurrence is located, at least partially, on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the number of total known occurrences and the existence of the occurrence on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance and moderate residual impacts on Malheur cryptantha, but is not likely to contribute to the need to list the species under the ESA.

Cusick's pincushion is an annual forb considered imperiled (G3S2) in Idaho by the IDFG based on the few known occurrences in the area restricted to southwestern Idaho and southeastern Oregon (IFWIS

2016). It has been identified as a Type 2 BLM species in Idaho. Being an annual species, developing population estimates and determining trends is complicated, but studies of Idaho occurrences found several ongoing threats, including OHV traffic and mineral development, as well as the extirpation of at least one known occurrence (Mosely 1994). IFWIS recognizes 13 occurrences in Idaho and 43 occurrences were identified by ORBIC, preconstruction surveys, and other BLM surveys. Of the total 56 known occurrences, three are known to occur in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. All of these occurrences are located on federally managed lands where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the total number of known occurrences and the existence of the occurrences on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance and moderate residual impacts on Cusick's pincushion, but is not likely to contribute to the need to list the species under the ESA.

Janish's penstemon is considered imperiled in Idaho (G4S2) by the IDFG based on the few known occurrences in the state and several ongoing threats (IFWIS 2016). It has been identified as a Type 3 BLM species in Idaho. Janish's penstemon is distributed across several states in the western US, with occurrences known from Oregon, Idaho, Nevada, and California. IFWIS recognizes 13 occurrences in Idaho, and an additional 4 were identified in Oregon from the ORBIC and preconstruction survey datasets. Of the 17 total known occurrences, one is known to exist in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. This occurrence is located on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the broader distribution of the species beyond the B2H Project area and the existence of the occurrence on federally managed land where several mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance and moderate residual impacts on Janish's penstemon, but is not likely to contribute to the need to list the species under the ESA.

Carveseed is considered rare, uncommon, or threatened (G4G5S3) by the IDFG based on the few known occurrences and limited distribution in the state (IFWIS 2016). It has been identified as a Type 4 BLM species in Idaho. Carveseed is distributed across several states in the western US, with occurrences known form Oregon, Idaho, Nevada, Utah and California. IFWIS recognizes 12 occurrences in Idaho and 6 were identified in Oregon by other BLM surveys in the region. Of the total 18 occurrences, one is known to exist in the 1-mile analysis corridor and may be affected by implementation of the Applicant's Proposed Action Alternative. This occurrence is located, at least partially, on federally managed land where resource management plans require the conservation of sensitive species and potential impacts resulting from B2H Project implementation will be avoided or minimized to the greatest extent possible. Based on the broader distribution of the species beyond the B2H Project area and the existence of the occurrence on federally managed land where several

mitigation measures to avoid or reduce disturbance would limit impacts on the species, implementation of the Applicant's Proposed Action Alternative could result in long-term disturbance and moderate residual impacts on carveseed, but is not likely to contribute to the need to list the species under the ESA.

Until the final engineering design and results from preconstruction surveys are available, the exact location of sensitive plant species in relation to B2H Project features is not available and a quantitative determination of the number of individuals affected, acres of habitat disturbed, or anticipated amount of impacts on sensitive plant species cannot be provided.

Variation S6-A1

The 1-mile analysis corridor for Variation S6-A1 contains known occurrences of Cusick's pincushion, and Greeley's springparsley. Besides one occurrence of Greeley's springparsley on private land, all sensitive plant species occurrences in the 1-mile analysis corridor for Variation S6-A1 exist, at least partially on federally managed land.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S6-A1 could result in long-term disturbance and moderate residual impacts on Cusick's pincushion but would not contribute to the need to list the species under the ESA, but may result in high residual impacts on Greeley's springparsley and contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S6-A2

The 1-mile analysis corridor for Variation S6-A2 contains known occurrences of Janish's penstemon, as well as Cusick's pincushion, and Greeley's springparsley. Besides one occurrence of Greeley's springparsley on private land, all sensitive plant species occurrences in the 1-mile analysis corridor for Variation S6-A2 exist, at least partially on federally managed land. Some of the Greeley's springparsley occurrences are different than those contained in the 1-mile analysis corridor of the Variation S6-A1, but the total number of occurrences is the same.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S6-A2 could result in long-term disturbance and moderate residual impacts on Cusick's pincushion and Janish's penstemon but would not contribute to the need to list these species under the ESA, but may result in high residual impacts on Greeley's springparsley and contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the

exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S6-B1

The 1-mile analysis corridor for Variation S6-B1 contains known occurrences of Cusick's pincushion, Malheur cryptantha, false naked buckwheat, carveseed, smooth stickleaf, and Janish's penstemon. All sensitive plant species occurrences in the 1-mile analysis corridor for Variation S6-B1 exist, at least partially on federally managed land.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S6-B1 could result in long-term disturbance and moderate residual impacts on Cusick's pincushion, Malheur cryptantha, carveseed, smooth stickleaf, and Janish's penstemon but would not contribute to the need to list these species under the ESA, but may result in high residual impacts on false naked buckwheat and contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Variation S6-B2

The 1-mile analysis corridor for Variation S6-B2 contains the same species and occurrences as the 1-mile analysis corridor of Variation S6-B1.

Similar to the Applicant's Proposed Action Alternative, implementation of Variation S6-B2 could result in long-term disturbance and moderate residual impacts on Cusick's pincushion, Malheur cryptantha, carveseed, smooth stickleaf, and Janish's penstemon but would not contribute to the need to list these species under the ESA, but may result in high residual impacts on false naked buckwheat and contribute to the need to list the species under the ESA.

The types of potential effects and impacts, application of mitigation measures based on preconstruction surveys, and anticipated residual impacts on sensitive plant species would be similar to the Applicant's Proposed Action Alternative. The amount of impacts on sensitive plant species would depend on the exact location of B2H Project features in relation to sensitive plant species and habitats, which would be determined from the results of preconstruction surveys.

Noxious Weeds

Applicant's Proposed Action Alternative and All Variations

The Applicant's Proposed Action Alternative and all variations in Segment 6 would result in disturbance to native vegetation communities, which could alter vegetation community structure, soil properties, and water availability creating conditions favorable for noxious weed establishment and spread. Where this disturbance is in areas without weed infestations, the B2H Project may introduce noxious weed species through the transport of plant materials. The anticipated amounts of B2H Project disturbance to

vegetation communities are summarized in Table 3-137. The types of potential effects and impacts on vegetation resources associated with noxious weed invasion, and Applicant-committed design features to reduce noxious weed invasion potential would be similar to that described for Segment 1.

Traditional Foods and Ethnobotanical Resources

Applicant's Proposed Action Alternative and All Variations

The Applicant's Proposed Action Alternative and all other alternative routes would result in disturbance and potential impacts on native vegetation communities (Table 3-137). The types of potential effects and impacts on traditional foods and ethnobotanical resources associated with B2H Project implementation, as well as the application of Applicant-committed design features to reduce disturbance to native vegetation communities and development of site-specific mitigation during government to government consultation would be similar to that described for Segment 1.

Conclusion

The Applicant's Proposed Action Alternative and all variations considered in Segment 6 would result in predominantly moderate impacts on vegetation communities, with variation S6-A2 and S6-B1 resulting in the least moderate impacts. All variations would have similar impacts on traditional foods and other ethnobotanical resources important to tribal groups.

Impacts on federally listed species are not expected for the Applicant's Proposed Action Alternative or any variations considered in Segment 6. High and moderate residual impacts on sensitive plant species could occur for the Applicant's Proposed Action Alternative and all variations. Based on the available occurrence data, Variation S6-A1 could affect fewer occurrences than Variation S6-A2 and variations S6-B1 and S6-B2 would affect occurrences similarly.

All variations would result in disturbance to native vegetation communities, increase the potential establishment and spread of noxious weeds and other invasive plants, and cross areas with few identified noxious weed infestations and introduce noxious weeds and other invasive plants to these areas.

Variation S6-B1 would result in less overall impacts on vegetation resources than Variation S6-B2 as it results in less moderate impacts on vegetation communities. Neither Variation S6-A1 nor Variation S6-A2 clearly results in the least overall impacts on vegetation resources. Variation S6-A2 would result in less moderate impacts on vegetation communities than Variation S6-A1, but could result in greater impacts on sensitive plant species.

3.2.4 WILDLIFE RESOURCES

3.2.4.1 INTRODUCTION

Wildlife resources include terrestrial and some aquatic animal species and the habitats they depend on to survive and reproduce. Wildlife habitats provide animals with cover from weather and predators; food and water for nourishment; and space to obtain food and water and to attract a mate. Although all wildlife species are important members of native communities and ecosystems, most species are common and have wide distributions within the B2H Project area, the state, and the region. Consequently, the relationship of most of these species to the B2H Project is not discussed here in the same depth as the relationship of the species on which the decision-making agencies place management emphasis. Species that warrant increased management attention and, thus, will be discussed in detail below include ESA candidate, proposed, threatened, and endangered species; BLM and USFS special status species; migratory birds; raptors; USFS management indicator species (MIS) (refer to Appendix F); Oregon endangered, threatened, critical, and vulnerable species; and other species of socioeconomic importance (e.g., big game).

3.2.4.2 REGULATORY FRAMEWORK

Implementation of the B2H Project would be consistent with statutes, regulations, plans, programs, and policies of federal agencies, state and local governments, and affiliated tribes.

FEDERAL

Endangered Species Act

The Federal ESA was enacted in 1973. This law established a regulatory system to protect species that are at risk of extinction. Species listed under the ESA are protected from any action that would constitute a “take,” which is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting the species, or attempting to engage in any such conduct. Under Section 7, the ESA requires that “each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with affected States, to be critical” (16 U.S.C. 35 1531–1544).

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (Eagle Act) prohibits take, possession of, selling, purchasing, bartering, or transportation of live or dead bald or golden eagles or any parts, nests, or eggs of these birds. Under the Eagle Act, “take” includes pursuing, shooting, poisoning, wounding, killing, capturing, molesting, and disturbing. The USFWS has developed the *National Bald Eagle Management Guidelines*, which provide general recommendations for activities that occur near bald eagle roosts and nests. These guidelines are not law but are meant to help landowners and agencies avoid violating the Eagle Act and, in turn, prosecution. On September 11, 2009, the USFWS published

new guidelines and regulations specifying the conditions under which incidental take permits could be authorized under the Eagle Act (74 *Federal Register* 46836).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712, July 3, 1918, as amended in 1936, 1960, 1969, 1974, 1978, 1986, and 1989) was enacted in 1918 to put an end to the commercial trade of migratory birds and their feathers. This act decrees that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected (USFWS 2015). Under the MBTA, it is unlawful to pursue, hunt, take, capture, kill, possess, sell, barter, purchase, deliver, transport, or receive any migratory birds (including parts, nests, eggs, or other products, manufactured or not). The MBTA provides a framework for state-managed hunting of some species and authorizes the issuance of permits for take of other birds under limited conditions such as for falconry, research, conservation, and to prevent crop predations.

Executive Order 13816— Responsibilities of Federal Agencies to Protect Migratory Birds

Executive Order 13186 (January 10, 2001; “Responsibilities of Federal Agencies to Protect Migratory Birds”) directs federal agencies to avoid or minimize the negative impact of their actions on migratory birds and to take active steps to protect birds and their habitat. The Executive Order also requires federal agencies to ensure that environmental analyses of federal actions required by NEPA, or other established environmental review processes, evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern. This includes developing and implementing a Memorandum of Understanding (MOU) with the USFWS promoting the conservation of migratory bird populations to guide conformance with the MBTA.

Bureau of Land Management and U.S. Fish and Wildlife Service Memorandum of Understanding

The BLM entered into an MOU with the USFWS dated April 12, 2010, to identify and implement strategies that promote conservation of migratory birds and to avoid or minimize adverse impacts on migratory birds. Under the MOU, the BLM, in coordination with the USFWS, is to develop conservation measures and ensure monitoring of conservation measures to minimize, reduce, or avoid unintentional take.

The purpose of the MOU is, “to strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds through enhanced collaboration between the BLM and the USFWS and in coordination with state, tribal, and local governments” (BLM and USFWS 2010).

Among the BLM’s responsibilities under the MOU are the following:

> Address the conservation of migratory bird habitat and populations when developing, amending, or revising management plans for BLM lands, consistent with the Federal

> Land Policy and Management Act, Endangered Species Act, and other applicable law. When developing the list of species to be considered in the planning process, BLM will consult the current USFWS Species of Concern lists. Under the MOU, the BLM agrees to consult the current listing of USFWS Birds of Conservation Concern, 2008 (BCC) (BLM and USFWS 2010)

The BLM's responsibilities also include "In coordination with the FWS, develop conservation measures and ensure monitoring of the effectiveness of conservation measures to minimize, reduce or avoid unintentional take. As needed, modify conservation measures to be more effective to reduce unintentional take, and, as practicable, to restore and enhance the habitat of migratory birds" (BLM and USFWS 2010).

Instruction Memorandum 2008-050, Migratory Bird Treaty Act – Interim Management Guidance

Instruction Memorandum 2008-050 addresses the BLM's implementation of the MBTA. The BLM Washington Office currently is developing an instruction memorandum that provides further guidance on the implementation of the BLM and USFWS MOU.

U.S. Forest Service and U.S. Fish and Wildlife Service Memorandum of Understanding

The purpose of this MOU between the USFWS and USFS is, "to strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds through enhanced collaboration between the Parties, in coordination with State, Tribal, and local governments" (USFS and USFWS 2008). The MOU referenced here (USFS and USFWS 2008) expired on December 8, 2013. Both parties have agreed to extend the MOU as currently written through December 31, 2017, while the parties work together to evaluate the MOU to ensure that it is meeting the stated purpose, scope, and responsibilities identified in Executive Order 13186. If deemed necessary by this evaluation of the MOU, the parties will revise relevant portions of the MOU.

Among the USFS's responsibilities under the MOU are the following:

> Address the conservation of migratory bird habitat and populations when developing, amending, or revising management plans for national forests and grasslands, consistent with NFMA [National Forest Management Act], ESA, and other authorities listed above. When developing the list of species to be considered in the planning process, consult the current FWS Birds of Conservation Concern, 2008 (BCC), State lists, and comprehensive planning efforts for migratory birds.
>
> Within the NEPA process, evaluate the effects of agency actions on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors (USFS and USFWS 2008).

The USFS's responsibilities also include to

> Coordinate with appropriate FWS Ecological Services office when planning projects that are likely to have a negative effect on migratory bird populations. Cooperate in developing approaches to minimize negative impacts and maximize benefits to migratory birds (USFS and USFWS 2008).

Federal Land Policy and Management Act

The Federal Land Policy and Management Act (FLPMA) (43 U.S.C. 1701) as amended, consolidates and articulates BLM and USFS management responsibilities and governs most uses of federal lands, including authorization to grant or renew rights-of-way. In accordance with FLPMA, BLM, and USFS must make land-use decisions based on principles of multiple use and sustained yield. As such, a grant of right-of-way must be limited to its necessary use and must contain terms and conditions that reflect the agencies' management responsibilities under FLPMA, including minimizing impacts on fish and wildlife habitat.

National Forest Management Act

The NFMA, as amended, and its implementing regulations under 36 CFR 219 consolidate and articulate USFS management responsibilities for lands and resources of the National Forest System. NFMA regulations require that "fish and wildlife habitat be managed to maintain viable populations of existing species in the planning area." In accordance with the NFMA, each national forest and grassland is required to develop LRMPs and periodically revise them. The USFS has developed LRMPs for national forests that specify regulations, goals, and management objectives, including temporal and spatial restrictions for activities within areas managed to protect certain species and land and aquatic values. To ensure that these viable populations are maintained, the Pacific Northwest Region of the USFS has identified management requirements for a number species within the region. These MIS are emphasized because their populations can be used as an indicator of the health of a specific type of habitat. Restrictions on land use and recommendations outlined in these documents were used while planning the B2H Project, particularly regarding biological resources. A summary of all federally imposed seasonal restrictions is available in the project record; the B2H Project would comply with all agency timing restrictions unless an exception is granted by the agencies.

Forest and Rangeland Renewable Resources Planning Act

The Forest and Rangeland Renewable Resources Planning Act (FRRRPA), as amended by the NFMA consolidates and articulates USFS management responsibilities similar to those described under the NFMA. The FRRRPA requires the assessment, planning, and monitoring of national forest resources with periodic display to Congress facilitating the direction of goods and services to be produced from the nation's forests.

Special Status Species

Special status species include the following: (1) species listed under the ESA as endangered, threatened, proposed, or candidate; (2) BLM and USFS sensitive species; and (3) Oregon-listed threatened, endangered, vulnerable, or critical species. Due to their high-priority status, ESA species also will be discussed and analyzed separately in this document. Both the USFS and the BLM have established lists of species they consider "at risk" on lands they manage: the USFS Regional Forester's sensitive species list and the BLM State Directors' special status species list. The Regional Forester's sensitive species list includes animal species for which population viability is a concern within lands managed by the USFS. BLM special status species, per BLM Manual 6840 (BLM 2008), are managed under the special status species policy, whose purpose is to conserve listed species and their ecosystems and to ensure that actions taken by the BLM are consistent with the conservation of special status species and do not contribute to the listing of any species under the ESA.

U.S. Forest Service Management Indicator Species

USFS Manual 2620.5(1) defines MIS as "plant and animal species, communities, or special habitats selected for emphasis in planning, and which are monitored during forest plan implementation to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent" (USFS 1991). Each national forest designates its own list of MIS. The Wallowa-Whitman National Forest has five MIS or groups that could occur in the study corridor.

Wildlife Concerns for Tribes with Treaty Rights and Traditional Interests in the Study Corridor

As a majority of the B2H Project area is within lands ceded to the U.S. Government by the Treaty of 1855 with the Cayuse, Umatilla, and Walla Walla Tribes, the BLM and USFS—as managers of the federal lands within the B2H Project area—have the legal responsibility to consult with the CTUIR and consider the conditions necessary to satisfy the rights reserved by the tribe as part of the treaty. Exercise of treaty rights could include, but is not limited to, collection of plant resources and hunting of small and large game for economic, religious, and cultural use. B2H Project impacts on wildlife have the potential to affect the CTUIR's exercise of these treaty rights.

Although the CTUIR is the only Native American group with ceded lands in the B2H Project area, several other tribes maintain traditional interests in natural resources, including wildlife, within the B2H study corridor. As indicated in consultation with the BLM, the Shoshone-Paiute Tribes of the Duck Valley Indian Reservation maintain that they possess "aboriginal title" to lands within the B2H Project area. The Burns Paiute Tribe, the Nez Perce Tribe, the Confederated Tribes of the Colville Reservation, and the Shoshone-Bannock Tribes of the Fort Hall Reservation consider portions of the B2H Project area to be part of their aboriginal territory, subsistence range, traditional use area, or zone of influence.

Over the past two centuries, tribal access to natural resources, including hunting, gathering and grazing, has been affected by changes to land ownership patterns, commercial extraction of resources, land use, and land-management practices. Nevertheless, Native American tribes maintain an active

interest in wildlife in the B2H Project area. The BLM currently is consulting with these Native American sovereign tribal governments to better understand the nature and location of wildlife impact concerns for the B2H Project. Ethnographic studies have been completed by the CTUIR and Shoshone-Paiute Tribes of the Duck Valley Indian Reservation; ethnographic studies currently are being conducted by the Burns Paiute Tribe and may reveal additional information regarding type and distribution of species of small and large game considered significant by the tribes.

STATE

Comprehensive Wildlife Conservation Strategies

The IDFG and ODFW have published comprehensive wildlife conservation strategies aimed at encouraging land-management activities that conserve and enhance wildlife habitat (IDFG 2011; ODFW 2006). These state comprehensive conservation strategies were established to create a conservation plan to conserve the states' species of greatest conservation need and to provide a common framework that would enable conservation partners (federal, state, and private) to jointly implement a long-term approach for the benefit of those species. The conservation strategies (also known as conservation plans) are not regulatory documents, so they are not intended to be prescriptive, and the species identified are not equivalent to an official state listing as threatened, endangered, or fully protected. However, these conservation strategies do identify species of greatest conservation need, identify the key habitats for each species and the regions within the state where they can be found, recommend actions to improve the species' population status and habitat conditions, and describe an approach for long-term monitoring. In general, the species identified as species of greatest conservation need are those that have demonstrated a conservation need (due to population or habitat conditions) or where demographic data are lacking. Oregon's comprehensive wildlife conservation strategy lists 224 species of greatest conservation need, including 166 vertebrates and 58 invertebrates (ODFW 2006). The Idaho comprehensive wildlife conservation strategy establishes 229 species of greatest conservation need, including 126 vertebrate species and 103 invertebrate species (IDFG 2011). The IDFG is in the process of drafting a new state wildlife action plan that will supersede the comprehensive wildlife conservation strategies and may be released to the public in 2016.

Oregon Endangered Species Act

Oregon enacted a state ESA (ORS 496.171 to 496.192 and 498.026) in 1987. The goal of this state law is for conservation of threatened or endangered species through "the use of methods and procedures necessary to bring a species to the point at which [protective] measures are no longer necessary" (ORS 496.171[1]). Species on the Oregon state list include all native species listed under the Federal ESA as of May 15, 1987, as well as any additional native species determined by the appropriate state agency to be in danger of extinction throughout a large portion of the species' range within Oregon. The Oregon ESA requires state agencies to develop programs to manage and protect endangered species and to follow guidelines for threatened species. Responsibility for these species falls to the ODFW. Species can be Oregon state-listed as endangered or threatened, proposed as endangered or threatened, or proposed as a candidate for listing (ORBIC 2010). Oregon maintains a list of species protected under the Oregon ESA of 1987 (ORBIC 2010). The ODFW also maintains a list of sensitive species, under

which species can be designated as critical or vulnerable (ORBIC 2010). This list is used to determine species on which to focus management, research, and conservation activities. For projects subject to Energy Facility Siting Council (EFSC) standards, such as the B2H Project, the jurisdiction of the Oregon endangered species list extends to all lands in the state. In addition, enforcement and management of the state law is limited to state agencies (e.g., the ODA for listed plant species).

Oregon Habitat Mitigation Policy

The ODFW has developed a Fish and Wildlife Habitat Mitigation Policy (Oregon Administrative Rules [OAR] 635-415-0000) that provides a framework for assigning one of six category types to habitats based on the relative importance of these habitats to fish and wildlife species. The policy establishes consistent goals and standards to mitigate the impacts of a project on fish and wildlife habitats. A project's potential impact on Fish and Wildlife Habitat Mitigation Policy category types (as defined under OAR 635-415-0000) needs to be assessed as part of the project's EFSC site certification. The EFSC specifies the conditions of construction and operations required by Oregon. If approved, a Site Certification Agreement is issued in lieu of any other individual Oregon state or local agency permits (this assessment would be restricted to the portion of the B2H Project that crosses Oregon, as a similar program has not been developed in Idaho). This type of analysis is not included in the NEPA process and is instead disclosed in Exhibit P of the B2H Project's application for EFSC site certification. The habitat category types from the Fish and Wildlife Habitat Mitigation Policy (OAR 635-415-0025) are defined as follows:

- Category 1: Irreplaceable, essential, and limited habitat with a mitigation goal of no loss of habitat quantity or quality. The mitigation strategy is avoidance.
- Category 2: Essential and limited habitat with a mitigation goal of no net loss of habitat quantity or quality and to provide a net benefit of habitat quantity or quality. The mitigation strategy is in-kind, in-proximity mitigation.
- Category 3: Essential habitat, or important and limited habitat, with a mitigation goal of no net loss of either habitat quantity or quality. The mitigation strategy is in-kind, in-proximity mitigation.
- Category 4: Important habitat with a mitigation goal of no net loss in either existing habitat quantity or quality. The mitigation strategy is either in-kind or out-of-kind or in-proximity or off-proximity mitigation.
- Category 5: Habitat with a high potential to become either essential or important habitat with a mitigation goal, if impacts are unavoidable, to provide a net benefit in habitat quantity or quality. The mitigation strategy includes actions that improve habitat conditions.
- Category 6: Habitat with low potential to become essential or important habitat with a mitigation goal of minimizing impacts. The mitigation strategy is minimizing direct habitat loss and avoiding off-site impacts.

Greater Sage-Grouse Policy and Management Guidance

U.S. Fish and Wildlife Service 12-month Findings for Petitions to List the Greater Sage-Grouse as Threatened or Endangered

In 2010, the USFWS issued its *12-Month Findings for Petitions to List the Greater Sage-Grouse as Threatened or Endangered*, which found that listing the Greater Sage-Grouse as threatened or endangered under the ESA is warranted, but precluded by higher-priority listing actions (USFWS 2010a). The USFWS found that "sagebrush habitats are becoming increasingly degraded and fragmented due to multiple threats" and identified the major threats to Greater Sage-Grouse habitat as "direct conversion, urbanization, infrastructure such as roads and power lines built in support of several activities, wildfire and the change in wildfire frequency, incursion of invasive plants, grazing, and nonrenewable and renewable energy development." On October 2, 2015, the USFWS announced a 12-month finding on petitions to list the Greater Sage-Grouse, both range-wide and the Columbia Basin population, as an endangered or threatened species under the ESA of 1973, as amended (80 *Federal Register* 59857). After review of the best available scientific and commercial information, the USFWS found that the Columbia Basin population does not qualify as a distinct population segment and that listing the Greater Sage-Grouse was not warranted.

Greater Sage-Grouse Range-wide Mitigation Framework (Version 1.0 – September 3, 2014)

In September 2014, the USFWS issued its Greater Sage-Grouse Range-Wide Mitigation Framework. The first part of this document provides general goals and regulatory considerations for any mitigation program within the context of the mitigation hierarchy. The second part provides overarching mitigation principles, standards, and recommendations for the development of mitigation processes and programs. The purpose of this document is to communicate some of the factors that the USFWS is likely to consider in evaluating the efficacy of mitigation practices and programs in reducing threats to Greater Sage-Grouse. The recommendations provided in this framework are consistent with the information and conservation objectives provided in the 2013 Conservation Objectives Team (COT) Report for Greater Sage-Grouse.

Oregon Department of Fish and Wildlife Management Plans

The ODFW uses the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat (Conservation Assessment and Strategy) (ODFW 2011) to provide guidance to public and private land managers for Greater Sage-Grouse conservation. In September 2015, the ODFW Commission established OAR 635-140 for the Conservation Assessment and Strategy for the protection and enhancement of Greater Sage-Grouse in Oregon. These administrative rules guide the ODFW's approach to evaluating mitigation measures following anthropogenic impacts on Greater Sage-Grouse and Greater Sage-Grouse habitat. OAR 635-140 describes the hierarchy for avoidance, minimization and mitigation measures for direct and indirect impacts.

The Conservation Assessment and Strategy uses a core area landscape approach, as developed by Doherty et al. (2010), to protect Greater Sage-Grouse habitats. This landscape approach prioritizes habitats based on measures that assess Greater Sage-Grouse population and habitat relative abundance and provides protection for a minimum of 75 percent of the population. This landscape approach establishes core areas and low-density areas based on metrics that assess Greater Sage-Grouse populations and habitat abundance. Core areas are established to protect the most important breeding areas, and this is determined from spring lek counts of males, while low-density habitat is delineated in additional areas that provide breeding, summer, and migratory habitats for Greater Sage-Grouse. According to the Conservation Assessment and Strategy, the goal of core areas is to "assist in identifying the most productive habitat areas for Greater Sage-Grouse and those areas that should be protected from habitat loss and fragmentation" (ODFW 2011). Because core areas are established around high densities of Greater Sage-Grouse, they protect about 90 percent of the population while only encompassing about 38 percent of the species' range within Oregon.

The ODFW classifies the status of Greater Sage-Grouse leks for management purposes, using the following definitions for documenting lek status in Oregon:

- Occupied lek: A regularly visited lek that has had at least one male counted in the last 7 years.
- Occupied pending: A lek not counted regularly in the last 7 years, but birds were present at last visit.
- Unoccupied lek: A lek that has been counted annually and has had zero birds for 8 or more consecutive years.
- Unoccupied pending: A lek not counted regularly in a 7-year period, but birds were not present at last visit.
- Unknown lek: Any lek where the status has not been documented during the course of a breeding season. New leks found during aerial surveys in the current year receive an annual status of unknown unless they are confirmed on the ground or observed more than one time by air.
- Historic lek: A lek that has been unoccupied prior to 1980 and remains so.

The ODFW, in coordination with the Sage-Grouse Conservation Partnership, developed a Greater Sage-Grouse Habitat Quantification Tool (HQT). The HQT is a science-based approach that measures the quantity and quality of Greater Sage-Grouse habitat at a site in terms of habitat function, measured in functional acres. Habitat function refers to the quality of the habitat for meeting life history requirements (reproduction, recruitment and survival) for Greater Sage-Grouse at multiple scales (site, local and landscape), and includes biotic and abiotic factors as well as the direct and indirect effects of anthropogenic disturbances on and surrounding the site. To determine functional acres, the HQT uses a geographic information system component that incorporates over 40 datasets that reflect important aspects of Greater Sage-Grouse ecology, landscape condition, land use, and management.

Oregon's approach to mitigation for impacts on Sage-Grouse and Sage-Grouse habitat, outlined in the state's Oregon Greater Sage-Grouse Action Plan (Sage-Grouse Conservation Partnership), uses the

HQT to determine debits generated by anthropogenic disturbances and credits generated by mitigation projects in functional acres. The HQT is currently being tested and refined by the Sage-Grouse Conservation Partnership to ensure it is a functional tool for public use.

Management of Greater Sage-Grouse in Idaho

In Idaho, management direction for Greater Sage-Grouse falls under the Conservation Plan for the Greater Sage-Grouse in Idaho as amended by the Idaho Sage-Grouse Task Force (2012). The conservation plan includes background information on Greater Sage-Grouse, a summary of the species' status in Idaho, a discussion of threats, various types of conservation measures, and evaluation guidelines and recommendations for research and monitoring. This plan refers to local working group plans for more specific direction, which in the vicinity of the B2H Project area includes the Owyhee County Sage-grouse Management Plan. "The purpose of the Owyhee County Sage-grouse Management Plan is to use local input and knowledge to develop a long-term collaborative management plan providing a framework for Greater Sage-Grouse management in conjunction with federal, state, and Owyhee County land management plans and actions in Owyhee County. This long-term management plan will provide guidance to resource and land management agencies as well as Owyhee County in dealing with issues that directly or indirectly affect the Goal of the local working group."

The IDFG classifies the status of Greater Sage-Grouse leks for management purposes using the following definitions for lek status in Idaho:

- Occupied lek: A lek that has been active (i.e., at least two displaying males observed) during at least one breeding season within the prior 5 years.
- Unoccupied lek: A lek that has not been active during a period of 5 consecutive years.
- Undetermined lek: Any lek that has not been documented as active in the last 5 years but for which survey information is insufficient to designate the lek as unoccupied. For example, if a lek is discovered the first time during an aerial survey but is not confirmed on the ground that year or revisited in subsequent years, the location is given an undetermined status.

Bureau of Land Management Policy for Greater Sage-Grouse

The BLM issued a Record of Decision approving the Greater Sage-Grouse Approved Resource Management Plan Amendments (ARMPAs) in September 2015, including the Oregon Greater Sage-Grouse ARMPA (BLM 2015a) and the Idaho and Southwestern Montana Greater Sage-Grouse ARMPA (BLM 2015b). The ARMPAs amended land-use plans in Idaho and Oregon by establishing Greater Sage-Grouse management areas and providing direction for management and conservation of Greater Sage-Grouse and its habitat. The ARMPAs were a critical component to ensure the protection of Greater Sage-Grouse habitat by avoiding, minimizing, and compensating for unavoidable impacts of threats on Greater Sage-Grouse habitat and helped support the U.S. Fish and Wildlife Service's determination that Greater Sage-Grouse no longer warrants protection under the Endangered Species Act.

In particular, these amendments changed land use designations for management decisions within newly delineated Greater Sage-Grouse Habitat Management Areas. Land-use designations for realty actions such as rights-of-way for high-voltage transmission lines within Priority Habitat Management Areas (PHMA) and General Habitat Management Areas (GHMA) in Oregon, and PHMA and Important Habitat Management Areas (IHMA) in Idaho have changed from “open” to “avoidance areas”. While this new management prescription generally changes the areas available for actions like rights-of-way for high-voltage transmission lines, the BLM identified in the ARMPAs several priority transmission projects under review that would not be affected by the new management decisions. Instead, the management prescriptions for only these identified projects would remain “open” and not bound by the more limited designation of “avoidance.”

The B2H Project was one of the priority transmission projects identified in the ARMPAs (refer to MD LR 6 in the BLM ARMPAs for Oregon, and MD LR 12 in the BLM ARMPAs for Idaho and Southwestern Montana, listed below). Specific language included in the BLM ARMPAs for Oregon applicable to the B2H Project includes:

> **MD LR 6:** Priority Habitat Management Areas (PHMA) and General Habitat Management Areas (GHMA) are designated as avoidance areas for high voltage (100-kV or greater) transmission lines and major pipelines (24” or greater in diameter) ROWs (including permits and leases). All authorizations in these areas, other than the following identified projects, shall comply with the conservation measures outlined in this Approved Plan, including the RDFs (Appendix C) and screening criteria (see SSS 13) of this document. The BLM is currently processing an application for Boardman to Hemingway Transmission Line Project and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project’s NEPA review process, which should achieve a net conservation benefit for the GRSG.

Specific language included in the BLM ARMPAs in Idaho applicable to the B2H Project includes:

> **MD LR 12:** PHMA (Idaho and Montana) and IHMA (Idaho), and GHMA (Montana only) are designated as avoidance areas for high voltage transmission line and large pipeline ROWs, except for Gateway West and Boardman to Hemingway Transmission Projects. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this proposed plan, including the RDFs and avoidance criteria presented in MD SSS 29 and MD SSS 30 of this document. The BLM is currently processing an application for Gateway West and Boardman to Hemingway Transmission Projects and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project’s NEPA review process, which should achieve a net conservation benefit for the GRSG.

The ARMPAs also acknowledged that the NEPA process for the B2H Project has been underway for several years and that the BLM is already assessing the impacts of the B2H Project to Greater Sage-Grouse and analyzing project-specific conservation measures through the B2H Project NEPA process.

While the conservation measures in the ARMPAs would not apply to the B2H Project, the Applicant has committed to comply with seasonal restrictions in the ARMPAs (refer to Appendix B) and to develop a comprehensive mitigation plan (based on the components outlined in the Framework Plan for Compensatory Mitigation, included in Appendix C), which will identify appropriate levels of compensatory mitigation to demonstrate a net conservation benefit. The Applicant, in coordination with the BLM and the cooperating agencies, will utilize the mitigation framework to guide the mitigation based on the final design and engineering of any selected route. The BLM will require the Applicant to complete a final Compensatory Mitigation Plan for Greater Sage-Grouse, prior to any surface-disturbing activity associated with construction of the transmission line being permitted and obtaining a Notice to Proceed. Compensatory mitigation will be in addition to project-specific conservation measures that the BLM and cooperating agencies have developed through the NEPA process to avoid and minimize effects on Greater Sage-Grouse and their habitats.

Through the ARMPAs, the BLM designated the habitat management areas as follows:

- PHMA: Land identified as having the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. PHMAs largely coincide with areas identified as Priority Areas of Conservation in the COT Report (described below). These areas include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors.
- IHMA (Idaho and Southwestern Montana ARMPA only): Lands that contain additional habitat and populations that provide a management buffer for the PHMA and to connect patches of PHMA. IHMAs typically are adjacent to PHMAs but generally reflect somewhat lower Greater Sage-Grouse population status and/or reduced habitat value due to disturbance, habitat fragmentation, or other factors. Within the B2H Project area IHMAs are designated in Idaho but not Oregon.
- GHMA: Lands where some special management will apply to sustain Greater Sage-Grouse populations; areas of occupied seasonal or year-round habitat outside of PHMA and IHMA.

Western Association of Fish and Wildlife Agencies Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats

The Western Association of Fish and Wildlife Agencies (WAFWA) entered into a contract with the USFWS in 2002 to produce a complete conservation assessment for Greater Sage-Grouse and its habitat. The WAFWA chose to produce the assessment in two phases: the first phase is an assessment of Greater Sage-Grouse populations and sagebrush habitats on which they depend and referred to as the Western Association of Fish and Wildlife Agencies Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats (WAFWA Assessment) (Connelly et al. 2004); the second phase is discussed below. The WAFWA Assessment provides a thorough discussion of population status and trends, population ecology and characteristics, habitat characteristics, sagebrush ecosystem dynamics, sagebrush ecosystem status and trends, and other information concerning impacts on Greater Sage-Grouse. The WAFWA Assessment demonstrated that approximately 99 percent of the current population of Greater Sage-Grouse is found in the U.S., while the remaining 1 percent is located in Canada. Federal lands make up about 72 percent of the total range of the species, which makes federal

land-managing agencies primarily responsible for habitat management. However, privately owned lands provide critical seasonal habitats for many populations and their importance to conservation may greatly exceed their ownership percentage. Throughout their range, Greater Sage-Grouse populations are located on lands that overlap significant natural resources, such as oil and gas resources, water resources, wind power sites, mineral deposits, agricultural, and recreational areas. Greater Sage-Grouse also are found in habitats that are at significant risk of change due to exotic weeds, fire, and conifer encroachment.

WAFWA Greater Sage-Grouse Comprehensive Conservation

This document, identified as the WAFWA Greater Sage-Grouse Comprehensive Conservation Strategy (WAFWA Strategy) (Stiver at al. 2006), is the second phase of the WAFWA Assessment discussed above. The WAFWA Strategy is a conservation strategy for Greater Sage- Grouse and sagebrush habitats and is designed to augment and facilitate other conservation plans and strategies. This document references local, state, provincial, and agency conservation strategies and adds regional and range-wide strategies. Seven substrategies are outlined in the WAFWA Strategy, including: (1) conservation actions, (2) monitoring the effectiveness of conservation actions, (3) monitoring the implementation of conservation actions, (4) research and technology, (5) funding, (6) communications, and (7) adaptive management. In this WAFWA Strategy, seven Greater Sage-Grouse management zones are established based on populations within floristic provinces. The success of conservation actions will be judged on the basis of long-term population trends in each of the seven management zones. The overall goal of the WAFWA Strategy is to maintain and enhance populations and distribution of Greater Sage-Grouse by protecting and improving sagebrush habitats and ecosystems that sustain these populations. The overall objective of the WAFWA Strategy is to produce and maintain neutral or positive trends in populations and to maintain or increase the distribution of Greater Sage-Grouse in each management zone.

Bureau of Land Management National Technical Team Report

As part of its Greater Sage-Grouse conservation efforts, the BLM convened a National Technical Team. This team was composed of representatives from the BLM, the USFWS, the NRCS, the USGS, and state fish and wildlife agencies. The team was responsible for (1) ensuring that relevant science for Greater Sage-Grouse conservation was considered, reasonably interpreted, and accurately presented with risks and uncertainties clearly delineated; (2) providing conservation objectives in measurable terms to guide planning; and (3) identifying science-based conservation measures. By the end of 2011, the National Technical Team prepared a report that fulfilled this responsibility (released as IM 2012-044). The National Technical Team report provides management recommendations for the species across its entire range that could be implemented to address the threats. Because the range of the species is so large, and local ecological conditions vary, it is possible that local management decisions may differ from the specific standards in the report. If the local plan decisions vary from the National Technical Team report, the differences will be justified by scientific or local information. The report and its associated conservation measures are not intended to create a standard for Greater Sage-Grouse management.

U.S. Fish and Wildlife Service Conservation Objectives Team Report

Working in advance of its 2015 listing decision, the USFWS decided to develop conservation objectives for the Greater Sage-Grouse that could help direct conservation actions for the species. The USFWS created a COT Report of state experts and USFWS representatives to accomplish this task. The team developed *Greater Sage-grouse Conservation Objectives: Final COT Report*, which identifies key areas for Greater Sage-Grouse and key threats in those areas, as well as the extent to which they need to be reduced in order for the species to be conserved and for the USFWS to determine that listing is not warranted (USFWS 2013). The COT Report establishes conservation objectives for the primary habitat threats identified in the March 2010 USFWS finding that listing of the Greater Sage-Grouse was warranted but precluded. Those objectives could be met through local planning efforts, BLM planning efforts, and state efforts. The highest level objective identified in the COT Report is identified as meeting the objectives of the 2006 WAFWA Greater Sage-Grouse Comprehensive Strategy of "reversing negative population trends and achieving a neutral or positive population trend." The COT Report identifies the threats to be addressed to meet overall conservation objectives. Additional information on the COT Report is provided on the USFWS website: http://www.fws.gov/mountain-prairie/species/birds/sagegrouse/COT/COT-Report-with-Dear-Interested-Reader-Letter.pdf.

The USFWS will use the COT Report to review B2H actions and determine whether these actions will contribute toward the need to list the species under the Federal ESA. For new transmission lines and roads, the following COT Report criteria are important in the overall listing review: avoid Priority Area of Conservation (PAC) and other high-quality Greater Sage-Grouse habitat; minimize impacts on Greater Sage-Grouse and their habitat via actions such as undergrounding and narrow-separation colocation; assess all direct and indirect effects; assign value (mitigation ratios) based on habitat or population characteristics; apply good mitigation principles and standards when designing mitigation actions (refer to USFWS range-wide mitigation framework for additional guidance), and ensure the B2H Project (in its entirety) results in a net conservation benefit to Greater Sage-Grouse.

U.S. Geological Survey Baseline Environmental Report

To augment the BLM's planning on a biological and meaningful scale for Greater Sage-Grouse, a Baseline Environmental Report (BER) for Greater Sage-Grouse was produced by the USGS (Manier et al. 2013). The BER is a science support document that provides information to put planning units and issues into the context of the larger WAFWA Greater Sage-Grouse Management Zones. The BER examines each threat identified in the USFWS's listing decision published on March 15, 2010. For each threat, the BER summarizes the current, scientific understanding of various impacts on Greater Sage-Grouse populations and habitats. The BER also reports patterns, thresholds, indicators, metrics, and measured responses that quantify the impacts of each specific threat. Additional information on the BER is provided on the USGS website: http://pubs.usgs.gov/of/2013/1098/.

Greater Sage-Grouse Ecology and Conservation of a Landscape Species and its Habitats (Greater Sage-Grouse Monograph)

Thirty-eight federal, state, university, and nongovernmental experts collaborated to produce new scientific information about Greater Sage-Grouse populations, sagebrush habitats, and relationships among Greater Sage-Grouse, sagebrush habitats, and land use. The information was published as a scientific monograph in the series *Studies in Avian Biology* under the management of the Cooper Ornithological Society (Knick and Connelly 2011). The Greater Sage-Grouse Monograph is an important foundation for developing conservation strategies and actions and provides a comprehensive synthesis of scientific information on the biology and ecology of the Greater Sage-Grouse.

3.2.4.3 Issues Identified for Analysis

The following wildlife-related issues were raised by the public, Native American tribes, or federal and state agencies during scoping or are issues that must be considered as required by law or regulation. The following statements summarize the issues identified that are associated with wildlife.

- What effects on wildlife habitats, such as fragmentation, fire regimes, and spread or introduction of invasive species, would occur?
- What would the effects on rare and/or sensitive wildlife habitats, such as caves, lava tubes, riparian areas, and aquatic habitats, be?
- What effects would there be on sensitive seasonal wildlife habitat, such as big game wintering or birthing areas and migration routes?
- What would be the effects on species with no special status, including birds, small mammals, reptiles, and amphibians?
- Would any of the habitats affected meet the definition of one of the six ODFW habitat categories, as described in the ODFW Habitat Mitigation Policy (OAR 635-415-00)? If so, how?
- Would big game species and designated big game areas be affected?
- Would the B2H Project have adverse effects on sensitive insects, such as bees?
- Would the B2H Project adversely affect raptor nests?
- What would be the effects on special wildlife areas, such as WMAs?
- Would the Oregon Conservation Strategy be implemented in B2H Project planning, construction, and operation?
- Would the B2H Project cause an increase in bird and bat electrocutions and collisions with towers, wires, and other structures?
- What would be the B2H Project effects on migratory birds?
- What would be the B2H Project effects on species considered of religious, cultural, or economic value to Native American tribes?
- Will the B2H Project result in fragmentation of key wildlife habitat?
- Would the B2H Project comply with the ODFW habitat categories, as described in the ODFW Habitat Mitigation Policy (OAR 635-415-00)?
- Would the B2H Project affect threatened, endangered, proposed, or sensitive wildlife species?
- Would the B2H Project disturb Greater Sage-Grouse habitat?

- Would waterfowl and shorebird migration routes be affected?
- Would the transmission line injure or kill birds that perch on or strike the lines?
- Would bats and their migratory corridors be affected by the transmission line?
- Would the transmission line affect elk, pronghorn, deer, or bighorn sheep?
- What would be the effects on bald and golden eagles?
- Would the B2H Project negatively affect special status wildlife species?
- Would federal critical habitat be affected?
- Would the B2H Project negatively affect Greater Sage-Grouse and their habitat and cause an increase in predation?
- What would the effects of ground disturbance be on pygmy rabbits or the Washington ground squirrel?

3.2.4.4 METHODS

The general study methods used to analyze the impacts of the B2H Project in this EIS are described in Section 2.5.1 and 3.1.3. This section discusses how the study methods are applied to assess the impacts of the B2H Project on wildlife resources.

DATA SOURCES

The list of special status wildlife species that may occur in the B2H Project area was derived by identifying the federally listed endangered, threatened, and candidate species that occur in Oregon and Idaho; the species listed as endangered, threatened, and sensitive by Oregon; the Idaho species of greatest conservation need; the USFS sensitive species that occur on the Wallowa-Whitman National Forest; and BLM sensitive species that occur in Oregon and Idaho. This list was refined to include only species that have ranges in the vicinity of the study corridor; the list then was refined further to identify those species known to occur in the study corridor.

Information obtained from the following sources was used to evaluate wildlife resources within the study corridor:

- USFWS IPaC—Information for Planning, and Conservation
- IDFG State Wildlife Action Plan – Owyhee Uplands Section (Draft)
- IFWIS
- ORBIC database (ORBIC, formerly the Oregon Natural Heritage Information Center, maintains a database of occurrence records for sensitive species in Oregon; this database represents voluntarily documented and submitted records rather than records derived through systematic survey. Therefore, the absence of a record does not necessarily indicate that the species is not present. [Note: ORBIC requested that these rare-species occurrence locations be kept confidential.])
- ODFW Oregon Conservation Strategy
- Consultation with appropriate agencies
- USFS Regional Forester's sensitive species list (July 21, 2015)

- BLM State Directors' special status species lists (Oregon–July 13, 2015; Idaho—January 13, 2015)
- Peer-reviewed literature
- NatureServe web application

Data sources for GIS analyses included the following:

BLM Idaho and Oregon

- Greater Sage-Grouse PHMA, IHMA, and GHMA

BLM GeoBOB Database

- Wildsite data (pronghorn winter range in Oregon)
- Location data for various special status species

IDFG

- Bighorn sheep core herd home ranges
- Bighorn sheep population management units
- Bighorn sheep lambing areas
- Greater Sage-Grouse lek locations
- Mule deer winter range
- Pronghorn winter range
- IFWIS location data for various special status species

ODFW

- Bighorn sheep occupied habitat
- Elk winter range
- Greater Sage-Grouse lek locations (leks used in the analysis included those with a status of occupied, occupied pending, and unoccupied pending)
- Mule deer winter range

TetraTech, Inc. (Idaho and/or Oregon)

- Greater Sage-Grouse lek locations identified during B2H Project-specific surveys
- Washington ground squirrel colonies identified during B2H Project-specific surveys
- Raptor nests and individuals identified during B2H Project-specific surveys
- Other special status species identified during B2H Project-specific surveys

USFS

- The Wallowa-Whitman National Forest conducted an analysis of MIS using USFS GIS data and provided a report with information to be included in this EIS
- National Resource Information System (NRIS) location data for USFS sensitive species on the Wallowa-Whitman National Forest

USFWS

- Columbia spotted frog locations
- Golden eagle nest locations

Washington Department of Fish and Wildlife

- Location data for various special status species

Washington Wildlife Habitat Connectivity Working Group

- Washington ground squirrel habitat concentration areas

ANALYSIS AREA

The study corridor for wildlife habitat consisted of a 1-mile-wide corridor aligned with the alternative routes (0.5 mile on either side of the alternative route centerlines). This area was chosen because it was considered to be large enough to capture the extent of potential direct impacts on habitat that could occur during construction and operation of the B2H Project. For some species, where species-specific surveys were conducted (e.g., Washington ground squirrel), the analysis included a "site boundary,"' which included a 500-foot-wide corridor, including the transmission line, substation footprints, tensioning sites, multi-use areas, and access roads.

A 10-mile-wide corridor (5 miles on either side of the centerline and alternative centerlines) was used for identification of special status species that potentially could be affected by the B2H Project. This larger study corridor was chosen to account for the potential uncertainty of the presence (limited survey coverage) and locations (inaccurate or historical mapping techniques) of many special status species populations in the vicinity of the B2H Project area. Any species with known occurrences within the 10-mile-wide study corridor were considered to be present within the appropriate vegetation community subtype(s) that potentially could be affected by the B2H Project.

In an effort to effectively organize the overall analysis, the entire study corridor was divided into six B2H Project segments. These segments are mentioned throughout Section 3.2.4.5 and are analyzed in more detail for specific wildlife groups and species in Section 3.2.4.6.

The watershed level (i.e., the fifth level HUC) is used as the study corridor to assess impacts on USFS MIS and for activities on USFS lands.

Impact Assessment and Mitigation Planning

Criteria for Assessing Level of Impacts

Table 3-139 presents the criteria that were developed to assess the intensity of potential effects on wildlife species associated with implementation of the B2H Project. These criteria were based on considerations of relative abundance of each habitat type; consideration of a species legal status, regulatory protection, and susceptibility to temporary or permanent disturbances. Criteria were developed for wildlife habitat, special status species, migratory birds, including raptors, and big game.

Table 3-139. Criteria for Assessing Level of Impacts on Wildlife

Level of Impacts	Description
High	• Mortality of federally endangered, threatened, proposed, or candidate species • Ongoing mortality of wildlife (other than federally endangered, threatened, proposed, or candidate species) due to direct interaction with the B2H Project that may result in population-level effects • Permanent loss or displacement from large portions of occupied habitats for federally endangered, threatened, proposed, or candidate species • Permanent loss or displacement of wildlife (other than federally endangered, threatened, proposed, or candidate species) from crucial habitat during sensitive periods that results in population-level effects
Moderate	• Impacts that would have adverse effects on wildlife species (other than federally endangered, threatened, proposed, or candidate species) that does not reduce population viability • Permanent loss or modification of unoccupied suitable habitat for federally endangered, threatened, proposed, or candidate species • Disturbance or displacement of federally endangered, threatened, proposed, or candidate species from habitat that would not severely limit the long-term sustainability of populations • Temporary disturbance or displacement to wildlife (other than federally endangered, threatened, proposed, or candidate species) from crucial habitats during a critical or sensitive period • Removal of or disturbance to nesting sites, or disruption of breeding and foraging behavior for bald and golden eagles
Low	• Impacts that would have minor adverse effects on wildlife species (other than federally endangered, threatened, proposed, or candidate species) that does not reduce population viability • Loss of habitat for wildlife (other than federally endangered, threatened, proposed, and candidate species) that does not result in population -level effects • Temporary disturbance or displacement of wildlife (other than federally endangered, threatened, proposed, and candidate species) from seasonal habitats that occurs outside sensitive periods • Impacts that would have only minor adverse effects on species and would not limit the long-term sustainability of populations (e.g., indirect effects or impacts in areas of pre-existing disturbance)

The duration of effects on wildlife resources is described according to the following terms and definitions:

- Short term (temporary) – 5 years or less
- Long term – More than 5 years
- Permanent – Impacts that endure beyond the life of the B2H Project

Effects Analysis

Assessment of Initial Impacts

Initial impacts are those effects resulting from the implementation of the B2H Project, with consideration of the design features of the B2H Project for environmental protection. The design features of the B2H Project for environmental protection would be implemented to reduce initial impacts on wildlife resources. Initial impacts on wildlife resources were assigned using the criteria for assessing impacts identified in Table 3-139. A list and description of all design features of the B2H Project for environmental protection are provided in Table 2-7. The design features of the B2H Project for environmental protection relevant to wildlife resources are summarized below.

- ***Design Feature 2 (Environmental Training for All Personnel)***. Prior to construction, the CIC would instruct all personnel on the protection of ecological and natural resources, such as (a) federal and state laws regarding wildlife resources; (b) the importance of ecological and natural resources; (c) the purpose and necessity of protecting ecological and natural resources; and (d) reporting and procedures for stop work.
- ***Design Feature 4 (Preconstruction Surveys for Sensitive Species)***. Preconstruction surveys for special status species, threatened and endangered species, or other species of particular concern would be considered in accordance with the Biological Resources Conservation Plan in the POD. In cases for which such species are identified, appropriate action would be taken to avoid adverse impacts on the species and its habitat. This design feature would minimize effects on the species and its habitat.
- ***Design Feature 5 (Spatial Extent of Construction Activities)***. The spatial limits of construction activities, including vehicle movement, would be predetermined with activity restricted to and confined within those limits.
- ***Design Feature 6 (Reclaim Construction Areas)***. In construction areas (e.g., staging areas, material laydown yards, fly yards, and wire pulling/splicing sites) where there is ground disturbance and where recontouring is required, surface reclamation would occur as required by the Reclamation, Revegetation, and Monitoring Plan or the landowner. The method of reclamation may consist of, but not be limited to, returning disturbed areas to their natural contour, reseeding, installing cross drains for erosion control, placing water bars in permanent roads, and filling ditches where they were installed for temporary roads.

  All areas on lands administered by federal agencies disturbed as a part of the construction and/or maintenance of the proposed transmission line would be seeded with a seed mixture appropriate for those areas as identified in the Reclamation, Revegetation, and Monitoring Plan Framework in the POD. The federal land-managing agency would approve a seed mixture that fits each range type. Seeding methods typically would include drill seeding, where practicable; however, the federal land-managing agency may recommend broadcast seeding as an alternative method in some cases.

  In construction areas where disturbing the existing contours is not required, vegetation would be left in place wherever possible, and original contours would be maintained to avoid excessive

root damage and allow for resprouting in accordance with the Reclamation, Revegetation, and Monitoring Plan or landowner approval.

- ***Design Feature 8 (Overland Travel in Construction Work Areas)***. Grading would be minimized by driving overland in areas approved in advance by the land-managing agency or land owner, or both, in predesignated work areas (e.g., staging areas, material laydown yards, fly yards, and wire pulling/splicing sites) whenever possible.
- ***Design Feature 9 (Use of Access Routes Outside of Right-of-Way)***. All vehicle movement outside the right-of-way would be restricted to predesignated access, contractor-acquired access, public roads, or overland travel routes approved in advance by the applicable land-managing agency or landowner.
- ***Design Feature 11 (Limit Construction and Maintenance Activities during Migratory Bird Nesting Season)***. On federal lands, avoid vegetation clearing and other construction and maintenance activities when possible during the migratory bird nesting season, between April 1 and July 15. On non-federal lands, B2H Project activities will be compliant with the MBTA.
- ***Design Feature 12 (Avian-Safe Design)***. The Applicant would design and construct all new or rebuilt transmission facilities to avian-safe design standards, including the Applicant's Avian Protection Plan (Idaho Power Company 2015), Reducing Avian Collisions with Power Lines (APLIC 2012) and Suggested Practices for Avian Protection on Power Lines (APLIC 2006).
- ***Design Feature 13 (Raptor Protection during Breeding)***. Agency guidelines for raptor protection during the breeding season would be followed.
- ***Design Feature 15 (Reduce Impacts on Riparian Areas)***. Consistent with the BLM and USFS riparian management policies, surface-disturbing activities would be avoided in defined segments of RCAs, using the following delineation criteria, unless exception criteria defined by the BLM are met or with agency approval of acceptable measures to protect riparian resources and habitats by avoiding or minimizing stormwater runoff, sedimentation, and disturbance of riparian vegetation, habitats, and wildlife species:
  - Fish-bearing streams: 300 feet slope distance on either side of the stream, or to the extent of additional delineation criteria, whichever is greatest.
  - Perennial non-fish-bearing streams: 150 feet slope distance on either side of the stream, or to the extent of additional delineation criteria, whichever is greatest.
  - Ponds, lakes, reservoirs, and wetlands greater than 1 acre: 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond, or lake, or to the extent of additional delineation criteria, whichever is greatest.
  - Intermittent or seasonally flowing streams and wetlands less than 1 acre: In watersheds that support ESA-listed fish species or designated critical habitat, or both, 100 feet slope distance from the edge of the stream channel or wetland to the outer edge of riparian vegetation, whichever is greatest. In watersheds that do not have current documented presence of ESA-listed fish species and /or designated critical habitat, 50 feet slope distance from the edge of the stream channel or wetland to the outer edge of riparian vegetation, whichever is greatest.

Mitigation measures, such as micro-siting road locations, would be developed on a site-specific basis, in consultation and coordination with the BLM and other federal land-managing agencies, and incorporated into the POD.

- ***Design Feature 16 (Span Riparian Communities/Water Courses)***. Based on biological resources surveys and results of Section 7 consultation, state and federally designated sensitive plants, habitat, wetlands, riparian areas, springs, wells, water courses, or rare/slow regenerating vegetation communities would be flagged and structures would be placed to allow spanning of these features, where feasible, within the limits of standard structure design.
- ***Design Feature 21 (Disposal of Hazardous Materials and Construction Waste)***. Hazardous material would not be discharged onto the ground or into streams or drainage areas. Enclosed containment would be provided for all waste. All construction waste (i.e., trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials) would be removed to a disposal facility authorized to accept such materials within one month of B2H Project completion, except for hazardous waste which would be removed within one week of B2H Project completion.

  Refueling and storing potentially hazardous materials would not occur within a 200-foot radius of all identified private water wells, and a 400-foot radius of all identified municipal or community water wells. Spill prevention and containment measures would be incorporated as needed.

Table 3-140 summarizes the level of anticipated initial impacts on wildlife resources, as well as the relevant design features of the B2H Project for environmental protection. Design features of the B2H Project for environmental protection that are identified for individual resources in Table 3-140 would also provide protection for other wildlife species that use the same habitat as those resources listed. The habitats used by the species listed in Table 3-140 are described in Section 3.2.4.5.

Mitigation Planning and Effectiveness

In addition to the design features of the B2H Project for environmental protection, selective mitigation measures would be applied where feasible to reduce potential impacts on wildlife resources or where required to comply with law, regulation, or agency policy. A list and description of all selective mitigation measures is provided in Table 2-13. The selective mitigation measures that would be applied to wildlife resources are summarized below.

- ***Selective Mitigation Measure 5 (Minimize Vegetation Clearing for Operational Clearances)***. Removal of vegetation in the right-of-way would be minimized to limit disturbance to timber resources and slow-growing vegetation communities and to protect sensitive habitat that is subject to structure- and conductor-clearance requirements. Trees and other vegetation would be removed selectively (e.g., edge feathering) to blend the edge of the right-of-way into adjacent vegetation patterns, as practicable and appropriate.

Table 3-140. Summary of Initial and Residual Impact Levels for Wildlife Habitat Types						
Common Name	**Scientific Name**	**Habitat Type**	**Relevant Design Feature (location specific)**	**Initial Impact**	**Selective Mitigation Measure Applied (location specific)**	**Residual Impact**
Special Status Wildlife						
Columbia spotted frog	*Rana luteiventris*	Suitable habitat (high potential)	2, 4, 5, 8, 9, 10, 15, 16, 21	Low	None	Low
		Occupied habitat	2, 4, 5, 8, 9, 10, 15, 16, 21	Moderate	2, 5, 6, 12	Moderate
		Potentially occupied habitat (higher quality)	2, 4, 5, 8, 9, 10, 15, 16, 21	Moderate	2, 5, 6, 12	Moderate
		Potentially occupied dispersal/connectivity habitat	2, 4, 5, 8, 9, 10, 15, 16, 21	Moderate	2, 5, 6, 12	Moderate
Greater Sage-Grouse	*Centrocercus urophasianus*	Priority Habitat Management Areas, Important Habitat Management Areas	2, 4, 5, 8, 9, 10, 12, 21	High	2, 6, 12, 14, 15	High
		General Habitat Management Areas	2, 4, 5, 8, 9, 10, 12, 21	Moderate	2, 6, 12, 14, 15	Moderate
Washington ground squirrel	*Urocitellus washingtoni*	Suitable habitat	2, 4, 5, 8, 9, 10, 21	Moderate	2, 6, 12, 14, 15	Moderate
		Occupied colony avoidance areas	2, 4, 5, 8, 9, 10, 21	High	2, 6, 8, 12, 14, 15	High
		Occupied colony dispersal areas	2, 4, 5, 8, 9, 10, 21	High	2, 6, 12, 14, 15	High
Big Game						
Elk	*Cervus canadensis*	Winter range	2, 5, 8, 9, 10, 21	Moderate	6, 12	Low
Mule deer	*Odocoileus hemionus*	Winter range	2, 5, 8, 9, 10, 21	Moderate	6, 12	Low
Pronghorn	*Antilocapra americana*	Winter range	2, 5, 8, 9, 10, 21	Moderate	6, 12	Low
Bighorn sheep	*Ovis canadensis*	Oregon occupied range	2, 5, 8, 9, 10, 21	Moderate	6, 12	Low
		Core herd home range	2, 5, 8, 9, 10, 21	Moderate	6, 12	Low
		Lambing areas	2, 5, 8, 9, 10, 21	High	6, 12	Low
		Population management units	2, 5, 8, 9, 10, 21	Low	None	Low

- ***Selective Mitigation Measure 6 (Limit New or Improved Accessibility to Areas Previously Inaccessible)***. In areas of sensitive habitat or areas sensitive to additional public access, new or improved access in the B2H Project area would be limited.

  New or improved access would be closed or rehabilitated using the most effective and least environmentally damaging methods appropriate to that area (in consultation with the landowner or land-managing agency). Methods for road closure or management may include installing locking gates, obstructing the path (e.g., earthen berms, boulders, redistribution of woody debris), revegetating and mulching the surface of the roadbed to make it less apparent, or restoring the road to its natural contour and vegetation.
- ***Selective Mitigation Measure 8 (Span or Avoid Sensitive Features)***. Within the limits of standard tower design, structures would be located to allow conductors to avoid identified sensitive features, such as sensitive wildlife and habitats. This could be accomplished through methods such as selective tower placement, spanning sensitive features, or realigning the B2H Project centerline (micro-siting).
- ***Selective Mitigation Measure 12 (Seasonal and Spatial Wildlife Restrictions)***. To minimize disturbance to identified wildlife species during sensitive periods, construction, operation, and maintenance activities on federals lands would be restricted in designated areas unless exceptions are granted by the Authorized Officer or his/her designated representative and other applicable regulatory agencies (e.g., USFWS, state wildlife agencies). Refer to Appendix B.
- ***Selective Mitigation Measure 14 (Overland Access)***. In addition to using overland travel in work areas, overland access to work areas may be used to reduce resource impacts. The construction contractor would use overland access to the greatest extent possible in areas where no grading would be needed to access work areas. Overland access would consist of drive-and-crush (i.e., vehicular travel to access a site without significantly modifying the landscape, cropping vegetation, or removing soil) and/or clear-and-cut travel (removal of all vegetation while leaving the root crown intact to improve or provide suitable access for equipment). Prior to commencement of work activities, overland access routes would be staked. Routes would be specified in the POD. Use of overland access routes would be restricted based on dry or frozen soil conditions, seasonal weather conditions, and relatively flat terrain.
- ***Selective Mitigation Measure 15 (Flight Diverters and Perch Deterrents)***. Shield wires, guy wires, and overhead optical ground wire along designated portions of the transmission line with a high potential for avian collisions would be marked with flight diverters or other BLM or USFS approved devices in accordance with agency requirements and Reducing Avian Collisions with Power Lines, The State of the Art in 2012 (APLIC 2012). Portions of the transmission line adjacent to or that cross through waterfowl and general migratory pathways or habitat for high-priority species may be marked to reduce the risk of avian collisions. This measure also may include use of devices to deter raptors from perching on transmission line structures in habitat for high-priority prey species (e.g., sage-grouse). The specific segments where these devices would be used would be determined in consultation with the appropriate agencies.

Assessment of Residual Impacts

Residual impacts include those impacts on wildlife resources that are anticipated after the application of selective mitigation measures. The level of potential residual impacts on special status wildlife resources associated with implementation of the B2H Project was assessed using the criteria presented in Table 3-139. Application of selective mitigation measures is expected to reduce the level of anticipated impacts. The summary of residual effects is provided in Table 3-140. Additional protection measures are outlined in the Operation and Maintenance Plan and the POD. Residual effects on wildlife habitat are the same as residual effects on the primary vegetation communities discussed in Section 3.2.3 and are not discussed here. Residual effects from the B2H Project are presented and discussed under Environmental Consequences for each segment. Habitats analyzed for Washington ground squirrel, Greater Sage-Grouse, and Columbia spotted frog are described below.

Additional Analysis

The extent of loss of wildlife habitat (in acres) due to B2H Project features was estimated to present a more explicit measure of impacts on wildlife resources and is presented for wildlife resources for all alternative routes and variations in Section 3.2.4.6. The total extent of disturbance (in acres) due to construction of features such as roads, transmission line towers, and other B2H Project facilities was estimated over the entire length of an alternative route based on the access model developed for the B2H Project and the Applicant's project description (refer to Section 2.5.1). Disturbance associated with construction of the B2H Project was assumed to occur at a constant density (acres) per mile and was calculated for each alternative route based on the total estimated disturbance and total length of each alternative route. The estimated density of disturbance (in acres per mile) for each alternative route was used to calculate the extent of effects on wildlife habitat (in acres) that could occur for each length of habitat crossed. As the estimated density of disturbance per mile in the alternative route study corridors varies by alternative route, the centerline of the alternative routes that cross the same length of wildlife habitat may vary in estimated area of disturbance (in acres) to the habitat.

To further evaluate the B2H Project's potential effects on Greater Sage-Grouse and bald and golden eagles, the number of leks (for Greater Sage-Grouse) and nests (for bald and golden eagles), were determined within set distances from the alternative routes centerline. The number of Greater Sage-Grouse leks was calculated within 0.25, 2.0, and 3.1 miles of centerlines and the number of gold and bald eagle nest was calculated within 0.5 and 5 miles of alternative route centerlines.

Indirect effects on Washington ground squirrel and Greater Sage-Grouse were quantified as the percentage of acres within a set distance from alternative routes centerline. Percentage of Washington ground squirrel habitat was calculated within the right-of-way (125 feet on each side of the alternative routes centerline) and percentage of Greater Sage-Grouse habitat was calculated within 3.1 miles of alternative routes centerline.

The buffer distances for Washington ground squirrel and bald and golden eagles were determined in coordination with the cooperating land-managing agencies. Buffer distances for Greater Sage-Grouse are based on findings on disturbance buffers from tall structures by Manier et al. (2014) and are

consistent with Appendix B – Lek Buffer Distances in the Oregon Greater Sage-Grouse ARMPA (BLM 2015a).

3.2.4.5 Affected Environment

Wildlife Habitat

The study corridor traverses four ecoregions: Columbia Plateau, Blue Mountains, Northern Basin and Range, and Snake River Plain. Descriptions of each of the four ecoregions in which the B2H Project occurs are provided in Section 3.2.3. Primary vegetation communities are described in detail in Section 3.2.3 and these community types are equivalent to the wildlife habitat types discussed in this section.

Wildlife species use a variety of habitats in the study corridor. These habitats provide important features such as foraging areas, breeding and wintering range, and cover for a range of bird, mammal, amphibian, reptile, and fish species common to eastern Oregon and southwestern Idaho.

The existing wildlife habitats in the study corridor are generally categorized as grassland, shrubland, forest/woodland, RCAs (includes wetlands, riparian, and surface water habitats, refer to Section 3.2.3), bare ground/cliff/talus, agriculture, and developed/disturbed areas. Although in smaller percentages than predominant habitat types within the study corridor, RCAs typically support the highest diversity of wildlife species. Wildlife habitat in the study corridor correspond to the vegetation community types discussed in Section 3.2.3. Each of these types exhibit existing fragmentation from land uses, such as roadway development, utility rights-of-way, agricultural use, livestock grazing practices, and wildfire. However, large blocks of contiguous habitat do occur throughout the study corridor. Wildlife populations in the vicinity of existing infrastructure (i.e., utility rights-of-way and roadway facilities and corridors) are likely to have already experienced some impacts associated with habitat fragmentation and disturbance such as reduced carrying capacity, lower reproductive success, higher susceptibility to predation, and reduced mobility and restricted home ranges. Table E-2 (Appendix E) lists some of the typical wildlife species expected to occur within each wildlife habitat type.

Federally Proposed, Endangered, Threatened, and Candidate Species

Table 3-141 identifies the federally proposed, endangered, threatened, and candidate wildlife species with potential habitat or occurrences within the study corridor. There is no designated or proposed critical habitat for threatened or endangered wildlife species in the study corridor. Of the species listed in Table 3-141, only gray wolf was carried forward for analysis. The rationale for not carrying forward yellow-billed cuckoo, North American wolverine, Canada lynx, and Snake River physa snail for analysis is provided below.

Table 3-141. Federally Proposed, Endangered, Threatened and Candidate Wildlife Species with Potential Occurrence in the Study Corridor (by analysis segment)

Species	Status	Primary Wildlife Habitat Type (Source Habitat)	Occurrence In Study Corridor	Occurrence Potential by Segment					
				1	2	3	4	5	6
Birds									
Yellow-billed Cuckoo (*Coccyzus americanus*), Population: Western U.S. DPS	T	Wetland/Riparian/ Open Water (Riparian)	HN/N	N	N	N	N	N	N
Mammals									
North American Wolverine (*Gulo gulo luscus*)[1]	P	Forest/Woodland (Subalpine/ Montane Forest)	HD/S (dispersal only)	N	M	M	N	N	N
Canada lynx (*Lynx canadensis*)	T	Forest/Woodland (Subalpine/ Montane Forest)	HN/N	N	N	N	N	N	N
Gray Wolf (*Canis lupus*) Population: Rocky Mountain DPS	DL (east of US 395 in B2H Project area in Oregon), E (west of US 395 in B2H Project area in Oregon)	All habitats (habitat generalist)	HD/D	K	K	M	M	M	M
Invertebrates									
Snake River physa snail (*Physa natricina*)	E	Wetland/Riparian/ Open Water (Riparian)	HN/N	N	N	N	N	N	N

Table Source: Official U.S. Fish and Wildlife Species list for the Boardman to Hemingway Transmission Line Project (March 2016).

Table Notes:

[1]On April 4, 2016, wolverines in the contiguous U.S. were once again proposed as a threatened species under the ESA. The USFWS had not yet updated the ESA species list for the B2H Project area to include wolverines at the time that the official ESA species list for the B2H Project was received. However, portions of the B2H Project may be located in wolverine habitat.

DPS = Distinct population segment

Status Designations

C = Endangered Species Act (ESA) Candidate Species
P = Proposed Federally Threatened or Endangered
T = Federally Threatened
E = Federally Endangered
DL = Federally Delisted

Occurrence in Study Corridor

HD = Habitat documented or suspected within the study corridor or near enough to be affected by B2H Project activities
HN = Habitat not within the study corridor or affected by its activities
D = Species documented in general vicinity of B2H Project activities
S = Species suspected in general vicinity of B2H Project activities
N = Species not documented and not suspected in general vicinity of B2H Project activities

Occurrence Potential by Segment

K = Known to occur (documented within the study corridor)
L = Likely to occur (documented within B2H Project vicinity outside study corridor)
M = May occur (not documented in B2H Project vicinity but suitable habitat is present in study corridor and the B2H Project is within the species' range)
N = Does not occur

On October 3, 2014, the western distinct population segment of the yellow-billed cuckoo was formally listed as threatened. In accordance with the listing, critical habitat has been proposed but not designated. No proposed critical habitat has been identified in Oregon, and the nearest proposed critical habitat in Idaho is in the central portion of the state, well outside the boundaries of the study corridor. In addition, occupied or suitable habitat is not known to be present in the study corridor. This species is, therefore, not discussed in more detail.

On December 13, 2015, USFWS announced that wolverines in the contiguous U.S. are warranted to be listed under the ESA, but precluded from full protection due to other listings of higher priority, placing this distinct population segment of wolverines on the candidate list. On April 4, 2016, wolverines in the contiguous U.S. were once again proposed as a threatened species under the ESA. Although there is some peripheral/secondary habitat (dispersal) available in the study corridor for wolverine, there is no verified occurrence or source habitat. Individuals would likely only be found in the study corridor while dispersing among habitats. This species is, therefore, not discussed in more detail.

The distribution of the endangered Snake River physa snail is highly limited and only known within the Snake River in southern Idaho. The snail is not known to occur in the study corridor and is not discussed in more detail.

Due to the lack of source habitat and highly limited availability of secondary and dispersal ('peripheral') habitat, Canada lynx is not expected to occur within the study corridor. In addition, none of the Oregon counties listed as locations where lynx are known to or believed to occur are within the study corridor (USFWS 2016). This species is not discussed further.

Gray Wolf

Regulatory Status

The gray wolf has undergone a lengthy, complex history regarding its listing status under the ESA. Although this section does not present a full history of all listing actions and related court decisions, a summary is provided of the original listing history of the species and recent determinations that affect the listing status of the species in the B2H Project area.

The timber wolf, considered at the time an eastern subspecies of the gray wolf (*C. l. lycaon*), was listed under the Endangered Species Preservation Act in 1967 (32 *Federal Register* 4001). The northern Rocky Mountain wolf (*C. l. irremotus*) was listed under the Endangered Species Conservation Act in 1973 (U.S.C. Title 16, Sections 1531-1544), and the species was listed under the ESA in 1978 throughout the contiguous U.S., acknowledging that previous subspecies names and boundaries were likely inaccurate (43 *Federal Register* 9607-9615).

The USFWS designated the Northern Rocky Mountains population of gray wolves as a distinct population segment in 2008. USFWS delisted the distinct population segment after determining recovery objectives had been met (73 *Federal Register* 10514-10560). The gray wolf listing was reinstated in response to a court order in 2008 (73 *Federal Register* 75356-75371). In 2009, the USFWS published a rule delisting gray wolves in the Northern Rocky Mountains distinct populations

segment, except for Wyoming where the species remained listed as a nonessential experimental population (74 *Federal Register* 15123-15188). The delisted portion of the Northern Rocky Mountains distinct population segment was listed again in response to a court order in 2010 (75 *Federal Register* 65574-65579). In 2011, the Northern Rocky Mountains distinct population segment was delisted by legislation (76 *Federal Register* 25590-25592).

The Northern Rocky Mountains distinct population segment includes wolves in eastern Oregon and all of Idaho (as well as Montana, Wyoming, eastern Washington, and north-central Utah). In Oregon, wolves retain endangered status under the ESA in portions of the state west of the centerline of Highway 395 and Highway 78 north of Burns Junction, and west of the centerline of Highway 95 south of Burns Junction. Additionally, the gray wolf is listed as a sensitive species by the BLM in Idaho and Oregon and by the USFS on the Wallowa-Whitman National Forest.

Taxonomy and Life History

Taxonomy of North American wolves has been subject to frequent revision and contradiction, as indicated above in the history of the species' listing under the ESA, and uncertainty continues to this day. Although up to 24 New World and eight Old World subspecies have been described by some authors (Mech 1974, Wilson and Reeder 2005), many of these were considered invalid by later authors, and some have become extinct. As few as three or four subspecies may now be recognized in North America (78 *Federal Register* 60813-60815). One former subspecies is now recognized as the eastern (or timber) wolf (*C. lycaon*). The red wolf (*C. rufus*) of the southeastern U.S., listed as endangered under the ESA, is closely related to the eastern wolf, and both species appear to be more closely related to coyotes (*C. latrans*) than to the gray wolf (Wilson and Reeder 2005). One possible evolutionary and biogeographical explanation is that the common ancestor of the coyote, eastern wolf, and red wolf dispersed to and diverged in North America from the Eurasian gray wolf. These species later came into contact when gray wolves reached North America during a more recent interglacial period.

All North American wolf species are social and form packs of mostly related individuals led by a dominant male-female pair. Litter size averages six pups, which are raised in sheltered dens by the female. Gray wolves are mature at approximately one year, but may not reproduce until their second year. Gray wolves are almost exclusively carnivorous, cooperating to take large grazing mammals but also opportunistically capturing small mammals and birds (78 *Federal Register* 60813-60815), and even fish in some populations (Darimont and Reimchen 2002). Gray wolves will prey on livestock directly and also will scavenge on livestock carcasses (Morehouse and Boyce 2011).

Distribution and Habitat Requirements

The gray wolf is currently found south of Canada only in northern Mexico, a few areas in the Rocky Mountains (reintroduction sites in Montana, Wyoming, and Idaho), northwestern Great Lakes region, and Cascade Mountains of northern Washington. Formerly, gray wolves were much more numerous in the Rocky Mountain states than in the southwestern U.S. The gray wolf is a habitat generalist, with large stable home ranges and exclusive pack territories. Wolf packs generally consist of a breeding pair and offspring. Travel patterns across home ranges are influenced by elevation, topography, prey

distribution, and climatic conditions; travel routes along roads, trails, and survey lines for efficiency are common (Paquet and Carbyn 2003). In addition to avoiding roads and human activity, the gray wolf selects den sites (natal and secondary) according to proximity of stable food and water resources; selecting for proximity to ungulate prey species and often denning along ungulate migration routes. Den sites also are located relative to adjacent wolf pack proximity. However, territory overlap with other predators occurs. Limiting factors include climate, prey density, human-induced mortality and disease (Paquet and Carbyn 2003).

Threats to Survival

Human conflicts drive the primary threats to the ESA-listed population of the gray wolf, and human-caused deaths can be the majority of mortality for dispersing or resident wolves (Boyd and Pletscher 1999). Although wolves are generalists in their habitat and prey preferences to a degree, and tolerant of some human presence, the degree of disturbance, dispersal barriers, habitat modification, and conflicts with residents and livestock producers has rendered most of the lower and middle elevations within the range of the gray wolf unsuitable for their recovery. High road densities have been shown to increase gray wolf deaths from road mortality and shooting and decrease the probability of an area being occupied by gray wolves (Kaartinen et al. 2005). However, gray wolves also will travel opportunistically on low-use roads and trails that cross their home ranges (Whittington et al. 2005).

Occurrence in the Study Corridor

Gray wolves with federally endangered status are only found in Segment 1 of the study corridor, as described under Affected Environment for Segment 1. Gray wolves have federally endangered status in portions of the B2H Project west of U.S. 395. No known federally endangered wolf packs are crossed by the B2H Project, but estimated wolf use areas (as designated by ODFW) occur in the study corridor west of U.S. 395.

Other Special Status Species

Table 3-142 presents animal species listed as sensitive by the BLM or USFS (threatened, endangered, critical, or vulnerable by Oregon or as species of greatest conservation need by Idaho) that potentially could occur in the study corridor. Three of these species, Columbia spotted frog (Great Basin distinct population segment), Greater Sage-Grouse, and Washington ground squirrel, are former candidates for protection under the ESA and are discussed in more detail below. The USFS sensitive species list includes animal species for which population viability is a concern on USFS-administered lands. USFS manages sensitive species under policy contained in USFS Manual 2670. The objective of the USFS policy is to maintain viable populations for native and desired non- native wildlife species in habitats distributed throughout their geographic range on USFS lands. BLM sensitive species are managed under the special status species policy contained in BLM Manual 6840 (BLM 2008). The objectives of the BLM special status species policy are to (1) conserve and/or recover ESA-listed species and the ecosystems on which they depend so ESA protections are no longer needed for these species and (2) to initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species and minimize the likelihood of and the need for listing these species under the ESA. The B2H Project extends northwest from southwest Idaho to northeast Oregon across mostly shrubland habitat types.

Table 3-142. Special Status Species with Documented Occurrence or Potential Habitat in the Study Corridor

Species	Status	Primary Wildlife Habitat Type	Occurrence Potential by Segment					
			1	2	3	4	5	6
Amphibians								
Columbia spotted frog *(Rana luteiventris)* Great Basin distinct population segment	ID BLM S, ID SGCN, OR BLM S, CR	RCA	N	N	N	M	K	M
Columbia spotted frog *(Rana luteiventris)* Population outside Great Basin distinct population segment	USFS S, CR	RCA	K	K	K	M	N	N
Northern leopard frog (*Lithobates pipiens*)	ID BLM S, ID SGCN, OR BLM S, CR,	RCA	M	M	M	K	K	K
Rocky Mountain tailed frog *(Ascaphus montanus)*	OR BLM S, USFS S, SV	RCA	N	M	K	N	N	—
Western toad *(Bufo boreas)* Northern Rocky Mountain population only	ID BLM S, ID SGCN, SV	RCA, Forest/Woodland	M	M	K	K	K	M
Woodhouse's toad (*Anaxyrus woodhousii*) (*Anaxyrus woodhousii woodhouse – Idaho)*	ID BLM S, ID SGCN, OR BLM S	RCA	M	M	M	M	M	M
Reptiles								
Common garter snake (*Thamnophis sirtalis*)	ID BLM S	RCA, Forest/ Woodland, Grassland	—	—	—	—	—	M
Longnose snake (*Rhinocheilus lecontei*)	ID BLM S	Bare Ground/Cliffs/ Talus, Shrubland	—	—	—	—	—	M
Mojave black-collared lizard (*Crotaphytus bicinctores*)	ID BLM S, ID SGCN	Bare Ground/Cliffs/ Talus, Shrubland	—	—	—	—	—	K
Painted turtle (*Chrysemys picta*)	OR BLM S	Open Water	K	K	K	N	N	N
Western ground snake (*Sonorasemiannulata*)	ID BLM S	Bare Ground/Cliffs/ Talus, Shrubland	—	—	—	—	—	K

Table 3-142. Special Status Species with Documented Occurrence or Potential Habitat in the Study Corridor								
Species	Status	Primary Wildlife Habitat Type	Occurrence Potential by Segment					
			1	2	3	4	5	6
Birds								
American bittern (*Botaurus lentiginosus*)	ID SGCN	RCA	—	—	—	—	—	M
American peregrine falcon (*Falco peregrinus anatum*)	ID BLM S, OR BLM S, USFS S, SV	Bare Ground/Cliffs/ Talus, Forest/ Woodland, RCA, Developed/Disturbed	M	K	K	M	M	M
American three-toed woodpecker (*Picoides dorsalis*)	SV	Forest/Woodland	K	K	K	N	N	—
American white pelican *(Pelecanus erythrorhynchos)*	ID SGCN, OR BLM S, SV	RCA	K	M	K	K	K	K
Bald eagle *(Haliaeetus leucocephalus)*	ID BLM S, OR BLM S, USFS S, ST	Forest/Woodland, Developed/Disturbed	K	K	K	K	K	K
Black-backed woodpecker (*Picoides arcticus*)	SV	Forest/Woodland	M	K	K	M	M	—
Black-throated sparrow (*Amphispiza bilineata*)	ID BLM S	Shrubland	—	—	—	—	—	K
Black tern (*Chlidonias niger*)	ID SGCN	RCA	—	—	—	—	—	M
Bobolink (*Dolichonyx oryzivorus*)	OR BLM S, SV	Grassland, Shrubland	K	K	K	K	M	—
Brewer's sparrow (*Spizella breweri*)	ID BLM S	Shrubland	—	—	—	—	—	K
Burrowing owl (*Athene cunicularia*)	CR, ID BLM S, ID SGCN	Grassland, Shrubland	K	M	K	K	K	K
California gull (breeding population) (*Larus californicus*)	ID SGCN	RCA	—	—	—	—	—	M

Table 3-142. Special Status Species with Documented Occurrence or Potential Habitat in the Study Corridor

Species	Status	Primary Wildlife Habitat Type	Occurrence Potential by Segment					
			1	2	3	4	5	6
Caspian tern (*Hydroprogne caspia*)	ID SGCN	RCA	—	—	—	—	—	M
Cassin's finch (*Haemorhous cassinii*)	ID BLM S	Forest/Woodland (conifer forest)	—	—	—	—	—	M
Clark's grebe (*Aechmophorus clarkii*)	ID SGCN	RCA	—	—	—	—	—	M
Common nighthawk (*Chordeiles minor*)	SC, ID SGCN	Grassland, Shrubland, Forest/Woodland	K	K	K	K	K	K
Ferruginous hawk *(Buteo regalis)*	ID BLM S, ID SGCN, CR	RCA, Grassland, Bare Ground/Cliffs/Talus	K	K	K	K	K	K
Flammulated owl (*Otus flammeolus*)	SV	Forest/Woodland	N	K	M	N	N	N
Golden eagle (*Aquila chrysaetos*)	BGEPA, ID BLM S, ID SGCN	Shrubland, Bare Ground/Cliffs/Talus, Grassland	K	K	K	K	K	K
Grasshopper sparrow *(Ammodramus savannarum)*	ID BLM S, ID SGCN, OR BLM S, SV	Grassland	K	K	K	K	K	K
Great gray owl (*Strix nebulosa*)	SV	Forest/Woodland	K	K	M	N	N	—
Greater Sage-Grouse (*Centrocercus urophasianus*)	ID BLM S, ID SGCN, OR BLM S, USFS S, SV	Shrubland	N	K	K	K	K	K
Greater sandhill crane *(Grus canadensistabida)*	SV	RCA, Grassland, Agriculture	M	M	M	M	M	—
Harlequin duck (*Histrionicus histrionicus*)	USFS S, ID BLM	RCA	K	K	N	—	—	N

Table 3-142. Special Status Species with Documented Occurrence or Potential Habitat in the Study Corridor

Species	Status	Primary Wildlife Habitat Type	Occurrence Potential by Segment					
			1	2	3	4	5	6
Horned grebe *(Podiceps auritus)*	OR BLM S	RCA	M	M	M	M	M	—
Lewis's woodpecker (*Melanerpes lewis*)	ID BLM S, OR BLM S, USFS S, CR	Forest/Woodland, RCA	M	K	K	M	M	K
Loggerhead shrike *(Lanius ludovicianus)*	ID BLM S, SV	Shrubland, Forest/Woodland	K	K	K	K	K	K
Long-billed curlew (*Numenius americanus*)	ID BLM S, ID SGCN, SV	Grassland, RCA	K	K	K	K	K	K
Mountain quail (*Oreortyx pictus*)	ID BLM S, SV	Shrubland, Forest/Woodland	M	M	M	M	M	M
Northern Goshawk (*Accipiter gentilis*)	ID BLM S, SV	Forest/Woodland	K	K	K	M	M	K
Olive-sided flycatcher (*Contopus cooperi*)	ID BLM S, SV	Forest/Woodland	N	K	M	N	N	N
Pileated woodpecker (*Dryocopus pileatus*)	SV	Forest/Woodland, RCA	K	K	M	N	N	—
Prairie falcon (*Falco mexicanus*)	ID BLM S	Shrubland, Bare Ground/Cliffs/Talus, Grassland	—	—	—	—	—	K
Ring-billed gull (breeding population) (*Larus delawarensis*)	ID SGCN	RCA	—	—	—	—	—	M
Sage sparrow (*Amphispiza belli*)	ID BLM S, ID SGCN, CR	Shrubland	M	M	M	K	K	K
Sage thrasher (*Oreoscoptes montanus*)	ID BLM S, ID SGCN	Shrubland	—	—	—	—	—	K

Table 3-142. Special Status Species with Documented Occurrence or Potential Habitat in the Study Corridor

Species	Status	Primary Wildlife Habitat Type	Occurrence Potential by Segment					
			1	2	3	4	5	6
Sandhill crane (*Grus canadensis*)	ID SGCN	RCA	—	—	—	—	—	M
Short-eared owl (*Asio flammeus*)	ID BLM S, ID SGCN	Grassland, Shrubland	—	—	—	—	—	K
Snowy egret (*Egretta thula)*	OR BLM S, SV	RCA	N	N	N	K	M	M
Swainson's hawk (*Buteo swainsoni*)	SV	Grassland, Shrubland, Agriculture	K	K	K	K	K	—
Tricolored blackbird (*Agelaius tricolor*)	OR BLM S	Agriculture, RCA, Grassland, Shrubland	K	M	N	N	N	N
Upland sandpiper (*Bartramia longicauda*)	USFS S, CR	Grassland, Agriculture	N	M	M	N	N	—
Western grebe (*Aechmophorus occidentalis*)	ID SGCN	RCA	—	—	—	—	—	M
White-faced ibis (*Plegadis chihi*)	ID BLM S, ID SGCN	RCA, Shrublands	—	—	—	—	—	M
White-headed woodpecker (*Picoides albolarvatus*)	Idaho BLM S, OR BLM S, USFS S, CR	Forest/Woodland	N	M	K	N	N	N
Willow flycatcher *(Empidonax trailii)*	ID BLM S	RCA	—	—	—	—	—	M
Mammals								
American marten (*Martes americana*)	SV	Forest/Woodland	N	K	M	N	N	—
Bighorn sheep (*Ovis canadensis spp.*)	ID BLM S, ID SGCN	Bare Ground/Cliffs/ Talus, Shrubland	—	—	—	—	—	K

Table 3-142. Special Status Species with Documented Occurrence or Potential Habitat in the Study Corridor

Species	Status	Primary Wildlife Habitat Type	Occurrence Potential by Segment					
			1	2	3	4	5	6
Big brown bat (*Eptesicus fuscus*)	ID BLM S	Forest/Woodland, Agriculture	—	—	—	—	—	K
California myotis (*Myotis californicus)*	ID BLM S, SV	Forest/Woodland, RCA, Shrubland, Grassland	N	N	K	M	M	M
Canyon bat (*Perimyotis hesperus*)	ID BLM S	Bare Ground/Cliffs/Talus, Shrubland	—	—	—	—	—	K
Columbia plateau ground squirrel (*Spermophilus canus*)	ID SGCN	Sagebrush	—	—	—	—	—	M
Fringed myotis (*Myotis thysanodes*)	ID BLM S, OR BLM S, USFS S, SV	Shrubland, Grassland, Forest/Woodland	K	K	K	N	N	M
Gray wolf (*Canis lupus*)	USFWS DL (east of US 395 in B2H Project area in Oregon), USFWS E (west of US 395 in B2H Project area in Oregon), OR BLM S, ID BLM S, USFS S	Forest/Woodland (habitat generalist)	K	K	M	M	M	M
Hoary bat (*Lasiurus cinereus*)	ID SGCN	Shrubland, RCA	—	—	—	—	—	M
Little brown bat (*Myotis lucifugus*)	ID BLM S, ID SGCN	Forest/Woodland, RCA	—	—	—	—	—	K
Long-legged myotis (*Myotis volans*)	SV, ID BLM S	Forest/Woodland	N	K	K	N	N	N
Merriam's ground squirrel (*Spermophilus canus vigilis*)	ID BLM S	Shrubland	—	—	—	—	—	K
Pallid bat (*Antrozous pallidus*)	ID BLM S, OR BLM S, SV	Shrubland, Grassland, Bare Ground/Cliffs/ Talus	K	M	K	K	M	K
Piute ground squirrel (*Urocitellus mollis*)	ID BLM S	Shrubland, Grassland	—	—	—	—	—	K
Pygmy rabbit (*Brachylagus idahoensis*)	ID BLM S, ID SGCN, OR BLM S	Shrubland	N	N	M	M	K	M
Silver-haired bat (*Lasionycteris noctivagans*)	ID BLM S, ID SGCN, SV	Forest/Woodland	K	K	K	K	K	M

Table 3-142. Special Status Species with Documented Occurrence or Potential Habitat in the Study Corridor

Species	Status	Primary Wildlife Habitat Type	Occurrence Potential by Segment					
			1	2	3	4	5	6
Spotted bat (*Euderma maculatum*)	ID BLM S, OR BLM S, USFS S, SV	Shrublands, Bare Ground/Cliffs/Talus, Forest/Woodland	M	M	M	M	M	K
Townsend's big-eared bat (*Corynorhinus townsendii*)	ID BLM S, ID SGCN, OR BLM S, USFS S, CR	Shrublands, Forest/Woodland, Bare Ground/Cliffs/Talus	M	K	K	K	M	M
Washington ground squirrel (*Spermophilus washingtoni*)	OR BLM S, SE	Grassland, Shrubland	K	N	N	N	N	—
Western small-footed myotis (*Myotis ciliolabrum*)	ID BLM S, ID SGCN	Forest/Woodland, RCA, Shrubland, Grassland, Bare Ground/Cliffs/ Talus	—	—	—	—	—	K
White-tailed jackrabbit (*Lepus townsendii*)	SV	Shrubland, Grassland	M	K	K	M	K	—
Invertebrates								
Alpine tiger beetle (*Cicindela plutonica*)	ID SGCN	Shrubland	—	—	—	—	—	M
Blue mountainsnail (Oreohelix strigose delicata)	USFS S	Forest/Woodland	M	M	M	—	—	—
California floater (Anodonta californiensis)	USFS S	RCA	M	M	M	—	—	—
Columbia Oregonian (Cryptomastix hendersoni)	USFS S	RCA	M	M	M	—	—	—
Columbia pebblesnail (*Fluminicola fuscus*)	USFS S	RCA	M	M	M	—	—	—
Crooked Creek springsnail (*Pyrgulopsis intermedia*)	OR BLM S	RCA	N	N	N	N	M	—
Duckhead snowfly (*Capnura anas*)	ID SGCN	RCA	—	—	—	—	—	M
Fir pinwheel (*Radiodiscus abietum*)	USFS S	Forest/Woodland	N	M	N	—	—	—
Hunt's bumble bee (*Bombus huntii*)	ID SGCN	Shrubland	—	—	—	—	—	M
Intermountain sulphur *(Coliaschristina pseudochristina)*	OR BLM S, USFS S	Forest/Woodland	N	M	K	N	N	—

Table 3-142. Special Status Species with Documented Occurrence or Potential Habitat in the Study Corridor

Species	Status	Primary Wildlife Habitat Type	Occurrence Potential by Segment					
			1	2	3	4	5	6
Jackson Lake springsnail *(Pyrgulopsis robusta)*	OR BLM S	RCA	M	N	N	N	N	—
Johnson's hairstreak (*Callophrys johnsoni*)	USFS S	Forest/Woodland	M	K	K	—	—	—
Lined june beetle (*Polyphylla devestiva*)	ID SGCN	Shrubland, grassland	—	—	—	—	—	M
Morrison bumble bee (*Bombus morrisoni*)	ID SGCN	Shrubland	—	—	—	—	—	M
Owyhee springsnail *(Pyrgulopsis owyheensis)*	OR BLM S	RCA	N	N	N	N	K	—
Owyhee hot springsnail *(Pyrgulopsis fresti)*	OR BLM S	RCA	N	N	N	N	M	—
Poplar Oregonian (Cryptomastix populi)	OR BLM S, USFS S	RCA	N	M	N	N	N	—
Raptor fairy shrimp (*Branchinecta raptor*)	ID SGCN	RCA	—	—	—	—	—	M
Shortface lanx (*Fisherola nuttali*)	USFS S	RCA	M	M	M	—	—	—
Shiny tightcoil (Pristiloma wascoense)	USFS S	Forest/Woodland	M	M	M	—	—	—
Silver-bordered fritillary *(Boloria selene)*	OR BLM S, USFS S	RCA	N	M	M	N	N	—
Western bumblebee *(Bombus occidentalis)*	USFS S, OR BLM S	Grassland	K	K	K	M	M	—
Western ridged mussel (*Gonidea angulata*)	ID SGCN, OR BLM S, USFS S	RCA	K	M	M	M	M	M

Table Notes:
Dashes (—) indicate segments where the species is not categorized as a special status species (no determination of occupancy)

Status Designations
BGEPA = Bald and Golden Eagle Protection Act
CR = State Critical
ID BLM S = Idaho Bureau of Land Management Sensitive
ID SGCN = Idaho Species of Greatest Conservation Need
OR BLM S = Oregon Bureau of Land Management Sensitive
SC = State Candidate (Oregon)
SE = State Endangered (Oregon)
ST = State Threatened (Oregon)
SV = State Vulnerable (Oregon)
USFS S = U.S. Forest Service Sensitive
USFWS C = Candidate for listing under the Federal Endangered Species Act
USFWS DL = Delisted under the Federal Endangered Species Act
USFWS E = Endangered under the Federal Endangered Species Act
USFWS P = Proposed for listing under the Federal Endangered Species Act
USFWS T = Threatened under the Federal Endangered Species Act

Occurrence Potential by Segment
K = Known to occur (documented within the study corridor)
L = Likely to occur (documented within B2H Project vicinity outside study corridor)
M = May occur (not documented in B2H Project vicinity but suitable habitat is present in study corridor and the B2H Project is within the species' range)
N = Does not occur

This section describes the affected environment for special status wildlife species that are known to be present, or have suitable habitat, in the B2H Project area.

Table 3-142 identifies those special status wildlife species with documented occurrence or potential habitat in the study corridor, by analysis segment. For reference, MV-7 illustrates the broad distribution of vegetation communities (i.e., wildlife habitats) in the study corridor. Detailed discussions for special status species and their habitats are presented by segment.

Columbia Spotted Frog

Regulatory Status

In May 1989, the USFWS was petitioned to list the Columbia spotted frog under the ESA. In May 1993, the species was placed in a 12-month 'warranted but precluded from listing' status (58 *Federal Register* 27260, April 23, 1993).

The USFWS accepts species-specific genetic and geographic differences in Columbia spotted frogs based on Green et al. (1996 and 1997), and the populations are divided into four distinct population segments:

- Main (Northern) distinct population segment (Alaska, British Columbia, Alberta, Wyoming, Montana, north and central Idaho, eastern Washington, and northeastern Oregon)
- Great Basin distinct population segment (southwestern Idaho, northern Nevada, and eastern Oregon)
- Wasatch Front distinct population segment (Utah)
- West Desert distinct population segment (Utah)

All of the distinct population segments, except for the main population, were classified as candidate species by the USFWS's 12-month petition finding. The only population classified as a candidate species within the study corridor, the Great Basin distinct population segment, was determined to be not warranted for protection under the ESA on October 8, 2015 (80 *Federal Register* 60834). The Great Basin distinct population segment of the Columbia spotted frog is considered a BLM sensitive species in Idaho and Oregon, and is considered vulnerable by Oregon and a species of greatest conservation need by Idaho.

Taxonomy and Life History

Spotted frogs (*Rana pretiosa*) were first described as a single species and later split into two subspecies, *R. pretiosa pretiosa* and *R. pretiosa luteiventris*. More recently, work identifying species-specific genetic and geographic differences has resulted in characterization of populations in western Washington and Oregon and northeastern California as Oregon spotted frogs (*R. pretiosa*) and the remainder of the populations as Columbia spotted frogs (*R. luteiventris*). Based on further geographic and genetic characterization, Columbia spotted frogs in southwest Idaho, southeast Oregon, and northeast and central Nevada are part of the Great Basin population of Columbia spotted frogs. It was previously thought that populations in northeast Oregon were part of the Great Basin population;

however, it was later determined that these populations belong to the Northern or main population segment (USFWS 2011).

Distribution and Habitat Requirements

Prior to 1995, only six historical sites were known in the Owyhee Mountain range in Idaho and only 22 sites were known in southeastern Oregon in Malheur County. The current range of the Great Basin distinct population segments of Columbia spotted frog populations in Oregon and Idaho (Owyhee subpopulation) appear to be widely distributed throughout southwestern Idaho (Owyhee County) and southeastern Oregon (east of Highway 395 and south of Highway 20, including the Owyhee and Steens Mountains in Lake, Harney and Malheur Counties). Throughout their current range, many populations of Columbia spotted frog within the Great Basin distinct population segments are small and fragmented.

Columbia spotted frogs are closely associated with clear, slow-moving streams or ponded surface waters with permanent hydroperiods and relatively cool constant water temperatures (Arkle and Pilliod 2015). In addition to permanently wet habitat, streams with beaver ponds, deep maximum depth, abundant shoreline vegetation, and non-salmonid fish species have the greatest probability of being occupied by Columbia spotted frogs within the Great Basin (Arkle and Pilliod 2015). During the summer they may disperse into upland forests, grasslands, and shrublands; however, these upland habitats must still be closely associated with moist vegetated areas. Aquatic habitat for the spotted frog consists of the littoral zone of emergent vegetation, including willows (*Salix* spp.), grasses and sedges, and submerged aquatic plants. The Columbia spotted frog over-winters in or adjacent to perennial waterbodies that remain above freezing temperatures and are well oxygenated, such as streams, springs, and spring-fed lakes. Several studies have identified general associations between National Wetland Inventory classifications and Columbia spotted frog occurrences (Patla and Keinath 2005). The wetland classifications associated with source habitat for Columbia spotted frogs include palustrine wetlands with shrub-scrub, emergent, aquatic bottom, and intermittent riverine streambed sites and water regimes with seasonally flooded, semi-permanently flooded, or saturated areas. Columbia spotted frog populations are more successful in larger habitat patches that are less vulnerable to environmental stochasticity (e.g., drought) (Hossack et al. 2013).

Threats to Survival

Habitat modification and destruction is a major threat to the Columbia spotted frog (Hossack et al. 2013). The Great Basin population is particularly susceptible to habitat modification (Noss et al. 2006; Tait 2007). Habitat degradation and fragmentation has resulted from agricultural development, intensive livestock grazing, spring development, urbanization, and mining activities. Additional threats to this species include predation by non-native species (e.g., bullfrog) and possibly climate change (NatureServe 2010). Predicted changes in stream flow patterns, precipitation, and temperature from climate change could reduce habitat suitability and connectivity for populations, and, therefore, population success, in the Great Basin region (Pilliod et al. 2015). Research by Pilliod and Sherer (2015) indicates that habitat management may aid in population rebound for drastically diminished populations, but full recovery may take many years.

Occurrence in the Study Corridor

Locations of Columbia spotted frog in the study corridor are described under Affected Environment for Segments 5 and 6 and displayed in MV-8.

Due to the proximity of preferred habitat types for both the Northern and Great Basin populations of Columbia spotted frog within the vicinity of U.S. Highway 20, some suitable habitat for both may overlap in Segment 4. However, this analysis focuses on the Great Basin distinct population segment, located south of Highway 20, in Segments 5 and 6. For this analysis, habitat for the Columbia spotted frog Great Basin DPS was identified based on the presence of RCAs (refer to Section 3.2.3.4 for a description of RCAs) and other habitat criteria for areas within the range of the Columbia spotted frog Great Basin DPS. Columbia spotted frog habitat were classified as one of six habitat types based on (1) whether Columbia spotted frog is known to occupy an RCA and/or the 12-digit HUC that an RCA is within, and (2) characteristics of the RCA relative to Columbia spotted frog habitat requirements, including hydroperiod (perennial or intermittent) and whether salmonids are known to occur:

- Occupied habitat: RCAs with known occupancy
- Potentially occupied habitat – lower quality: RCAs with unknown occupancy that are within 12-digit HUCs with known occupancy, have a perennial hydroperiod (i.e., RCA categories 1 and 3, and wetlands included in RCA Category 4, refer to Table 3-93 in Section 3.2.3), and are inhabited by salmonids
- Potentially occupied habitat – higher quality: RCAs with unknown occupancy that are within 12-digit HUCs with known occupancy, have a perennial hydroperiod (i.e., RCA categories 1, 2, and 3, and wetlands included in RCA Category 4, refer to Table 3.-39 in Section 3.2.3), and are not inhabited by salmonids
- Potentially occupied dispersal/connectivity habitat: RCAs with unknown occupancy that are within 12-digit HUCs with known occupancy, do not have a perennial hydroperiod (i.e., RCA Category 4, excluding RCAs with wetlands, refer to Table 3-93 in Section 3.2.3), but are connected to an occupied habitat RCA
- Suitable habitat – low potential: RCAs with unknown occupancy that are within 12-digit HUCs with unknown occupancy, do not have a perennial hydroperiod (i.e., RCA Category 4, excluding RCAs with wetlands, refer to Table 3-93 in Section 3.2.3), and are inhabited by salmonids
- Suitable habitat – high potential: RCAs with unknown occupancy that are within 12-digit HUCs with unknown occupancy, do not have a perennial hydroperiod (i.e., RCA Category 4, excluding RCAs with wetlands, refer to Table 3-93 in Section 3.2.3), and are not inhabited by salmonids

Greater Sage-Grouse

Regulatory Status

The range-wide population of Greater Sage-Grouse became a candidate species for listing under the ESA as threatened or endangered on March 4, 2010 (75 *Federal Register* 13909). However, on October 2, 2015, the USFWS found that protection for Greater Sage-Grouse under the ESA was no longer warranted (80 *Federal Register* 59857). The BLM's ARMPAs (described in Section 3.2.4.2) were

a critical component to ensure the protection of Greater Sage-Grouse habitat and helped support the U.S. Fish and Wildlife Service's determination that Greater Sage-Grouse no longer warrants protection under the ESA.

In addition to its ESA candidate status, nevertheless, the Greater Sage-Grouse is a BLM and USFS sensitive species, and is considered vulnerable by Oregon. For management of Greater Sage-Grouse in Oregon, the ODFW uses the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon (ODFW 2011), Oregon Sage-Grouse Action Plan (Sage-Grouse Conservation Partnership 2015a), State of Oregon Greater Sage-Grouse Habitat Mitigation Manual (Sage-Grouse Conservation Partnership 2015b); OAR Division 140 - Greater Sage-Grouse Conservation Strategy for Oregon, and Executive Order 15-18. For management of Greater Sage-Grouse in Idaho, the Idaho Greater Sage-Grouse Advisory Committee (2006) published management guidance in the Conservation Plan for the Greater Sage-Grouse in Idaho. This plan refers to local working group plans for more specific direction, which in the vicinity of the study corridor includes the Owyhee County Sage-grouse Management Plan (Owyhee County Sage-grouse Local Working Group 2013).

Life History

Greater Sage-Grouse breeding occurs between late February and early June and centers on a lek or strutting ground. Leks are usually located in open areas with greater visibility than surrounding areas. Male and female Greater Sage-Grouse attend leks where males perform ritualized courtship displays in the early morning hours. Mating is thought to occur on the lek with egg laying occurring soon after. All parental-investment functions (e.g., nesting, early and late brood-rearing) are performed by the female. Nesting usually occurs under sagebrush within 4 miles of a lek (ODFW 2011). Greater Sage-Grouse chicks are dependent on insect prey base after hatching (Johnson and Boyce 1990), but their diet shifts almost entirely to sagebrush as local vegetation desiccates in the late summer and fall (Schroeder et al. 1999).

According to the Idaho Sage-Grouse Local Working Groups Statewide Annual Report 2014 (Idaho Sage-Grouse Advisory Committee Technical Assistance Team 2015), in Idaho, male attendance at leks increased 5 percent from 2013, but decreased 1.7 percent from the five-year average. The average number of chicks per hen was 1.6, which is below the estimated number (2.25 or greater) needed for stable or increasing populations (Connelly and Braun 1997). In Oregon, chicks per female increased approximately 3 percent from 1980 to 2010 with an average of 1.59 chicks per female from 1993 to 2010 (ODFW 2011). No significant change in males per lek was found from 1980 to 2010 or over 5-year increments within the 30-year period.

Distribution and Habitat Requirements

Historical distribution of the Greater Sage-Grouse includes 13 U.S. states (Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Colorado, Utah, South Dakota, North Dakota, Nebraska, and Arizona) and three Canadian provinces (British Columbia, Alberta, and Saskatchewan) (Schroeder et al. 1999; Schroeder et al. 2004; Young et al. 2000). Current distribution represents approximately 56 percent of historical range across 11 U.S. states (Washington, Oregon, California, Nevada, Idaho,

Montana, Wyoming, Colorado, Utah, South Dakota, and North Dakota) and two Canadian provinces (Alberta and Saskatchewan) (Schroeder et al. 2004).

The distribution of Greater Sage-Grouse is closely aligned with the distribution of sagebrush-dominated landscapes (Schroeder et al. 2004). Greater Sage-Grouse require large, intact and connected expanses of sagebrush shrubland to exist (Aldridge et al. 2008; Wisdom et al. 2011). Greater Sage-Grouse typically occupy sagebrush vegetation but also may use a variety of other habitats (e.g., riparian meadows, and agricultural lands) intermixed in a sagebrush-dominated landscape (Shepard 2006). Sagebrush cover, height, and vegetative vertical structure have greater importance than the presence of particular sagebrush species when characterizing suitable Greater Sage-Grouse habitat (Connelly et al. 2000).

In Idaho, sagebrush patches adjacent to large, abrupt patches of grass or forb-dominated habitat (usually burned areas or crested wheatgrass seedings) received much less use on their periphery than more interspersed sagebrush patches (Shepard 2006). Aldridge and Boyce (2007) found Greater Sage-Grouse selected large expanses of sagebrush and avoided anthropogenic edge during the breeding season. Thus, the use of fragmented habitat by Greater Sage-Grouse is dependent on the juxtaposition of these habitats in relation to sagebrush and the hazards to birds using these areas (Connelly et al. 2011a).

Greater Sage-Grouse habitat use varies by season. Breeding, nesting, and brood-rearing habitat (i.e., spring and summer) is characterized by 10 to 25 percent sagebrush cover with an abundant grass and forb understory of greater than 15 percent cover (Connelly et al. 2000). The grass component is important in secluding nest sites, and forbs are important as browse for Greater Sage-Grouse and for providing habitat for protein-rich insects, which are necessary for chick growth. Suitable late brood-rearing and summer habitats include a variety of sagebrush communities that are capable of supporting a continued source of succulent forbs and insects, higher-elevation habitats where forbs are still present later in the year, agricultural fields, lower-elevation meadows, moist grassy areas, and riparian areas adjacent to sagebrush communities. Winter habitat consists of relatively large areas of sagebrush with 10 to 30 percent canopy cover that provide cover and forage above the snow level (Connelly et al. 2000). Greater Sage-Grouse are capable of traveling long distances, up to 50 miles, between seasonal habitats when necessary (Leonard et al. 2000).

The ODFW used average maximum counts of lekking male Greater Sage-Grouse to identify four lek density strata (percent of breeding population): very high (25 percent), high (50 percent), moderate (75 percent), and low (100 percent). Lek density strata, winter habitat use areas, and connectivity corridors were integrated to classify Greater Sage-Grouse habitat into one of two categories: core areas and low-density areas. Core area habitat consists of all sagebrush types or other habitats that support Greater Sage-Grouse that are encompassed by areas of very high, high, and moderate lek density strata; where low lek density strata overlap local connectivity corridors; or where known winter habitat use polygons overlap with either low lek density strata, connectivity corridors, or occupied habitat. Low-density area habitat encompasses the remainder. IDFG has not developed an analogous classification system for Greater Sage-Grouse habitat in Idaho.

There is little information available regarding minimum sagebrush patch sizes required to support populations of Greater Sage-Grouse. This is due in part to the migratory nature of some but not all populations, the lack of connectivity between seasonal habitats, and differences in local, regional, and range-wide ecological conditions that influence the distribution of sagebrush and associated understories. Where home ranges have been reported, they are extremely variable (1.5 to 238 square miles; Connelly et al. 2011b). Investigations from Idaho and Wyoming suggest that relatively large blocks of sagebrush habitat (more than 9,900 acres) are critical to successful reproduction and over-winter survival (Leonard et al. 2000; Walker et al. 2007). Occupancy of a home range also is based on multiple variables associated with both local vegetation characteristics and landscape characteristics (Knick et al. 2013). Pyke (2011) estimated that greater than 9,884 acres (4,000 hectares) was necessary for population sustainability; however, Pyke did not indicate whether this value was for migratory or non-migratory populations, or whether this included juxtaposition of all seasonal habitats. Large seasonal and annual movements emphasize the large landscapes required by the Greater Sage-Grouse (Connelly et al. 2011b; Knick et al. 2003).

Greater Sage-Grouse populations may be non-migratory or migratory, moving between or among seasonal use areas (Connelly et al. 2011b). Greater Sage-Grouse in Idaho are both migratory and non-migratory with migratory birds dispersing up to 77.5 miles (Idaho Sage-Grouse Advisory Committee 2006). Greater Sage-Grouse in Oregon generally exhibit one- stage migratory behavior with the largest movements (10 miles) occurring between breeding and summer habitats, which corresponds with elevational movements in mountains (ODFW 2011). Movements between summer and winter habitats (3 to 9 miles) were generally directed toward breeding areas, although Greater Sage-Grouse may travel considerable distances (over 19 miles) in severe winters to find food and cover (USFWS 2013).

Threats to Survival

Greater Sage-Grouse numbers have declined range-wide. Population declines have coincided with a decrease in habitat quality. The reasons for habitat loss vary from site to site, but include wildfire, urban expansion, development, agricultural conversion, herbicide treatments, rangeland seeding, noxious weeds and non-native grass species expansion, conifer encroachment, drought, and improper livestock grazing management (Connelly et al. 2011b; Pyke et al. 2015).

Knick and Connelly (2011) found that fire and human disturbance were the primary factors influencing fate of leks. Knick et al. (2003) reported 95 percent of active leks (3,184 leks) in their western states study area were in landscapes with less than 3 percent development; all lands surrounding leks were less than 14 percent developed.

Wildfire is one of the top threats to Greater Sage-Grouse in Idaho and Oregon. It causes loss of habitat, and has been identified as a primary factor associated with Greater Sage-Grouse population declines (USFWS 2010a). Greater Sage-Grouse typically select nest sites near the largest sagebrush plants that have a good herbaceous understory, which is precisely where wildfire or prescribed fire tends to travel. Thus, the mosaic of habitat that results from burning may actually diminish their productivity for Greater Sage-Grouse. Fire can reduce shrub cover, increase the amount of invasive plant species, and large intense fires can reduce habitat diversity. However, fire also can have beneficial impacts on Greater

Sage-Grouse habitat. Fire can reduce juniper cover and, under the right conditions, return sites to a more suitable mix of bunchgrass and sagebrush over time.

Juniper encroachment, another threat to Greater Sage-Grouse, affects more than 12 million acres in the Great Basin alone (Miller et al. 2008). Conifer encroachment fragments sagebrush habitat for Greater Sage-Grouse both by removing suitable cover (i.e., sagebrush) and by providing tall structures (i.e., trees) that attract predators of Greater Sage-Grouse, such as corvids (Doherty et al. 2008, 2010). A decline of shrubs is the most documented shift in understory vegetation following juniper encroachment. Mountain big sagebrush sites show 20 to 25 percent declines in shrub cover in response to trees reaching 50 percent of the maximum site potential (Miller et al. 2000). Corvid abundances have been positively correlated with higher nest predation rates of many birds, including Greater Sage-Grouse (ODFW 2011). Energy development has been identified as a threat to Greater Sage-Grouse. Direct and indirect disturbance, habitat loss, and fragmentation due to energy development have resulted in Greater Sage-Grouse population declines (USFWS 2013).

Comparing environmental conditions and levels of human disturbance on areas of former range (i.e., extirpated range) with areas still occupied by Greater Sage-Grouse (i.e., occupied range), Wisdom et al. (2011) presented five environmental variables that were the most significant in discriminating between former range and areas still occupied by Greater Sage-Grouse: sagebrush area, elevation, distance to transmission lines, distance to cellular towers, and land ownership.

While the amount of habitat available to Greater Sage-Grouse is very important, habitat pattern and quality is just as critical to long-term survival of the species. Fragmentation of habitat into smaller patches can result in extirpation of local Greater Sage-Grouse populations when functional connectivity among patches is lost. Leks separated by distances greater than 11 miles could be isolated due to decreased probability of dispersals from neighboring leks (Connelly et al. 2000). Isolation and reduced connectivity increases the probability of loss of genetic diversity and extirpation from stochastic events (Knick and Hanser 2011).

Occurrence in the Study Corridor

Both Greater Sage-Grouse PHMA and GHMA occur in the study corridor in Segments 2 through 4, only GHMA occurs in the study corridor in Segment 5, and IHMA and GHMA occur in the study corridor in Segment 6. No Sagebrush Focal Areas are located in the study corridor. Locations of habitat in the study corridor are described under Affected Environment for the relevant segments and displayed in MV-9.

For this analysis, effects of the B2H Project on Greater Sage-Grouse PHMA and GHMA are addressed. Effects of the B2H Project on IHMA in Idaho are also addressed. However, some portions of IHMA consist of lands that serve as management buffers between developed areas and PHMA and are not identified as areas with ecological site characteristics suitable for Greater Sage-Grouse habitat or occupancy (Makela and Major 2012). Definitions of PHMA, IHMA, and GHMA are provided under Greater Sage-Grouse Policy and Management Guidance in Section 3.2.4.2.

Washington Ground Squirrel

Regulatory Status

The Washington ground squirrel is a former candidate for listing as threatened or endangered under the ESA (59 *Federal Register* 58982). On September 21, 2016, the USFWS announced that protection for Washington ground squirrel under the ESA was not warranted (81 *Federal Register* 64843).

The Washington ground squirrel is a BLM sensitive species and is listed as endangered by Oregon. In Oregon, some threats are being addressed as a result of its state listing, and by implementation of the Threemile Canyon Farms Multi-Species Candidate Conservation Agreement with Assurances, which protects 36 percent of known Oregon breeding colonies, one-third of known occupied habitat, from agricultural development. ODFW classifies Washington ground squirrel occupied habitat as Category 1 and Category 2 habitat (refer to Oregon Habitat Mitigation Policy under Regulatory Framework earlier in this section).

Taxonomy and Life History

The Washington ground squirrel is diurnal and semi-fossorial. It has a prolonged period of seasonal dormancy, escaping extremes of both winter and summer. Adults emerge from hibernation between January and early March, and breed soon after (Rickart and Yensen 1991).

Washington ground squirrels eat a broad range of succulent forb and grass stems, buds, leaves, flowers, roots, bulbs, seeds; they also eat insects and various agricultural crops (Rickart and Yensen 1991). Washington ground squirrels usually live less than 5 years and have high annual mortality rates. Causes of mortality included starvation or freezing during estivation/hibernation, predation by mammals and various birds of prey, disease, and human interference (Delavan 2008; USFWS 2010b). Delavan (2008) found that home range sizes varied from 435 to 77,021 square meters, with males having significantly larger home ranges than females, and home range sizes decreasing with increasing food availability. Males are more mobile and disperse greater distance than females. In Oregon, juvenile male dispersal distances ranged from 40 to 3,521 meters (131 to 11,551 feet), with a median of 880 meters (2,887 feet) (Delavan 2008; Klein et al. 2005).

Distribution and Habitat Requirements

The Washington ground squirrel is endemic to the Deschutes–Columbia Plateau sagebrush-steppe and grassland communities in eastern Oregon and southcentral Washington. Approximately two-thirds of the Washington ground squirrel total historical range has been converted to agricultural and residential uses, and recent surveys suggest that its current range has contracted toward the center of its historical range (75 *Federal Register* 69239). This species now occurs in Washington, east of the Columbia River in Adams, Douglas, Franklin, Grant, Lincoln, and Walla Walla Counties; and in north- central Oregon in the northern halves of Gilliam and Morrow Counties and in northwestern Umatilla County (75 *Federal Register* 69222).

The most densely occupied territories in Oregon occur on the Boardman Grasslands Important Bird Areas on the NWSTF Boardman and the adjacent Boardman Conservation Area, managed by the Nature Conservancy (Audubon Society 2013). The Important Bird Areas consist of these two land

parcels, totaling 69,000 acres. The parcels represent the largest remaining single block of predominantly native, ungrazed shrub-steppe and grassland habitats in the Columbia Basin. Washington ground squirrels are strongly associated with sagebrush-steppe and native bunchgrass habitats, and use areas with high sagebrush canopy cover and high grass and forb density (Delavan 2008; USFWS 2010b). Soil types essential for burrow excavation by Washington ground squirrel are distributed sporadically within the species' range, and have been seriously fragmented by human development in the Columbia Basin, particularly by conversion to agricultural use (Betts 1990; USFWS 2008a).

Threats to Survival

Overall threats to the survival for the Washington ground squirrel are summarized in the USFWS's 2010 candidate review (75 *Federal Register* 69239):

> Agricultural, residential, and wind power development along with other forms of development continue to eliminate Washington ground squirrel habitat in portions of its range. Throughout much of its range, Washington ground squirrel are threatened by the establishment and spread of invasive plant species, particularly cheatgrass, which alter available cover and food quantity and quality, and increase fire intervals. Additional threats include habitat fragmentation, recreational shooting, genetic isolation and drift, predation, disease, drought, and possible competition with related species in disturbed habitat at the periphery of their range.

Impacts on Washington ground squirrel from military readiness activities on the NWSTF Boardman were assessed in an EIS and the U.S. Department of the Navy (Navy) developed conservation measures for Washington ground squirrel in coordination with USFWS (Navy 2015). The contribution the B2H Project's impacts on Washington ground squirrel inhabiting the NWSTF Boardman in conjunction with those from Navy activities are discussed in the cumulative effects analysis in Section 3.3.4.

Occurrence in the Study Corridor

Washington ground squirrel is only found in Segment 1 of the study corridor, as described under Affected Environment for Segment 1 and displayed in MV-8.

The Navy considers all of the NWSTF Boardman to be Washington ground squirrel occupied habitat and mitigation actions are dependent on the quality of habitat affected, as outlined in the *Naval Weapons Systems Training Facility Boardman Integrated Natural Resources Management Plan* (Navy 2012). The occupied habitat on the NWSTF Boardman includes the 11,226-acre Washington ground squirrel Resource Management Area on the southern portion of the NWSTF Boardman, which is no longer used for military training activities and where habitat restoration efforts are focused; no ground-disturbing actions are allowed in the Resource Management Area (Navy 2015).

ODFW classifies Washington ground squirrel occupied habitat as Category 1 and Category 2 habitat, as defined in their Fish and Wildlife Habitat Mitigation Policy (refer to Oregon Habitat Mitigation Policy

under Section 3.2.4.2). Category 1 Washington ground squirrel habitat is considered by ODFW to be the single hole or cluster of holes of an active colony, as well as the required habitat for squirrel survival, which is a 785-foot buffer around the active holes. Current ODFW guidance identifies Washington ground squirrel colonies (including a 785-foot buffer of suitable habitat around the burrow or colony) as an avoidance area for energy development projects. ODFW defines Category 2 Washington ground squirrel habitat as an area of potential Washington ground squirrel use that extends 4,921 feet (1.5 kilometers) beyond the colony in similar habitat type and quality. The 1.5-kilometer distance corresponds to the 75th percentile for documented dispersal events of juvenile male squirrels as reported by Klein et al. (2005).

For this analysis, Category 1 habitat is referred to as occupied colony avoidance areas and Category 2 habitat is referred to as occupied colony dispersal areas. Washington ground squirrel habitat concentration areas, as designated by Washington Wildlife Habitat Connectivity Working Group (2012), are used to define and identify suitable habitat. Habitat concentration areas are defined by Washington Wildlife Habitat Connectivity Working Group as significant habitat areas that are expected or known to be important for a species based on survey data or habitat association. Washington ground squirrel habitat concentration areas were identified by Washington Wildlife Habitat Connectivity Working Group as modeled habitat with values greater than 0.25 and up to 1.0.

Migratory Birds Including Raptors

Most bird species in the U.S., with the exception of non-migratory upland game species and a few non-native species such as the house sparrow and European starling, are protected under the federal MBTA of 1918, which prohibits injury or death to migratory birds and their active nests, eggs, and young. The MBTA provides a framework for state-managed hunting of some species and authorizes the issuance of permits for take of other birds under limited conditions such as for falconry, research, conservation, and to prevent crop predations. Protected migratory birds may be present as year-round residents in the study corridor, and some species may pass through the area during spring and fall migration periods. All birds of prey (raptors) are protected under the MBTA, with bald and golden eagles afforded additional protective measures under the Eagle Act and others receiving additional protection as special status species.

In 2000, the Oregon-Washington Partners in Flight published the Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington (Altman 2000). This strategy is used to address the requirements contained in Executive Order 13186 (*Federal Register* 3853, 2001). Many of the birds identified in this plan also are addressed in the USFWS Birds of Conservation Concern (BCC) (USFWS 2008b). The BCC report identifies species, subspecies, and populations of migratory and non-migratory birds in need of additional conservation actions for each of the identified bird conservation regions (BCRs).

For the purposes of migratory bird management, the BCC report identifies BCRs, which are ecologically distinct regions in North America with similar bird communities, habitats, and resource management issues; the study corridor for the B2H Project includes portions of BCR 9 (Great Basin) and BCR 10

(Northern Rocky Mountains, U.S. portion only). BCR 9 includes the majority of Segment 1 and Segments 4, 5, and 6, while BCR 10 includes a small portion of Segment 1 and Segments 2 and 3.

Table 3-143 lists the BCCs in BCRs 9 and 10 that are known or have potential to occur within the study corridor. Many of the species are discussed in other portions of this section and have additional conservation rankings, including Brewer's sparrow (ID BLM S), ferruginous hawk (ID BLM S, ID SGCN), flammulated owl (ID BLM S, SV), Greater Sage-Grouse (ID BLM S, OR BLM S, USFS S, ST), Lewis's woodpecker (ID BLM S, OR BLM S, USFS S, CR), loggerhead shrike (ID BLM S), long-billed curlew (SV, ID SGCN), olive-sided flycatcher (ID BLM S, SV), peregrine falcon (American subspecies – ID BLM S, OR BLM S, USFS S, SV), sage sparrow (ID BLM S, ID SGCN), Swainson's hawk (SV), upland sandpiper (USFS S, CR), white-headed woodpecker (OR BLM S, USFS S, CR), and willow flycatcher (ID BLM S).

Table 3-143. Birds of Conservation Concern with Habitat in the Study Corridor

Species	Primary Wildlife Habitat Type (Specific Type if applicable)	Species is Included on Birds of Conservation Concern List for Bird Conservation Region		Occurrence Potential by Segment					
		BCR 9	BCR 10	1	2	3	4	5	6
Bald eagle[1,2]	RCA, Forest/Woodland	X	X	K	K	K	K	K	K
Black rosy-finch	Bare Ground/Cliff/Talus	X	X	N	N	N	M	M	M
Brewer's sparrow[1]	Shrubland (sagebrush)	X	X	M	M	K	K	K	K
Calliope hummingbird	Forest/Woodland, RCA	X	X	M	M	M	M	M	M
Cassin's finch	Forest/Woodland (conifer forest)	—	X	M	M	K	—	—	—
Eared grebe	RCA	X[3]	—	N	—	—	M	M	M
Ferruginous hawk[1]	Grassland, Shrubland, Forest/Woodland (western juniper woodland), Agriculture	X	X	K	K	K	K	K	K
Flammulated owl[1]	Forest/Woodland (coniferous woodlands and forest edges)	X	X	N	K	M	N	N	N
Golden eagle[1]*	Grassland, Shrubland, Forest/Woodland, Agriculture, Bare ground/Cliffs/Talus	X	—	K	—	—	K	K	K
Greater Sage-Grouse[1,4]	Shrubland (sagebrush)	X	—	N	—	—	K	K	K
Green-tailed towhee	Shrubland	X	—	M	—	—	M	M	M
Lewis's woodpecker[1]	Forest/Woodland, RCA	X	X	M	K	K	M	M	K
Loggerhead shrike[1]	Grassland, Shrubland, Forest/Woodland, Agriculture	X	X	K	K	K	K	K	K
Long-billed curlew[1]	Grassland	X	X	K	K	K	K	K	K
Olive-sided flycatcher*	Forest/Woodland (spruce and fir forests)	—	X	N	M	M	—	—	—

Table 3-143. Birds of Conservation Concern with Habitat in the Study Corridor

Species	Primary Wildlife Habitat Type (Specific Type if applicable)	Species is Included on Birds of Conservation Concern List for Bird Conservation Region		Occurrence Potential by Segment					
		BCR 9	BCR 10	1	2	3	4	5	6
Peregrine falcon[1,2]	Forest/Woodland, Bare Ground/Cliff/Talus, Developed/Disturbed	X[3]	X	M	K	K	M	M	K
Sage sparrow[1]	Shrubland (sagebrush), Forest/Woodland	X	X	M	M	M	M	K	K
Sage thrasher	Shrubland (sagebrush)	X	X	M	M	K	K	K	K
Swainson's hawk[1]	Grassland, Shrubland,, Agriculture	—	X	K	K	K	—	—	—
Upland sandpiper[1]	Grassland	—	X	N	M	M	—	—	—
White-headed woodpecker[1]	Forest/Woodland (ponderosa pine, subalpine fir)	X	X	N	M	K	N	N	N
Williamson's sapsucker	Forest/Woodland	X	X	N	M	M	N	N	N
Willow flycatcher[1,5]	RCA	X	X	M	M	K	M	M	M

Table Notes:
[1]Species with additional conservation rankings.
[2]Species is ESA delisted.
[3]Non-breeding in this Bird Conservation Region.
[4]Greater Sage-Grouse is addressed in greater detail in the individual subsections of this EIS.
[5] Non-listed subspecies or population of threatened or endangered species.
"—" = a segment in which the species is not on the Birds of Conservation Concern list for that region

BCR = Bird Conservation Region
K = Known to occur (documented within the study corridor)
L = Likely to occur (documented within B2H Project vicinity outside study corridor)
M = May occur (not documented in B2H Project vicinity but suitable habitat is present in study corridor and the B2H Project is within the species' range)
N = Does not occur
RCA = Riparian conservation area
X = Designated habitat is present

The Oregon portion of the B2H Project is located within the Pacific Flyway and the Idaho portion is within the Central Flyway; flyways are the total geographic area, including breeding and non-breeding habitat, that a migratory bird population or species travels to during its annual migration cycle (Kirby et al. 2008). Four designated Audubon Society Important Bird Areas are in the B2H Project area:

- The Boardman Grasslands Important Bird Areas, located in northern Morrow County on the NWSTF Boardman and the Boardman Conservation Area, which includes the largest remaining single block of predominantly native shrub-steppe and grassland habitats in the Columbia Basin.
- The Ladd Marsh Important Bird Areas, located near La Grande, which consists of a group of wetlands, marshes, and prairies totaling more than 6,000 acres.
- Snake River Birds of Prey Important Bird Areas, located near Boise, which is 485,832 acres and has one of the densest populations of nesting raptors in North America.

- Deer Flat National Wildlife Refuge Important Bird Areas, located near Boise, encompasses two major areas for breeding, wintering, and migrating birds on the Central Flyway, particularly waterfowl. Various raptors are known to or are expected to occur in the study corridor.

Table 3-144 identifies raptor species not already identified in Table 3-143 with known occurrence or habitat in the study corridor by segment.

Table 3-144. Additional Raptor Species with Known Occurrence or Habitat in the Study Corridor

Species	Primary Wildlife Habitat Type	Occurrence Potential By Segment					
		1	2	3	4	5	6
American kestrel	Grassland, Shrubland, Forest/Woodland, Agriculture	K	K	K	M	M	K
Barn owl	Grassland, Shrubland (shrub-steppe with big sage and shrub-steppe without big sage), Agriculture	K	K	K	K	M	M
Burrowing owl	Grassland, Shrubland, Agriculture	K	K	K	K	K	K
Coopers hawk	Forest/Woodland (western juniper woodland)	K	M	M	M	M	K
Great gray owl	Forest/Woodland	K	K	M	N	N	N
Great horned owl	Forest/Woodland (western juniper woodland)	K	M	K	M	M	M
Long-eared owl	Grassland, Shrubland, Agriculture	M	M	M	M	M	M
Northern goshawk	Forest/Woodland (coniferous forest)	K	K	K	M	M	K
Northern harrier	Grassland, Shrubland, RCA, Agriculture	K	M	K	M	M	K
Northern pygmy owl	Forest/Woodland	K	M	N	M	N	N
Northern saw-whet owl	Shrubland, Forest/woodland (coniferous woodland)	M	M	M	M	M	M
Osprey	RCA	K	M	K	M	M	M
Prairie falcon	Grassland, Shrubland, Agriculture	K	K	K	M	M	K
Red-tailed hawk	Grassland, Shrubland, Forest/Woodland (western juniper woodland), Agriculture	K	K	K	K	K	K
Rough-legged hawk	Agriculture, Grassland, RCA	K	M	M	M	M	M
Sharp-shinned hawk	Forest/Woodland	M	K	K	M	M	K
Short-eared owl	Grassland, Shrubland	K	K	K	K	K	K
Western screech owl	Forest/Woodland (western juniper woodland), RCA	M	M	M	M	M	K

Table Notes:

K = Known to occur (documented within the study corridor)

M = May occur (not documented in B2H Project vicinity but suitable habitat is present in study corridor and the B2H Project is within the species' range)

N = Does not occur

RCA = Riparian Conservation Areas

BIG GAME

Common big game species that occur in the B2H Project area include pronghorn, elk, and mule deer; less common big game species include bighorn sheep, moose, and white-tailed deer. Non-forest habitats provide the majority of the forage for big game, while forested habitats provide hiding and thermal cover. Some portions of the study corridor are used year-round by these species; however, some areas are used specifically as seasonal ranges. The study corridor contains habitats that have been designated by the ODFW, IDFG, and USFS for elk, mule deer, bighorn sheep, and pronghorn. Big

game habitat conditions differ across the study corridor. Existing roads at varying densities occur throughout the majority of big game seasonal ranges that intersect the study corridor. Although all seasonal ranges are important for the general fitness of mule deer, elk, and pronghorn populations, ODFW, IDFG, BLM, and USFS place management emphasis on seasonal ranges (i.e., winter range) that limit populations. For bighorn sheep, lands that provide unique habitat and terrain that is suitable for occupancy (i.e., population management units in Idaho and occupied range in Oregon) are the focus of management efforts. Population management units are bighorn sheep management areas designated by the IDFG and include areas that support persistent bighorn sheep populations (i.e., occupied habitat), as well as land used for movement that is not considered occupied habitat, whereas occupied range primarily represents occupied habitat in Oregon. Occupied habitat in Idaho is represented by lambing areas, as identified by IDFG, and core herd home range, as identified by Idaho BLM. The distribution of big game habitat in the B2H Project area is displayed in MV-10.

Table 3-145 identifies the managed big game habitat types found in the B2H Project area, and indicates the segments in which habitat is designated.

Table 3-145. Big Game Habitat Crossed by the B2H Project

Species	Occurrence by Segment					
	1	2	3	4	5	6
Elk Winter Range	X	X	X	X	X	—
Mule Deer Winter Range	X	X	X	X	X	X
Occupied Bighorn Sheep Habitat (Oregon)	—	—	X	—	—	—
Bighorn Sheep Population management units (Idaho)	—	—	—	—	—	X
Pronghorn Winter Range	—	—	—	X	X	—

Table Notes:
X = Designated habitat is present
Dash (—) = No designated habitat

Traditional Foods

In all segments, the B2H Project crosses habitats for wildlife resources considered traditional foods by Native American tribes. In the issues identified for analysis, tribal concerns include potential impacts on fish and wildlife resources. These resources are discussed below by segment (waterfowl are discussed under Migratory Birds Including Raptors as species occurring in RCAs). Exercise of treaty rights could include, but is not limited to, hunting of small and large game for economic, religious, and cultural use.

Segment 1—Morrow-Umatilla

Wildlife Habitat

Applicant's Proposed Action Alternative and Alternative Routes and Route Variations

Agriculture and shrublands comprise the majority of wildlife habitat in Segment 1 (MV-7, Table 3-99 in Section 3.2.3). Although agriculture occurs throughout Segment 1, these areas are especially concentrated in the western portion of the segment; native-dominated vegetation communities (e.g., grasslands, shrublands) are more prevalent in the central and eastern portions of the segment.

Forest/woodland habitats occur at the extreme eastern end of the segment where the alternative routes enter the Blue Mountains. Riparian/wetland habitat (i.e., RCAs) also is present, though to a much more limited extent than the other habitat types. Additionally, RCAs and shrublands occur on the Coyote Springs Wildlife Area at the extreme western end of Segment 1 (Link 1-3) within the study corridors for the Applicant's Proposed Action Alternative, the Applicant's Proposed Action – Southern Route Alternative, the East of Bombing Range Road Alternative, and the West of Bombing Range Road – Southern Route Alternative; Coyote Springs Wildlife Area provides an important land base for the conservation and recreation of fish and wildlife and plays an important role for the fall and spring migrations of waterfowl in addition to resident upland game bird production. Refer to Table E-2 (Appendix E) for a list of the wildlife species commonly found in each wildlife habitat type in Segment 1.

Federally Proposed, Endangered, Threatened, and Candidate Species

Gray Wolf

Portions of the B2H Project located west of U.S. 395 are located in ODFW East Wolf Management Zone where gray wolves are listed as federally endangered and portions east of U.S. 395 are in the East Wolf Management Zone where gray wolves have been delisted as federally endangered. The locations of gray wolf habitat in the B2H Project area are described by alternative route below.

Applicant's Proposed Action Alternative

ODFW-designated known gray wolf use areas occur within the study corridor south of the Union County-Umatilla County border and east of Interstate 84 (Link 1-77), but are not crossed. Wolves in this area have been delisted as federally endangered.

Variation S1-B1

The proximity of Variation S1-B1 to known wolf use areas is the same as that described for the Applicant's Proposed Action Alternative.

Variation S1-B2

Variation S1-B2 crosses closer than the Applicant's Proposed Action and all alternatives to the known gray wolf use areas where the route variation is colocated with an existing 230-kV transmission line west of Interstate 84 just south of the Umatilla County-Union County border (Link 1-77).

Additional Action – 69-Kilovolt Line Replacement

Design Option 1

Wolf use areas do not occur within the Design Option 1 study corridor.

Design Options 2 and 3

Wolf use areas do not occur within the study corridors for Design Options 2 and 3.

East of Bombing Range Road Alternative

The proximity of the East of Bombing Range Road Alternative to known wolf use areas is the same as that described for the Applicant's Proposed Action Alternative.

Applicant's Proposed Action – Southern Route Alternative

The proximity of the Applicant's Proposed Action – Southern Route Alternative to known wolf use areas is the same as that described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

The affected environment for Design Options 1, 2, and 3 would be the same as that described for the Applicant's Proposed Action Alternative.

West of Bombing Range Road – Southern Route Alternative

ODFW-designated estimated wolf use areas are not crossed but occur in the study corridor west of U.S. 395 (Link 1-64) on private shrubland, grassland, and forested land where gray wolves retain federally endangered status. The proximity of the West of Bombing Range Road – Southern Route Alternative to known wolf use areas is the same as that described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

The affected environment for Design Options 1, 2, and 3 would be the same as that described for the Applicant's Proposed Action Alternative.

Longhorn Alternative

The proximity of the Longhorn Alternative to known wolf use areas is the same as that described for the Applicant's Proposed Action Alternative.

Interstate 84 Alternative

The proximity of the Interstate 84 Alternative to known wolf use areas is the same as that described for the Applicant's Proposed Action Alternative.

Variations S1-A1 and S1-A2

Wolf use areas do not occur within the study corridor.

Interstate 84 – Southern Route Alternative

The proximity of the Interstate 84 – Southern Route Alternative to known wolf use areas is the same as that described for the Applicant's Proposed Action Alternative.

Other Special Status Species

Alternative Routes and Route Variations

Thirty-two special status species may occur, are likely to occur, or are known to occur in Segment 1 (Table 3-142). Habitat types available for special status species in the study corridor for all alternative routes are identified in Table 3-99 in Section 3.2.3. A large proportion of available shrubland and grassland habitat in the study corridor contains invasive species, such as cheatgrass, and has been previously affected by a variety of activities, such as agricultural and energy development. Special status species that have been documented in the Segment 1 study corridor include bobolink, common nighthawk, long-billed curlew, Swainson's hawk, burrowing owl, pallid bat, and white-tailed jackrabbit.

Descriptions and habitat requirements for these species, and others that may occur in this segment, are provided in Appendix E.

Special status species that use agricultural lands in Segment 1 include greater sandhill crane and Swainson's hawk. Greater sandhill crane is typically only found in Segment 1 during migration and Swainson's hawk, a long-distance migrant, during the breeding season.

Special status species such as common nighthawk, burrowing owl, Swainson's hawk, bats (e.g., pallid bat), and white-tailed jackrabbits forage within shrubland habitat. These species are affected by loss or modification of habitat for prey species. Two of these species, common nighthawk and Swainson's hawk, are long-distance migrants and would only be present in the B2H Project area during the breeding season. Burrowing owls are known to nest in shrub-steppe habitat in Morrow and Umatilla Counties and also migrate, although hatch-year males may sometimes over-winter. The most densely occupied breeding area for burrowing owls in the Pacific Northwest is located in Umatilla County, several miles northeast of the study corridor.

Bird species such as the bobolink and long-billed curlew typically use grasslands for both foraging and nesting habitat. The long-billed curlew is a ground nesting species utilizing grasslands as cover for cryptic nests constructed in shallow scrapes in the soil. The common nighthawk typically uses grasslands as foraging habitats, preferring gravelly soils and riverbanks for nesting habitat. Conservation threats to these birds include loss of breeding and foraging habitat resulting from land development practices.

Special status species that occur in forest/woodland habitat in the study corridor for Segment 1 include species such as cavity-nesting woodpeckers, great gray owl, northern goshawk, gray wolf, long-legged myotis, and western bumblebee. Forest/woodland habitat in Segment 1 occurs at the far eastern end of the segment on Wallowa-Whitman National Forest and private land. Threats to these species include habitat conversion and loss of habitat due to logging practices.

Special status species that use RCAs in Segment 1 include Columbia spotted frog (Northern distinct population segment), northern leopard frog, Woodhouse's toad, Jackson Lake springsnail, and western ridged mussel. Threats to these species include loss or modification of habitat due to soil erosion and sedimentation as a result of construction activities.

Washington Ground Squirrel

Segment 1 contains the most densely occupied habitat for Washington ground squirrel in Oregon. Suitable habitat, occupied colony avoidance areas, and/or occupied colony dispersal areas, are documented in the study corridor for the Applicant's Proposed Action Alternative and other alternative routes (Table 3-152, MV-8). Habitat for the Washington ground squirrel occurs on private and DOD lands in the study corridor. Surveys for Washington ground squirrel colonies were conducted in 2011, 2012, and 2013 along the Applicant's Proposed Action Alternative, the Longhorn Alternative, and East of Bombing Range Road Alternative, as well as the portions of the West of the Bombing Range Road – Southern Route and Applicant's Proposed Action – Southern Route that share an alignment with the

Applicant's Proposed Action, but not along the other alternative routes, as they were not being considered for the B2H Project at the time. Active Washington ground squirrel colonies were documented along all alternative routes surveyed.

Table 3-146 presents the resource inventory for Washington ground squirrel habitat types for all alternative routes and route variations in Segment 1.

Table 3-146. Alternative Route Comparison for Washington Ground Squirrel Inventory Data for Segment 1—Morrow-Umatilla (miles crossed)

Alternative Route	Total Length (miles)	Occupied Colony Avoidance Areas	Occupied Colony Dispersal Areas	Suitable Habitat
Applicant's Proposed Action	91.9	0.1	5.9	12.5
Variation S1-B1	*6.4*	*0.0*	*0.0*	*0.0*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*0.0*
East of Bombing Range Road	92.3	0.4	2.8	8.4
Applicant's Proposed Action – Southern Route[1]	99.1	0.1	5.9	13.5
West of Bombing Range Road – Southern Route[1]	95.6	0.0	3.8	13.9
Longhorn	88.2	0.4	3.9	6.2
Interstate 84[1]	84.7	0.0	0.0	4.9
Variation S1-A1[1]	*18.5*	*0.0*	*0.0*	*1.0*
Variation S1-A2[1]	*18.5*	*0.0*	*0.0*	*11.0*
Interstate 84 – Southern Route[1]	93.4	0.0	0.0	6.0

Table Notes: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[1]Portions of this route that cross Washington ground squirrel suitable habitat were not surveyed for colonies.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative crosses Washington ground squirrel occupied colony dispersal areas and suitable habitat inside the eastern boundary of the NWSTF Boardman (Link 1-27) where the B2H Project would replace an existing 69-kV transmission line; Washington ground squirrel occupied colony avoidance areas occur within the study corridor in this area but are not crossed. A Conference Opinion was issued by the USFWS stating that proposed activities by the Navy on the NWSTF Boardman would not likely jeopardize the continued existence of Washington ground squirrel (Navy 2015). The Navy considers all of the NWSTF Boardman to be Washington ground squirrel occupied habitat, including the 11,226-acre Washington ground squirrel Resource Management Area on the southern portion of the NWSTF Boardman, which is no longer used for military training activities where ground-disturbing activities are not allowed (Navy 2015); the Applicant's Proposed Action Alternative crosses the eastern edge of the Resource Management Area.

Adjacent to the southeasterly portion of the NWSTF Boardman (Link 1-35), Washington ground squirrel suitable habitat and occupied colony dispersal areas have been identified among agricultural fields and are crossed by the Applicant's Proposed Action Alternative; in this area occupied colony avoidance areas that extend from the NWSTF Boardman occur within the study corridor but are not crossed. East from the Umatilla County-Morrow County border (Link 1-60), the Applicant's Proposed Action

Alternative crosses Washington ground squirrel occupied colony avoidance and dispersal areas and suitable habitat on privately owned shrublands.

Variation S1-B1

Variation S1-B1 does not cross occupied or suitable Washington ground squirrel habitat.

Variation S1-B2

Variation S1-B2 does not cross occupied or suitable Washington ground squirrel habitat.

Additional Action – 69-Kilovolt Line Replacement

Design Option 1

Design Option 1 crosses patches of suitable Washington ground squirrel habitat throughout the north-south portion, as well as occupied colony avoidance and dispersal areas east of and on the southeasterly portion of the NWSTF Boardman. Design Option 1 crosses the Washington ground squirrel Resource Management Area where it crosses the eastern boundary of the NWSTF Boardman and connects with the existing 69-kV transmission line.

Design Options 2 and 3

Design Option 2 and 3 crosses patches of suitable Washington ground squirrel habitat throughout the north-south portion, as well as occupied colony dispersal areas east of the southeasterly portion of the NWSTF Boardman and along the southern boundary of the NWSTF Boardman; Design Option 2 does not cross Washington ground squirrel occupied colony avoidance areas. Design Options 2 and 3 do not cross the Washington ground squirrel Resource Management Area.

East of Bombing Range Road Alternative

The locations where Washington grounds squirrel habitat is crossed by the East of Bombing Range Road Alternative east of the Umatilla County-Morrow County border (Link 1-60) is the same as those described for the Applicant's Proposed Action Alternative. Additionally, the route crosses suitable habitat patches among agricultural fields along Bombing Range Road (Link 1-25), as well as occupied colony avoidance and dispersal areas east of the southeasterly portion of the NWSTF Boardman (Link1-33).

Applicant's Proposed Action – Southern Route Alternative

The Applicant's Proposed Action – Southern Route Alternative crosses the same Washington ground squirrel habitat as that described for the Applicant's Proposed Action Alternative, including the Washington ground squirrel Resource Management Area on the NWSTF Boardman. The route also crosses shrublands and grasslands identified as suitable habitat just south of U.S. 395 in Umatilla County (Link 1-83); this area of suitable habitat has been not surveyed for Washington ground squirrel and may or may not contain active colonies.

Additional Action – 69-Kilovolt Line Replacement

The affected environment for Design Options 1, 2, and 3 would be the same as that described for the Applicant's Proposed Action Alternative.

West of Bombing Range Road – Southern Route Alternative

Washington ground squirrel habitat crossed by the West of Bombing Range Road – Southern Route Alternative, both east and west of Bombing Range Road itself, is the same as that crossed by the Applicant's Proposed Action Alternative, including the Washington ground squirrel Resource Management Area on the NWSTF Boardman. The portion of the route that diverges from the Applicant's Proposed Action Alternative is located on suitable habitat in shrubland and grassland valleys in a mountainous region in Morrow and Umatilla Counties (Links 1-62 and 1-64); this area of suitable habitat has not been surveyed for Washington ground squirrel and may or may not contain active colonies.

Additional Action – 69-Kilovolt Line Replacement

The affected environment for Design Options 1, 2, and 3 would be the same as that described for the Applicant's Proposed Action Alternative.

Longhorn Alternative

The Washington ground squirrel occupied colony avoidance and dispersal areas and suitable habitat crossed by the Longhorn Alternative east of the Morrow County-Umatilla County border would be the same as that crossed by the Applicant's Proposed Action Alternative. Additionally, a portion of the route that diverges from the Applicant's Proposed Action Alternative east of the NWSTF Boardman (Link 1-15) would be located on occupied colony avoidance and dispersal areas on privately owned shrublands among agricultural fields.

Interstate 84 Alternative

The Interstate 84 Alternative crosses Washington ground squirrel suitable habitat south of the Umatilla River on privately owned shrubland (Links 1-31, 1-39, and 1-49); this area of suitable habitat has not been surveyed for Washington ground squirrel and may or may not contain active colonies.

Variations S1-A1 and S1-A2

The variations cross Washington ground squirrel suitable habitat south of the Umatilla River (Link 1-31 for Variation S1-A1 and Link 1-37 for Variation S2-A2) on privately owned shrubland; this area of suitable habitat has not been surveyed and may or may not contain active colonies.

Interstate 84 – Southern Route Alternative

The Interstate 84 – Southern Route Alternative crosses the same Washington ground squirrel suitable habitat as the Interstate 84 Alternative south of the Umatilla River. The route also is located on the same Washington ground squirrel suitable habitat south of U.S. 395 as the Applicant's Proposed Action – Southern Route Alternative.

Migratory Birds Including Raptors

Segment 1 is within the migratory bird Pacific Flyway and contains habitat that supports many avian species identified as BCCs within BCRs 9 and 10 (Table 3-143). In addition, existing habitats provide nesting and foraging areas for a variety of raptors not listed as BCCs (Table 3-144).

Although fragmented by agricultural areas, habitat for shrubland and grassland species, such as sage sparrow, sage thrasher, and Brewer's sparrow, is available throughout the study corridor in Segment 1, including on the NWSTF Boardman. The NWSTF Boardman, along with the Boardman Conservation Area, has been designated as the Boardman Grasslands Important Bird Areas; 81 bird species have been documented on the NWSTF Boardman since 1979, 41 of which have been known to nest there (Navy 2012). Habitat for forest/woodland species, such as great horned owl, northern pygmy owl, and sharp-shinned hawk, is also present. Wetland/riparian habitat is limited, but species that occupy this habitat, such as willow flycatcher, may be found.

A detailed discussion of available habitat types in Segment 1 is presented in Section 3.2.3. Refer to Table 3-99 in Section 3.2.3 for the quantity of each habitat type in Segment 1. Migratory bird habitat present in the study corridor is described by alternative route below.

The shrublands and grasslands in Segment 1 provide hunting and breeding habitat for golden eagles, and forested areas near waterbodies in the study corridor are suitable for bald eagle use; locations of known eagle nests in the study corridor are presented in Table 3-147 and described by alternative route below. The location of a bald eagle winter roost site in relation to the alternative routes also is described.

Table 3-147. Number of Eagle Nests in Segment 1—Morrow-Umatilla

Alternative Route	Bald Eagle		Golden Eagle	
	1-Mile Corridor	10-Mile Corridor	1-Mile Corridor	10-Mile Corridor
Applicant's Proposed Action	0	0	0	6
Variation S1-B1	*0*	*0*	*0*	*1*
Variation S1-B2	*0*	*0*	*0*	*1*
East of Bombing Range Road	0	0	0	6
Applicant's Proposed Action – Southern Route	0	0	0	6
West of Bombing Range Road – Southern Route	0	0	0	7
Longhorn	0	0	0	6
Interstate 84	0	1	0	2
Variation S1-A1	*0*	*1*	*0*	*1*
Variation S1-A2	*0*	*1*	*0*	*1*
Interstate 84 – Southern Route	0	1	0	2

Applicant's Proposed Action Alternative

Much of the portion of the Applicant's Proposed Action Alternative that extends from the western end of Segment 1 east to where the route ascends the Blue Mountains crosses habitat for shrubland and grassland species (Links 1-65, 1-71, and 1-77), such as sage sparrow, sage thrasher, and Brewer's sparrow. Though in a more limited amount, this portion of the route also crosses habitat for wetland/riparian species, such as willow flycatcher. In particular, habitat for shrubland and grassland species is present on the Boardman Grasslands Important Bird Areas on the NWSTF Boardman, which the route crosses at the extreme western end of Segment 1 (Link 1-27). The eastern end of the route

crosses habitat for forest/woodland species (Link 1-77), such as great horned owl, northern pygmy owl, and sharp-shinned hawk, on Wallowa-Whitman National Forest and privately owned forest land.

No golden eagle nests are known to occur within 0.5 mile of the Applicant's Proposed Action Alternative and no bald eagle nests are known within 5 miles. The Applicant's Proposed Action Alternative crosses within 5 miles of golden eagle nests near the Morrow County-Umatilla County border north of where Butter Creek intersects Highway 74 (Link 1-60), and at the extreme eastern end of Segment 1 near the eastern edge of the Wallowa-Whitman National Forest (Link 1-77). Additionally, the Applicant's Proposed Action Alternative crosses within 5 miles of a bald eagle winter roost site on the Wallowa-Whitman National Forest at the extreme eastern end of Segment 1 (Link 1-77).

Variations S1-B1 and S1-B2

The variations crosses migratory bird habitat for forest/woodland species, such as great horned owl, northern pygmy owl, and sharp-shinned hawk, on the Wallowa-Whitman National Forest and privately owned forest land (Links 1-73, 1-75, and 1-77).

No golden eagle nests are currently known to occur within 0.5 mile of the variations and no bald eagle nests are currently known within 5 miles. The variations cross within 5 miles of a golden eagle nest, as well as a bald eagle winter roost site, at the extreme eastern end of Segment 1 near the eastern edge of the Wallowa-Whitman National Forest (Link 1-77).

Additional Action – 69-Kilovolt Line Replacement

Design Option 1

The undisturbed land crossed by Design Option 1 could support such grassland/shrubland migratory birds as golden eagle, sage sparrow, sage thrasher, and Brewer's sparrow, particularly on the NWSTF Boardman, which is part of the Boardman Grasslands Important Bird Areas.

Design Options 2 and 3

The undisturbed land crossed by Design Options 2 and 3 could support such grassland/shrubland migratory birds as golden eagle, sage sparrow, sage thrasher, and Brewer's sparrow. Boardman Grasslands Important Bird Areas on the NWSTF Boardman occur within the study corridors of the design options but are not crossed.

East Bombing Range Road Alternative

The migratory bird habitat crossed by the East of Bombing Range Road Alternative is the same as that described for the Applicant's Proposed Action Alternative, except for at the extreme western end of Segment 1 where the Boardman Grasslands Important Bird Areas on the NWSTF Boardman occur in the study corridor of the East of Bombing Range Road Alternative (Link 1-25) but are not crossed.

The proximity of bald and golden eagle nests and a bald eagle winter roost site to the East of Bombing Range Road Alternative is the same as that described for the Applicant's Proposed Action Alternative.

Applicant's Proposed Action – Southern Route Alternative

The migratory bird habitat crossed by the Applicant's Proposed Action – Southern Route Alternative is similar to that described for the Applicant's Proposed Action Alternative, including the habitat for shrubland and grassland species crossed on the Boardman Grasslands Important Bird Areas on the NWSTF Boardman.

The proximity of bald and golden eagle nests and a bald eagle winter roost site to the Applicant's Proposed Action – Southern Route Alternative is the same as that described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

The affected environment for Design Options 1, 2, and 3 would be the same as that described for the Applicant's Proposed Action Alternative.

West of Bombing Range Road – Southern Route Alternative

The migratory bird habitat crossed by the West of Bombing Range Road – Southern Route Alternative is similar to that described for the Applicant's Proposed Action Alternative, including the habitat for shrubland and grassland species crossed on the Boardman Grasslands Important Bird Areas on the NWSTF Boardman.

The proximity of bald and golden eagle nests and a bald eagle winter roost site to the West of Bombing Range Road – Southern Route Alternative is the same as that described for the Applicant's Proposed Action Alternative, but, additionally, the West of Bombing Range Road – Southern Route Alternative crosses within 5 miles of a golden eagle nest west of the Morrow County-Umatilla County border where Highway 74 intersects the county border (Link 1-62).

Additional Action – 69-Kilovolt Line Replacement

The affected environment for Design Options 1, 2, and 3 would be the same as that described for the Applicant's Proposed Action Alternative.

Longhorn Alternative

The migratory bird habitat is similar to that described for the Applicant's Proposed Action Alternative, except for at the extreme western end of Segment 1 where the Boardman Grasslands Important Bird Areas on the NWSTF Boardman are within the study corridor of the Longhorn Alternative (Link 1-15) but are not crossed.

The proximity of bald and golden eagle nests and a winter roost site to the Longhorn Alternative is the same as that described for the Applicant's Proposed Action Alternative.

Interstate 84 Alternative

The migratory bird habitat crossed by the Interstate 84 Alternative is similar to that described for the Applicant's Proposed Action Alternative, except for that the Interstate 84 Alternative crosses more riparian/woodland habitat and less shrubland habitat, and at the extreme western end of Segment 1,

and the Boardman Grasslands Important Bird Areas on the NWSTF Boardman are in the study corridor of the Interstate 84 Alternative (Link 1-5) but are not crossed.

No bald or golden eagles are currently known to occur within 0.5 mile of the Interstate 84 Alternative. The route crosses within 5 miles of a bald eagle nest near the Umatilla River between Stanfield and Echo (Link 1-23). The Interstate 84 Alternative crosses within 5 miles of golden eagle nests near Rieth (Link 1-31) and at the extreme eastern end of Segment 1 near the eastern edge of the Wallowa-Whitman National Forest (Link 1-77). The alternative also crosses within 5 miles of a bald eagle winter roost site at the extreme eastern end of Segment 1 (Link 1-77) on Wallowa-Whitman National Forest.

Variation S1-A1

Most of the migratory bird habitat along this variation has been converted for human uses, including agriculture, which provides habitat for species such as loggerhead shrike and Swainson's hawk.

No bald or golden eagles are currently known to occur within 0.5 mile of Variation S1-A1. The variation crosses within 5 miles of a bald eagle nest near the Umatilla River between Stanfield and Echo (Link 1-23), and within 5 miles of a golden eagle nests near Rieth (Link 1-31).

Variation S1-A2

The migratory bird habitat crossed by the variation is primarily that of shrubland species, such as sage sparrow, sage thrasher, and Brewer's sparrow.

The proximity of bald and golden eagle nests to Variation S1-A2 is the same as that described for Variation S1-A1.

Interstate 84 – Southern Route Alternative

The migratory bird habitat crossed by the route is similar to that described for the Interstate 84 Alternative.

The proximity of bald and golden eagle nests to the Interstate 84 – Southern Route Alternative is the same as that described for the Interstate 84 Alternative. The alternative also crosses within 5 miles of a bald eagle winter roost site at the extreme eastern end of Segment 1 on Wallowa-Whitman National Forest (Link 1-77).

Big Game

Big game species present in Segment 1 include mule deer, white-tailed deer and elk. Cover is limited in Segment 1, and the study corridor provides some forage, although this is may be of poorer quality due to invasive species and extensive agricultural development. Designated winter range for elk and mule deer is concentrated in the eastern portion of Segment 1.

Segment 1 crosses three ODFW Wildlife Management Units (WMU) that include the Columbia Basin, Ukiah, and Starkey WMUs. In all three WMUs, mule deer populations are currently below management objectives (ODFW 2015b). Factors that can negatively affect mule deer populations in the B2H Project area include drought, severe winter weather, habitat degradation, and increased predation (ODFW

2003a). Elk populations in the Ukiah and Starkey WMUs also are currently below management objectives. The Columbia Basin WMU is considered an elk de-emphasized area (ODFW 2015c). Elk de-emphasis areas are characterized by high percentages of private land with ongoing elk damage to private property and agricultural crops, or high potential for such damage. Management objectives are not proposed for these areas, and the management focus is to minimize elk numbers and damage caused by elk (ODFW 2005). Factors that can negatively affect elk populations in the B2H Project area include a lack of habitat in large, unroaded areas, and habitat with inadequate hiding cover (ODFW 2003b).

Table 3-148 presents the miles of big game habitat crossed by the centerline of all alternative routes and route variations in Segment 1. Locations of mule deer and elk winter range crossed by the B2H Project are described by alternative route below and displayed in MV-10.

Table 3-148. Big Game Inventory Data for Segment 1—Morrow-Umatilla (miles crossed)

Alternative Route	Total Length (miles)	Bighorn Sheep Oregon Occupied Range	Bighorn Sheep Population Management Units	Pronghorn Winter Range	Mule Deer Winter Range	Elk Winter Range
Applicant's Proposed Action	91.9	0.0	0.0	0.0	9.1	14.5
Variation S1-B1	*6.4*	*0.0*	*0.0*	*0.0*	*0.4*	*0.7*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*0.0*	*0.4*	*1.2*
East of Bombing Range Road	92.3	0.0	0.0	0.0	9.1	14.5
Applicant's Proposed Action – Southern Route	99.1	0.0	0.0	0.0	20.2	19.9
West of Bombing Range Road – Southern Route	95.6	0.0	0.0	0.0	46.5	19.9
Longhorn	88.2	0.0	0.0	0.0	9.1	14.5
Interstate 84	84.7	0.0	0.0	0.0	9.1	14.5
Variation S1-A1	*18.5*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S1-A2	*18.5*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Interstate 84 – Southern Route	93.4	0.0	0.0	0.0	20.2	19.9

Table Note: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative traverses a block of mule deer and elk winter range in Umatilla County that stretches from shrublands and grasslands east of U.S. 395 to where the route crosses the Blue Mountains (Links 1-63, 1-65, and 1-77).

Variations S1-B1 and Variation S1-B2

The variations' southern ends (Links 1-75 and 1-77) cross designated mule deer and the elk winter range.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 do not cross designated mule deer or elk winter range.

East Bombing Range Road Alternative

Designated big game habitat crossed by the East of Bombing Range Road Alternative is the same as that crossed by the Applicant's Proposed Action Alternative.

Applicant's Proposed Action – Southern Route Alternative

The Applicant's Proposed Action – Southern Route Alternative crosses a large block of mule deer winter range in Umatilla County that extends south and east of where the route intersect U.S. 395 to where the route crosses the Blue Mountains (Links 1-83, 1-66, 1-65, and 1-77). Elk winter range overlaps with eastern portions of mule deer winter range crossed by the route (Links 1-66, 1-65, and 1-77).

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 do not cross designated mule deer or elk winter range.

West of Bombing Range Road – Southern Route Alternative

The West of Bombing Range Road – Southern Route Alternative crosses a large block of mule deer winter range that extends from shrublands and grasslands at the eastern end of the route in Morrow County west to the Blue Mountains (Links 1-38, 1-62, 1-64, 1-66, 1-65, and 1-77). Elk winter range crossed is the same as that crossed by the Applicant's Proposed Action – Southern Route Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 do not cross designated mule deer or elk winter range.

Longhorn Alternative

Designated big game habitat crossed by the Longhorn Alternative is the same as that crossed by the Applicant's Proposed Action Alternative.

Interstate 84 Alternative

Designated big game habitat crossed by the Interstate 84 Alternative is the same as that crossed by the Applicant's Proposed Action Alternative.

Variations S1-A1 and S1-A2

The variations do not cross designated big game habitat.

Interstate 84 – Southern Route Alternative

Designated big game habitat crossed by Interstate 84 – Southern Route Alternative is the same as that crossed by the Applicant's Proposed Action – Southern Route Alternative.

Management Indicator Species and USFS Sensitive Species

Alternative Routes and Route Variations

The Applicant's Proposed Action and all alternative routes, as well as Variations S1-A1 and S1-A2, cross national forest land in Segment 1 (Link 1-77). The affected environment for MIS and USFS sensitive species is described in Appendix F.

SEGMENT 2—BLUE MOUNTAINS

Wildlife Habitat

Alternative Routes and Route Variations

Forests/woodlands, RCAs and shrublands comprise the majority of wildlife habitats in Segment 2 (MV-7, Table 3-102 in Section 3.2.3). A limited amount of grassland also is present. In particular, the Ladd Marsh Wildlife Area, which encompasses one of the largest remaining wetlands in northeast Oregon and provides habitat for waterfowl and other birds and wildlife, is crossed by central portions of the Mill Creek Alternative (Link 2-63). Rebarrow Forest, Winn Meadow, and conservation easements west of Ladd Marsh Wildlife Area provide habitat for elk and other wildlife moving between Ladd Marsh Wildlife Area and Glass Hill and are in central portions of Segment 2. Species occurring in Segment 2 that may use these important habitat areas are discussed below. Refer to Table E-2 (Appendix E) for a list of the wildlife species commonly found in each wildlife habitat type in Segment 2.

Special Status Species

Alternative Routes and Route Variations

Forty-eight special status species may occur, are likely to occur, or are known to occur in Segment 2 (Table 3-142). Information relating to the amount of habitat available for special status species within the analysis area is located in Table 3-102 in Section 3.2.3 and locations of habitat are depicted in MV-7. Special status species that are known to be present in Segment 2 include American peregrine falcon; several woodpecker species, including pileated woodpecker and Lewis's woodpecker, common night hawk; golden eagle; northern goshawk; Greater Sage-Grouse (discussed in greater detail below); olive-sided flycatcher; Swainson's hawk; American marten (dispersal habitat only); gray wolf; long-legged myotis; Townsend's big-eared bat; and Johnson's hairstreak. Species accounts for these species, and other species that may occur in this segment, are included in Appendix E.

Forest/woodland special status species that are known to or may occur in the study corridor include olive-sided flycatcher, pileated woodpecker, American marten, gray wolf, and fringed myotis. Some woodpecker species known to or likely to occur in Segment 2, such as pileated woodpecker, are strongly associated with old growth coniferous forest types known to occur in the Blue Mountains. Although old growth multi-strata forest does occur in the watersheds analyzed for the B2H Project, high-quality old growth habitat is very limited. Primary threats to primary cavity excavators are loss of habitat and habitat fragmentation due to forest clearing and silviculture practices. Olive-sided flycatchers use lower-elevation forest clearings adjacent to grasslands and shrublands for foraging habitat, preferring open canopy tree branches for nesting. The American marten and gray wolf use high alpine forest habitat, with wolves venturing into lower elevations, potentially hunting along forest margins. Use of the area by martens is expected to be limited to dispersal. Primary conservation threats to carnivores include habitat loss, fragmentation, and human-caused mortality. Sensitive bats occurring within this segment are primarily forest dwelling. They use forest canopies as foraging habitat, sometimes foraging along forest edges over shrublands and grasslands. These areas include utility corridors, especially those located near water sources. While these species will use rock outcroppings and caves for roosting, hibernation, and maternity roosts, they also are known to use forest trees for daytime roosts

outside of hibernation and breeding seasons. Forest dwelling bats exhibit high roost site fidelity at rock outcroppings and caves, but switching of daytime tree roosts is common, making an abundance of large trees and snags especially important in areas such as the Segment 2 B2H Project area where rock outcroppings and caves are very limited. Fringed myotis specifically use old growth forest for roosting habitat in Oregon. Spotted bats have more specific habitat requirements, with a preference for forest stands adjacent to conspicuous rock outcroppings. Threats to these species include habitat conversion and loss of habitat due to logging practices.

Special status species that use shrubland habitats include common nighthawk, Swainson's hawk, and pallid bat. These species use shrublands extensively for foraging and are susceptible to disturbances that cause them to abandon nesting and roosting sites and hibernacula. These species are affected by loss or modification of habitat for prey species. Common nighthawk and Swainson's hawk are long-distance migrants and would only be present in the B2H Project area during the breeding season.

Special status wildlife species that use RCAs in Segment 2 include Columbia spotted frog (Northern distinct population segment), northern leopard frog, Rocky Mountain tailed frog, Woodhouse's toad, and western ridged mussel. Threats to these species include loss or modification of habitat due to soil erosion and sedimentation as a result of construction activities. Although not a riparian obligate, Lewis's woodpecker may use decaying cottonwood trees for nesting and is threatened by dead tree and snag removal.

Bird species such as the bobolink and long-billed curlew typically use grasslands for both foraging and nesting habitat. The long-billed curlew is a ground nesting species using grasslands as cover for cryptic nests constructed in shallow scrapes in the soil. The common nighthawk typically uses grasslands as foraging habitats, preferring gravelly soils and riverbanks for nesting habitat. Conservation threats to these birds include loss of breeding and foraging habitat resulting from land development practices.

Greater Sage-Grouse

A small amount of Greater Sage-Grouse GHMA occurs in the Segment 2 study corridor (MV-9, Table 3-149). No leks have been identified in the study corridor in Segment 2.

Table 3-149 presents the miles of Greater Sage-Grouse habitat types crossed by the centerline of all alternative routes and route variations in Segment 2. Locations of Greater Sage-Grouse habitat crossed by the B2H Project are described by alternative route below and displayed in MV-9.

Table 3-149. Greater Sage-Grouse Inventory Data for Segment 2—Blue Mountains (miles crossed)

Alternative Route	Total Length (miles)	Priority Habitat Management Areas	General Habitat Management Areas
Applicant's Proposed Action	33.8	0.0	3.2
Variation S2-A1	*2.8*	*0.0*	*0.0*
Variation S2-A2	*2.9*	*0.0*	*0.0*
Variation S2-B1	*3.7*	*0.0*	*0.0*
Variation S2-B2	*3.8*	*0.0*	*0.0*

Table 3-149. Greater Sage-Grouse Inventory Data for Segment 2—Blue Mountains (miles crossed)			
Alternative Route	**Total Length (miles)**	**Priority Habitat Management Areas**	**General Habitat Management Areas**
Variation S2-C1	*9.3*	*0.0*	*0.0*
Variation S2-C2	*8.8*	*0.0*	*0.0*
Variation S2-E1	*2.3*	*0.0*	*0.0*
Variation S2-E2	*2.6*	*0.0*	*0.0*
Variation S2-F1	*12.1*	*0.0*	*3.2*
Variation S2-F2	*12.2*	*0.0*	*1.9*
Glass Hill	33.7	0.0	3.2
Variation S2-D1	*4.3*	*0.0*	*0.0*
Variation S2-D2	*4.1*	*0.0*	*0.0*
Mill Creek	34.0	0.0	1.9
Table Note: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.			

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative crosses the edges of several smaller blocks of Greater Sage-Grouse GHMA from approximately where the route crosses Highway 237 to approximately 3 miles to the northwest on the route (Links 2-85 and 2-75). The Applicant's Proposed Action Alternative crosses a large block of Greater Sage-Grouse GHMA from near the Union County-Baker County border to the eastern end of Segment 2 (Links 2-85 and 2-95).

Variations S2-A1, S2-A2, S2-B1, S2-B2, S2-C1, S2-C2, S2-E1, and S2-E1

The variations do not cross Greater Sage-Grouse habitat.

Variation S2-F1

Variation S2-F1 crosses the same Greater Sage-Grouse habitat as that described for the Applicant's Proposed Action Alternative.

Variation S2-F2

Variation S2-F2 crosses a large block of Greater Sage-Grouse GHMA from the Union County-Baker County border to the eastern end of Segment 2 (Link 2-90). GHMA also occurs within the study corridor approximately 1.5 miles southeast of where the variation intersects Interstate 84, east to where the variation intersects Highway 237 (Links 2-70 and 2-80). Additionally, a small area of PHMA on the Baker PAC occurs within the 3.1-mile indirect effects buffer at the southern end of Segment 2 (Link 2-90) (refer to Assessment of Residual Impacts in Section 3.2.4.4 Methods for an explanation of the 3.1-mile indirect effects buffer).

Glass Hill Alternative

The Glass Hill Alternative crosses the same Greater Sage-Grouse habitat as that described for the Applicant's Proposed Action Alternative.

Variation S2-D1 and S2-D2

The variations do not cross Greater Sage-Grouse habitat.

Mill Creek Alternative

The Mill Creek Alternative crosses and is in proximity to the same Greater Sage-Grouse habitat as that described for Variation S2-F2.

Migratory Birds Including Raptors

Segment 2 is in the migratory bird Pacific Flyway and contains habitats that support many avian species identified as BCCs within BCR 10 (Table 3-143).These habitats also provide nesting and foraging areas for a variety of raptors not listed as BCCs (Table 3-144). Habitat for forest/woodland species (e.g., Cassin's finch, flammulated owl, and Williamson's sapsucker), wetland/riparian species (e.g., willow flycatcher), shrubland species (e.g., sage thrasher and Brewer's sparrow), and, to a lesser extent, grassland species (e.g., long-billed curlew and upland sandpiper) is present in the study corridor in Segment 2 (Table 3-102 in Section 3.2.3 and MV-7). A detailed discussion of available wildlife habitats within the study corridor in Segment 2 is presented in Section 3.2.3. The Ladd Marsh Important Bird Area on the Ladd Marsh Wildlife Area, one of the largest remaining wetlands in northeast Oregon established to protect nesting and migrating waterfowl, is located in the central portion of Segment 2, approximately 5 miles southeast of La Grande (Link 2-63).

The shrublands and grasslands in Segment 2 provide hunting and breeding habitat for golden eagles, and forested areas near waterbodies in the study corridor are suitable for bald eagle use; locations of known eagle nests in the study corridor are presented in Table 3-150 and described by alternative route at the end of Segment 2 Affected Environment. The location of a bald eagle winter roost site in relation to the alternative routes also is described.

Table 3-150. Number of Eagle Nests in Segment 2—Blue Mountains

Alternative Route	Bald Eagle		Golden Eagle	
	1-Mile Corridor	10-Mile Corridor	1-Mile Corridor	10-Mile Corridor
Applicant's Proposed Action	0	2	2	15
Variation S2-A1	*0*	*0*	*0*	*1*
Variation S2-A2	*0*	*0*	*0*	*1*
Variation S2-B1	*0*	*1*	*1*	*3*
Variation S2-B2	*0*	*1*	*1*	*3*
Variation S2-C1	*0*	*1*	*0*	*4*
Variation S2-C2	*1*	*1*	*0*	*4*
Variation S2-E1	*0*	*1*	*0*	*1*
Variation S2-E2	*0*	*1*	*0*	*1*
Variation S2-F1	*0*	*1*	*1*	*12*
Variation S2-F2	*0*	*1*	*3*	*12*
Glass Hill	0	2	2	15
Variation S2-D1	*0*	*1*	*0*	*2*
Variation S2-D2	*0*	*1*	*0*	*2*
Mill Creek	0	2	6	16

Applicant's Proposed Action Alternative

Throughout Segment 2, the Applicant's Proposed Action Alternative crosses habitat for shrubland species, such as sage thrasher and Brewer's sparrow; forest/woodland species, such as Cassin's finch, flammulated owl, and Williamson's sapsucker; and wetland/riparian species, such as willow flycatcher.

No bald eagle nests are known within 0.5 mile of the route. The Applicant's Proposed Action Alternative is within 5 miles of bald and golden eagle nests in the vicinity of Morgan Lake (Link 2-45), as well as golden eagle nests near where the route intersects Highway 244 (Link 2-20), near the Union County/Baker County border (Links 2-85 and 2-95), and northwest of where the route intersects Highway 237 (Link 2-85). The Applicant's Proposed Action Alternative also is within 5 miles of a bald eagle winter roost site on Wallowa-Whitman National Forest at the western end of Segment 2 (Links 2-1 and 2-5).

Variations S2-A1 and S2-A2

The variations cross habitat for grassland species, such as long-billed curlew and upland sandpiper, as well as habitat for forest/woodland species, such as Cassin's finch, flammulated owl, and Williamson's sapsucker.

No bald eagle nests are known within 5 miles and no golden eagle nests within 0.5 mile of the variations. One golden eagle nest is within 5 miles of the eastern end of the variations (Links 2-5 and 2-7). The variations also are in within 5 miles of a bald eagle winter roost site on Wallowa-Whitman National Forest (Links 2-1, 2-3, 2-5, and 2-7).

Variations S2-B1 and S2-B2

The variations cross habitat for forest/woodland species, such as Cassin's finch, flammulated owl, and Williamson's sapsucker; wetland/riparian species, such as willow flycatcher; and shrubland species, such as sage thrasher and Brewer's sparrow.

No bald eagle nests are known within 0.5 mile of the variations. One golden eagle nest is within 0.5 mile of the western end of the variations (Links 2-25 and 2-30) and a bald eagle nest is within 5 miles of the eastern end of the variations (Links 2-25 and 2-35). The variations also are within 5 miles of a bald eagle winter roost site on Wallowa-Whitman National Forest (Links 2-25 and 2-30).

Variation S2-C1

Variation S2-C1 crosses habitat for forest/woodland species, such as Cassin's finch, flammulated owl, and Williamson's sapsucker, as well as habitat for shrubland species, such as sage thrasher and Brewer's sparrow.

No bald or golden eagle nests are known within 0.5 mile of the variation, but Variation S2-C1 is within 5 miles of bald and golden eagle nests in the vicinity of Morgan Lake (Link 2-45).

Variation S2-C2

Variation S2-C2 crosses habitat for forest/woodland species, such as Cassin's finch, flammulated owl, and Williamson's sapsucker, as well as habitat for shrubland species, such as sage thrasher and Brewer's sparrow. The route variation also crosses, to a lesser extent, habitat for RCA species, such as willow flycatcher. In particular, habitat for RCA species is present on the Ladd Marsh Important Bird Areas on the Ladd Marsh Wildlife Area, of which the route variation crosses along a small portion on the western edge (Link 2-48).

No golden eagle nests are known within 0.5 mile of the variation. Variation S2-C2 is within 0.5 mile of a bald eagle nest west of Morgan Lake and within 5 miles of a golden eagle nest east of Morgan Lake (Link 2-48).

Variations S2-E1 and S2-E2

The variations cross habitat for forest/woodland species, such as Cassin's finch, flammulated owl, and Williamson's sapsucker, as well as habitat for shrubland species, such as Brewer's sparrow and sage thrasher.

No bald or golden eagle nests are known within 0.5 mile of the variation, but the north ends of the variations are within 5 miles of a golden eagle nest (Links 2-55 and 2-60).

Variations S2-F1 and S2-F2

The variations cross habitat for grassland species, such as upland sandpiper and long-billed curlew; wetland/riparian species, such as willow flycatcher; and shrubland species, such as sage thrasher and Brewer's sparrow.

No bald eagle nests are known within 0.5 mile of the variations, but the variations are within 0.5 mile of golden eagle nests northwest of where the route intersects Highway 237 (Links 2-85 and 2-80).

Glass Hill Alternative

The Glass Hill Alternative crosses habitat for forest/woodland species, such as Cassin's finch, flammulated owl, and Williamson's sapsucker; shrubland species, such as sage thrasher and Brewer's sparrow; and RCA, such as willow flycatcher.

No bald eagle nests are known within 0.5 mile of the route. The Glass Hill Alternative crosses within 5 miles of golden eagle nests near where the route intersects Highway 244 (Link 2-20), northwest of where the route intersects Highway 237 (Link 2-85), and near the Union County/Baker County border (Link 2-95). The Glass Hill Alternative also is within 5 miles of a bald eagle winter roost site on Wallowa-Whitman National Forest at the western end of Segment 2 (Links 2-1 and 2-5).

Variation S2-D1

Variation S2-D1 crosses habitat for forest/woodland species, such as Cassin's finch, flammulated owl, and Williamson's sapsucker; wetland/riparian species, such as willow flycatcher; and shrubland species, such as sage thrasher and Brewer's sparrow.

No bald or golden eagle nests are known within 0.5 mile of the variation. Bald and golden eagle nests near Morgan Lake are within 5 miles of Variation S2-D2 (Links 2-42 and 2-47).

Variation S2-D2

Variation S2-D2 crosses habitat for forest/woodland species, such as Cassin's finch, flammulated owl, and Williamson's sapsucker; RCA species, such as willow flycatcher; and grassland species, such as long-billed curlew and upland sandpiper.

No bald or golden eagle nests are known within 0.5 mile of the route. Bald and golden eagle nests near Morgan Lake are within 5 miles of Variation S2-D2 (Links 2-46).

Mill Creek Alternative

The Mill Creek Alternative crosses habitat for forest/woodland species, such as Cassin's finch, flammulated owl, and Williamson's sapsucker; shrubland species, such as sage thrasher and Brewer's sparrow; and RCA species, such as willow flycatcher. In particular, habitat for RCA species is present on the Ladd Marsh Important Bird Areas on the Ladd Marsh Wildlife Area, which the route crosses in a central portion of Segment 2 (Link 2-63).

No bald eagle nests are known within 0.5 mile of the route. The Mill Creek Alternative crosses within 5 miles bald and golden eagle nests in the vicinity of Morgan Lake (Links 2-10 and 2-12), as well as golden eagle nests near where the route intersects Highway 244 (Link 2-10), northwest of where the route intersects Highway 237 (Link 2-70), northwest of La Grande (Link 2-10), near the Union County/Baker County border (Link 2-90), and south of Ladd Marsh Wildlife Area (Link 2-63). The Mill Creek Alternative also is within 5 miles of a bald eagle winter roost site on Wallowa-Whitman National Forest at the western end of Segment 2 (Links 2-3 and 2-7).

Big Game

Big game species known to be present in Segment 2 include mule deer, white-tailed deer, and elk. Major habitat types used by big game species in Segment 2 consist primarily of forest/woodland and shrubland types, which provide forage, hiding, and thermal cover. Designated winter range for elk and mule deer is present throughout the majority of Segment 2.

Segment 2 crosses two ODFW WMUs that include the Starkey and Catherine Creek WMUs. In both WMUs, mule deer populations are currently below management objectives (ODFW 2015b). Elk populations in the Starkey WMU also are currently below management objectives, while elk populations in the Catherine Creek WMU are currently above management objectives (ODFW 2015c). Factors that can negatively affect mule deer elk populations in the B2H Project area are the same as those described for Segment 1.

Table 3-151 presents the miles of big game habitat types crossed by the centerline of all alternative routes and route variations in Segment 2. Locations of mule deer and elk winter range crossed by the B2H Project are described by alternative route below and displayed in MV-10.

Table 3-151. Big Game Inventory Data for Segment 2—Blue Mountains (miles crossed)			
Alternative Route	**Total Length (miles)**	**Mule Deer Winter Range**	**Elk Winter Range**
Applicant's Proposed Action	33.8	26.7	29.1
Variation S2-A1	*2.8*	*2.8*	*2.8*
Variation S2-A2	*2.9*	*2.9*	*2.9*
Variation S2-B1	*3.7*	*3.7*	*3.7*
Variation S2-B2	*3.8*	*3.8*	*3.8*
Variation S2-C1	*9.3*	*5.0*	*7.4*
Variation S2-C2	*8.8*	*5.6*	*6.8*
Variation S2-E1	*2.3*	*2.3*	*2.3*
Variation S2-E2	*2.6*	*2.6*	*2.6*
Variation S2-F1	*12.1*	*9.3*	*9.3*
Variation S2-F2	*12.2*	*10.2*	*10.2*
Glass Hill	33.7	26.6	29.0
Variation S2-D1	*4.3*	*2.8*	*4.3*
Variation S2-D2	*4.1*	*2.2*	*4.1*
Mill Creek	34.0	32.0	32.0
Table Note: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.			

Applicant's Proposed Action Alternative

Most of the Applicant's Proposed Action Alternative crosses elk or mule deer winter range.

Variations S2-A1, S2-A2, S2-B1, S2-B2, S2-E1, and S2-E2

The entire lengths of the variations cross elk and mule deer winter range.

Variations S2-C1 and S2-C2

The entire lengths of the variations cross elk and mule deer winter range, except for a portion near the eastern ends of the variations (Links 2-48 and 2-50).

Variation S2-F1

The entire length of the variation crosses elk and mule deer winter range, except for a portion near the western end of the route variation that stretches west from where the variation intersects the Oregon National Historic Trail (Link 2-75).

Variation S2-F2

The entire length of the variation crosses elk and mule deer winter range, except for a small portion where the variation crosses Interstate 84 (Link 2-70).

Glass Hill Alternative

Except for several small portions, the entire length of the Glass Hill Alternative crosses elk or mule deer winter range.

Variations S2-D1 and S2-D2

The entire lengths of the variations cross elk and mule deer winter range.

Mill Creek Alternative

Except for two small portions, the entire length of the Mill Creek Alternative crosses elk and mule deer winter range.

Management Indicator Species and USFS Sensitive Species

Alternative Routes and Route Variations

The Applicant's Proposed Action and all alternative routes, as well as Variations S2-A1 and S2-A2, cross national forest land in Segment 2 (Links 2-1, 2-3, 2-5, and 2-7). The affected environment for MIS is described in Appendix F.

USFS sensitive wildlife species that may occur on USFS-administered land in areas crossed by alternative routes in Segment 2 are the same as those described for Segment 1.

SEGMENT 3—BAKER VALLEY

Wildlife Habitat

Alternative Routes and Route Variations

Shrubland habitat is the dominant wildlife habitat type in the study corridor, with forest/woodland habitat concentrated in the northeast portion of Segment 3, along the Timber Canyon Alternative (MV-7, Table 3-106 in Section 3.2.3). A limited amount of grasslands and RCAs also are present in Segment 3. Refer to Table E-2 (Appendix E) for a list of the wildlife species commonly found in each wildlife habitat type in Segment 3.

Special Status species

Alternative Routes and Route Variations

Forty-eight special status species may occur, are likely to occur, or are known to occur in Segment 3 (Table 3-142). Information relating to the amount of habitat available for special status species within the study corridor is located in Table 3-106 in Section 3.2.3. GHMA locations are depicted in MV-7. Special status species that are known to be present in Segment 3 include American peregrine falcon; woodpecker species, including white-headed woodpecker and Lewis's woodpecker; common night hawk; golden eagle; Greater Sage-Grouse (discussed in greater detail below); Swainson's hawk; gray wolf; long-legged myotis; Townsend's big-eared bat; white-tailed jackrabbit; and Johnson's hairstreak. Species accounts for these species and others that may occur in this segment, as identified in Table 3-142, are included in Appendix E.

Special status species that use shrubland habitats include common nighthawk, pallid bat, and white-tailed jackrabbit. Nighthawks and pallid bats are susceptible to disturbances that cause them to abandon roosting and nesting sites and hibernacula. White-tailed jackrabbits forage on grasses and forbs in shrublands and are threatened by habitat modification and predation by large hawks.

Special status forest/woodland species present in the study corridor for Segment 3 include species such as cavity-nesting woodpeckers, olive-sided flycatcher, American marten (dispersal), and gray wolf. The majority of habitat for these species, in the form of dry ponderosa pine, mixed conifer, and

lodgepole pine forest types, is located along the Timber Canyon Alternative (including portions on the Wallowa-Whitman Nation Forest). Threats to special status species include habitat loss, modification, and fragmentation.

Special status wildlife species that use RCAs in Segment 3 include the Columbia spotted frog (Northern), northern leopard frog, Woodhouse's toad, and western ridged mussel. Threats to these species include loss or modification of habitat due to soil erosion and sedimentation as a result of construction activities. Although not a riparian obligate, Lewis's woodpecker may use decaying cottonwood trees for nesting and could be affected by dead tree and snag removal.

Bird species such as the bobolink and long-billed curlew typically use grasslands for both foraging and nesting habitat. The long-billed curlew is a ground nesting species using grasslands as cover for cryptic nests constructed in shallow scrapes in the soil. The common nighthawk typically uses grasslands as foraging habitats, preferring gravelly soils and riverbanks for nesting habitat. Conservation threats to these birds include loss of breeding and foraging habitat resulting from land development practices.

Greater Sage-Grouse

Garton et al. (2011) identified five Greater Sage-Grouse populations in Oregon. Segment 3 runs through one of these, the Baker population, which is located in northeast Oregon (minimum estimated spring population of 872 to 1,650 birds in 2010) (ODFW 2011). According to the ODFW Greater Sage-Grouse Strategy, the current amount of habitat available to this population is 853,848 acres.

An ODFW assessment of habitat connectivity provides evidence that connectivity is limited between Greater Sage-Grouse in the Baker population and northern Malheur County (ODFW 2011). The Baker population appears to be separated by topography and unsuitable habitat from the nearest population in Weiser, Idaho, by approximately 20 miles. Interseasonal movements of a radio-marked female Greater Sage-Grouse between its spring/summer range east of Keating, Oregon, and winter locations northwest of Weiser, Idaho (a distance of approximately 33 miles), indicate some connection of the Baker population with adjacent populations (USFWS 2013).

It is unknown if there is movement (dispersal) of birds from habitat east of Interstate 84 to habitats in the southwest portion of Baker County. The ODFW assumes that Greater Sage-Grouse populations east of Interstate 84 are closed to immigration or emigration (i.e., "closed populations"), and those near Malheur County are open populations (i.e., population size is regulated in part by immigration from populations north of Harper). A telemetry study involving 63 Greater Sage-Grouse in Baker County during 2009–2012 found no evidence of dispersal into Malheur County. Most birds occupied relatively small ranges during spring and summer months, but showed large movements to winter habitat. Several birds moved approximately 16 kilometers southwest to the Virtue Flat area for winter. One female moved out of the B2H Project area to winter in southwest Idaho (a distance of 33 miles) and returned to Oregon in spring (USFWS 2013).

More than 80 percent of the historical sagebrush habitat for the Baker population remains available today, but steeper habitat and rugged topography reduces the suitability for Greater Sage-Grouse (USFWS 2013). 300,000 acres in this region were identified by the USFWS as PACs and includes

much of the current range of the Baker population (USFWS 2013).The ODFW's Greater Sage-Grouse Conservation Assessment and Strategy has identified essential habitats which are referred to as core areas and are equivalent to PHMA. These core areas represent key habitat areas as determined by breeding bird densities, winter habitat use, and connective habitat use. In Oregon, these units are called Oregon PACs and represent approximately 90 percent of the breeding population within 38 percent of the species range in Oregon. In most cases, Oregon PACs identify biologically meaningful units for management and monitoring that are different from USFWS PACs documented in the 2013 COT Report. In some cases, Oregon PACs combine smaller core habitat polygons into a single unit (ODFW unpublished data).

Based on Integrated Landscape Assessment Project (ILAP) (Gaines et al. 2013) data, 75.9 percent (243,259 acres) of the 336,539-acre Baker Oregon PAC is comprised of existing Greater Sage-Grouse habitat and 24.1 percent (77,434 acres) is potential Greater Sage-Grouse habitat. Potential habitat consists of areas that are capable of supporting sagebrush but not currently suitable for Greater Sage-Grouse and include burned areas, agricultural land, areas encroached by junipers, and crested wheat plantings.

ODFW calculations of 2013 spring trend (moving 5-year average) count for the population in Baker core habitat estimates 571 birds, which is 62.6 percent below the 2003 baseline of 2,017 birds. There are 34 known leks/lek complexes within this core habitat area, 10 of which have not had any observed male attendance in the last 10 years. In 2015, the moving 5-year average population count in Baker core habitat dropped to 165 birds, triggering the hard adaptive management trigger established in the Oregon Greater Sage-Grouse ARMPA which requires that more restrictive management actions are taken to stop a severe deviation from Greater Sage-Grouse conservation objectives set forth in the ARMPA (BLM 2015a; Glen Frederick [BLM], personal communication, June 2016).

The Baker population is more at risk and likely less resilient than other populations, since connectivity to other populations appears limited. There is no redundancy in this population as all birds are believed to be in one general area. For the entire population, the environmental similarity to extirpated populations is high (Wisdom et al. 2011). Most (68 percent) of the Greater Sage-Grouse habitat for the Baker population is in private ownership and 31 percent is administered by BLM (ODFW 2011). This is the largest proportion of privately managed Greater Sage-Grouse habitat for any population in Oregon. The USFWS (2013) noted that there are limited regulatory mechanisms in place, making it uncertain as to whether state-recommended conservation measures and practices will be applied on the majority of lands within this population; however, Oregon's "Sage-Grouse Rule" (OAR 660-023-0115) directs counties to apply a program of mitigation to land-use proposals, establishes a metering mechanism that allows only one percent of each core area to be developed per 10-year increment, and establishes a hard ceiling that would not allow human-caused development to ever occupy more than three percent of any core area. The Magpie Peak area is a particularly important area of habitat for the Baker Oregon PAC. Impacts on this area would be estimated at a higher magnitude than adjacent areas (ODFW, personal communication, September 9, 2014).

Invasive weeds and juniper encroachment are considered to be the primary threats to this population (Hagen 2011), but other threats to this population include renewable energy development (primarily wind), energy transmission, and Off Highway Vehicle recreation (USFWS 2013). Multiple large wildfires have occurred in the southwest portions of the Baker Oregon PAC and the adjacent GHMA in the B2H Project area, including the 1,485-acre White Swan Fire (2001), the 4,402-acre Iron Mountain Fire (2006), 2,904-acre Pleasant Valley Fire (2007), and the 3,300 Radio Tower Fire (2014); the 2015 103,865-acre Cornet-Windy Ridge Fire only burned small portions of GHMA that are in the study corridor of the alternative routes (BLM n.d.; USGS 2016). The impact of wildfire on Greater Sage-Grouse habitat in the B2H Project area is discussed further in the wildlife resources cumulative effects analysis (Section 3.3.3.4).

Table 3-152 and MV-9 present the miles of Greater Sage-Grouse habitat types crossed by the centerline of all alternative routes and route variations in Segment 3. Locations of Greater Sage-Grouse habitat crossed by the B2H Projects are described by alternative route below.

Table 3-152. Greater Sage-Grouse Inventory Data for Segment 3—Baker Valley (miles crossed)

Alternative Route	Total Length (miles)	Priority Habitat Management Areas	General Habitat Management Areas
Applicant's Proposed Action	55.2	30.2	17.1
Variation S3-A1	*12.4*	*8.1*	*4.3*
Variation S3-A2	*12.2*	*9.0*	*3.2*
Variation S3-B1	*13.9*	*13.6*	*0.3*
Variation S3-B2	*14.4*	*4.2*	*3.6*
Variation S3-B3	*14.7*	*4.2*	*1.9*
Variation S3-B4	*14.3*	*2.3*	*1.2*
Variation S3-B5	*14.0*	*2.3*	*4.3*
Variation S3-C1	*21.1*	*8.5*	*5.3*
Variation S3-C2	*21.7*	*8.7*	*5.7*
Variation S3-C3	*21.1*	*0.0*	*1.1*
Variation S3-C4	*21.4*	*0.0*	*1.1*
Variation S3-C5	*21.0*	*0.0*	*1.1*
Variation S3-C6	*24.7*	*0.0*	*9.4*
Flagstaff A	55.3	18.9	21.1
Timber Canyon	70.3	0.0	28.8
Flagstaff A – Burnt River Mountain	55.3	10.4	16.9
Flagstaff B	56.0	20.8	18.7
Flagstaff B – Burnt River West	55.7	13.2	13.4
Flagstaff B – Durkee	59.6	12.3	22.8

Table Note: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.

The number and occupancy status of leks within 0.25, 2.0, and 3.1 miles of the centerlines of the alternative routes and route variations are presented in Table 3-153. The locations of leks in relation to the B2H Project are described by alternative route below. The lek occupancy status classifications are

defined in Section 3.2.4.2 under Greater Sage-Grouse Policy and Management Guidance – Oregon Department of Fish and Wildlife Plans.

Table 3-153. Number of Greater Sage-Grouse Leks in Segment 3—Baker Valley

Alternative Route	Lek Occupancy Status	Number of Leks within 0.25, 2.0, and 3.1 Miles					
		Priority Habitat Management Areas			General Habitat Management Areas		
		0.25	2.0	3.1	0.25	2.0	3.1
Applicant's Proposed Action	Unoccupied	0	0	0	0	0	0
	Unoccupied pending	0	1	6	0	1	1
	Occupied	0	0	4	0	0	0
	Occupied pending	0	4	7	0	0	0
	Historic	0	0	2	0	0	0
	Unknown	0	1	3	0	0	0
Variation S3-A1	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*1*	*4*	*0*	*0*	*0*
	Occupied	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied pending	*0*	*4*	*5*	*0*	*0*	*0*
	Historic	*0*	*0*	*0*	*0*	*0*	*0*
	Unknown	0	0	0	0	0	0
Variation S3-A2	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*1*	*4*	*0*	*0*	*0*
	Occupied	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied pending	*0*	*4*	*5*	*0*	*0*	*0*
	Historic	*0*	*0*	*0*	*0*	*0*	*0*
	Unknown	*0*	*0*	*0*	*0*	*0*	*0*
Variation S3-B1	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*3*	*0*	*0*	*1*
	Occupied	*0*	*0*	*4*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Historic	*0*	*0*	*2*	*0*	*0*	*0*
	Unknown	*0*	*1*	*1*	*0*	*0*	*0*
Variation S3-B2	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*3*	*0*	*0*	*1*
	Occupied	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Historic	*0*	*0*	*0*	*0*	*0*	*0*
	Unknown	*0*	*1*	*1*	*0*	*0*	*0*
Variation S3-B3	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*3*	*0*	*0*	*1*
	Occupied	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Historic	*0*	*0*	*0*	*0*	*0*	*0*
	Unknown	*0*	*1*	*1*	*0*	*0*	*0*

Table 3-153. Number of Greater Sage-Grouse Leks in Segment 3—Baker Valley							
Alternative Route	Lek Occupancy Status	Number of Leks within 0.25, 2.0, and 3.1 Miles					
		Priority Habitat Management Areas			General Habitat Management Areas		
		0.25	2.0	3.1	0.25	2.0	3.1
Variation S3-B4	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*3*	*0*	*0*	*1*
	Occupied	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Historic	*0*	*0*	*0*	*0*	*0*	*0*
	Unknown	*0*	*1*	*1*	*0*	*0*	*0*
Variation S3-B5	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*3*	*0*	*0*	*1*
	Occupied	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Historic	*0*	*0*	*0*	*0*	*0*	*0*
	Unknown	*0*	*1*	*1*	*0*	*0*	*0*
Variation S3-C1	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied	*0*	*0*	*0*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*0*	*0*	*0*	*0*
	Historic	*0*	*0*	*0*	*0*	*0*	*0*
	Unknown	*0*	*0*	*2*	*0*	*0*	*0*
Variation S3-C2	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied	*0*	*0*	*0*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*0*	*0*	*0*	*0*
	Historic	*0*	*0*	*0*	*0*	*0*	*0*
	Unknown	*0*	*0*	*2*	*0*	*0*	*0*
Variation S3-C3	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied	*0*	*0*	*0*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*0*	*0*	*0*	*0*
	Historic	*0*	*0*	*0*	*0*	*0*	*0*
	Unknown	*0*	*0*	*2*	*0*	*0*	*0*
Variation S3-C4	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied	*0*	*0*	*0*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*0*	*0*	*0*	*0*
	Historic	*0*	*0*	*0*	*0*	*0*	*0*
	Unknown	*0*	*0*	*2*	*0*	*0*	*0*

Table 3-153. Number of Greater Sage-Grouse Leks in Segment 3—Baker Valley							
Alternative Route	Lek Occupancy Status	Number of Leks within 0.25, 2.0, and 3.1 Miles					
		Priority Habitat Management Areas			General Habitat Management Areas		
		0.25	2.0	3.1	0.25	2.0	3.1
Variation S3-C5	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied	*0*	*0*	*0*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*0*	*0*	*0*	*0*
	Historic	*0*	*0*	*0*	*0*	*0*	*0*
	Unknown	*0*	*0*	*2*	*0*	*0*	*0*
Variation S3-C6	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*2*	*0*	*0*	*0*
	Occupied	*0*	*0*	*0*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*0*	*0*	*0*	*0*
	Historic	*0*	*0*	*0*	*0*	*0*	*0*
	Unknown	*0*	*0*	*2*	*0*	*0*	*0*
Flagstaff A	Unoccupied	0	0	0	0	0	0
	Unoccupied pending	0	2	6	0	1	1
	Occupied	0	0	1	0	0	0
	Occupied pending	0	4	7	0	0	0
	Historic	0	0	0	0	0	0
	Unknown	0	1	3	0	0	0
Timber Canyon	Unoccupied	0	0	0	0	0	0
	Unoccupied pending	0	0	0	0	0	0
	Occupied	0	0	0	0	0	0
	Occupied pending	0	0	4	0	0	1
	Historic	0	0	0	0	0	0
	Unknown	0	0	0	0	0	0
Flagstaff A – Burnt River Mountain	Unoccupied	0	0	0	0	0	0
	Unoccupied pending	0	2	6	0	1	1
	Occupied	0	0	1	0	0	0
	Occupied pending	0	4	7	0	0	0
	Historic	0	0	0	0	0	0
	Unknown	0	1	3	0	0	0
Flagstaff B	Unoccupied	0	0	0	0	0	0
	Unoccupied pending	0	2	6	0	1	1
	Occupied	0	0	1	0	0	0
	Occupied pending	0	4	7	0	0	0
	Historic	0	0	0	0	0	0
	Unknown	0	1	3	0	0	0

Table 3-153. Number of Greater Sage-Grouse Leks in Segment 3—Baker Valley							
Alternative Route	Lek Occupancy Status	Number of Leks within 0.25, 2.0, and 3.1 Miles					
		Priority Habitat Management Areas			General Habitat Management Areas		
		0.25	2.0	3.1	0.25	2.0	3.1
Flagstaff B – Burnt River West	Unoccupied	0	0	0	0	0	0
	Unoccupied pending	0	4	6	0	1	1
	Occupied	0	0	1	0	0	0
	Occupied pending	0	4	7	0	0	0
	Historic	0	0	0	0	0	0
	Unknown	0	1	3	0	0	0
Flagstaff B – Durkee	Unoccupied	0	0	0	0	0	0
	Unoccupied pending	0	2	7	0	1	1
	Occupied	0	0	1	0	0	0
	Occupied pending	0	4	7	0	0	0
	Historic	0	0	0	0	0	0
	Unknown	0	1	3	0	0	0

Applicant's Proposed Action Alternative

A large portion of the Applicant's Proposed Action Alternative in Segment 3 crosses PHMA on the western edge of the Baker Oregon PAC (Links 3-4, 3-22, 3-26, and 3-28) and is within 3.1 miles of occupied, occupied pending, unoccupied pending, historic, and unknown status leks; however, no leks are closer than 0.25 mile. The Applicant's Proposed Action Alternative also crosses blocks of Greater Sage-Grouse GHMA at the beginning, middle, and end of the route in Segment 3 (Links 3-4, 3-54, 3-78, and 3-80).

Variations S3-A1 and S3-A2

The entire lengths of the variations cross either Greater Sage-Grouse GHMA or PHMA, with the majority of the variations crossing PHMA in the Baker Oregon PAC (Links 3-4, 3-12, and 3-14). The entire length of Variation S3-A2 is colocated with an existing transmission line. The variations also are within 3.1 miles of occupied, occupied pending, and unoccupied pending leks, but none are closer than 0.25 mile.

Variation S3-B1

The entire length of Variation S3-B1 crosses Greater Sage-Grouse PHMA on the Baker Oregon PAC, except for a very small portion of the extreme southern end of the variation that crosses GHMA (Link 3-28). The variation also is within 3.1 miles of occupied, occupied pending, unoccupied pending, historic, and unknown status leks, but none are closer than 0.25 mile.

Variations S3-B2 and S3-B3

Northern and central portions of Variation S3-B2 cross Greater Sage-Grouse PHMA on the Baker Oregon PAC (Links 3-24, 3-37, and 3-41). The variation also is within 3.1 miles of occupied, occupied pending, unoccupied pending, and unknown status leks, but none are closer than 0.25 mile. Additionally, central and southern portions of the variation cross GHMA (Links 3-47 and 3-48).

Variation S3-B4

The northern end of Variation S3-B4 crosses Greater Sage-Grouse PHMA on the Baker Oregon PAC (Link 3-24) and the southern end crosses GHMA (Link 3-48). The variation also is within 3.1 miles of occupied, occupied pending, unoccupied pending, and unknown status leks, but none are closer than 0.25 mile.

Variation S3-B5

The northern end of Variation S3-B5 crosses Greater Sage-Grouse PHMA on the Baker Oregon PAC (Link 3-24). The variation also is within 3.1 miles of occupied, occupied pending, unoccupied pending, and unknown status leks, but none are closer than 0.25 mile. Additionally, central and southern portions of the variation cross GHMA (Links 3-47 and 3-48).

Variations S3-C1 and S3-C2

The northern portions of the variations cross Greater Sage-Grouse PHMA on the Baker Oregon PAC (Link 3-58) and central portions cross GHMA (Links 3-78 and 3-80). The majority of Variation S3-C2 that crosses Greater Sage-Grouse PHMA is colocated with an existing transmission line. The variations also are within 3.1 miles of unoccupied pending and unknown status leks, but none are closer than 2 miles.

Variations S3-C3, S3-C4, and S3-C5

The variations do not cross Greater Sage-Grouse PHMA, but do cross a small portion of GHMA at the northern end of the variations (Link 3-56). The variations also are within 3.1 miles of unoccupied pending and unknown status leks, but none are closer than 2 miles.

Variation S3-C6

Variation S3-C5 does not cross Greater Sage-Grouse PHMA, but does cross a small portion of GHMA at the northern end of the variation (Link 3-56) and a large portion of GHMA near the southern end of the variation (Link 3-90). The variation also is within 3.1 miles of unoccupied pending and unknown status leks, but none are closer than 2 miles. Additionally, the variation crosses north of PHMA on the Cow Valley Oregon PAC.

Flagstaff A Alternative

Large northern and central portions of the Flagstaff A Alternative cross Greater Sage-Grouse PHMA on the western edge of the Baker Oregon PAC (Links 3-4, 3-22, 3-24, and 3-31). Additionally, the alternative is within 3.1 miles of occupied, occupied pending, unoccupied pending, and unknown status leks; however, no leks are closer than 0.25 mile. The Flagstaff A Alternative also crosses blocks of Greater Sage-Grouse GHMA at the northern, central, and southern portions of the route (Links 3-4, 3-47 3-48, 3-54, 3-78, and 3-80).

Timber Canyon Alternative

PHMA on the Baker Oregon PAC is within the study corridor of the Timber Canyon Alternative (Links 3-6 and 3-8) but is not crossed. A large amount of GHMA is crossed by the alternative at its southern end (Link 3-80), as well as a smaller portion at the alternative's northern end (Link 3-6). Portions of the

Timber Canyon Alternative also are within 3.1 miles of occupied pending leks, but none are closer than 2 miles.

Flagstaff A – Burnt River Mountain Alternative

A large northern portion of the Flagstaff A – Burnt River Mountain Alternative crosses Greater Sage-Grouse PHMA on the western edge of the Baker Oregon PAC (Links 3-12, 3-14, and 3-24). Additionally, the alternative is within 3.1 miles of occupied, occupied pending, unoccupied pending, and unknown status leks; however, no leks are closer than 0.25 mile. The Flagstaff A – Burnt River Mountain Alternative also crosses blocks of Greater Sage-Grouse GHMA at northern and central portions of the route (Links 3-10, 3-40, 3-46, 3-47 3-48, and 3-54).

Flagstaff B Alternative

Large northern and central portions of the Flagstaff B Alternative cross Greater Sage-Grouse PHMA on the western edge of the Baker Oregon PAC (Links 3-12, 3-14, 3-24, 3-31, and 3-41). Additionally, the alternative is within 3.1 miles of occupied, occupied pending, unoccupied pending, and unknown status leks; however, no leks are closer than 0.25 mile. The Flagstaff B Alternative also crosses blocks of Greater Sage-Grouse GHMA at the northern, central, and southern portions of the route (Links 3-4, 3-46, 3-48, 3-70, and 3-80).

Flagstaff B – Burnt River West Alternative

A large northern portion of the Flagstaff B – Burnt River West Alternative crosses Greater Sage-Grouse PHMA on the western edge of the Baker Oregon PAC (Links 3-12, 3-14, 3-24, 3-31, and 3-41). Additionally, the alternative is within 3.1 miles of occupied, occupied pending, unoccupied pending, and unknown status leks; however, no leks are closer than 0.25 mile. The Flagstaff B – Burnt River West Alternative also crosses blocks of Greater Sage-Grouse GHMA at northern and central portions of the route (Links 3-10, 3-46, 3-48, and 3-54).

Flagstaff B – Durkee Alternative

A large northern portion of the Flagstaff B – Durkee Alternative crosses Greater Sage-Grouse PHMA on the western edge of the Baker Oregon PAC (Links 3-12, 3-14, 3-24, 3-31, and 3-41). Additionally, the alternative is within 3.1 miles of occupied, occupied pending, unoccupied pending, and unknown status leks; however, no leks are closer than 0.25 mile. The Flagstaff B – Durkee Alternative also crosses blocks of Greater Sage-Grouse GHMA at northern, central, and southern portions of the route (Links 3-4, 3-46, 3-48, 3-54, and 3-90). Additionally, PHMA on the Cow Valley Oregon PAC occurs in the study corridor at the extreme southern end of the alternative route (Link 3-90).

Migratory Birds Including Raptors

Segment 3 is in the migratory bird Pacific Flyway and contains habitats that support many avian species identified as BCCs within BCR 10 (Table 3-143). These habitats also provide nesting and foraging areas for a variety of raptors (Table 3-142). Habitat for forest/woodland species (e.g., Cassin's finch and white-headed woodpecker), shrubland species (e.g., Brewer's sparrow and sage thrasher), and, to a lesser extent, grassland species (e.g., long-billed curlew) and RCA species (e.g., willow

flycatcher), is present in the study corridor in Segment 3 (Table 106 in Section 3.2.3 and MV-7). A detailed discussion of available wildlife habitats within the study corridor in Segment 3 is presented in Vegetation Resources, Section 3.2.3.

The shrublands and grasslands in Segment 3 provide hunting and breeding habitat for golden eagles, and forested areas near waterbodies in the study corridor are suitable for bald eagle use; locations of known eagle nests in the study corridor are presented in Table 3-147 and described by alternative route at the end of Segment 3 Affected Environment.

Table 3-154. Number of Eagle Nests in Segment 3—Baker Valley

Alternative Route	Bald Eagle		Golden Eagle	
	1-Mile Corridor	10-Mile Corridor	1-Mile Corridor	10-Mile Corridor
Applicant's Proposed Action	0	0	8	56
Variation S3-A1	*0*	*0*	*4*	*22*
Variation S3-A2	*0*	*0*	*4*	*23*
Variation S3-B1	*0*	*0*	*3*	*16*
Variation S3-B2	*0*	*0*	*1*	*13*
Variation S3-B3	*0*	*0*	*1*	*13*
Variation S3-B4	*0*	*0*	*1*	*13*
Variation S3-B5	*0*	*0*	*1*	*13*
Variation S3-C1	*0*	*0*	*2*	*27*
Variation S3-C2	*0*	*0*	*2*	*28*
Variation S3-C3	*0*	*0*	*1*	*29*
Variation S3-C4	*0*	*0*	*1*	*29*
Variation S3-C5	*0*	*0*	*2*	*29*
Variation S3-C6	*0*	*0*	*0*	*31*
Flagstaff A	0	0	6	54
Timber Canyon	0	1	0	49
Flagstaff A – Burnt River Mountain	0	0	5	56
Flagstaff B	0	0	6	54
Flagstaff B – Burnt River West	0	0	6	57
Flagstaff B – Durkee	0	0	4	58

Applicant's Proposed Action Alternative

Throughout Segment 3, the Applicant's Proposed Action Alternative crosses habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and, to a lesser extent, the Applicant's Proposed Action Alternative crosses habitat for RCA species, such as willow flycatcher, and grassland species, such as long-billed curlew. No bald eagle nests are known within 5 miles, but the Applicant's Proposed Action Alternative is within 5 miles of golden eagle nests throughout Segment 3.

Variations S3-A1 and S3-A2

The variations cross habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and, to a lesser extent, the variations cross habitat for RCA species, such as willow flycatcher. No bald eagle nests are known within 5 miles, but the variations are within 5 miles of golden eagle nests.

Variations S3-B1, S3-B2, S3-B3, S3-B4, and S3-B5

The variations cross habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and, to a lesser extent, the variations crosses habitat for RCA species, such as willow flycatcher, and grassland species, such as long-billed curlew. No bald eagle nests are known within 5 miles, but the variations are within 5 miles of golden eagle nests.

Variations S3-C1 and S3-C2

The variations cross habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and, to a lesser extent, the variations crosses habitat for RCA species, such as willow flycatcher, and grassland species, such as long-billed curlew. No bald eagle nests are known within 5 miles, but the variations are within 5 miles of golden eagle nests.

Variations S3-C3, S3-C4, S3-C5, and S3-C6

The variations cross habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and, to a lesser extent, the variations cross habitat for RCA species, such as willow flycatcher; grassland species, such as long-billed curlew; and forest/woodland species, such as Cassin's finch and white-headed woodpecker. No bald eagle nests are known within 5 miles, but Variation S3-C3 is within 5 miles of golden eagle nests.

Flagstaff A Alternative

Throughout Segment 3, the Flagstaff A Alternative crosses habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and, to a lesser extent, the Flagstaff A Alternative crosses habitat for RCA species, such as willow flycatcher, and grassland species, such as long-billed curlew. No bald eagle nests are known within 5 miles of the route, but the Flagstaff A Alternative is within 5 miles of golden eagle nests throughout Segment 3.

Timber Canyon Alternative

Throughout Segment 3, the Timber Canyon Alternative crosses habitat for forest/woodland species, such as Cassin's finch and white-headed woodpecker, as well as shrubland species, such as Brewer's sparrow and sage thrasher. To a lesser extent, the Timber Canyon Alternative crosses habitat for RCA species, such as willow flycatcher, and grassland species, such as long-billed curlew. The Timber Canyon Alternative is within 5 miles of a bald eagle nest near Richland (Link 3-8), as well as golden eagle nests throughout Segment 3; none of the eagle nests are within 0.5 mile of the route.

Flagstaff A – Burnt River Mountain Alternative

Throughout Segment 3, the Flagstaff A – Burnt River Mountain Alternative crosses habitat for shrubland species, such as Brewer's sparrow and sage thrasher. To a lesser extent, the Flagstaff A – Burnt River Mountain Alternative crosses habitat for RCA species, such as willow flycatcher; grassland species, such as long-billed curlew; and forest/woodland species, such as Cassin's finch and white-headed woodpecker. No bald eagle nests are known within 5 miles of the route, but the Flagstaff A – Burnt River Mountain Alternative is within 5 miles of golden eagle nests throughout Segment 3.

Flagstaff B Alternative

Throughout Segment 3, the Flagstaff B Alternative crosses habitat for shrubland species, such as Brewer's sparrow and sage thrasher. To a lesser extent, the Flagstaff B Alternative crosses habitat for RCA species, such as willow flycatcher, and grassland species, such as long-billed curlew. No bald eagle nests are known within 5 miles of the route, but the Flagstaff B Alternative is within 5 miles of golden eagle nests throughout Segment 3.

Flagstaff B – Burnt River West Alternative

Throughout Segment 3, the Flagstaff B – Burnt River West Alternative crosses habitat for shrubland species, such as Brewer's sparrow and sage thrasher. To a lesser extent, the Flagstaff B – Burnt River West Alternative crosses habitat for RCA species, such as willow flycatcher; grassland species, such as long-billed curlew; and forest/woodland species, such as Cassin's finch and white-headed woodpecker. No bald eagle nests are known within 5 miles of the route, but the Flagstaff B – Burnt River West Alternative is within 5 miles of golden eagle nests throughout Segment 3.

Flagstaff B – Durkee Alternative

Throughout Segment 3, the Flagstaff B – Durkee Alternative crosses habitat for shrubland species, such as Brewer's sparrow and sage thrasher. To a lesser extent, the Flagstaff B – Durkee Alternative crosses habitat for RCA species, such as willow flycatcher; grassland species, such as long-billed curlew; and forest/woodland species, such as Cassin's finch and white-headed woodpecker. No bald eagle nests are known within 5 miles of the route, but the Flagstaff B – Durkee Alternative is within 5 miles of golden eagle nests throughout Segment 3.

Big Game

Big game species present in the B2H Project area for Segment 3 include mule deer, white-tailed deer, elk, pronghorn, and bighorn sheep. Major habitat types identified and used by these species in Segment 3 include shrublands and forests/woodlands, primarily used by mule deer and elk, and cliffs and talus areas and grasslands, used by bighorn sheep. Designated habitat types that are crossed by routes in Segment 3 include winter range for elk and mule deer, as well as a small amount of bighorn sheep Oregon occupied range; locations of big game habitat crossed by the B2H Project are described by alternative route below and displayed in MV-10.

Segment 3 crosses four ODFW WMUs that include the Keating, Lookout Mountain, Sumpter, and Catherine Creek WMUs. In all four WMUs, mule deer populations are currently below management objectives (ODFW 2015b), and elk populations are currently above management objectives (ODFW 2015c). Factors that can affect mule deer and elk populations in the B2H Project area are the same as those described for Segment 1. Bighorn sheep populations in Segment 3 are part of the Burnt River herd. As of 2003, the Burnt River herd population status was considered stable (ODFW 2003c). Factors that can negatively affect bighorn sheep populations in Oregon include lack of water, habitat loss, predation, and habitat degradation due to noxious weed establishment and fire suppression that has allowed encroachment of woody vegetation into the open habitat preferred by bighorn sheep (ODFW 2003c).

Table 3-155 presents the miles of big game habitat types crossed by the centerline of all alternative routes and route variations in Segment 3.

Table 3-155. Big Game Inventory Data for Segment 3—Baker Valley (miles crossed)

Alternative Route	Total Length (miles)	Bighorn Sheep Oregon Occupied Range	Mule Deer Winter Range	Elk Winter Range
Applicant's Proposed Action	55.2	0.0	26.0	1.7
Variation S3-A1	*12.4*	*0.0*	*0.0*	*0.0*
Variation S3-A2	*12.2*	*0.0*	*0.0*	*0.0*
Variation S3-B1	*13.9*	*0.0*	*0.7*	*0.0*
Variation S3-B2	*14.4*	*0.0*	*4.3*	*0.0*
Variation S3-B3	*14.7*	*0.0*	*4.6*	*0.0*
Variation S3-B4	*14.3*	*0.0*	*4.6*	*0.0*
Variation S3-B5	*14.0*	*0.0*	*4.3*	*0.0*
Variation S3-C1	*21.1*	*0.0*	*17.5*	*1.7*
Variation S3-C2	*21.7*	*0.0*	*18.7*	*1.7*
Variation S3-C3	*21.1*	*0.0*	*21.0*	*4.9*
Variation S3-C4	*21.4*	*0.0*	*21.3*	*4.9*
Variation S3-C5	*21.0*	*0.8*	*21.0*	*10.0*
Variation S3-C6	*24.7*	*1.3*	*24.7*	*17.1*
Flagstaff A	55.3	0.0	29.6	1.7
Timber Canyon	70.3	0.0	37.1	43.1
Flagstaff A – Burnt River Mountain	55.3	0.0	33.2	4.9
Flagstaff B	56.0	0.0	29.9	1.7
Flagstaff B – Burnt River West	55.7	0.8	33.4	10.0
Flagstaff B – Durkee	59.6	1.3	37.1	17.1

Table Note: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.

Applicant's Proposed Action Alternative

Most of the southern half of the Applicant's Proposed Action Alternative crosses mule deer winter range, but only a small portion of the southern end of the route crosses elk winter range (Link 3-92). The Applicant's Proposed Action Alternative does not cross designated bighorn sheep habitat.

Variations S3-A1 and S3-A2

The variations do not cross designated big game habitat.

Variation S3-B1

A small portion of mule deer winter range is crossed at the southern end of the variation (Link 3-28). The variation does not cross elk winter habitat or designated bighorn sheep habitat.

Variations S3-B2, S3-B3, S3-B4, and S3-B5

Portions of the southern end of the variations cross mule deer winter range (Links 3-44, 3-47, and 3-48). The variations do not cross elk winter range or designated bighorn sheep habitat.

Variations S3-C1 and S3-C2

The entire lengths of the variations cross mule deer winter range, except for a small central portion of the variations (Link 3-78). A small portion of the southern end of the variations crosses elk winter range (Link 3-92). The variations do not cross designated bighorn sheep habitat.

Variation S3-C3 and S3-C4

The entire lengths of the variations cross mule deer winter range and the southern half of the variations cross elk winter range. The variations do not cross designated bighorn sheep habitat.

Variation S3-C5

The entire length of the variation crosses mule deer winter range and the southern half of the variation crosses elk winter range. A small portion of bighorn sheep Oregon occupied range is crossed near the northern end of the variation (Link 3-74).

Variation S3-C6

The entire length of the variation crosses mule deer winter range and most of the variation crosses elk winter range. A small portion of bighorn sheep Oregon occupied range is crossed near the northern end of the variation (Link 3-72).

Flagstaff A Alternative

Most of the southern half of the Flagstaff A Alternative crosses mule deer winter range, but only a small portion of the southern end of the route crosses elk winter range (Link 3-92). The Flagstaff A Alternative does not cross designated bighorn sheep habitat.

Timber Canyon Alternative

The Timber Canyon Alternative crosses elk winter range and mule deer winter range throughout Segment 3. The alternative route does not cross designated bighorn sheep habitat.

Flagstaff A – Burnt River Mountain Alternative

Most of the southern half of the Flagstaff A – Burnt River Mountain Alternative crosses mule deer winter range, but only a small portion of the southern end of the route crosses elk winter range (Link 3-92). The Flagstaff A – Burnt River Mountain Alternative does not cross designated bighorn sheep habitat.

Flagstaff B Alternative

Most of the southern half of the Flagstaff B Alternative crosses mule deer winter range. Elk winter range crossed by the Flagstaff A Alternative is the same as that described for the Applicant's Proposed Action Alternative. The Flagstaff B Alternative does not cross designated bighorn sheep habitat.

Flagstaff B – Burnt River West Alternative

Most of the southern half of the Flagstaff B – Burnt River West Alternative crosses mule deer winter range, but only a small portion of the southern end of the route crosses elk winter range (Link 3-73). The Flagstaff B – Burnt River West Alternative crosses a small portion of bighorn sheep Oregon occupied range west of Durkee (Link 3-71).

Flagstaff B – Durkee Alternative

Most of the southern half of the Flagstaff B – Durkee Alternative crosses mule deer winter range, but only a small portion of the southern end of the route crosses elk winter range (Links 3-74 and 3-90). The Flagstaff B – Durkee Alternative crosses a small portion of bighorn sheep Oregon occupied range west of Durkee (Link 3-71).

Management Indicator Species and USFS Sensitive Species

Alternative Routes and Route Variations

The Timber Canyon Alternative is the only route that crosses national forest land in Segment 3 (Link 3-6). The affected environment for MIS and USFS sensitive species is described in Appendix F.

SEGMENT 4—BROGAN

Wildlife Habitat

Alternative Routes and Route Variations

Shrublands comprise the majority of wildlife habitats in Segment 4 (MV-7, Table 3-110 in Section 3.2.3). Shrubland habitat is evenly distributed throughout Segment 4. Limited grassland habitat and RCAs also are present scattered throughout Segment 4. Small acreages of bare ground/cliff/talus habitat are present, with the majority concentrated in the southwestern portion of Segment 4. Table E-2 (Appendix E) describes wildlife species commonly found in the wildlife habitats present in Segment 4.

Special Status Species

Alternative Routes and Route Variations

Thirty special status species may occur, are likely to occur, or are known to occur in Segment 4 (Table 3-142). Information relating to the types of habitat available for special status species within the study corridor is located in Table 3-110 in Section 3.2.3. Habitat locations are depicted in MV-7. Special status species in Segment 4 include shrubland species, such as common nighthawk, pallid bat, burrowing owl, and white-tailed jackrabbit; grassland species, such as bobolink and long-billed curlew; and species that occur in RCAs, including northern leopard frog, Woodhouse's toad, and western ridged mussel. Threats to these species have been discussed in previous segments. Species accounts for these species, and others that may occur in this segment, as identified in Table 3-142, are discussed in Appendix E.

Greater Sage-Grouse

Segment 4 crosses through areas mapped for the Northern Great Basin population, a large Greater Sage-Grouse population found in Oregon, Idaho, Nevada, and Utah. The population is divided into two segments, with the largest portion located in Oregon, Idaho, and Nevada and the smaller portion located in northwestern Utah, known as the Box Elder area. This population occurs on a large amount of publicly managed land (largely BLM), and that is among the least fragmented and largest sagebrush-dominated landscapes within the extant range of Greater Sage-Grouse (USFWS 2013). In 2007, this population was estimated to have a minimum of 9,114 males (Garton et al. 2011).

Loss of sagebrush habitat has been and continues to be a threat to the Northern Great Basin population in Oregon. Between 1963 and 1974, 500,000 acres of sagebrush habitat was seeded to crested wheatgrass or sprayed with herbicide, and 1,600 water developments and 463 miles of pipeline were constructed in the BLM Vale District (USFWS 2013). More recently, wildfire has been the largest threat to landscape-scale losses of sagebrush habitat. Large wildfires that have burned Greater Sage-Grouse habitat in the study corridor include the 80,054-acre Jackson Fire (2000), the 4,104-acre Cavanaugh 2 Fire (2001), the 4,302-acre Farewell Bend Fire (2005),14,632-acre Mud Springs Fire (2006), the 22,700-acre Kitten Fire Complex (2014), and the 12,024-acre Lime Hill Fire (2015) (BLM n.d.; USGS 2016). In conjunction with fire, invasive weeds also are one of the greatest risks to the more than 4 million acres of sagebrush habitat for this population in Oregon. More than 580,000 acres is dominated by invasive species (Hagen 2011). Other threats in this region include mining development, renewable energy development, transmission lines, and juniper encroachment at higher elevations. West Nile virus also has been detected in mosquitoes in this region (Oregon Public Health Division 2014) and the population was subjected to the largest known West Nile virus mortality event involving Greater Sage-Grouse in Oregon. Despite efforts to manage wildfire risks, wildfires and invasive species have continued to reduce the quality of habitat in portions of Segment 4. Due to existing landscape features, this northwestern portion of the population is at higher risk from landscape altering events such as high intensity wildfire (USFWS 2013).

The Cow Valley Oregon PAC is present in Segment 4 and is the northern-most concentration of Greater Sage-Grouse in the Northern Great Basin population. Based on ILAP data (Gaines et al. 2013), 83.2 percent (300,608 acres) of the 368,615 acre Cow Valley Oregon PAC is comprised of existing Greater Sage-Grouse habitat and 16.8 percent (60,826 acres) is potential Greater Sage-Grouse habitat. Potential habitat consists of areas that are capable of supporting sagebrush but not currently suitable for Greater Sage-Grouse and include burned areas, agricultural land, areas encroached by junipers, and crested wheat plantings.

There are at least 38 leks or lek complexes within the Cow Valley Oregon PAC. Since 1998, lek surveys have been conducted annually at three of these that are in proximity to the B2H Project: Becker Creek, Worthington, and County Border Number 2. The spring trend for maximum attendance per lek (moving 5-year average) was 28 Greater Sage-Grouse in 2014 which is 65 percent above the 2003 baseline of 16 Greater Sage-Grouse. Greater Sage-Grouse have not been observed at the Becker Creek lek complex in the last 4 years. Attendance at the Worthington lek complex is relatively low (12 Greater Sage-Grouse in 2014), but has increased 63 percent from the 2003 baseline. The County Border Number 2 lek has the highest attendance (42 sage-grouse in 2014) compared to the other lek complexes, has increased 79 percent from the 2003 baseline.

Greater Sage-Grouse may disperse between the Cow Valley Oregon PAC and other Oregon PACs. Dispersal is most likely to occur with the adjacent Bully Creek Oregon PAC located to the south. Dispersal also is possible between the Cow Valley Oregon PAC and the Drewsey and Crowley Oregon PACs, as connectivity is not severely limited.

Table 3-156 presents the miles of Greater Sage-Grouse habitat types crossed by the centerline of all alternative routes and route variations in Segment 4. Locations of Greater Sage-Grouse habitat crossed by the B2H Project are described by alternative route below and displayed in MV-8.

Table 3-156. Alternative Route Comparison for Greater Sage-Grouse Inventory Data for Segment 4—Brogan (miles crossed)

Alternative Route	Total Length (miles)	Priority Habitat Management Areas	General Habitat Management Areas
Applicant's Proposed Action	40.1	20.3	18.7
Variation S4-A1	*5.9*	*0.0*	*4.8*
Variation S4-A2	*6.0*	*0.0*	*4.8*
Variation S4-A3	*6.1*	*0.0*	*4.8*
Tub Mountain South	40.5	6.8	10.2
Willow Creek	34.6	15.5	14.5

Table Note: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.

The number and occupancy status of leks within 0.25, 2.0, and 3.1 miles of the centerlines of the alternative routes and route variations are presented in Table 3-157. The proximity of leks to the alternative routes and route variations is discussed by route below. The lek occupancy status classifications are defined in Section 3.2.4.2 under Greater Sage-Grouse Policy and Management Guidance – Oregon Department of Fish and Wildlife Plans.

Table 3-157. Number of Greater Sage-Grouse Leks in Segment 4—Brogan

Alternative Route	Lek Occupancy Status	Number of Leks within 0.25, 2.0, and 3.1 Miles					
		Priority Habitat Management Areas			General Habitat Management Areas		
		0.25	2.0	3.1	0.25	2.0	3.1
Applicant's Proposed Action	Unoccupied	0	0	0	0	0	0
	Unoccupied pending	0	0	2	0	0	0
	Occupied	0	0	0	0	0	0
	Occupied pending	0	1	10	0	0	1
	Historic	0	0	1	0	0	0
	Unknown	0	0	0	0	0	0
Variation S4-A1	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied	*0*	*0*	*0*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*0*	*0*	*0*	*0*
	Historic	*0*	*0*	*1*	*0*	*0*	*0*
	Unknown	*0*	*0*	*0*	*0*	*0*	*0*
Variation S4-A2	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied	*0*	*0*	*0*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*0*	*0*	*0*	*0*
	Historic	*0*	*0*	*1*	*0*	*0*	*0*
	Unknown	*0*	*0*	*0*	*0*	*0*	*0*

Table 3-157. Number of Greater Sage-Grouse Leks in Segment 4—Brogan							
Alternative Route	**Lek Occupancy Status**	**Number of Leks within 0.25, 2.0, and 3.1 Miles**					
		Priority Habitat Management Areas			**General Habitat** Management Areas		
		0.25	**2.0**	**3.1**	**0.25**	**2.0**	**3.1**
Variation S4-A3	*Unoccupied*	*0*	*0*	*0*	*0*	*0*	*0*
	Unoccupied pending	*0*	*0*	*1*	*0*	*0*	*0*
	Occupied	*0*	*0*	*0*	*0*	*0*	*0*
	Occupied pending	*0*	*0*	*0*	*0*	*0*	*0*
	Historic	*0*	*0*	*1*	*0*	*0*	*0*
	Unknown	*0*	*0*	*0*	*0*	*0*	*0*
Tub Mountain South	Unoccupied	0	0	0	0	0	0
	Unoccupied pending	0	0	1	0	0	0
	Occupied	0	0	0	0	0	0
	Occupied pending	0	1	1	0	0	0
	Historic	0	0	1	0	0	0
	Unknown	0	0	0	0	0	0
Willow Creek	Unoccupied	0	0	0	0	0	0
	Unoccupied pending	0	0	1	0	0	0
	Occupied	0	0	0	0	0	0
	Occupied pending	0	2	8	0	0	1
	Historic	0	0	1	0	0	0
	Unknown	0	0	0	0	0	0

Applicant's Proposed Action Alternative

Except for a very small portion at the northern end of the route, the entire length of the Applicant's Proposed Action Alternative crosses Greater Sage-Grouse habitat, with approximately half of the route crossing PHMA in the Cow Valley Oregon PAC (Links 4-25, 4-45, 4-50, and 4-65) and approximately half the route crossing GHMA (Links 4-13, 4-65, and 4-70). The Applicant's Proposed Action Alternative also is within 3.1 miles of occupied pending, unoccupied pending, and historic leks; however, no leks are closer than 0.25 mile.

Variations S4-A1, S4-A2, and S4-A3

Except for a very small portion at the northern end of the route, the entire lengths of the variations cross Greater Sage-Grouse GHMA. The entire length of Variation S4-A2 is colocated with an existing transmission line. The variations also are 3.1 miles of unoccupied pending and historic leks; however, no leks are closer than 2.0 miles. The variations do not cross PHMA.

Tub Mountain South Alternative

Northern portions of the Tub Mountain South Alternative cross GHMA (Link 4-15) and PHMA in the Cow Valley PAC (Link 4-30) and southern portions cross GHMA (Link 4-75); a large central portion of the alternative route (Link 4-75), along with smaller portions of the northern and southern sections, does not cross Greater Sage-Grouse habitat. The route also is 3.1 miles of occupied pending, unoccupied pending, and historic leks; however, no leks are closer than 0.25 mile.

Willow Creek Alternative

Except for several small portions of the route, the entire length of the Willow Creek Alternative crosses Greater Sage-Grouse habitat, with GHMA (Link 4-13) and PHMA in the Cow Valley PAC (Links 4-25, 4-35, 4-40, and 4-60) crossed in the northern half and GHMA crossed in the southern half (Links 4-60 and 4-70). The route also is 3.1 miles of occupied pending, unoccupied pending, and historic leks; however, no leks are closer than 0.25 mile.

Migratory Birds Including Raptors

Segment 4 is in the migratory bird Pacific Flyway and contains habitats that support many avian species identified as BCCs within BCR 9 (Table 3-143). These habitats also provide nesting and foraging areas for a variety of raptors (Table 3-144). Habitat for shrubland species (e.g., Brewer's sparrow and sage thrasher), and, to a lesser extent, grassland species (e.g., long-billed curlew), and species that occur in RCAs (e.g., willow flycatcher), is present in the study corridor in Segment 4 (Table 3-110 in Section 3.2.3 and MV-7). A detailed discussion of available wildlife habitats within the study corridor in Segment 4 is presented in Vegetation Resources, Section 3.2.3.

The shrublands and grasslands in Segment 4 provide hunting and breeding habitat for golden eagles, and forested areas near waterbodies in the B2H Project area are suitable for bald eagle use; locations of known eagle nests in the study corridor are presented in Table 3-158 and described by alternative route and route variation below.

Table 3-158. Number of Eagle Nests in Segment 4—Brogan

Alternative Route	Bald Eagle		Golden Eagle	
	1-Mile Corridor	10-Mile Corridor	1-Mile Corridor	10-Mile Corridor
Applicant's Proposed Action	0	2	6	50
Variation S4-A1	*0*	*0*	*2*	*19*
Variation S4-A2	*0*	*0*	*4*	*19*
Variation S4-A3	*0*	*0*	*2*	*19*
Tub Mountain South	0	5	4	37
Willow Creek	0	4	4	39

Applicant's Proposed Action Alternative

Throughout Segment 4, the Applicant's Proposed Action Alternative crosses habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and, to a lesser extent, the Applicant's Proposed Action Alternative crosses habitat for species found in RCAs, such as willow flycatcher, and grassland species, such as long-billed curlew. The Applicant's Proposed Action Alternative is within 5 miles of bald and golden eagle nests throughout Segment 4; however, no bald eagle nests are closer than 0.5 mile.

Variations S4-A1, S4-A2, and S4-A3

The variations cross habitat for shrubland species, such as Brewer's sparrow and sage thrasher; species that occur in RCAs, such as willow flycatcher; and grassland species, such as long-billed curlew. The entire length of Variation S4-A2 is colocated with an existing transmission line. No bald

eagle nests are known within 5 miles of the variations, but the variations are within 0.5 mile of golden eagle nests.

Tub Mountain South Alternative

The Tub Mountain South Alternative crosses habitat for shrubland species, such as Brewer's sparrow and sage thrasher; grassland species, such as long-billed curlew; and, to a lesser extent, species found in RCAs, such as willow flycatcher. The Tub Mountain South Alternative is within 5 miles of bald and golden eagle nests throughout Segment 4; however, no bald eagle nests are closer than 0.5 mile.

Willow Creek Alternative

Throughout Segment 4, the Willow Creek Alternative crosses habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and, to a lesser extent, the Willow Creek Alternative crosses habitat for species found in RCAs, such as willow flycatcher, and grassland species, such as long-billed curlew. The Willow Creek Alternative is within 5 miles of bald and golden eagle nests throughout Segment 4; however, no bald eagle nests are closer than 0.5 mile.

Big Game

Big game species present in the B2H Project area for Segment 4 include mule deer, white-tailed deer, elk, and pronghorn. Major habitat types identified and used by these species in Segment 4 include shrublands and grasslands. Designated habitat types that are crossed by routes in Segment 4 include winter range for elk, mule deer, and pronghorn; locations of big game habitat crossed by the B2H Project are described by alternative route and route variation below and displayed in MV-10.

Segment 4 crosses two ODFW WMU that include the Sumpter and Beulah WMUs. In both WMUs, mule deer populations are currently below management objectives (ODFW 2015b, 2015c). Elk populations are currently above management objectives in the Sumpter WMU. The East Beulah WMU is considered an elk de-emphasized area (ODFW 2015c). Elk de-emphasis areas are characterized by high percentages of private land with ongoing elk damage to private property and agricultural crops, or high potential for such damage. Management objectives are not proposed for these areas, and the management focus is to minimize elk numbers and damage caused by elk (ODFW 2005). Population estimates for elk in the West Beulah WMU were not available for 2015, but estimates for 2010-2014 were below management objectives. Factors that can affect mule deer and elk populations in the B2H Project area are the same as those described for Segment 1. Factors affecting populations and management objectives for pronghorn in the B2H Project area were not available.

Table 3-159 presents the miles of big game habitat types crossed by the centerline of all alternative routes and route variations in Segment 4.

Table 3-159. Big Game Inventory Data for Segment 4—Brogan (miles crossed)

Alternative Route	Total Length (miles)	Pronghorn Winter Range	Mule Deer Winter Range	Elk Winter Range
Applicant's Proposed Action	40.1	0.0	26.0	35.4
Variation S4-A1	*5.9*	*0.0*	*5.9*	*5.9*
Variation S4-A2	*6.0*	*0.0*	*5.9*	*5.9*
Variation S4-A3	*6.1*	*0.0*	*6.0*	*6.0*
Tub Mountain South	40.5	13.1	37.0	24.1
Willow Creek	34.6	2.9	29.5	25.5
Table Notes: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.				

Applicant's Proposed Action Alternative

Applicant's Proposed Action Alternative crosses mule deer and/or elk winter range throughout Segment 4. The Applicant's Proposed Action Alternative does not cross pronghorn winter range.

Variations S4-A1, S4-A2, and S4-A3

The entire length the variations cross both elk and mule deer winter range. The entire length of Variation S4-A2 is colocated with an existing transmission line. The variations do not cross pronghorn winter range.

Tub Mountain South Alternative

Except for a small potion near the southern end of the alternative route (Link 4-75), all of the Tub Mountain South Alternative crosses mule deer and/or elk winter range in Segment 4. The Tub Mountain South Alternative also crosses three blocks of pronghorn winter range (Link 4-75).

Willow Creek Alternative

Except for a small potion (Link 4-60), all of the Willow Creek Alternative crosses mule deer and/or winter range in Segment 4. A small portion of the alternative route also crosses pronghorn winter range (Links 4-35, 4-40, and 4-60).

SEGMENT 5—MALHEUR

Wildlife Habitat

Alternative Routes and Route Variations

Shrublands comprise the majority of wildlife habitats in Segment 5 (MV-7, Table 3-113 in Section 3.2.3). Shrubland habitat is evenly distributed throughout Segment 5. Limited grassland habitat and RCAs also are present scattered throughout Segment 5. Small acreages of bare ground/cliff/talus habitat also are present. Additionally, the alternative routes and Variations S5-B1 and S5-B2 cross shrublands, grasslands, and RCAs at the Owyhee River Below the Dam ACEC along the Owyhee River (Links 5-30, 5-35, 5-50, and 5-55); the diverse habitat of this area supports a large number of wildlife

species, including migrating birds. Refer to Table E-2 (Appendix E) for a list of the wildlife species commonly found in each wildlife habitat type in Segment 5.

Special Status Species

Alternative Routes and Route Variations

Thirty-five special status species may occur, are likely to occur, or are known to occur in Segment 5 (Table 3-142). Information relating to the types of habitat available for special status species within the study corridor is located in Table 3-113 in Section 3.2.3. Habitat locations are depicted in MV-7. Special status species in Segment 4 include shrubland species such as common nighthawk, pallid bat, and white-tailed jackrabbit; grassland species such as bobolink and long-billed curlew; and species that occur in RCAs such as northern leopard frog and Woodhouse's toad. Threats to these species have been discussed in previous segments. Species accounts for these species, and others that may occur in this segment, as identified in Table 3-142, are discussed in Appendix E.

Columbia Spotted Frog

Habitat for the Columbia spotted frog Greater Basin distinct population segment is crossed in Segment 5. Table 3-160 presents the miles of Columbia spotted frog habitat crossed by the centerline of all alternative routes and route variations in Segment 5. Locations of Columbia spotted frog habitat crossed by the B2H Project are described by alternative route and route variation below and displayed in MV-8. Refer to the Occurrence subsection of Columbia spotted frog at the beginning of Section 3.2.4.5 for definitions of habitat types.

Table 3-160. Columbia Spotted Frog Inventory Data for Segment 5—Malheur (miles crossed)

Alternative Route	Total Length (miles)	Potentially Occupied Habitat (Higher Quality)	Suitable Habitat (High Potential)
Applicant's Proposed Action	40.4	0.0	1.8
Variation S5-A1	*7.4*	*0.0*	*0.5*
Variation S5-A2	*7.4*	*0.1*	*0.6*
Variation S5-B1	*2.5*	*0.0*	*0.7*
Variation S5-B2	*2.8*	*0.0*	*0.8*
Malheur S	43.5	0.9	2.0
Malheur A	43.1	0.9	2.0

Table Notes: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative crosses small portions of Columbia spotted frog suitable habitat (high potential) throughout Segment 5. The route does not cross any other Columbia spotted frog habitat types in Segment 5.

Variation S5-A1

The variation crosses four small areas of Columbia spotted frog suitable habitat (high potential) (Link 5-15). Potentially occupied habitat (higher quality) occurs within the study corridor near the variation's

northern end but is not crossed. The variation does not cross any other Columbia spotted frog habitat types in Segment 5.

Variation S5-A2

The variation crosses four small areas of Columbia spotted frog suitable habitat (high potential) (Link 5-20). The variation also crosses potentially occupied habitat (higher quality) near the variation's northern end. The variation does not cross any other Columbia spotted frog habitat types in Segment 5.

Variations S5-B1 and S5-B2

The variations cross small portions of Columbia spotted frog suitable habitat (high potential) throughout the length of the variations. The variations do not cross any other Columbia spotted frog habitat types in Segment 5.

Malheur S and Malheur A Alternatives

The Malheur S and Malheur A Alternatives cross small areas of Columbia spotted frog suitable habitat (high potential) throughout the southern half of Segment 5 (Links 5-25, 5-30, and 5-35). The alternative routes also cross areas of potentially occupied habitat (higher quality) in the northern half of Segment 5 (Link 5-25). The alternative routes do not cross any other Columbia spotted frog habitat types in Segment 5.

Greater Sage-Grouse

Segment 5 crosses habitat for the Greater Sage-Grouse Northern Great Basin population. This population was estimated, in 2007, to have a minimum of 9,114 males (Garton et al. 2011). The Northern Great Basin population occupies portions of Oregon, Nevada, Idaho, and Utah, and is separated from adjacent populations by distance (12 to 37 miles) and topography. Current threats and trends in habitat loss and fragmentation for the Northern Great Basin Greater Sage-Grouse population have been discussed previously in Segment 4.

As discussed for Segments 3 and 4, wildfire has been one of the largest threats to Greater Sage-Grouse habitat loss. Numerous large wildfires have affected areas of Greater Sage-Grouse habitat in the study corridor in Segment 5, including the 22,112-acre Double Mountain Fire (2005), the 31,320-acre Cow Hollow Fire (1996), and the 46,511-acre Owyhee Fire (2013) (BLM n.d.; USGS 2016). Wildfires affecting Greater Sage-Grouse habitat in Segment 5 in the B2H Project area are discussed further in cumulative effects analysis (Section 3.3.3.4).

The B2H Project crosses Greater Sage-Grouse GHMA in Segment 5; no PHMA or leks occur with the study corridor of the alternative routes and route variations. Table 3-161 presents the miles of Greater Sage-Grouse habitat types crossed by the centerline of all alternative routes and route variations in Segment 5. Locations of Greater Sage-Grouse habitat crossed by the B2H Project are described by alternative route and route variation below and displayed in MV-9.

Table 3-161. Greater Sage-Grouse Inventory Data for Segment 5—Malheur (miles crossed)			
Alternative Route	**Total Length (miles)**	**Priority Habitat Management Areas**	**General Habitat Management Areas**
Applicant's Proposed Action	40.4	0.0	11.2
Variation S5-A1	*7.4*	*0.0*	*0.0*
Variation S5-A2	*7.4*	*0.0*	*0.0*
Variation S5-B1	*2.5*	*0.0*	*0.2*
Variation S5-B2	*2.8*	*0.0*	*1.1*
Malheur S	43.5	0.0	22.4
Malheur A	43.1	0.0	25.6
Table Notes: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.			

Applicant's Proposed Action Alternative

The northern end and central portions of the Applicant's Proposed Action Alternative cross blocks of Greater Sage-Grouse GHMA (Links 5-1, 5-5, 5-40, and 5-45). The Applicant's Proposed Action Alternative does not cross PHMA and no leks are closer than 3.1 miles.

Variations S5-A1 and S5-A2

The variations do not cross Greater Sage-Grouse PHMA or GHMA and no leks are closer than 3.1 miles.

Variation S5-B1

A small portion of the variation crosses Greater Sage-Grouse GHMA at the variation's north end (Link 5-50). The variation does not cross PHMA and no leks are closer than 3.1 miles.

Variation S5-B2

The majority of the northern half of the variation crosses Greater Sage-Grouse GHMA (Link 5-5-45). The variation does not cross PHMA and no leks are closer than 3.1 miles.

Malheur S and Malheur A Alternatives

The Malheur S and Malheur A Alternatives cross Greater Sage-Grouse GHMA throughout Segment 5 (Links 5-1, 5-5, 5-25, 5-30, and 5-35). The alternative routes do not cross PHMA and no leks are closer than 3.1 miles.

Migratory Birds Including Raptors

Segment 5 is in the migratory bird Pacific Flyway and contains habitats that support many avian species identified as BCCs within BCR 9 (Table 3-143). These habitats also provide nesting and foraging areas for a variety of raptors (Table 3-144). Habitat for shrubland species (e.g., Brewer's sparrow and sage thrasher), and, to a lesser extent, grassland species (e.g., long-billed curlew), and species that occur in RCAs (e.g., willow flycatcher), is present in the study corridor in Segment 5 (Table 3-113 in Section 3.2.3 and MV-7). A detailed discussion of available wildlife habitats within the study corridor in Segment 5 is presented in Vegetation Resources, Section 3.2.3.

The shrublands and grasslands in Segment 5 provide hunting and breeding habitat for golden eagles, and waterbodies and adjacent habitat in the B2H Project area are suitable for bald eagle use; locations of known eagle nests in the study corridor are presented in Table 3-162 and described by alternative route and route variation below.

Table 3-162. Number of Eagle Nests in Segment 5—Malheur

Alternative Route	Bald Eagle		Golden Eagle	
	1-Mile Corridor	10-Mile Corridor	1-Mile Corridor	10-Mile Corridor
Applicant's Proposed Action	0	2	11	64
Variation S5-A1	*0*	*0*	*0*	*10*
Variation S5-A2	*0*	*0*	*0*	*12*
Variation S5-B1	*0*	*0*	*1*	*32*
Variation S5-B2	*0*	*0*	*1*	*32*
Malheur S	0	3	20	88
Malheur A	0	3	16	81

Applicant's Proposed Action Alternative

Throughout Segment 5, the Applicant's Proposed Action Alternative crosses habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and, to a lesser extent, the Applicant's Proposed Action Alternative crosses habitat for species found in RCAs, such as willow flycatcher, and grassland species, such as long-billed curlew. The Applicant's Proposed Action Alternative is within 5 miles of bald and golden eagle nests throughout Segment 5; however, no bald eagle nests are closer than 0.5 mile.

Variations S5-A1 and S5-A2

Variations S5-A1 and S5-A2 cross habitat for shrubland species, such as Brewer's sparrow and sage thrasher; species that occur in RCAs, such as willow flycatcher; and grassland species, such as long-billed curlew. No bald eagle nests are known within 5 miles of the variations and no golden eagle nests are closer than 0.5 mile.

Variations S5-B1 and S5-B2

Variation S5-B1 and S5-B2 cross habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and species that occur in RCAs, such as willow flycatcher. No bald eagle nests are known within 5 miles, but the variations are within 5 miles of golden eagle nests.

Malheur S and Malheur A Alternatives

Throughout Segment 5, the Malheur S Alternative and Malheur A Alternatives cross habitat for shrubland species such as Brewer's sparrow and sage thrasher, and, to a lesser extent, the alternative routes cross habitat for species found in RCAs such as willow flycatcher, and grassland species such as long-billed curlew. The Malheur S and Malheur B Alternatives are within 5 miles of bald and golden eagle nests throughout Segment 5; however, no bald eagle nests are closer than 0.5 mile.

Big Game

Big game species present in the B2H Project area for Segment 5 include mule deer, elk, and pronghorn. Designated habitat types that are crossed by routes in Segment 5 include winter range for elk, mule deer, and pronghorn; locations of big game habitat crossed by the B2H Project are described by alternative route and route variation below and displayed in MV-10.

Table 3-163 presents the miles of big game habitat types crossed by the centerline of all alternative routes and route variations in Segment 5.

Table 3-163. Big Game Inventory Data for Segment 5—Malheur (miles crossed)

Alternative Route	Total Length (miles)	Pronghorn Winter Range	Mule Deer Winter Range	Elk Winter Range
Applicant's Proposed Action	40.4	12.8	24.6	2.2
Variation S5-A1	*7.4*	*5.5*	*1.3*	*0.0*
Variation S5-A2	*7.4*	*6.0*	*0.2*	*0.0*
Variation S5-B1	*2.5*	*0.0*	*2.5*	*0.0*
Variation S5-B2	*2.8*	*0.0*	*2.8*	*0.0*
Malheur S	43.5	14.7	20.6	2.2
Malheur A	43.1	16.4	20.0	2.2

Table Notes: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.

Segment 5 crosses two ODFW WMU that include the Beulah and Owyhee WMUs. In both WMUs, mule deer populations are currently below management objectives (ODFW 2015b). Elk populations are currently above management objectives in the Owyhee WMU (ODFW 2015c). The East Beulah WMU is considered an elk de-emphasized area (ODFW 2015c). Elk de-emphasis areas are characterized by high percentages of private land with ongoing elk damage to private property and agricultural crops, or high potential for such damage. Management objectives are not proposed for these areas, and the management focus is to minimize elk numbers and damage caused by elk (ODFW 2005). Population estimates for elk in the West Beulah WMU were not available for 2015, but estimates for 2010-2014 were below management objectives. Factors that can affect mule deer and elk populations in the B2H Project area are the same as those described for Segment 1. Factors affecting populations and management objectives for pronghorn in the B2H Project area were not available.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative crosses two large blocks of mule deer winter range in the northern and southern halves of Segment 5 (Links 5-5, 5-10, 5-40, 5-50, 5-55, 5-65, and 5-70) and pronghorn winter range in central and northern portions of the routes (Links 5-1, 5-5, 5-15, and 5-40). The Applicant's Proposed Action Alternative only crosses a small area of elk winter range at the northern end of the route.

Variations S5-A1 and S5-A2

The majority of the variations cross pronghorn winter range, but only small portions cross mule deer winter range (Links 5-15 and 5-20). The variations do not cross elk winter range.

Variation S5-B1

The entire length of the route variation crosses mule deer winter range. The variations do not cross mule deer or elk winter range.

Variation S5-B2

The entire length of the route variation crosses mule deer winter range. The variation does not cross mule deer or elk winter range.

Malheur S and Malheur A Alternatives

Northern and southern portions of the Malheur S and Malheur A Alternatives cross mule deer winter range and the alternative routes cross blocks of pronghorn winter range in Segment 5. The alternative routes only cross a small area of elk winter range at the northern end of Segment 5.

SEGMENT 6—TREASURE VALLEY

Wildlife Habitat

Alternative Routes and Route Variations

Shrublands comprise the majority of habitat in Segment 6 (MV-7, Table 3-116 in Section 3.2.3). Limited RCAs are scattered throughout Segment 6. Grasslands also are present, but the majority of the grasslands are composed of non-native grass species. Refer to Table E-2 (Appendix E) for a list of the wildlife species commonly found in each wildlife habitat type in Segment 6.

Special Status Species

Alternative Routes and Route Variations

Fifty-four special status species may occur, are likely to occur, or are known to occur in Segment 6 (Table 3-142). Information relating to the types of habitat available for special status species within the study corridor is located in Table 3-116 in Section 3.2.3. Habitat locations are depicted in MV-7. Special status species in Segment 6 include shrubland species such as pallid bat and Greater Sage-Grouse (discussed in detail below) and species that occur in RCAs such as northern leopard frog and Woodhouse's toad; the majority of grassland habitat present is composed of non-native grasses and is unlikely to support special status grassland species. Threats to these special status species have been discussed in previous segments. Species accounts for these species, and others that may occur in this segment, as identified in Table 3-142, are discussed in Appendix E.

Columbia Spotted Frog

The only Columbia spotted frog (Greater Basin distinct population segment) habitat type crossed in Segment 6 is suitable habitat (high potential). Table 3-164 presents the miles of Columbia spotted frog habitat crossed by the centerline of the Applicant's Proposed Action and route variations in Segment 6. Locations of Columbia spotted frog habitat crossed by the B2H Project are described by alternative route and route variation below and displayed in MV-8. Refer to the Occurrence subsection of Columbia spotted frog at the beginning of Section 3.2.4.5 for definitions of habitat types.

Table 3-164. Columbia Spotted Frog Inventory Data for Segment 6—Treasure Valley (miles crossed)		
Alternative Route	**Total Length (miles)**	**Suitable Habitat (High Potential)**
Applicant's Proposed Action	28.0	2.1
Variation S6-A1	*9.3*	*1.0*
Variation S6-A2	*8.9*	*0.3*
Variation S6-B1	*14.4*	*0.7*
Variation S6-B2	*14.1*	*0.5*
Table Note: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.		

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative crosses small portions of Columbia spotted frog suitable habitat (high potential) throughout Segment 6. The route does not cross any other Columbia spotted frog habitat types in Segment 6.

Variations S6-A1 and S6-A2

Variations S6-A1 and S6-A2 cross several small portions of Columbia spotted frog suitable habitat (high potential) (Links 6-5, 6-10, 6-15, 6-20). The variations do not cross any other Columbia spotted frog habitat types in Segment 6.

Variations S6-B1 and S6-B2

Variations S6-B1 and S6-B2 cross several small portions of Columbia spotted frog suitable habitat (high potential) (Links 6-25 and 6-30). The variations do not cross any other Columbia spotted frog habitat types in Segment 6.

Greater Sage-Grouse

As with Segments 4 and 5, Segment 6 crosses the Northern Great Basin Greater Sage-Grouse population; population estimates and trends in habitat loss and fragmentation have been discussed previously.

Despite efforts to manage wildfire risks, wildfires have continued to reduce the quality of Greater Sage-Grouse habitat in Segment 6. Idaho's Murphy Fire Complex of 2007 affected roughly 600,000 acres of habitat for this population. Large wildfires that have affected areas of Greater Sage-Grouse habitat in the study corridor include the 260,182-acre Soda Fire of 2015 and the 42,688-acre Trimbly Fire of 2002. Wildfires affecting Greater Sage-Grouse habitat in Segment 6 in the B2H Project area are discussed further in the cumulative effects analysis (Section 3.3.3.4).

The B2H Project crosses IHMA, but not PHMA or GHMA, in Segment 6. However, some portions of IHMA consist of lands that serve as management buffers between developed areas and PHMA and are not identified as areas with ecological site characteristics suitable for Greater Sage-Grouse habitat or occupancy (Makela and Major 2012). No leks occur in the study corridor of Applicant's Proposed Action and route variations. Table 3-165 presents the miles of Greater Sage-Grouse habitat types crossed by the centerline of the Applicant's Proposed Action and route variations in Segment 6. Locations of

Greater Sage-Grouse habitat crossed by the B2H Project are described by alternative route and route variation below and displayed in MV-9.

Table 3-165. Greater Sage-Grouse Inventory Data for Segment 6—Treasure Valley (miles crossed)

Alternative Route	Total Length (miles)	Priority Habitat Management Areas	Important Habitat Management Areas[1]	General Habitat Management Areas
Applicant's Proposed Action	28.0	0.0	22.3	0.0
Variation S6-A1	*9.3*	*0.0*	*6.7*	*0.0*
Variation S6-A2	*8.9*	*0.0*	*5.9*	*0.0*
Variation S6-B1	*14.4*	*0.0*	*13.5*	*0.0*
Variation S6-B2	*14.1*	*0.0*	*13.7*	*0.0*

Table Notes:
[1]Some portions of Important Habitat Management Areas consist of lands that serve as management buffers between developed areas and Priority Habitat Management Areas and are not identified as areas with ecological site characteristics suitable for Greater Sage-Grouse habitat or occupancy.
Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action is adjacent to an existing 500-kV transmission line. The Applicant's Proposed Action crosses IHMA for the majority of Segment 6, but more than half of IHMA crossed (portions west of U.S. 95; Links 6-1, 6-20, and 6-25) are lands that serve as management buffers for PHMA and to connect patches of PHMA (refer to Greater Sage-Grouse Policy and Management Guidance in Section 3.2.4.2 for the definition of IHMA), and are not identified as lands used by Greater Sage-Grouse (Makela and Major 2012). No leks, PHMA, or GHMA are in the study corridor of the Applicant's Proposed Action Alternative.

Variations S6-A1 and S6-A2

Variations S6-A1 and S6-A2 parallel an existing 500-kV transmission line (however, Variation S6-A2 is closer to the existing transmission line than Variation S6-A1) and the majority of the variations cross IHMA; however, the portions of IHMA crossed are not identified as lands used by Greater Sage-Grouse (Makela and Major 2012), but are lands that serve as management buffers for PHMA and to connect patches of PHMA (refer to Greater Sage-Grouse Policy and Management Guidance in Section 3.2.4.2 for the definition of IHMA). No leks, PHMA, or GHMA are in the study corridor of the variations.

Variations S6-B1 and S6-B2

Variations S6-B1 and S6-B2 parallel an existing 500-kV transmission line (however, Variation S6-B1 is closer to the existing transmission line than Variation S6-B2). Except for small portions in the western halves (Links 6-25 and 6-30), the entire lengths of both route variations cross IHMA, all of which is identified as land used by Greater Sage-Grouse.

Migratory Birds Including Raptors

Segment 6 is in the migratory bird Pacific Flyway and contains habitats that support many avian species identified as BCCs within BCR 9 (Table 3-143). These habitats also provide nesting and foraging areas for a variety of raptors (Table 3-144). Habitat for shrubland species (e.g., Brewer's sparrow and sage thrasher) and, to a lesser extent, species that occur in RCAs (e.g., willow flycatcher), is present in the study corridor in Segment 6 (MV-7 and Table 3-116 in Section 3.2.3). Non-native grasslands also are present in Segment 6 and may provide habitat for some migratory bird species, but are unlikely to support BCCs. A detailed discussion of available wildlife habitats within the study corridor in Segment 6 is presented in Vegetation Resources, Section 3.2.3.

The shrublands and grasslands in Segment 6 provide hunting and breeding habitat for golden eagles; bald eagles occur in Segment 6 but no nests are known within 5 miles. Table 3-166 and described by alternative route and route variation below.

Table 3-166. Number of Eagle Nests in Segment 6—Treasure Valley

Alternative Route	Bald Eagle		Golden Eagle	
	1-Mile Corridor	10-Mile Corridor	1-Mile Corridor	10-Mile Corridor
Applicant's Proposed Action	0	0	9	67
Variation S6-A1	*0*	*0*	*2*	*19*
Variation S6-A2	*0*	*0*	*0*	*19*
Variation S6-B1	*0*	*0*	*5*	*46*
Variation S6-B2	*0*	*0*	*2*	*46*

Applicant's Proposed Action Alternative

The Applicant's Proposed Action is adjacent to an existing 500-kV transmission line. Throughout Segment 6, the Applicant's Proposed Action crosses habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and, to a lesser extent, the Applicant's Proposed Action crosses habitat for species found in RCAs, such as willow flycatcher. The Applicant's Proposed Action is within 5 miles to golden eagle nests throughout Segment 6; however, no bald eagle nests are known within 5 miles.

Variations S6-A1 and S6-A2

Variations S6-A1 and S6-A2 parallel an existing 500-kV transmission line (however, Variation S6-A2 is closer to the existing transmission line than Variation S6-A1). Variations S6-A1 and S6-A2 cross habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and species that occur in RCAs, such as willow flycatcher. No bald eagle nests are known within 5 miles of the variations, but the variations are within 5 miles of golden eagle nests. Variation S6-A1, but not Variation S6-A1, is within 0.5 mile of golden eagle nests

Variations S6-B1 and S6-B2

Variations S6-B1 and S6-B2 parallel an existing 500-kV transmission line (however, Variation S6-B1 is closer to the existing transmission line than Variations S6-B2). Variations S6-B1 and S6-B2 cross habitat for shrubland species, such as Brewer's sparrow and sage thrasher, and species that occur in

RCAs, such as willow flycatcher. No bald eagle nests are known within 5 miles of the variations, but the variations are within 0.5 mile of golden eagle nests.

Big Game

Big game species present in the B2H Project area for Segment 6 include mule deer, elk, pronghorn, and bighorn sheep. Designated habitat types that are crossed by routes in Segment 6 include winter range for mule deer and bighorn sheep population management units; bighorn sheep core herd home range, bighorn sheep lambing areas, and pronghorn winter range occur within the 5-mile-wide study corridor but are not crossed. Locations of big game habitat crossed by the B2H Project are described by alternative route and route variation below and displayed in MV-10.

Table 3-167 presents the miles of big game habitat types crossed by the centerline of the Applicant's Proposed Action and route variations in Segment 6.

Table 3-167. Big Game Inventory Data for Segment 6—Treasure Valley (miles crossed)

Alternative Route	Total Length (miles)	Bighorn Sheep Population Management Units	Mule Deer Winter Range
Applicant's Proposed Action	28.0	17.5	8.0
Variation S6-A1	*9.3*	*6.7*	*2.3*
Variation S6-A2	*8.9*	*6.8*	*1.9*
Variation S6-B1	*14.4*	*10.8*	*4.2*
Variation S6-B2	*14.1*	*13.2*	*4.8*

Table Notes: Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.

Segment 6 crosses one ODFW WMU, the Owyhee WMU, and one IDFG Game Management Unit (GMU), Unit 40. In the Owyhee WMU, mule deer populations are currently below management objectives and elk populations are currently above management objectives (ODFW 2015b, 2015c). Factors that can affect mule deer and elk populations in the Oregon portion of the B2H Project area are the same as those described for Segment 1. Mule deer in the Unit 40 GMU are part of the Owyhee Population Management Unit. The short- and long-term management objective for the Owyhee Population Management Unit is to increase the population. Management direction for mule deer habitat includes improvement in key winter, summer, and transitional habitats that provide for mule deer populations that meet or exceed statewide objectives (IDFG 2008). Bighorn sheep in the Unit 40 GMU are part of the Owyhee Front Population Management Unit. The management objective is to maintain or increase this population. Habitat degradation and disease are considered the primary threats to the Owyhee Front population (IDFG 2010). Factors affecting populations and management objectives for pronghorn in the B2H Project area were not available.

Applicant's Proposed Action Alternative

The majority of the Applicant's Proposed Action crosses bighorn sheep population management units and mule deer winter range in southern and northern portions of the route (Links 6-10 and 6-25).. Bighorn sheep core herd home range and lambing areas, as well as pronghorn winter range, occur in

the 5-mile-wide study corridor at the southern end of Segment 6 but are not crossed (Links 6-25 and 6-35).

Variations S6-A1 and S6-A2

The majority of Variations S6-A1 and S6-A2 cross bighorn sheep population management units and northern portions cross mule deer winter range (Links 6-5 and 6-10).

Variations S6-B1 and S6-B2

The majority of Variations S6-B1 and S6-B2 cross bighorn sheep population management units and southern portions cross mule deer winter range (Links 6-25 and 6-30). Bighorn sheep core herd home range and lambing areas, as well as pronghorn winter range, occur in the 5-mile-wide study corridor at the southern end of Segment 6 but are not crossed (Links 6-25 and 6-30).

3.2.4.6 Environmental Consequences (Results of Analysis)

Types of Potential Effects

Effects Common to All Wildlife Species

Effects of the B2H Project common to all wildlife species include many direct and indirect effects from construction that would persist through the life of the project (i.e., operations and maintenance). Additional short-term direct and indirect effects may occur during normal operations and routine maintenance of project facilities. The types of potential effects common to all wildlife species include mortality, habitat loss or modification, habitat fragmentation, noise and visual disturbance, increased fire hazard, predation, fugitive dusts, and impacts on water quality. The types of potential effects specific to gray wolf, Washington ground squirrel, Columbia spotted frog, Greater Sage-Grouse, migratory birds (including raptors), and big game are discussed in more detail in separate sections below.

Mortality

Mortality or injury to wildlife species could occur during construction and maintenance of the B2H Project. The probability of mortality or injury of wildlife is likely to be a function of species life history and physiological traits. Small species could be crushed by B2H Project equipment through either the crushing of burrows or of vegetation used as cover. Species with limited mobility such as terrestrial mollusks, including Columbia Oregonian, blue mountainsnail, and shiny tightcoil, would be at a higher risk of mortality from crushing by B2H Project equipment compared to species with greater mobility. Direct mortality to birds could occur if construction activities in bird nesting habitat damages nests or causes mortality to nestlings and fledglings. Additionally, bird and bat mortality could result from electrocution or collisions with the transmission line and other B2H Project features during the operation of the transmission line. Bats are likely to abandon roosts and hibernacula due to human disturbance causing disorientation and potentially resulting in individual mortality. Mortality and injury also could occur as a result of collision with moving construction equipment using access roads associated with the B2H Project.

Habitat Loss or Modification

A direct impact on all wildlife habitat types would be removal of vegetation for the right-of-way, roads, pads for transmission towers, transmission line safety, and ancillary facilities, including regeneration stations, substations, staging areas, and fly yards. Habitat for some species, such as birds, would be affected by obstructing flight paths both vertically and horizontally. Clearing of vegetation for these B2H Project facilities would decrease habitat quantity and quality for wildlife species, and the degree of impact would vary depending on vegetation type and recovery time.

Removal of shrubland wildlife habitats during construction could take more than 20 years to recover and regain their function as wildlife habitat. The effects of this could include changes in plant and wildlife species composition, increase in invasive plants and wildlife, and decrease in reproductive success of sagebrush-obligate wildlife species such as sage thrasher, Brewer's sparrow, and sagebrush lizard. For species that nest in shrubland habitat, such as loggerhead shrike, construction activities during nesting season may prevent birds from using breeding habitat and could cause birds to abandon nest sites. Loss of vegetation cover could result in a loss of nesting habitat for these birds, and also could have an effect on food availability for species that forage in shrublands.

In grassland habitats, construction-related removal of vegetation would cause short-term loss of this habitat type. However, vegetation would regrow following construction, and this habitat type would recover fairly quickly, especially with implementation of proper grazing. Wildlife species that use grasslands would still experience B2H Project-related impacts such as disturbance and increased susceptibility to predation. However, the short-term loss and minimal amount of grassland habitat that would be disturbed during construction would likely have marginal impacts on any wildlife species, as they would move to adjacent undisturbed grassland until disturbed areas are restored to their former state following construction, as long as adjacent habitats have not reached the species'/niche's carrying capacity. Loss of vegetation cover could result in a loss of nesting and foraging habitat for birds, including bobolink, long-billed curlew, common night hawk, and pallid bat.

Forests and woodlands cleared during construction would be affected for much longer than other habitat types. This impact would displace wildlife that use forests and woodlands for many generations until vegetation can recover. In addition, due to the greater potential for edge effects where this habitat type is cleared compared to the other habitat types, forest/woodlands adjacent to cleared areas would be affected as well. Though mature forests are rare in the B2H Project area, the impacts on this forest type, such as edge effects, would be more pronounced due to the more distinct difference between mature forest and adjacent cleared areas, and the longer recovery time of this type of habitat (several decades). Wildlife species that use this habitat type, including northern goshawk, American three-toed woodpecker, great gray owl, gray wolf, Johnson's hairstreak, long-legged myotis, and terrestrial mollusks such as Columbia Oregonian, blue mountainsnail, and shiny tightcoil would experience habitat loss until areas regrow during B2H Project operations, which would take several decades.

Removing trees would cause the loss of both present habitat (canopy cover, live trees, forest understory) and potential future habitat (snags and downed wood from dead, mature trees). Woodland/forest habitat support diverse assemblages of wildlife species, often including species that

are specific to that habitat type. Direct effects on special status birds in woodlands/forest habitat could include a loss of both nesting and foraging habitat due to construction operations. Woodpecker species found within this segment are cavity nesters and forage by gleaning insects from tree trunks and bark. Removal of timber, old growth timber, dying trees, and dead snags would result in a loss of woodlands/forest habitat for these species.

Habitat loss and modification in RCAs is anticipated to be largely avoided through spanning, however, the B2H Project may fragment some patches of riparian woodland as a result of required vegetation management. Riparian areas provide critical breeding and foraging habitat for a variety of avian, mammalian, amphibian, and invertebrate species. Riparian corridors can also provide important migratory routes for a number of species, including big game. Effects on special status birds could include a loss of both nesting and foraging habitat due to construction operations. Removal of dying trees and dead snags in wetland/riparian areas could impact nesting and foraging habitat for amphibians, birds and small mammals. Effects on aquatic mollusks, including shortface lanx, Columbia pebblesnail, and California floater, could include degradation of water quality associated with riparian clearing and sediment associated with access road construction and use.

The construction and use of access roads could modify wildlife habitat by increasing the potential for the introduction and spread of noxious weeds. Species such as the long-billed curlew, which prefers tall grass habitat, could be affected by noxious weed infestations that have the potential to change habitat structure within the grasslands.

Habitat Fragmentation

The B2H Project could affect wildlife by decreasing habitat quality through habitat fragmentation. Habitat fragmentation breaks up contiguous areas of vegetation/habitat into smaller patches. Habitat fragment size plays a crucial role in landscape function and many ecosystem interactions, including the distribution of plants and animals, fire regime, vegetation structure, and wildlife habitat. Unlike other infrastructure that creates a solitary footprint, power lines create a continuous line of fragmentation on both vertical and horizontal levels. B2H Project-related habitat fragmentation also would result in loss of connectivity between breeding, foraging and dispersal habitats for some species.

B2H Project-related habitat fragmentation would result from direct vegetation removal for right-of-ways, roads and ancillary facilities and multi-use areas. For some species, permanent access roads (standard of 8 feet wide, 14 to 16 feet wide during construction) could cause habitat fragmentation by serving as a barrier to movement, thereby isolating subpopulations and increasing the risk of local extirpation (Shepard et al. 2008). This could be predominantly experienced by smaller prey species, less mobile species such as herpetofauna and snails, or those less likely to move through open areas devoid of vegetation such as forest-dependent species. Due to the existing fragmentation of Columbia spotted frog habitat in Segments 5 and 6, creation of roads and disturbance corridors in suitable habitat would increase fragmentation. Impacts resulting from fragmentation would be short term and long term and would begin with the construction of the transmission line and new access roads, upgrading and increase of use on existing roads and would continue for the life of the B2H Project. Habitat reclamation and revegetation following construction should decrease the severity of some impacts.

In addition to breaking up blocks of suitable habitat, fragmentation also increases edge effects, which results when two different types of habitat lie adjacent to one another other. Edge effects can create a number of impacts, from altering nutrient flows/cycling; increasing the rate of invasion by noxious weeds, invasive wildlife species, and pathogens; lowering the carrying capacity of a habitat/patch, and disrupting metapopulation dynamics (Saunders et al. 1991). Although roads may not serve as a barrier to movement for all species, roads also can reduce habitat quality by creating edge effects. Edge effects tend to be more pronounced with increasing differences in adjacent habitat types, for example, mature multi-strata forest adjacent to grassland. The creation of edges in forests impacts microclimatic factors such as wind, humidity, and light, and could lead to a change in plant or animal species composition within the adjacent habitat, or increase the rate of invasion by noxious weeds, invasive wildlife species, and pathogens (Murcia 1995). Terrestrial mollusks, including Columbia Oregonian, blue mountainsnail, and shiny tightcoil, that typically occur in old growth or intact forests and are dependent on a stable microclimate, shadiness, and humidity may be particular sensitive to edge effects associated with forest clearing as suitable habitat adjacent to the right-of-way or other cleared areas would be subjected to increased temperatures and reduced shading and humidity.

The impacts of edge effects on wildlife, both adverse and beneficial, are highly dependent on species' habitat and life history requirements (Baker et al. 2013). For instance, some species are more susceptible to predators or nest predation near edges, while predators and some grazers/browsers (i.e., wolves, mule deer) may benefit from increased food availability. Additionally, prey species may prefer habitat further from edges in clearcut areas where fewer perch sites are available for avian predators (Kremsater and Bunnell 1999). Retained trees in logged areas are preferentially used by some birds for nesting due to a decreased risk of nest predation (Rosenvald and Lõhmus 2008). Not all wildlife species are affected by fragmentation and patch size identically (Bissonette and Storch 2003; D'Eon 2007). Fragmentation caused by the transmission line or access roads could create a barrier to foraging movements and isolate individuals within the habitat. Loss of canopy cover, increased potential for noxious weed infestation, and potential for increased fire regime may cause habitat degradation and abandonment of wildlife habitat.

Noise and Visual Disturbance

Another direct effect on habitat from B2H Project construction would be noise disturbance, which would cause displacement for some wildlife species in the short term. Some construction activities would raise the sound above ambient levels. In particular, noise disturbance would result from implosive devices used to make connections between conductors. The average sound level from detonation of implosive devices is between 118 and 122 A-weighted decibels (dBA) at an approximate distance of 200 feet (BLM 2013). The duration of sound emitted from detonation of an implosive device is short, ranging from approximately 210 to 360 milliseconds (BLM 2013). Since the potential for noise "startle" effects at noise sensitive areas at these distances exists, the use of implosive devices would be limited to daytime periods. Ambient noise in forested habitats generally ranges from 25 to 44 decibels (dB; USFWS 2006), and is usually lower in open and shrub habitats such as those found along the majority of the alternative routes and route variations.

For all wildlife habitat types, increased human presence and noise from construction activities during the nesting season may prevent birds from using breeding habitat and could cause birds to abandon nest sites. B2H Project activities adjacent to occupied roosting habitat for bats may cause behavioral disturbances causing bats to abandon daytime roosts, hibernacula, or maternity colonies. Behavioral disturbance and displacement of special status mammals such as the gray wolf due to construction noise, presence of humans, and construction equipment would occur during construction operations; impacts on gray wolves are discussed further under Federally Proposed, Endangered, Threatened, and Candidate Wildlife Species below.

Visual disturbance also would displace some wildlife species from suitable and/or occupied habitat in and around construction areas. Displacement could result in less available or lower quality forage, loss of access to preferred nesting/breeding sites, increased exposure to predation, and increased energy expenditure. Long-term impacts could result from visual cues that cause wildlife to avoid the area around the transmission line.

Fire Hazard

Construction activities could inadvertently cause fires, causing a loss of habitat and affecting wildlife, potentially both in the short and long term. Because warm and dry conditions are likely throughout the summer, the risk of wildfires during construction of the B2H Project may be elevated. Impacts from fires caused by the B2H Project would include changes in wildlife habitat and direct mortality to some slow-moving and fossorial wildlife species. Increases in fire frequency also could cause permanent changes in vegetation structure and composition resulting in a loss of foraging habitat for many wildlife species.

Increased Predation

The presence of the transmission line and associated structures may provide additional roosting structures for raptors and corvids, thus increasing their presence. Transmission line corridors and access roads may also provide additional connectivity for predators. Species such as Washington ground squirrel and Greater Sage-Grouse would be vulnerable to increased predation.

Fugitive Dust

An indirect effect on habitat that could occur during the construction period is fugitive dust dispersing from the immediate construction area. Impacts from fugitive dust would last longer than the construction timeline. High levels of fugitive dust can impact the growth of some organisms, especially mosses and lichens, and impact water sources. Most impacts from fugitive dust would last only until the next rain event, when the dust is washed away and diluted. Applying dust suppression techniques, such as watering construction areas, would reduce impacts from fugitive dust.

Water Quality

Additional indirect effects on wetland/riparian amphibian and invertebrate species include impacts on water quality due to soil erosion and sedimentation associated with construction of the transmission line and associated facilities, as well as construction and maintenance of access roads. Habitat for sensitive aquatic mollusks, including shortface lanx, Columbia pebblesnail, and California floater, could be subject to these indirect effects.

Federally Proposed, Endangered, Threatened, and Candidate Species

Gray Wolf

Wolves are habitat generalists and historically used or traveled through all habitat types in the B2H Project area. However, gray wolves are now generally more successful in forested habitats with adequate prey base. ODFW has designated Areas of Known Wolf Activity around known pack home ranges and will continue to monitor populations and dispersal activities. No known wolf packs are crossed by the B2H Project. Portions of the B2H Project area are located in the ODFW East Wolf Management Zone where gray wolves retain the status of federally endangered.

Potential direct effects of the B2H Project on gray wolves would be both short and long term and may include habitat displacement, degradation and fragmentation; disturbance; and injury or mortality. If gray wolves disperse through the B2H Project area, human presence, noise, and vehicle use associated with B2H Project construction and maintenance activities could increase the potential for disturbance and vehicle mortality. Potential indirect effects of the B2H Project on gray wolves would be both short and long term and would include increased disturbance and mortality associated with increased human access and activity (e.g., increased illegal hunting of gray wolves), and periodic disturbance and noise associated with vehicle use and human presence during maintenance activities subsequent to construction.

Other Special Status Species

Columbia Spotted Frog

Direct effects on Columbia spotted frog (Great Basin distinct population segment) would be both short and long term and would include habitat removal, modification, and fragmentation/loss of connectivity; direct mortality from ground disturbance and heavy equipment operations, as well as vehicle use associated with construction and maintenance activities; displacement; increased downstream sedimentation and erosion at breeding sites; removal of habitat (changes in water turbidity and temperature); and noise-related disturbance during the breeding season.

Indirect effect of construction and maintenance would be both short and long term and would include increased disturbance and mortality from increased human access and activity, an increase in predation by raptors and ravens that perch and nest on the new transmission line structures, alteration of native vegetation, and potential introduction and spread of weeds. The change in vegetation community structure could reduce the effectiveness of habitat in providing cover from predators (e.g., herons, bullfrogs, and garter snakes). Invasive plants and noxious weeds could be introduced or spread by vehicles and equipment used during construction or by subsequent public use of access roads constructed for the B2H Project, degrading Columbia spotted frog habitat. The potential spread of invasive plants and noxious weeds would be minimized through the development and implementation of a Noxious Weed Management Plan.

Fugitive dust resulting from construction activities and use of B2H Project access roads could result in indirect effects on Columbia spotted frog in the form of increased water turbidity. Dust production is expected only during construction activities and use of access roads that have not yet revegetated;

operation and regular maintenance of the transmission line are expected to produce a relatively small amount of dust or turbidity in waterbodies. Effects from fugitive dust are discussed further above.

Greater Sage-Grouse – Direct Effects

Potential direct effects on Greater Sage-Grouse from construction, operation, and maintenance of the B2H Project would be both short and long term and would include mortality due to electrocution; in-flight collisions with transmission line infrastructure; collisions with construction and maintenance vehicles; fragmentation of habitats due to the introduction of tall structures, increased EMFs, and construction of new roads; loss and degradation of habitat quality and function; disturbance to breeding activities due to increased human presence and noise at lek locations; disturbance during sensitive periods resulting from human presence, vehicle use, and noise during construction and maintenance; and interruption and/or alteration of seasonal migrations and movements among populations.

Mortality Due to Electrocution from Contact with Power Line Infrastructure

Electrocution of birds and other wildlife by power lines have been observed due to animals' simultaneous contact with grounded and energized electrical equipment. Electrocution of birds can occur when the distance between phase conductors or the distance between grounded and energized hardware is less than the wrist-to-wrist or head-to-foot distance of a bird (APLIC 2006). There would be no potential for electrocution of Greater Sage-Grouse due to contact with energized electrical infrastructure because the distance between conductors, or an energized conductor and a grounded element of the transmission line infrastructure, would be much greater than the wingspan or head-to-foot measurement of a Greater Sage-Grouse.

Mortality Due to Collisions with Power Line Infrastructure

Transmission lines proposed in Greater Sage-Grouse habitat in the B2H Project area may pose a risk for mortality and injury from in-flight collision. Factors influencing avian transmission line collisions include the location and configuration of transmission lines, species-specific tendencies for collision, and environmental conditions, including weather, topography, and habitat (APLIC 2006). Greater Sage-Grouse are unlikely to collide with the proposed transmission line due to their tendency for short, low flights and the elevation of the proposed conductors. However, in-flight collisions with transmission line towers is possible; the probability of collision with transmission line towers is greater for Greater Sage-Grouse than for some other bird species due to their larger size and low flight maneuverability (APLIC 2012).

Mortality Due to Collisions with Vehicles Traveling on Roads

Construction of the B2H Project in Greater Sage-Grouse habitat could increase the potential for Greater Sage-Grouse mortality as a result of collisions with construction and maintenance vehicles. Wildlife mortalities due to collisions with moving vehicles occur most frequently on well-traveled secondary roads and highways. The potential for wildlife collisions with vehicles on tertiary, unimproved, and one-lane roads is lower than on larger improved surface roads as the frequency of travel is relatively low and vehicle speeds are limited by road conditions. To the extent possible, existing roads in their present condition without improvement would be used to access the right-of-way. Existing roads in Greater

Sage-Grouse habitat likely to be used to access the B2H Project during construction and maintenance would generally be unimproved roads and only suitable for low-speed vehicle travel (25 mph or slower). Access roads constructed for the B2H Project would not be improved to a degree that vehicles traveling on these roads could reach high speeds. The B2H Project would require construction of new access roads and increased traffic on existing access roads during construction and maintenance activities. Due to the limitation of construction and maintenance vehicle speeds because of access road conditions, the probability of Greater Sage-Grouse mortality from collisions with vehicles traveling on access roads would be low. Additionally, a Traffic and Transportation Management Plan would be developed and incorporated into the POD to help reduce all potential environmental impacts related to transportation.

Loss and Degradation of Habitat Quality and Function

Construction of the B2H Project in Greater Sage-Grouse habitat would result in loss and degradation of Greater Sage-Grouse habitat quality and function. Removal of vegetation in Greater Sage-Grouse nesting, brood-rearing, and wintering habitat as a result of construction of transmission line towers and access roads would result in habitat loss and degradation. Direct loss of Greater Sage-Grouse habitats as a result of B2H Project construction would be minimized through restoration of areas not required for ongoing operation and maintenance of the transmission line in accordance with the Reclamation, Revegetation, and Monitoring Plan Framework to be included as a part of the POD.

Fragmentation of Habitats due to the Introduction of Tall Structures, Increased Electromagnetic Fields, and Construction of New Roads

Construction of the B2H Project in Greater Sage-Grouse habitat could increase the potential for fragmentation of habitats primarily as a result of avoidance of habitats near the transmission line due to the introduction of tall structures, EMF, and new roads.

Greater Sage-Grouse experts and agency personnel have raised concerns that Greater Sage-Grouse may avoid areas that contain tall structures (Braun 1998; Braun et al. 2002; Dinkins et al. 2014; Gillan et al. 2013; Pruett et al. 2009; Shirk et al. 2015; USFWS and BLM 2015) and areas adjacent to transmission lines due to the presence of EMFs near the line (USFWS 2010b). Based on recent research (Gillan et al. 2013; Hanser et al. 2011b; Shirk et al. 2015; Washington Wildlife Habitat Connectivity Working Group 2012), the USFWS and BLM (2015) reported that Greater Sage-Grouse may avoid habitat up to 600 meters (0.37 mile) from transmission lines. A USGS review of factors influencing Greater Sage-Grouse conservation concluded that Greater Sage-Grouse may avoid habitats within 0.4 to 2.9 miles of transmission lines, that erection of a transmission line close to a lek may negatively influence lek attendance and breeding season behavior, and that higher densities of power lines within 4.0 miles of a lek may negatively influence lek persistence (Manier et al. 2014). These distances are an attempt to balance the extent of protected areas with multiple land-use requirements using estimates of the distribution of Greater Sage-Grouse habitat. The authors stated that there is no single distance that is an appropriate buffer for all Greater Sage-Grouse populations and habitats because of variations in populations, habitats, development patterns, and other factors. They also acknowledge that

scientifically justifiable departures may be warranted based on local data and other factors when implementing buffer protections or density limits (Manier et al. 2014).

Across the western range of the species, habitat suitability as measured by the presence of active leks was highest in areas with power line densities less than 0.037 mile (of overhead transmission line) per square mile and leks were absent from areas where power line densities exceeded 0.124 mile (of overhead transmission line) per square mile (Knick et al. 2013). Displacement of Greater Sage-Grouse from occupied habitats may occur as a result of construction of transmission line towers, the tendency of Greater Sage-Grouse to avoid tall structures, and in response to increased raptor presence as a result of the presence of transmission towers on which raptors perch. Braun (1998), citing unpublished data, reported that Greater Sage-Grouse use of areas, near transmission lines, as inferred from pellet counts, increased as distance from transmission lines increased up to 1,969 feet. Similarly, in a comparison of Greater Sage-Grouse radiotelemetry locations in Idaho to locations of anthropogenic features, Gillian et al. (2013) found that Greater Sage-Grouse avoided areas within 1,969 feet of power transmission lines and 492 feet of buildings, and Hanser et al. (2011b) found a negative association between modeled Greater Sage-Grouse occurrence within 1,640 feet of energy development, power lines, and major roads in Wyoming using pellet count data. In Washington, Greater Sage-Grouse movement, gene flow, and lek activity are affected by transmission lines at distances greater than 1,640 feet (Washington Wildlife Habitat Connectivity Working Group 2012; Shirk et al. 2015).

Ellis (1985) found that construction of a transmission line altered dispersal patterns of breeding Greater Sage-Grouse, suggesting a transmission line could be a potential barrier to movements and, thus, result in habitat fragmentation. The transmission line was constructed within 656 feet of an active Greater Sage-Grouse lek and was situated between the lek and male breeding season day-use areas and resulted in a 72 percent decline in the mean number of displaying males and an alteration in daily dispersal patterns during the breeding season within two years of construction (Ellis 1985). The frequency of raptor-Greater Sage-Grouse interactions during the breeding season increased 65 percent between before and after transmission line comparisons (Ellis 1985). In other studies, the probability of lek persistence decreased with proximity to power lines and the increasing proportion of power lines in a 4-mile area around leks (Walker et al. 2007), and Greater Sage-Grouse avoided brood-rearing habitats within 2.9 miles of transmission lines (LeBeau 2012).

Greater Sage-Grouse populations rely on large, interconnected expanses of sagebrush and the majority of Greater Sage-Grouse populations throughout the western range of the species are connected by landscapes characterized by moderate-to-high potential for Greater Sage-Grouse movement (Knick et al. 2013; Wisdom et al. 2011). Lek persistence has been shown to be strongly related to lek connectivity, a measure of a lek's influence on the maintenance of range-wide population connectivity evaluated at a dispersal distance of 18 kilometers with abandoned leks having lower range-wide connectivity importance (Knick and Hanser 2011). As described previously, transmission lines could be a potential barrier to Greater Sage-Grouse movements (Ellis 1985; Shirk et al. 2015) and could limit dispersal between leks and populations, which could compromise lek and population persistence.

Increased EMFs have been shown to alter the behavior of avian species, though species vary in their sensitivity to this disturbance (Fernie and Reynolds 2005). Peer-reviewed studies regarding Greater Sage-Grouse reactions to EMFs have yet to be published. The potential effects of EMFs from the B2H Project are described in Section 3.2.18. If Greater Sage-Grouse avoid EMFs created by transmission lines, the effects are likely to be similar to those described for introduction of tall structures.

Traffic on B2H Project access roads will be greatest during construction of the transmission line, and in general, road effect-distances (the distance from a road at which a population density decrease is detected) are positively correlated with increased traffic density and speed (Forman and Alexander 1998). After completion of construction of the transmission line, B2H Project- and non- B2H Project-related traffic on access roads developed for the B2H Project would likely be low and avoidance of Greater Sage-Grouse habitats due to vehicle presence associated with access roads is expected to be minimal.

Disturbance and Disruption of Breeding Activities due to Increased Human Presence and Noise at Lek Locations

Construction of the B2H Project in Greater Sage-Grouse habitat could increase the potential for disturbance to Greater Sage-Grouse and disruption of breeding activities due to increased human presence and other construction equipment at lek locations. Several studies have demonstrated that roads near Greater Sage-Grouse leks may influence female habitat selection (Lyon and Anderson 2003) and that levels of road-related effects are positively correlated with increased traffic (Holloran 2005; Remington and Braun 1991). Greater Sage-Grouse have been shown to avoid nesting and summering near paved secondary highways (LeBeau 2012). Lyon and Anderson (2003) reported that traffic disturbance (1 to 12 vehicles per day) within 1.9 miles of leks during the breeding season reduced nest-initiation rates and increased distances moved from leks during nest site selection of female Greater Sage-Grouse. Rates of decline in male Greater Sage-Grouse lek attendance increased as traffic volumes on roads within approximately 1.9 miles of leks increased and vehicle activity on these roads during the daily strutting period (i.e., early morning) had a greater influence on male lek attendance compared to roads with no vehicle activity during early morning hours in another study (Holloran 2005). Peak male attendance (i.e., abundance) at leks experimentally treated with noise recorded at roads in a gas field, decreased 73 percent relative to paired controls. Blickley et al. (2012) suggest that the intermittent noise like that produced by traffic was a cause of declines in male lek attendance on leks near roads. Impacts of anthropogenic activity have been documented at leks at a distance of up to 3.7 miles (Naugle et al. 2011). Implementation of seasonal and spatial restrictions around leks would be expected to minimize disturbance associated with noise and human presence.

Minimal traffic disturbance (1 to 12 vehicles/day) within 1.86 miles of leks during the breeding season reduced nest-initiation rates and increased distances moved from leks during nest site selection of female Greater Sage-Grouse; nesting propensity was 26 percent lower for females breeding on road-disturbed leks compared to undisturbed females, and females moved twice as far from leks to nest locations if breeding on disturbed leks (Lyon and Anderson 2003). Additionally, Greater Sage-Grouse male lek attendance decreased proportionally with traffic volumes on roads near leks (Holloran 2005).

Therefore, even slight long-term increases in B2H Project and non- B2H Project-related traffic as a result of newly constructed roads has the potential to adversely influence Greater Sage-Grouse distribution and reproduction throughout the life of the B2H Project.

Disturbance to Wintering Periods Resulting from Human Presence, Vehicle Use, and Noise During Construction and Maintenance

Construction of the B2H Project in Greater Sage-Grouse habitat could increase the potential for disturbance to Greater Sage-Grouse during wintering periods resulting from human presence, vehicle use, and noise during construction and maintenance of the B2H Project.

Greater Sage-Grouse were found to be 30 percent more likely to occupy sagebrush-dominated habitats with no gas field infrastructure compared to habitats with 12.3 wells per 2.5 square miles (i.e., maximum allowable well density on federal lands) during the winter (Doherty et al. 2008). In central Wyoming, Greater Sage-Grouse at the scale of a home range avoided natural gas wells; at the scale of the population, avoidance of haul roads associated with natural gas development were observed during the winter (Dzialak et al. 2012). At a study site in southern Alberta, Canada, the probability of Greater Sage-Grouse selection of winter habitat declined when these habitats were within 1,900 meters of oil or natural gas wells (Carpenter et al. 2010). Other research suggests that disturbance to wintering Greater Sage-Grouse from energy development are related to human activity levels; variation in avoidance response to natural gas wells among Greater Sage-Grouse individuals between day and night locations (e.g., avoidance of infrastructure during the day, but not at night) suggests avoidance of human activity (Dzialak et al. 2012). Braun (2006) suggests dissuading raptor perching on transmission line poles situated in suitable winter habitat (along windswept ridges and near large expanses of sagebrush that are not typically covered by snow in winter) to minimize the influence of avian predators perching on transmission lines on wintering Greater Sage-Grouse populations.

Interruption and/or Alteration of Seasonal Migrations and Movements Among Populations

Construction of the B2H Project in Greater Sage-Grouse habitat could increase the potential for interruption and/or alternation of seasonal Greater Sage-Grouse migrations and movements among populations. As previously described, construction of transmission line structures and new access roads could result in Greater Sage-Grouse avoiding areas near the transmission line such that those habitats are no longer used by Greater Sage-Grouse, and could present a barrier to Greater Sage-Grouse movements. If Greater Sage-Grouse responses include avoidance of areas near the transmission line and/or reduction of movements across the transmission line right-of-way, the B2H Project may fragment and reduce the connectivity of Greater Sage-Grouse habitats in the B2H Project area. These effects could result in alteration of seasonal Greater Sage-Grouse migrations or movements among populations if habitats affected represent important seasonal habitat or habitat important for providing connectivity between populations. Gene flow in Greater Sage-Grouse populations is likely limited to the movement of individuals between neighboring leks and populations and not likely the result of long-distance movements of individuals across large portions of the species' range (Oyler-McCance et al. 2005). Thus, regional connectivity between leks and populations may represent a fundamental source of genetic recombination and metapopulation structure that supports

the long-term viability of the species. Additionally, connectivity between leks has been shown to be important for population sustainablity (Knick and Hanser 2011; Knick et al. 2013). Studies have shown that Greater Sage-Grouse that attend leks up to 11 miles from disturbances could be affected by the loss of seasonal habitat functionality (Nelle et al. 2000).

Greater Sage-Grouse Indirect Effects

Potential indirect effects on Greater Sage-Grouse from construction, operation, and maintenance of the B2H Project would be both short and long term and would include alteration of the native sagebrush understory through introduction and spread of non-native, invasive plants and noxious weeds, as well as an increase in anthropogenic fire start; avoidance of habitat due to potential increase in raptor predation pressure; disruption of nesting and breeding activities and avoidance of habitat due to vehicle noise and human presence resulting from public use of new access roads; increased mammalian predation risk; increased raptor and raven predation risk; alteration of behavioral patterns due to increased predation pressure; and increased disturbance and mortality associated with increased human access and activity (e.g., increased illegal hunting).

Avoidance of Habitat Due to Potential Increase in Raptor Predation Pressure

Construction of the B2H Project in Greater Sage-Grouse habitat could increase the potential for predation of Greater Sage-Grouse by raptors and ravens in areas around the transmission line. Greater Sage-Grouse may respond to increased predation pressure around the transmission line (Connelly et al. 2004) by avoiding areas where predators are concentrated and predation pressure is highest (Dinkins et al. 2012).

Reductions in male use of strutting grounds have been attributed to increased predation by golden eagles and ravens up to 3.7 miles from overhead power transmission and communication distribution lines (California Partners in Flight 2005; Manville 2004). If raptors and ravens are concentrated around the transmission line, Greater Sage-Grouse may abandon or reduce their use of habitats near the transmission line, effectively reducing the amount of habitat available to individuals and populations and potentially displacing birds into suboptimal habitats (Connelly et al. 2004).

Disruption of Nesting and Breeding Activities and Avoidance of Habitat Due to Vehicle Noise and Human Presence Resulting from Public Use of New Access Roads

New access roads could increase public use of lands in Greater Sage-Grouse habitat. The new access roads constructed for the B2H Project would facilitate public use of Greater Sage-Grouse habitats that are rarely visited by humans in their current condition due to their distance from developed roads. Increased vehicle noise and human presence due to public use of access roads would be expected to occur at low levels as the B2H Project predominately crosses Greater Sage-Grouse habitat in rural areas where existing public use of access roads and public lands are generally low. Construction of the B2H Project is not anticipated to create an attraction that would increase public visitation to the area following construction. Effects on Greater Sage-Grouse and Greater Sage-Grouse habitat use associated with vehicle noise and increased human presence resulting from public use of new access roads would be similar to the direct effects of construction on Greater Sage-Grouse habitat use and nesting and breeding activities. However, the intensity of the effects on Greater Sage-Grouse due to

public use of access roads would be expected to be less than the effects described for construction due to the anticipated infrequent public use of access roads. Furthermore, impacts from increased public use would be minimized through closure or rehabilitation of new access roads in sensitive habitat following construction.

Increased Predation Risk by Mammalian Predators

Construction of the B2H Project in Greater Sage-Grouse habitat could increase the potential for predation risk to Greater Sage-Grouse due to an increase in mobility of mammalian predators along the transmission line corridor and increased detectability of Greater Sage-Grouse to mammalian predators due to removal of escape cover. Improvement of old or construction of new access roads between tower locations would occur during B2H Project construction. Roads can provide corridors for mammalian predator movement, which may result in increased Greater Sage-Grouse predation (Kuipers 2004). Greater Sage-Grouse may experience increased predation by mammalian predators due to the lack of escape cover and increased visibility of Greater Sage-Grouse to mammalian predators when using these corridors.

Increased Predation Risk by Raptors and Ravens

Construction of the B2H Project in Greater Sage-Grouse habitat could increase the potential for predation of Greater Sage-Grouse by raptors and ravens. Ravens preferentially use habitats and nest in proximity to transmission lines (Coates et al. 2014a; Howe et al. 2014). Raptors and ravens are known to prey on nesting and foraging Greater Sage-Grouse in addition to individuals on leks (Hagen 2011; Lockyer et al. 2013). Tall structures (including transmission line towers) provide nesting sites and hunting perches for raptors and ravens in areas where vegetation is low and terrain is relatively flat (Connelly et al. 2000; Ellis 1984; Johnson et al. 2011; Steenhof et al. 1993). Transmission line poles and towers have been shown to influence raptor and corvid distributions and hunting efficiency (Coates et al. 2014a 2014b; Connelly et al. 2004; Steenhof et al. 1993), which may result in increased predation on Greater Sage-Grouse. Knick and Connelly (2011) reported foraging distances of avian Greater Sage-Grouse predators at 4.3 miles, suggesting that the extent of habitat indirectly affected as a result of existing and planned transmission line infrastructure could be substantial (Connelly et al. 2004; Cresswell et al. 2010). Leks in proximity to transmission lines have been found to have lower annual recruitment of individual birds when compared to leks farther from these lines. The difference was presumed to be a result of raptor predation (Braun et al. 2002). Implementation of nest management practices outlined in the Applicant's Avian Protection Plan (Idaho Power Company 2015), as well as perch deterrents (Selective Mitigation Measure 15), would reduce nesting and perching on B2H Project structures and minimize an increase in avian predation.

Alteration of Behavioral Patterns Due to Increased Predation Pressure

Construction of the B2H Project in Greater Sage-Grouse habitat could increase predation pressure on Greater Sage-Grouse from avian and mammalian predators. Greater Sage-Grouse may respond to increased predation pressure by increasing sheltering behavior to avoid predation and reducing or shifting temporally other essential behaviors (e.g., foraging) (ODFW 2011). These behavioral shifts may

reduce the fitness of individual Greater Sage-Grouse that occupy habitats near the transmission line, which may ultimately influence survival (Holloran 2005).

Alteration of the Native Sagebrush Understory through Introduction and Spread of Non-native, Invasive Plants and Noxious Weeds

Construction of the B2H Project in Greater Sage-Grouse habitat could increase the potential for introduction and spread of non-native plants and noxious weeds, most notably cheatgrass in Greater Sage-Grouse habitats. Invasive plants and noxious weeds could be introduced or spread by vehicles and equipment used during construction or by subsequent public use of access roads constructed for the B2H Project. Cheatgrass has been a major factor in the loss of big sagebrush communities (Chambers et al. 2007) and is consistently cited as a major challenge to the maintenance of sagebrush-steppe habitats (Knick 1999; Young and Allen 1997). Invasive plants such as cheatgrass and medusahead displace desirable native plant species and degrade rangeland health. In many cases the displaced species are critical to Greater Sage-Grouse survival (NRCS 2010). Degradation of Greater Sage-Grouse habitat due to invasion of non-native plants and noxious weeds could lead to decreased survival of individual birds in affected populations and a reduction in the carrying capacity of sagebrush habitats.

In addition to cheatgrass' displacement of native understory species, infestation leads to an increased risk of wildfires that eliminate the sagebrush overstory because cheatgrass germinates early and, thus, dries early in the growing season (Klemmedson and Smith 1964). Sagebrush plant communities important for Greater Sage-Grouse survival could be destroyed by fire and habitats require decades to recover. Moreover, fires promote the proliferation of invasive annual grasses and could result in the permanent conversion of sagebrush-dominated habitats to habitats of annual grasslands. Prior to re-establishment of sagebrush cover, these sites often have limited or no value to Greater Sage-Grouse (Connelly et al. 2000). More frequent fires in Greater Sage-Grouse habitats as a result of construction of the transmission line, access roads, and alteration of vegetation communities could result in reduced local Greater Sage-Grouse population size and reduction of suitable habitat available for Greater Sage-Grouse in the B2H Project area.

Washington Ground Squirrel

Potential direct effects of the B2H Project on the Washington ground squirrel would be both short and long term and would include direct mortality, disturbance, habitat fragmentation, and loss or modification of habitat. Ground disturbance and heavy equipment operation during construction could result in Washington ground squirrel injury or mortality, destruction of burrows, and/or degradation of foraging and dispersal habitat. Vehicle use associated with B2H Project construction and maintenance activities also could increase the potential for disturbance and vehicle mortality. Habitat loss, degradation, and fragmentation could increase habitat patch isolation, reduce potential connectivity between patches and subpopulations, and impact dispersal rates and abundance for Washington ground squirrel (Hanser et al. 2011a; Noss et al. 2006). Construction-related noise, human presence, and dust disturbance also could impact Washington ground squirrel during construction and could

potentially make habitat temporarily unsuitable for this species. Exposure to EMFs does not appear to adversely affect small mammals, such as the Washington ground squirrel.

Indirect effects from the B2H Project would be both short and long term and could include conversion of native grassland to less desirable habitat types, habitat loss or modification due to altered fire regimes, facilitation of invasive plant establishment, and increased disturbance from an increase in recreational access from B2H Project access roads. There also could be an increase in predation by raptors that perch and nest on the new transmission towers; however, the potential for raptor perching and nesting on transmission line structures already exists in some areas, but the proposed transmission towers would be taller than the existing towers and could result in more raptor predation than there is at present. Because juvenile Washington ground squirrels regularly disperse from occupied colonies (Klein et al. [2005] found an average dispersal probability of 0.72), this increased predation could impact squirrels attempting to disperse into suitable but unoccupied habitats in addition to squirrels present in occupied habitats (i.e., colonies).

Migratory Birds Including Raptors

Potential impacts from the B2H Project on migratory birds, including bald and golden eagles, BLM Species of Conservation Concern, and USFWS BCC, would be both short and long term and could include collisions with construction vehicles, power lines, other equipment, or structures; direct removal of nesting habitat; destruction of unoccupied nests; induced abandonment of nests or breeding territories due to disturbance; electrocution; and fugitive dust; noise and visual disturbance. There is unlikely to be measurable impacts on any non-sensitive migratory bird populations, but there would be some impact on individuals and habitat.

Noise during construction could impact migratory birds by masking auditory communication, such as individuals defending territory or trying to attract a mate, flock members making contact calls, nestlings begging for food, or alarm calls (Parris and Schneider 2008). These impacts could have an effect on reproductive success or survival. Nesting birds are particularly sensitive to disturbance, and some disturbance could lead to nest failure or abandonment.

Bird electrocutions on power lines have been documented and are a function of size, habitat, behavior, age, season, and weather (Avian Power Line Interaction Committee [APLIC] 2006). Large body size is considered a primary factor in determining electrocution risk, as is the use of transmission line structures for perching or nesting. Raptors and large wading birds are therefore at higher potential risk than smaller birds (APLIC 2006). Raptor nests on transmission line towers also can increase the risk of interruptions and outages, and can potentially catch fire in wet conditions when located over exposed, energized equipment (APLIC 2006).

The risk of mortality and injury to birds from in-flight collisions with B2H Project components such as conductors and structures is likely to vary with species (Faanes 1987; Loss et al. 2015). The risk of collision with transmission lines has been linked to bird morphology (body size, weight, and wing shape), age, and behavior (flocking, nesting, courtship, foraging, flight ability, and altitude) (APLIC 2006, 2012; Janss 2000). The risk of collision also increases according to the number of times birds

cross transmission lines, or in species with low flight maneuverability, and in locations where power lines cross bird landing or take-off paths (Janss 2000). Collision risk is typically highest where concentrated bird activity occurs (APLIC 2012). The configuration of conductors and ground wires also affects the level of risk, which appears to increase with the number of tiers of wires that require birds to make vertical adjustments (APLIC 2012). Research shows avian collisions with transmission lines can be significantly reduced, but not eliminated, by applying flight diverters at locations where collision risk is elevated (Savereno et al. 1996). Additionally, introduction of new collision risk from proposed transmission lines could be reduced through colocation with existing transmission lines.

Removal of trees would affect both present and future habitat for cavity-nesting birds, such as woodpeckers and bluebirds. Snags are a vital habitat element for many species, and removal of snags, plus the removal of mature trees that would become snags, would decrease nesting substrate and foraging habitat for these species.

Direct impacts on raptors would be both short and long term and could include collision with B2H Project structures, electrocution, disturbance due to construction noise, fugitive dust, and visual disturbance. Raptors are particularly sensitive to disturbance during the nesting period and some construction activities could cause nest failure or abandonment.

Potential indirect effects on raptors would be both short and long term and could include increased non-B2H Project-related, human activity along the right-of-way and B2H Project roads, which could add to the intensity of disturbance within the study corridor. Disturbance from this could render some areas temporarily unsuitable as raptor habitat. This could be especially critical during the nesting season; at that time, disturbance could be sufficient to scare a raptor from its nest or disrupt brooding or feeding. Increased disturbance and mortality could result from increased human access and activity (e.g., increased illegal shooting of raptors). Increased human presence also could increase the risk of fire, which would alter raptor habitat and prey populations, and possibly cause nestling mortality. The impacts on habitat and small mammals described above, including habitat loss and edge effects, brought about by vegetation alterations and removal could lead to a change in plant species composition, potentially lowering the quality of habitat for raptors and/or their prey and the population size and robustness. Decreased prey for raptors would likely have negative implications for the condition and trend of raptor populations.

Transmission line towers also may increase raptor nest site availability and alter raptor distribution on the landscape. Steenhof et al. (1993) found that 133 pairs of raptors and ravens (*Corvus corax*) nested along a 500-kV transmission line in Idaho in 11 years of initial construction, and 82 percent of pairs nested on the power line during successive years. Ferruginous hawks (*Buteo regalis*), red-tailed hawks (*B. jamaicensis*) and great horned owls (*Bubo virginianus*) are known to nest on transmission towers (Gilmer and Wiehe 1977). Ferruginous hawks were the most common raptor nesting in the towers; great horned owls were observed using abandoned ferruginous nests in the following breeding season (Gilmer and Wiehe 1977).

It is difficult to determine whether nesting raptors benefit from an increase in nest site availability as a result of transmission tower construction. For example, continuous, long-term EMF exposure can affect reproductive success of species such as the American kestrel (*Falco sparverius*), increasing fertility, egg size, embryonic development, and fledging success, but reducing hatching success (Fernie et al. 2000; Fernie and Reynolds 2005). However, Dell'omo et al. (2009) found no significant short-term physiological effects on kestrel hatchlings. Furthermore, species such as ferruginous hawks can increase nesting and fledgling success in artificial nest sites compared to natural sites (Tigner et al. 1996).

Types of potential effects on migratory birds would be similar for all alternatives and route variations. However, in areas of concentrated bird activity such as the Boardman Grasslands Important Bird Areas or the Ladd Marsh Important Bird Areas, migratory bird collision risk would be higher. The introduction of new collision risk would be reduced through colocation or replacement of existing transmission lines.

Big Game

Direct impacts on big game from construction would be both short and long term and could include vehicle collisions, noise, habitat loss, and visual disturbance, which is a change in the viewshed of the animal that is perceived as alarming. Vegetation clearing has the potential to alter big game designated winter range. Alterations to winter range could remove forage that is already scarce during that time of year. However, for the B2H Project, vegetation clearing in general is not expected to negatively impact big game appreciably due to the small amount of habitat affected compared to the large home ranges of these species, and because the cleared areas would still provide forage as they recover. Exponent (2015) found that exposure to EMFs does not adversely affect elk or mule deer; however, this research has not been peer-reviewed.

Noise and visual disturbance associated with increased human activity could displace big game from preferred areas. These disturbances could potentially alter migratory and breeding activities during construction. Displacement of big game from winter areas during sensitive periods also could occur. This displacement could affect over-winter survival on winter range by causing animals to mobilize stored bodily energy reserves that are needed to survive the winter when food is scarce.

Potential indirect effects on big game from the B2H Project would be both short and long term and would include fugitive dust, increased predation and hunting, habitat alteration, and increased human activity. Travel patterns of wide-ranging carnivores can be positively influenced by roads and trails (Paquet and Carbyn 2003). Therefore, rates of predation could increase as a result of behavioral response to B2H Project features. Access roads may facilitate increased hunting and poaching pressures on big game (Gaines et al. 2003). Increases in non-B2H Project-related human presence in the B2H Project area could lead to increased harvest of big game and an increased risk of fire, which would alter habitat for big game. Additionally, invasive plant species could be introduced and spread as a result of increased human presence; the spread of invasive plants could alter available cover and food quantity and quality for big game species.

Increased human activity along the right-of-way and access roads could cause increased disturbance to big game. Activity of big game species in the right-of-way can be low compared to adjacent habitat, while the tendency for animals to cross a right-of-way can be a function of species response to disturbance (Sopuk and Vernam 1986) as well as right-of-way characteristics such as width (Willyard et al. 2004). Large ungulates can be attracted to right-of-ways by increased forage potential (Willyard et al. 2004), potentially due to vegetation reclamation efforts.

Response to disturbed right-of-way sites differs between big game species. Elk, in particular, are known to avoid habitat near roads due to human activity and increased traffic (Ager et al. 2003; Johnson et al. 2000; Millspaugh 1999; Wisdom 1998). The indirect effects from increased traffic in elk winter and summer range can affect the overall success of elk populations by reducing habitat use, fragmenting the landscape and reducing migration corridors, and impeding the ability of elk to carry out important life processes (ODFW 2015a). ODFW (2015a) identifies short-term and long-term displacement from otherwise suitable habitat which provides essential or important habitat functions and values as a primary mechanism of indirect impacts from energy facility roads on elk. Avoidance of habitat near roads or other areas where activity is occurring could temporarily render habitat unsuitable and could increase energetic demands on animals as they move away from the disturbance. This could be especially problematic if it occurs on designated winter range areas during critical times of year. Conducting construction activities outside the recommended winter restriction periods and restricting traffic on access roads during the operations phase of the B2H Project would reduce indirect impacts on elk habitat. However, the ability to successfully restrict traffic access to facility roads may vary depending on land ownership, landscape position, and surrounding land use.

Initial and Residual Impact Assessment Results

A summary of the levels of initial and residual impacts on wildlife resources associated with the B2H Project are presented in Table 3-140 (Section 3.2.4.4). As explained under Impact Assessment and Mitigation Planning in Section 3.2.4.4, initial impacts are those effects resulting from the implementation of the B2H Project, with consideration of the design features of the B2H Project for environmental protection, and residual impacts include those impacts on wildlife resources that are anticipated after the application of selective mitigation measures. The impact assessment results are described by segment and alternative route below.

No Action Alternative

Under this alternative for all B2H Project segments, the environment would remain as it presently exists.

Environmental Consequences Common to All Segments

Traditional Foods

In all segments, the B2H Project would affect wildlife resources that are considered traditional foods by Native American tribes. These resources include big game and waterfowl and are analyzed by segment below (waterfowl are analyzed under Migratory Birds Including Raptors as species occurring in RCAs).

Project impacts on wildlife have the potential to affect tribal exercise of tribal treaty rights. Potential direct effects on wildlife resources of tribal concern include altered availability and changes in habitats of these resources. Potential indirect effects include impacts on ability to gather traditional foods (e.g., decreased access to traditional use areas established by treaties), effects on indigenous peoples relationships with traditional foods, effects on tribal culture and livelihood and health (physical, mental, spiritual), and impacts on retaining traditional knowledge.

Geotechnical Investigation

Disturbance to soil and vegetation in wildlife habitat could occur as a result of overland vehicle access or foot traffic during geotechnical surveys and preconstruction special status species surveys. Overland vehicle access for geotechnical surveys will be restricted to routes designated in the POD, and special status species surveys would follow agency-approved protocol and would minimize ground disturbance to the extent possible. However, even minimal disturbance in habitat that is rare, highly erodible, or otherwise particularly sensitive could have detrimental effects on a species.

Resource-avoidance measures for the geotechnical investigation would include (1) monitor geotechnical investigation activities, (2) adjust activities to occur outside of seasonal restrictions, (3) use alternative access or drilling methods, (4) relocate the borehole, and (5) abandon the geotechnical site. Selective mitigation measures also could be applied to reduce potential effects on wildlife resources.

SEGMENT 1—MORROW-UMATILLA

Wildlife Habitat

Alternative Routes and Route Variations

Wildlife habitat types that would be affected by the B2H Project in Segment 1 include grasslands, shrublands, RCAs, and forest/woodlands. Additionally, the Applicant's Proposed Action Alternative, the Applicant's Proposed Action – Southern Route Alternative, the East of Bombing Range Road Alternative, and the West of Bombing Range Road – Southern Route Alternative could affect shrublands and RCAs on the Coyote Springs Wildlife Area. The amount of wildlife habitat types that would be disturbed by each alternative route and route variation in Segment 1 is provided in Table 3-120, and residual impacts on each wildlife habitat type is provided in Table 3-119 in Section 3.2.3. The types of potential effects on each wildlife habitat type are described in detail at the beginning of Section 3.2.4.6. The primary impact on wildlife habitats would include habitat removal and fragmentation. The Applicant's Proposed Action and all alternatives and variations in Segment 1 would result in moderate residual impacts on shrubland and forest/woodland habitat types because they support a wide range of species and are slow to regenerate. Loss or adverse modification of native grassland habitats would result in moderate residual impacts because they are uncommon throughout the B2H Project area and, therefore, habitat for grassland species is limited. Although disturbance to RCAs is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible (Design Features 15 and 16), the B2H Project in Segment 1 would have moderate residual impacts on this valuable wildlife habitat type.

Federally Proposed, Endangered, Threatened, and Candidate Species

Gray Wolf

Applicant's Proposed Action Alternative

The Applicant's Proposed Action would have short- and long-term residual impacts on gray wolf. Potential mortality of federally endangered gray wolves would result in short-term high residual impacts. Disturbance or displacement from habitat would result in moderate long-term residual impacts but would not severely limit the long-term sustainability of populations of federally endangered gray wolves impacts from the Applicant's Proposed Action Alternative. The types of potential effects on gray wolf are described in detail at the beginning of Section 3.2.4.6.

Impacts on gray wolves and their habitat would be decreased through implementation of design features of the B2H Project for environmental protection and selective mitigation measures, including a speed limit on B2H Project access roads to reduce collisions with vehicles, limiting new or improved access to areas previously inaccessible through closure or rehabilitation of access roads not needed after construction, and reclamation of construction areas.

Variations S1-B1 and S1-B2

The types of potential effects on gray wolf, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on gray wolf would be the same as those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Wolf use areas do not occur in study corridors of Design Options 1, 2, and 3; therefore, no identifiable impacts from the design options are anticipated on wolf use areas.

East Bombing Range Road Alternative

The types of potential effects on gray wolf, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on gray wolf would be the same as those described for the Applicant's Proposed Action Alternative.

Applicant's Proposed Action – Southern Route Alternative

The types of potential effects on gray wolf, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on gray wolf would be the same as those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Wolf use areas do not occur in the study corridors of Design Options 1, 2, and 3; therefore, no identifiable impacts are anticipated on wolf use areas.

West of Bombing Range Road – Southern Route Alternative

The types of potential effects on gray wolf, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on gray wolf would be the same as those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Wolf use areas do not occur in the study corridors of Design Options 1, 2, and 3; therefore, no identifiable impacts are anticipated on wolf use areas.

Longhorn Alternative

The types of potential effects on gray wolf, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on gray wolf would be the same as those described for the Applicant's Proposed Action Alternative.

Interstate 84 Alternative

The types of potential effects on gray wolf, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on gray wolf would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S1-A1 and S1-A2

The types of potential effects on gray wolf, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on gray wolf would be the same as those described for the Applicant's Proposed Action Alternative.

Interstate 84 – Southern Route Alternative

The types of potential effects on gray wolf, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on gray wolf would be the same as those described for the Applicant's Proposed Action Alternative.

Other Special Status Species

Alternative Routes and Route Variations

The amount of each wildlife habitat type that would be disturbed in Segment 1 is compared by alternative in Table 3-120 in Section 3.2.3. Special status species using wildlife habitats in Segment 1 are described at the beginning of Section 3.2.4.5. Potential effects on special status wildlife species would be similar to potential effects on other wildlife species that use the same habitat types. The types of potential effects on each wildlife habitat type are described in detail in Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on special status wildlife include installing devices to deter raptor perching on transmission line structures and minimize an increase in predation, minimization of removal of trees and other vegetation, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), limiting construction and maintenance activities during migratory bird nesting season, implementing seasonal and spatial restrictions for sensitive periods and habitats, conducting preconstruction surveys, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4).

The types of potential effects on special status wildlife species would be similar for all alternatives. Because mortality of special status species (without population-level effects) and temporary disturbance during critical or sensitive periods could occur (without population-level effects), the Applicant's Proposed Action and all alternatives in Segment 1 could result in long-term moderate impacts on special status species. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Washington Ground Squirrel

Table 3-168 presents miles crossed and residual impacts on Washington ground squirrel for all alternative routes and route variations in Segment 1. Levels of residual impacts and duration of impacts on Washington ground squirrel are described by alternative route and route variation below, and displayed in MV-8. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Table 3-168. Washington Ground Squirrel Inventory Data and Residual Impacts for Segment 1—Morrow-Umatilla (miles crossed)

Alternative Route	Inventory[1]				Residual Impacts[2]	
	Total Length (miles)	Occupied Colony Avoidance Areas	Occupied Colony Dispersal Areas	Suitable Habitat	High	Moderate
Applicant's Proposed Action	91.9	0.1	5.9	12.5	6.0	12.5
Variation S1-B1	*6.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
East of Bombing Range Road	92.3	0.4	2.8	8.4	3.2	8.4
Applicant's Proposed Action – Southern Route[3]	99.1	0.1	5.9	13.5	6.0	13.5
West of Bombing Range Road – Southern Route[3]	95.6	0.0	3.8	13.9	3.8	13.9
Longhorn	88.2	0.4	3.9	6.2	4.3	6.2

Table 3-168. Washington Ground Squirrel Inventory Data and Residual Impacts for Segment 1—Morrow-Umatilla (miles crossed)

Alternative Route	Inventory[1]				Residual Impacts[2]	
	Total Length (miles)	Occupied Colony Avoidance Areas	Occupied Colony Dispersal Areas	Suitable Habitat	High	Moderate
Interstate 84[3]	84.7	0.0	0.0	4.9	0.0	4.9
Variation S1-A1[3]	*18.5*	*0.0*	*0.0*	*1.0*	*0.0*	*1.0*
Variation S1-A2[3]	*18.5*	*0.0*	*0.0*	*11.0*	*0.0*	*11.0*
Interstate 84 – Southern Route[3]	93.4	0.0	0.0	6.0	0.0	6.0

Table Notes
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]Low levels of impacts on Washington ground squirrel are not anticipated as a result of B2H Project implementation.
[3]Portions of this route that cross Washington ground squirrel suitable habitat were not surveyed for colonies.

Table 3-169 displays acreage of disturbance on Washington ground squirrel habitat types for each of the alternative routes and variations. The percentage of the right-of-way that intersects each habitat type represents indirect effects on Washington ground squirrel.

Table 3-169. Anticipated Acres of Disturbance and Percent of Right-of-Way with Habitat for Washington Ground Squirrel for Segment 1—Morrow-Umatilla

Alternative Route	Total Acres within Right-of-Way	Total Acres of Disturbance	Occupied Colony Avoidance Areas		Occupied Colony Dispersal Areas		Suitable Habitat	
			Acres of Disturbance	Percent of Right-of-Way with Habitat	Acres of Disturbance	Percent of Right-of-Way with Habitat	Acres of Disturbance	Percent of Right-of-Way with Habitat
Applicant's Proposed Action	2,784	1,907	2[1]	0.1	122	5.3	259	14.1
Variation S1-B1	*195*	*142*	*0*	*None*	*0*	*None*	*0*	*None*
Variation S1-B2	*195*	*136*	*0*	*None*	*0*	*None*	*0*	*None*
East of Bombing Range Road	2,793	1,913	8	0.5	58	3.0	174	9.7
Applicant's Proposed Action – Southern Route	3,005	2,090	2[1]	0.1	124	4.9	284	13.9
West of Bombing Range Road – Southern Route	2,898	2,111	0[1]	<0.1	84	3.0	307	15.4
Longhorn	2,676	1,867	8	0.4	82	4.4	131	7.1

Table 3-169. Anticipated Acres of Disturbance and Percent of Right-of-Way with Habitat for Washington Ground Squirrel for Segment 1—Morrow-Umatilla

Alternative Route	Total Acres within Right-of-Way	Total Acres of Disturbance	Occupied Colony Avoidance Areas		Occupied Colony Dispersal Areas		Suitable Habitat	
			Acres of Disturbance	Percent of Right-of-Way with Habitat	Acres of Disturbance	Percent of Right-of-Way with Habitat	Acres of Disturbance	Percent of Right-of-Way with Habitat
Interstate 84	2,569	1,784	0	None	0	None	103	5.9
Variation S1-A1	*563*	*360*	*0*	*None*	*0*	*None*	*19*	*5.8*
Variation S1-A2	*562*	*408*	*0*	*None*	*0*	*None*	*242*	*60.0*
Interstate 84 – Southern Route	2,833	1,989	0	None	0	None	128	6.4

Table Notes:
[1]Disturbance from portions of routes that are adjacent to, but do not cross, habitat is not represented here, as disturbance was calculated using estimated density of disturbance (in acres per mile) for length of habitat crossed (refer to Additional Analysis in Section 3.2.4.4 for a detailed explanation of disturbance calculations)
Habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance.
Acres in the table are rounded and, therefore, columns may not sum exactly.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative would have high and moderate residual impacts on Washington ground squirrel. Short-term high residual impacts on Washington ground squirrel from the Applicant's Proposed Action Alternative would result from potential mortality to individuals. Permanent high residual impacts would result from permanent loss and/or modification of occupied colony dispersal areas. Permanent moderate residual impacts would result from permanent loss and/or modification of suitable habitat. Anticipated acres of disturbance to occupied colony avoidance areas and occupied colony dispersal areas and suitable habitat are presented in Table 3-169. Along with the disturbance to Washington ground squirrel habitat expected from Applicant's Proposed Action Alternative, indirect effects are anticipated on Washington ground squirrel across the Applicant's Proposed Action Alternative right-of-way; Table 3-169 presents the percentage of the right-of-way that intersects the different Washington ground squirrel habitat types for each route.

The types of potential effects on Washington ground squirrel are described in detail in Section 3.2.4.6. In addition to the types of impacts from construction, operation, and maintenance that are common to all alternatives that cross occupied and suitable Washington ground squirrel habitat, short-term high residual impacts from the Applicant's Proposed Action Alternative would result from surveys and excavation for unexploded ordnances that would be required prior to construction on portions of the route located inside the eastern boundary of the NWSTF Boardman, including on the NWSTF Boardman's Washington ground squirrel Resource Management Area. This additional disturbance could increase impacts on Washington ground squirrel, including additional mortality and burrow destruction from ground disturbance and heavy equipment operation.

Washington ground squirrel habitat crossed by the Applicant's Proposed Action Alternative on the NWSTF Boardman is likely to have previously incurred some of the B2H Project's potential impacts from construction and maintenance of the existing transmission line. In particular, potential for raptor perching and nesting on transmission line structures already exists; however, the proposed transmission line towers would be taller than the existing towers and could result in increased raptor predation compared to current levels of predation.

Impacts on Washington ground squirrel from military readiness activities on the NWSTF Boardman were assessed in an EIS and the Navy developed conservation measures for Washington ground squirrel in coordination with the USFWS (Navy 2015). The contribution the B2H Project's impacts on Washington ground squirrel inhabiting the NWSTF Boardman in conjunction with those from Navy activities are discussed in the cumulative effects analysis in Section 3.3.4.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on Washington ground squirrel are listed in Table 3-140 and include conducting preconstruction surveys, installing devices to deter raptor perching on transmission line structures, avoiding occupied colony avoidance areas through spanning and/or micro-siting, implementing seasonal and spatial restrictions, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4).

Occupied colony avoidance areas (i.e., Category 1 habitat) would be avoided, as required by the Fish and Wildlife Habitat Mitigation Policy (OAR 635-415-0000), the goals and standards of which must be followed to comply with the Oregon EFSC's fish and wildlife habitat standards (OAR 345-022-0060). As per the Fish and Wildlife Habitat Mitigation Policy, compensatory mitigation would be required for B2H Project disturbance in Category 2 Washington ground squirrel habitat (i.e., occupied colony dispersal areas). The mitigation goal for Category 2 habitat is no net loss of either predevelopment habitat quantity or quality, and to provide a net benefit of habitat quantity or quality. The mitigation strategy is in-kind, in-proximity mitigation The Washington ground squirrel Resource Management Area on the NWSTF Boardman, which is considered an avoidance area by the Navy, would not be avoided by the Applicant's Proposed Action, though impacts would be minimized through the protective measures and compensatory mitigation described above.

Variations S1-B1 and S1-B2

The variations do not cross occupied or suitable Washington ground squirrel habitat; therefore, no identifiable impacts on Washington ground squirrel would be anticipated from the variations.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 would have high and moderate residual impacts on Washington ground squirrel. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Design Option 1, but not Design Options 2 and 3, crosses the Washington ground squirrel Resource Management Area on the NWSTF Boardman; impacts on Washington ground squirrel on the NWSTF Boardman and the Resource Management Area from Design Option 1 would be the same as those described for the Applicant's Proposed Action Alternative. The types of potential

effects on Washington ground squirrel are described in detail under Types of Potential Effects. The design features of the B2H Project for environmental protection, selective mitigation measures, and compensatory mitigation that would minimize impacts from the B2H Project on Washington ground squirrel would be the same as that described for the Applicant's Proposed Action Alternative.

East Bombing Range Road Alternative

The East of Bombing Range Road Alternative would have high and moderate residual impacts on Washington ground squirrel. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to occupied colony avoidance areas and occupied colony dispersal areas and suitable habitat are presented in Table 3-169. Along with the direct effects from the footprint of the route, indirect effects are anticipated on Washington ground squirrel across the right-of-way; Table 3-169 presents the percentage of the right-of-way that intersects the different Washington ground squirrel habitat types for each alternative and variation.

The types of potential effects on Washington ground squirrel are described in detail at the beginning of Section 3.2.4.6 and are similar to those described for the Applicant's Proposed Action Alternative. However, the East of Bombing Range Road Alternative would not have the additional impacts on Washington ground squirrel as those described for the Proposed Action where it crosses the NWSTF Boardman. The design features of the B2H Project for environmental protection, selective mitigation measures, and compensatory mitigation that would minimize impacts from the B2H Project on Washington ground squirrel would be the same as that described for the Applicant's Proposed Action Alternative.

Applicant's Proposed Action – Southern Route Alternative

The Applicant's Proposed Action – Southern Route Alternative would have high and moderate residual impacts on Washington ground squirrel. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to occupied colony avoidance areas and occupied colony dispersal areas and suitable habitat are presented in Table 3-169.

The types of potential effects on Washington ground squirrel are described in detail at the beginning of Section 3.2.4.6. This alternative would have the same additional impacts as discussed for the Applicant's Proposed Action Alternative where it crosses the NWSTF Boardman and the NWSTF Boardman's Washington ground squirrel Resource Management Area. The Washington ground squirrel suitable habitat crossed by the portion of this route that deviates from the Applicant's Proposed Action Alternative has not been surveyed for Washington ground squirrel colonies; additional high residual impacts would result from this portion of the route if active colonies are identified in preconstruction surveys. Along with the direct effects from the footprint of the route, indirect effects are anticipated on Washington ground squirrel across the right-of-way; Table 3-169 presents the percentage of the right-of-way that intersects the different Washington ground squirrel habitat types for each alternative and variation.

The design features of the B2H Project for environmental protection, selective mitigation measures, and compensatory mitigation that would minimize impacts from the B2H Project on Washington ground squirrel would be the same as that described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Impacts on Washington ground squirrel from Design Options 1, 2, and 3 would be the same as those described for the Applicant's Proposed Action Alternative.

West of Bombing Range Road – Southern Route Alternative

The West of Bombing Range Road – Southern Route Alternative would have high and moderate residual impacts on Washington ground squirrel. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to occupied colony avoidance areas and occupied colony dispersal areas and suitable habitat are presented in Table 3-169.

The types of potential effects on Washington ground squirrel are described in detail at the beginning of Section 3.2.4.6. This alternative would have the same additional impacts as discussed for the Applicant's Proposed Action Alternative where it crosses the NWSTF Boardman and the NWSTF Boardman's Washington ground squirrel Resource Management Area. The Washington ground squirrel suitable habitat crossed by the portion of this route that deviates from the Applicant's Proposed Action Alternative has not been surveyed for Washington ground squirrel colonies; additional high residual impacts would result from this portion of the route if active colonies are identified in preconstruction surveys. Along with the direct effects from the footprint of the route, indirect effects are anticipated on Washington ground squirrel across the right-of-way; Table 3-169 presents the percentage of the right-of-way that intersects the different Washington ground squirrel habitat types for each alternative and variation.

The design features of the B2H Project for environmental protection, selective mitigation measures, and compensatory mitigation that would minimize impacts from the B2H Project on Washington ground squirrel would be the same as that described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Impacts on Washington ground squirrel from Design Options 1, 2, and 3 would be the same as those described for the Applicant's Proposed Action Alternative.

Longhorn Alternative

The Longhorn Alternative would have high and moderate residual impacts on Washington ground squirrel. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to occupied colony avoidance areas and occupied colony dispersal areas and suitable habitat are presented in Table 3-169.

The types of potential effects on Washington ground squirrel are described in detail at the beginning of Section 3.2.4.6. The Longhorn Alternative would not have the additional impacts on Washington ground squirrel described for the Applicant's Proposed Action where it crosses the NWSTF Boardman. Along

with the direct effects from the footprint of the route, indirect effects are anticipated on Washington ground squirrel across the right-of-way; Table 3-169 presents the percentage of the right-of-way that intersects the different Washington ground squirrel habitat types for each alternative and variation.

The design features of the B2H Project for environmental protection, selective mitigation measures, and compensatory mitigation that would minimize impacts from the B2H Project on Washington ground squirrel would be the same as those described for the Applicant's Proposed Action Alternative.

Interstate 84 Alternative

The Interstate 84 Alternative would have moderate residual impacts on Washington ground squirrel (MV-8, Table 3-168). Permanent moderate residual impacts would result from permanent loss and/or modification of suitable habitat. Anticipated acres of disturbance to Washington ground squirrel habitat are presented in Table 3-169.

The types of potential effects on Washington ground squirrel are described in detail at the beginning of Section 3.2.4.6 The Interstate 84 Alternative would not have the additional impacts on Washington ground squirrel described for the Applicant's Proposed Action where it crosses the NWSTF Boardman. The Washington ground squirrel suitable habitat crossed by this route has not been surveyed for Washington ground squirrel colonies; additional high residual impacts would result from this route if active colonies are identified in preconstruction surveys. Along with the direct effects from the footprint of the route, indirect effects are anticipated on Washington ground squirrel across the right-of-way; Table 3-169 presents the percentage of the right-of-way that intersects the different Washington ground squirrel habitat types for each alternative and variation.

The design features of the B2H Project for environmental protection, selective mitigation measures, and compensatory mitigation that would minimize impacts from the B2H Project on Washington ground squirrel would be the same as that described for the Applicant's Proposed Action Alternative.

Variations S1-A1 and S1-A2

The variations would have moderate residual impacts on Washington ground squirrel (MV-8, Table 3-168). Permanent moderate residual impacts would result from permanent loss and/or modification of suitable habitat. Anticipated acres of disturbance to Washington ground squirrel habitat are presented in Table 3-169.

The types of potential effects on Washington ground squirrel are described in detail at the beginning of Section 3.2.4.6. The Washington ground squirrel suitable habitat crossed by this route has not been surveyed for Washington ground squirrel colonies; additional high residual impacts would result from this route if active colonies are identified in preconstruction surveys. Along with the direct effects from the footprint of the route variation, indirect effects are anticipated on Washington ground squirrel across the right-of-way; Table 3-169 presents the percentage of the right-of-way that intersects the different Washington ground squirrel habitat types for each alternative and variation.

The design features of the B2H Project for environmental protection, selective mitigation measures, and compensatory mitigation that would minimize impacts from the B2H Project on Washington ground squirrel would be the same as that described for the Applicant's Proposed Action Alternative.

Interstate 84 – Southern Route Alternative

The Interstate 84 – Southern Route Alternative would have moderate residual impacts on Washington ground squirrel (MV-8, Table 3-168). Permanent moderate residual impacts would result from permanent loss and/or modification of suitable habitat. Anticipated acres of disturbance to occupied colony avoidance areas and occupied colony dispersal areas and suitable habitat are presented in Table 3-169.

The types of potential effects on Washington ground squirrel are described in detail at the beginning of Section 3.2.4.6. The Interstate 84 – Southern Route Alternative would not have the additional impacts on Washington ground squirrel described for the Applicant's Proposed Action where it crosses the NWSTF Boardman. The Washington ground squirrel suitable habitat crossed by this route has not been surveyed for Washington ground squirrel colonies; additional high residual impacts would result from this portion of the route if active colonies are identified in preconstruction surveys. Along with the direct effects from the footprint of the route, indirect effects are anticipated on Washington ground squirrel across the right-of-way; Table 3-169 presents the percentage of the right-of-way that intersects the different Washington ground squirrel habitat types for each alternative and variation.

The design features of the B2H Project for environmental protection, selective mitigation measures, and compensatory mitigation that would minimize impacts from the B2H Project on Washington ground squirrel would be the same as that described for the Applicant's Proposed Action Alternative.

Migratory Birds Including Raptors

Applicant's Proposed Action Alternative

Direct impacts on raptors and other migratory birds during construction could include collision with B2H Project structures, electrocution, disturbance due to construction noise, fugitive dust, and visual disturbance. The risk of migratory bird collision is potentially higher for the Applicant's Proposed Action Alternative and other alternative routes that cross Boardman Grasslands Important Bird Areas compared to other alternative routes due to the concentrated bird activity in these areas. The risk of collision risk already exists from the existing transmission line located along the route of the Applicant's Proposed Action Alternative; however, the risk of collision may be greater due to the increased size of the proposed transmission line towers. Raptors and other migratory birds are particularly sensitive to disturbance during the nesting period and some construction activities could cause nest failure or abandonment. The types of potential effects on raptors and other migratory birds are described in detail at the beginning of Section 3.2.4.6.

Residual impact levels for raptors and other migratory birds have been determined in accordance with the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4. Because removal or disturbance to nesting sites for raptors and

other migratory birds could occur, the Applicant's Proposed Action could result in long-term moderate residual impacts on raptors and other migratory birds. Short-term moderate residual impacts on bald and golden eagles would result from disruption of breeding and foraging behavior. Short-term moderate impacts from disturbance of nesting sites could occur if nests are located along the Applicant's Proposed Action during preconstruction surveys; no nests are currently known to occur within 0.5-mile of the Applicant's Proposed Action Alternative.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on raptors and other migratory birds include installing flight diverters, minimization of removal of trees and other vegetation, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), limiting construction and maintenance activities during migratory bird nesting season, implementing seasonal and spatial restrictions for sensitive periods and habitats, and conducting preconstruction surveys (refer to Section 3.2.4.4). In addition, adherence to the Applicant's Avian Protection Plan would minimize or avoid impacts from the B2H Project on raptors and other migratory birds.

Variations S1-B1 and S1-B2

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Residual impact levels and duration of impacts, as well as the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the Design Options 1, 2, and 3 on raptors and other migratory birds would be similar to those described for the Applicant's Proposed Action Alternative. The types of potential effects on raptors and other migratory birds are described in detail at the beginning of Section 3.2.4.6.

East Bombing Range Road Alternative

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative. Similar to the Applicant's Proposed Action Alternative, the risk of migratory bird collision is potentially high for the East of Bombing Range Road Alternative because concentrated bird activity occurs within the study corridor on the Boardman Grasslands Important Bird Areas. However, the risk of new collision risk would be reduced as compared to the Applicant's Proposed Action in the areas where it is colocated with an existing transmission line.

Applicant's Proposed Action – Southern Route Alternative

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that

would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative. Similarly to the Applicant's Proposed Action Alternative, the risk of migratory bird collision is potentially higher for the Applicant's Proposed Action – Southern Route Alternative because it crosses areas of concentrated bird activity on the Boardman Grasslands Important Bird Areas. The risk of collision risk already exists from the existing transmission line located along the route of the Applicant's Proposed Action – Southern Route Alternative; however, the risk of collision may be greater due to the increased size of the proposed transmission line towers.

Additional Action – 69-Kilovolt Line Replacement

Impacts from Design Option 1, 2, and 3 on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

West of Bombing Range Road – Southern Route Alternative

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative. Similarly to the Applicant's Proposed Action Alternative, the risk of migratory bird collision is potentially higher for the West of Bombing Range Road – Southern Route Alternative because it crosses areas of concentrated bird activity on the Boardman Grasslands Important Bird Areas. The risk of collision risk already exists from the existing transmission line located along the route of the West of Bombing Range Road – Southern Route Alternative; however, the risk of collision may be greater due to the increased size of the proposed transmission line towers.

Additional Action – 69-Kilovolt Line Replacement

Impacts from Design Option 1, 2, and 3 on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Longhorn Alternative

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative. Similar to the Applicant's Proposed Action Alternative, the risk of migratory bird collision is potentially high for the Longhorn Alternative because concentrated bird activity occurs within the study corridor on the Boardman Grasslands Important Bird Areas.

Interstate 84 Alternative

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative. However, the risk of migratory bird

collision may be lower for the Interstate 84 Alternative because the Boardman Grasslands Important Bird Areas occur within a relatively small portion of the study corridor at the western end of the alternative route.

Variations S1-A1 and S1-A2

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Interstate 84 Alternative. However, the risk of new collision risk would be reduced for Variation S1-A2 as it is colocated with an existing transmission line.

Interstate 84 – Southern Route Alternative

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Interstate 84 Alternative.

Big Game

The direct and indirect effects of the B2H Project on big game species could incrementally contribute to other factors preventing mule deer and elk populations from meeting ODFW's management objectives for these species. However, as described below, design features of the B2H Project for environmental protection and selective mitigation measures will minimize impacts on WMUs and big game habitat.

Table 3-170 presents miles crossed and residual impacts on big game for all alternative routes and route variations in Segment 1. Levels of residual impacts and duration of impacts on big game are described by alternative route and route variation below, and displayed in MV-10. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Table 3-170. Big Game Inventory Data and Residual Impacts for Segment 1—Morrow-Umatilla (miles crossed)

Alternative Route	Total Length (miles)	Inventory[1]					Residual Impacts[2]
		Bighorn Sheep Oregon Occupied Range	Bighorn Sheep Population Management Units	Pronghorn Winter Range	Mule Deer Winter Range	Elk Winter Range	Low
Applicant's Proposed Action	91.9	0.0	0.0	0.0	9.1	14.5	14.5
Variation S1-B1	*6.4*	*0.0*	*0.0*	*0.0*	*0.4*	*0.7*	*0.7*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*0.0*	*0.4*	*1.2*	*1.2*
East of Bombing Range Road	92.3	0.0	0.0	0.0	9.1	14.5	14.5

Table 3-170. Big Game Inventory Data and Residual Impacts for Segment 1—Morrow-Umatilla (miles crossed)							
Alternative Route	Total Length (miles)	Inventory[1]					Residual Impacts[2]
		Bighorn Sheep Oregon Occupied Range	Bighorn Sheep Population Management Units	Pronghorn Winter Range	Mule Deer Winter Range	Elk Winter Range	Low
Applicant's Proposed Action – Southern Route	99.1	0.0	0.0	0.0	20.2	19.9	25.4
West of Bombing Range Road – Southern Route	95.6	0.0	0.0	0.0	46.5	19.9	51.7
Longhorn	88.2	0.0	0.0	0.0	9.1	14.5	14.5
Interstate 84	84.7	0.0	0.0	0.0	9.1	14.5	14.5
Variation S1-A1	*18.5*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S1-A2	*18.5*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Interstate 84 – Southern Route	93.4	0.0	0.0	0.0	20.2	19.9	25.4

Table Notes:
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]High or moderate levels of impacts on Big Game are not anticipated as a result of B2H Project implementation.

Table 3-171 displays acreage of disturbance on big game habitat for all alternatives and variations in Segment 1.

Table 3-171. Anticipated Acres of Disturbance for Big Game for Segment 1—Morrow-Umatilla (acres)						
Alternative Route	Total Disturbance	Bighorn Sheep Oregon Occupied Range	Bighorn Sheep Population Management Units	Pronghorn Winter Range	Mule Deer Winter Range	Elk Winter Range
Applicant's Proposed Action	1,907	0	0	0	189	301
Variation S1-B1	*142*	*0*	*0*	*0*	*9*	*15*
Variation S1-B2	*136*	*0*	*0*	*0*	*9*	*26*
East of Bombing Range Road	1,913	0	0	0	189	301
Applicant's Proposed Action – Southern Route	2,090	0	0	0	426	419
West of Bombing Range Road – Southern Route	2,111	0	0	0	1,027	439
Longhorn	1,867	0	0	0	192	307
Interstate 84	1,784	0	0	0	191	305
Variation S1-A1	*360*	*0*	*0*	*0*	*0*	*0*
Variation S1-A2	*408*	*0*	*0*	*0*	*0*	*0*
Interstate 84 – Southern Route	1,989	0	0	0	430	423

Table Notes: Habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action would have short- and long-term low residual impacts on mule deer and elk. Anticipated acres of disturbance to mule deer and elk winter range are presented in Table 3-171. Short- and long-term residual impacts from the Applicant's Proposed Action would be low because impacts would have only minor adverse effects on mule deer and elk and would not limit the long-term sustainability of populations.

Direct effects on big game could include vehicle collisions, noise and visual disturbance, and habitat loss and modification. Indirect effects could include increased disturbance to big game from increased human activity from use of new or improved access roads. The types of potential effects on big game are described in detail at the beginning of Section 3.2.4.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project to big game are listed in Table 3-140 and include implementing seasonal restrictions, limiting new or improved access to areas previously inaccessible, leaving vegetation in place whenever possible, and reclaiming construction areas with an agency or landowner-approved seed mix (refer to Section 3.2.4.4).

Variations S1-B1 and S1-B2

The variations would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 do not cross designated mule deer or elk winter range; therefore, no identifiable impacts would be anticipated on these habitat types.

East Bombing Range Road Alternative

The East of Bombing Range Road Alternative would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Applicant's Proposed Action – Southern Route Alternative

The Applicant's Proposed Action – Southern Route Alternative would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 do not cross designated mule deer or elk winter range; therefore, no identifiable impacts would be anticipated on these habitat types.

West of Bombing Range Road – Southern Route Alternative

The West of Bombing Range Road – Southern Route Alternative would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Additional Action – 69-Kilovolt Line Replacement

Design Options 1, 2, and 3 do not cross designated mule deer or elk winter range; therefore, no identifiable impacts would be anticipated on these habitat types.

Longhorn Alternative

The Longhorn Alternative would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Interstate 84 Alternative

The Interstate 84 Alternative would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S1-A1 and S1-A2

The variations do not cross mule deer or elk winter range; therefore, no identifiable impacts would be anticipated on these habitat types.

Interstate 84 – Southern Route Alternative

The Interstate 84 – Southern Route Alternative would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Management Indicator Species and USFS Sensitive Species

Alternative Routes and Route Variations

The environmental consequences for MIS and USFS sensitive species are described in Appendix F.

Conclusion

All alternative routes and route variations would result in short-term, long-term, and permanent effects on wildlife habitat and wildlife species. A summary of effects on gray wolf, Washington ground squirrel, migratory birds including raptors, and big game are provided below.

Gray Wolf

The West of Bombing Range Road – Southern Route would have the greatest impact on gray wolves compared to the other alternative routes in Segment 1 because ODFW-designated wolf use areas where the gray wolf retains federally endangered status occur in the West of Bombing Range Road – Southern Route study corridor. ODFW-designated wolf use areas where the gray wolf retains federally endangered status do not occur in the study corridors of the other alternative routes.

The B2H Project would have high and moderate residual impacts on gray wolves with federally endangered status. Mortality of gray wolves and disturbance or displacement from habitat would be substantially minimized by limiting the extent of construction activities, enforcement of a speed limit, and limiting public accessibility of new or improved access roads. Disturbance or displacement from habitat is not anticipated to negatively affect gray wolves appreciably due to the small amount of habitat affected compared to the large home ranges of this species.

Washington Ground Squirrel

All alternative routes would result in moderate residual impacts from crossing Washington ground squirrel suitable habitat. In addition, all alternative routes would result in high residual impacts from crossing Washington ground squirrel occupied colony avoidance areas and/or occupied colony dispersal areas, with the exception of the Interstate 84 Alternative and the Interstate 84 – Southern Route Alternative, which have not been surveyed for colonies and may or may not contain active colonies. In addition to other direct and indirect effects, permanent loss and/or modification of Washington ground squirrel occupied colony dispersal areas and suitable habitat would occur where these habitat types are crossed by the alternative routes. Loss and modification of habitat in occupied colony avoidance areas would be avoided through spanning and/or micro-siting.

Impacts on Washington ground squirrel would be greatest from the Applicant's Proposed Action – Southern Route; the Applicant's Proposed Action – Southern Route crosses the same amount of occupied habitat (i.e., occupied colony avoidance areas and occupied colony dispersal areas) as the Applicant's Proposed Action, including the Washington ground squirrel Resource Management Area (all of which is considered an avoidance area by the Navy), but the Applicant's Proposed Action – Southern Route crosses more suitable habitat. The Interstate 84 Alternative would result in the lowest impacts on Washington ground squirrel as it does not cross occupied habitat and crosses the smallest amount of suitable habitat. However, the suitable habitat crossed by Interstate 84 has not been surveyed for colonies; but even if surveys determine that all of the suitable habitat crossed by the Interstate 84 Alternative is occupied habitat, the Applicant's Proposed Action and Applicant's Proposed Action – Southern Route would still be expected to have greater impacts on Washington ground squirrel since

the total amount of occupied habitat that the two alternatives cross is greater than the amount of suitable habitat crossed by the Interstate 84 Alternative.

Impacts on Washington ground squirrel would be reduced through limiting the extent of construction activities, use of existing access, enforcement of a speed limit, installation of devices to deter raptor perching, B2H Project activity restrictions during sensitive periods, and reclamation; moreover, compensatory mitigation that provides a net benefit of habitat quantity or quality would be required for surface disturbance in occupied colony dispersal areas (per the ODFW Fish and Wildlife Habitat Mitigation Policy).

Migratory Birds Including Raptors

All alternative routes and route variations would result in moderate residual impacts on raptors and other migratory birds from removal or disturbance to nesting sites, and from the disruption of bald and golden eagle breeding and foraging behavior. Avoidance and minimization measures, including limiting B2H Project activities and implementing spatial restrictions during the nesting season, would reduce impacts on migratory birds during construction and operation of the B2H Project. Removal of and disturbance to nesting habitat would not negatively affect raptors and other migratory birds appreciably due to the small amount of habitat affected compared to the large home ranges of these species. Habitat disturbed during construction would be reclaimed and would restore migratory bird habitats similar to those disturbed. While the resulting habitats may cause a shift in avian species use, population-level effects on migratory birds are not anticipated to occur.

Impacts on migratory bird habitat would be greater with the Applicant's Proposed Action Alternative, Applicant's Proposed Action – Southern Route Alternative, and West of Bombing Range Road – Southern Route Alternative from crossing the Boardman Grasslands Important Bird Areas, compared to the other alternative routes which do not cross any Important Bird Areas. No bald or golden eagle nests are known to occur within 0.5 mile of any alternative route or route variation.

Big Game

All alternative routes would have low residual impacts on big game. In addition to other direct and indirect effects, short- and long-term habitat loss would occur, but would not negatively affect big game appreciably due to the small amount of habitat affected compared to the large home ranges of these species. Disturbance to big game during sensitive periods would be minimized through the implementation of seasonal restrictions. The Applicant's Proposed Action Alternative, Longhorn Alternative, East of Bombing Range Road Alternative, and the Interstate 84 Alternative share an alignment where they cross big game habitat and would have the lowest impacts from crossing less big game habitat than the other alternative routes.

Summary

The Interstate 84 Alternative would result in the least overall impacts on wildlife resources compared to the other alternative routes in Segment 1 primarily because it would result in the least impacts on Washington ground squirrel. The Interstate 84 Alternative would also avoid the ODFW-designated wolf use areas where the gray wolf retains federally endangered status, avoid impacts on migratory birds

associated with crossing the Boardman Grasslands Important Bird Areas, and would cross less big game habitat than the West of Bombing Range Road – Southern Route and the Interstate 84–Southern Route.

SEGMENT 2—BLUE MOUNTAINS

Wildlife Habitat

Alternative Routes and Route Variations

Wildlife habitat that would be affected in Segment 2 includes woodland/forest and shrubland habitat, as well as RCAs. Grassland habitat also would be affected, but to a more limited extent. The amount of wildlife habitat types that would be disturbed in Segment 2 is compared by alternative route in Table 3-123, and residual impacts on each wildlife habitat type is provided in Table 3-122 in Section 3.2.3. Additionally, wildlife habitat on the Ladd Marsh Wildlife Area, as well as Rebarrow Forest, Winn Meadow, and other lands west of Ladd Marsh Wildlife Area would be affected by central portions of the routes in Segment 2.

The types of potential effects on each wildlife habitat type are described in detail at the beginning of Section 3.2.4.6. The primary impact on wildlife habitats would include habitat removal and fragmentation. The Applicant's Proposed Action and all alternatives and variations in Segment 2 would result in moderate residual impacts on shrubland and forest/woodland habitat types because they support a wide range of species and are slow to regenerate. Native grassland habitats provide value to wildlife but are uncommon throughout the B2H Project area, therefore, the Applicant's Proposed Action and all alternatives and variations in Segment 2 would result in moderate residual impacts on this habitat type. Although disturbance to RCAs is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible (Design Features 15 and 16), the B2H Project in Segment 2 would have moderate residual impacts on this valuable wildlife habitat type.

Special Status species

Alternative Routes and Route Variations

The amount of each wildlife habitat that would be disturbed in Segment 2 is compared by alternative in Table 3-123 in Section 3.2.3. Special status species using wildlife habitats in Segment 2 are described at the beginning of Section 3.2.4.5. Potential effects on special status wildlife species would be similar to potential effects on other wildlife species that use the same habitat types. The types of potential effects on each wildlife habitat type are described in detail at the beginning of Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on special status wildlife include installing devices to deter raptor perching on transmission line structures and minimize an increase in predation, minimization of removal of trees and other vegetation, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), limiting construction and maintenance activities during migratory bird nesting season, implementing seasonal and spatial restrictions for sensitive

periods and habitats, conducting preconstruction surveys, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4).

The types of potential effects on special status wildlife species would be similar for all alternatives. Because mortality of special status species (without population-level effects) and temporary disturbance during critical or sensitive periods could occur (without population-level effects), the Applicant's Proposed Action and all alternatives and variations in Segment 2 could result in long-term moderate impacts on special status species. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Greater Sage-Grouse

Table 3-172 presents miles crossed and residual impacts on Greater Sage-Grouse PHMA and GHMA for all alternative routes and route variations in Segment 2. Levels of residual impacts and duration of impacts on Greater Sage-Grouse are described by alternative route and route variation below, and displayed in MV-9. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Table 3-172. Greater Sage-Grouse Inventory Data and Residual Impacts for Segment 2—Blue Mountains (miles crossed)

Alternative Route	Total Length (miles)	Inventory (Miles Crossed)[1]		Residual Impacts (miles crossed)[2]	
		Priority Habitat Management Areas	General Habitat Management Areas	High	Moderate
Applicant's Proposed Action	33.8	0.0	3.2	0.0	3.2
Variation S2-A1	*2.8*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S2-A2	*2.9*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S2-B1	*3.7*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S2-B2	*3.8*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S2-C1	*9.3*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S2-C2	*8.8*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S2-E1	*2.3*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S2-E2	*2.6*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S2-F1	*12.1*	*0.0*	*3.2*	*0.0*	*3.2*
Variation S2-F2	*12.2*	*0.0*	*1.9*	*0.0*	*1.9*
Glass Hill	33.7	0.0	3.2	0.0	3.2
Variation S2-D1	*4.3*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S2-D2	*4.1*	*0.0*	*0.0*	*0.0*	*0.0*
Mill Creek	34.0	0.0	1.9	0.0	1.9

Table Notes:
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]Low levels of impacts on Greater Sage-Grouse are not anticipated as a result of B2H Project implementation.

Table 3-173 displays acreage of disturbance on Greater Sage-Grouse habitat types for each of the route alternatives and variations.

Table 3-173. Anticipated Acres of Disturbance for Greater Sage-Grouse for Segment 2—Blue Mountains			
Alternative Route	**Total Acres of Disturbance**	**Priority Habitat Management Areas**	**General Habitat Management Areas**
Applicant's Proposed Action	764	0	73
Variation S2-A1	*58*	*0*	*0*
Variation S2-A2	*60*	*0*	*0*
Variation S2-B1	*85*	*0*	*0*
Variation S2-B2	*85*	*0*	*0*
Variation S2-C1	*221*	*0*	*0*
Variation S2-C2	*191*	*0*	*0*
Variation S2-E1	*52*	*0*	*0*
Variation S2-E2	*58*	*0*	*0*
Variation S2-F1	*260*	*0*	*69*
Variation S2-F2	*266*	*0*	*41*
Glass Hill	752	0	72
Variation S2-D1	*109*	*0*	*0*
Variation S2-D2	*98*	*0*	*0*
Mill Creek	784	0	44
Table Notes: Greater Sage-Grouse habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.			

Applicant's Proposed Action Alternative

The Applicant's Proposed Action would have long-term moderate residual impacts on Greater Sage-Grouse. Long-term moderate residual impacts would occur where GHMA is crossed because impacts would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. GHMA represents areas of occupied seasonal or year-round Greater Sage-Grouse habitat, but not areas with the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-173.

Potential direct effects on Greater Sage-Grouse could include mortality due to electrocution; in-flight collisions with transmission line infrastructure; collisions with construction and maintenance vehicles; fragmentation of habitats due to the introduction of tall structures, increased EMFs, and construction of new roads; loss and degradation of habitat quality and function; disturbance to breeding activities due to increased human presence and noise at lek locations; disturbance during sensitive periods resulting from human presence, vehicle use, and noise during construction and maintenance; and interruption and/or alteration of seasonal migrations and movements among populations. Along with the direct effects that would be expected within the footprint of the Applicant's Proposed Action Alternative, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 16.5 percent would be in Greater Sage-Grouse GHMA. Indirect effects in these areas could include alteration of the native sagebrush understory through introduction and spread of non-native, invasive plants and noxious weeds; avoidance of habitat due to potential increase in raptor predation pressure; disruption of nesting and breeding activities and avoidance of habitat due to vehicle

noise and human presence resulting from public use of new access roads; increased mammalian predation risk; increased raptor and raven predation risk; and alteration of behavioral patterns due to increased predation pressure. The types of potential direct and indirect effects on Greater Sage-Grouse are described in detail at the beginning of Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on Greater Sage-Grouse are listed in Table 3-140 and include installing devices to deter raptor perching on transmission line structures, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), conducting preconstruction surveys, implementing seasonal restrictions for sensitive periods and habitats, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4). Seasonal restrictions for Greater Sage-Grouse would be similar to the seasonal restrictions identified in the Oregon ARMPAs (refer to Appendix B). Moreover, the B2H Project would be required to achieve a net conservation gain for Greater Sage-Grouse through compensatory mitigation as described in the Mitigation Framework (Appendix C).

Variations S2-A1 and S2-A2

The variations do not cross Greater Sage-Grouse habitat; therefore, no identifiable impacts on Greater Sage-Grouse would be anticipated.

Variation S2-B1 and S2-B2

The variations do not cross Greater Sage-Grouse habitat; therefore, no identifiable impacts on Greater Sage-Grouse would be anticipated.

Variation S2-C1 and S2-C2

The variations do not cross Greater Sage-Grouse habitat; therefore, no identifiable impacts on Greater Sage-Grouse would be anticipated.

Variations S2-E1 and S2-E2

The variations would have long-term moderate residual impacts on Greater Sage-Grouse. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-173.

Along with the direct effects that would be expected within the footprint of the variations, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 0.3 percent would be Greater Sage-Grouse GHMA. Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S2-F1

Variation S2-F1 would have long-term moderate residual impacts on Greater Sage-Grouse. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-173.

Along with the direct effects that would be expected within the footprint of Variation S2-F1, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 37.0 percent would be Greater Sage-Grouse GHMA. Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S2-F2

Variation S2-F2 would have long-term moderate residual impacts on Greater Sage-Grouse. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-173.

Along with the direct effects that would be expected within the footprint of Variation S2-F2, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 39.4 percent would be Greater Sage-Grouse GHMA and less than 0.1 percent would be PHMA on the Baker Oregon PAC. Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Glass Hill Alternative

The Glass Hill Alternative would have long-term moderate residual impacts on Greater Sage-Grouse. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-173.

Along with the direct effects that would be expected within the footprint of the Glass Hill Alternative, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 16.6 percent would be Greater Sage-Grouse GHMA. Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S2-D1 and S2-D2

The variations do not cross Greater Sage-Grouse habitat; therefore, no identifiable impacts on Greater Sage-Grouse would be anticipated.

Mill Creek Alternative

The Mill Creek Alternative would have long-term moderate residual impacts on Greater Sage-Grouse. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-173.

Along with the direct effects that would be expected within the footprint of the Mill Creek Alternative, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 17.4 percent would be Greater Sage-Grouse GHMA and 0.3 percent would be PHMA on the Baker Oregon PAC. Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Migratory Birds Including Raptors

Applicant's Proposed Action Alternative

Direct impacts on raptors and other migratory birds during construction could include collision with B2H Project structures, electrocution, disturbance due to construction noise, fugitive dust, and visual disturbance. Raptors and other migratory birds are particularly sensitive to disturbance during the nesting period and some construction activities could cause nest failure or abandonment. The types of potential effects on raptors and other migratory birds are described in detail at the beginning of Section 3.2.4.6.

Residual impact levels for raptors and other migratory birds have been determined in accordance with the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4. Because removal or disturbance to nesting sites for raptors and other migratory birds could occur, the Applicant's Proposed Action could result in long-term residual moderate impacts on raptors and other migratory birds. Short-term moderate residual impacts on bald and golden eagles would result from disruption of breeding and foraging behavior. Short-term moderate impacts from disturbance of nesting sites could occur if nests are located along the Applicant's Proposed Action during preconstruction surveys; no nests are currently known to occur within 0.5-mile of the Applicant's Proposed Action Alternative.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on raptors and other migratory birds include installing flight diverters, minimization of removal of trees and other vegetation, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), limiting construction and maintenance activities during migratory bird nesting season, implementing seasonal and spatial restrictions for sensitive periods and habitats, and conducting preconstruction surveys (refer to Section 3.2.4.4). In addition, adherence to the Applicant's Avian Protection Plan would minimize or avoid impacts from the B2H Project on raptors and other migratory birds.

Variations S2-A1 and S2-A2

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S2-B1 and S2-B2

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

The risk of increased collision may be somewhat reduced for Variation S2-B2 compared to Variation S2-B1 because this risk already exists from the existing transmission line located along the route of Variation S2-B2.

Variations S2-C1 and S2-C2

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

The risk of migratory bird collision is potentially higher for Variation S2-C2 than Variation S2-C1 because it crosses areas of concentrated bird activity on the Ladd Marsh Important Bird Areas.

Variations S2-E1 and S2-E2

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S2-F1 and S2-F2

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that

would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

The risk of increased collision may be somewhat reduced for Variation S2-F2 compared to Variation S2-F1 because this risk already exists from the existing transmission line located along the route of Variation S2-F2.

Glass Hill Alternative

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S2-D1 and S2-D2

The types of potential effects on raptors and other migratory birds, residual impact levels, and the design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Mill Creek Alternative

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. However, the risk of migratory bird collision is potentially higher for Mill Creek Alternative than the Applicant's Proposed Action because it crosses areas of concentrated bird activity on the Ladd Marsh Important Bird Areas. The risk of collision risk already exists from the existing transmission line located along the route of the Mill Creek Alternative; however, the risk of collision may be greater due to the increased size of the proposed transmission line towers. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Big Game

The direct and indirect effects of the B2H Project on big game species could incrementally contribute to other factors preventing mule deer and elk populations from meeting ODFW's management objectives for these species. However, as described below, design features of the B2H Project for environmental protection and selective mitigation measures will minimize impacts on WMUs and big game habitat.

Table 3-174 presents miles crossed and residual impacts on big game habitats for all alternative routes and route variations in Segment 2. Levels of residual impacts and duration of impacts on big game are described by alternative route and route variation below, and displayed in MV-10. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Table 3-174. Big Game Inventory Data and Residual Impacts for Segment 2—Blue Mountains (miles crossed)				
Alternative Route	Total Length (miles)	Inventory[1]		Residual Impacts[2]
		Mule Deer Winter Range	Elk Winter Range	Low
Applicant's Proposed Action	33.8	26.7	29.1	29.1
Variation S2-A1	*2.8*	*2.8*	*2.8*	*2.8*
Variation S2-A2	*2.9*	*2.9*	*2.9*	*2.9*
Variation S2-B1	*3.7*	*3.7*	*3.7*	*3.7*
Variation S2-B2	*3.8*	*3.8*	*3.8*	*3.8*
Variation S2-C1	*9.3*	*5.0*	*7.4*	*7.4*
Variation S2-C2	*8.8*	*5.6*	*6.8*	*6.8*
Variation S2-E1	*2.3*	*2.3*	*2.3*	*2.3*
Variation S2-E2	*2.6*	*2.6*	*2.6*	*2.6*
Variation S2-F1	*12.1*	*9.3*	*9.3*	*9.3*
Variation S2-F2	*12.2*	*10.2*	*10.2*	*10.2*
Glass Hill	33.7	26.6	29.0	29.0
Variation S2-D1	*4.3*	*2.8*	*4.3*	*4.3*
Variation S2-D2	*4.1*	*2.2*	*4.1*	*4.1*
Mill Creek	34.0	32.0	32.0	32.0

Table Notes:
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]High or moderate levels of impacts on Big Game are not anticipated as a result of B2H Project implementation.

Table 3-175 displays acreage of disturbance on big game habitat for all alternatives and variations in Segment 2.

Table 3-175. Anticipated Acres of Disturbance for Big Game for Segment 2—Blue Mountains (acres)						
Alternative Route	Total Disturbance	Bighorn Sheep Oregon Occupied Range	Bighorn Sheep Management Units	Pronghorn Winter Range	Mule Deer Winter Range	Elk Winter Range
Proposed Action	764	0	0	0	607	662
Variation S2-A1	*58*	*0*	*0*	*0*	*56*	*56*
Variation S2-A2	*60*	*0*	*0*	*0*	*60*	*60*
Variation S2-B1	*85*	*0*	*0*	*0*	*87*	*87*
Variation S2-B2	*85*	*0*	*0*	*0*	*85*	*85*
Variation S2-C1	*221*	*0*	*0*	*0*	*119*	*176*
Variation S2-C2	*191*	*0*	*0*	*0*	*121*	*147*
Variation S2-E1	*52*	*0*	*0*	*0*	*52*	*52*
Variation S2-E2	*58*	*0*	*0*	*0*	*58*	*58*
Variation S2-F1	*260*	*0*	*0*	*0*	*200*	*200*
Variation S2-F2	*266*	*0*	*0*	*0*	*222*	*222*

Table 3-175. Anticipated Acres of Disturbance for Big Game for Segment 2—Blue Mountains (acres)						
Alternative Route	**Total Disturbance**	**Bighorn Sheep Oregon Occupied Range**	**Bighorn Sheep Management Units**	**Pronghorn Winter Range**	**Mule Deer Winter Range**	**Elk Winter Range**
Glass Hill	752	0	0	0	595	649
Variation S2-D1	*109*	*0*	*0*	*0*	*71*	*109*
Variation S2-D2	*98*	*0*	*0*	*0*	*53*	*98*
Mill Creek	784	0	0	0	738	738
Table Note: Habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.						

Applicant's Proposed Action Alternative

The Applicant's Proposed Action would have short- and long-term low residual impacts on mule deer and elk. Anticipated acres of disturbance to mule deer and elk winter range are presented in Table 3-175. Short- and long-term residual impacts from the Applicant's Proposed Action would be low because impacts would have only minor adverse effects on mule deer and elk and would not limit the long-term sustainability of populations.

Direct effects on big game could include vehicle collisions, noise and visual disturbance, and habitat loss and modification. Indirect effects could include increased disturbance to big game from increased human activity from use of new or improved access roads. The types of potential effects on big game are described in detail at the beginning of Section 3.2.4.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project to big game are listed in Table 3-140 and include implementing seasonal restrictions, limiting new or improved access to areas previously inaccessible, leaving vegetation in place whenever possible, and reclaiming construction areas with an agency or landowner-approved seed mix (refer to Section 3.2.4.4).

Variations S2-A1 and S2-A2

The variations would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S2-B1 and S2-B2

The variations would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S2-C1 and S2-C2

The variations would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection,

and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S2-E1 and S2-E2

The variations would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S2-F1 and S2-F2

The variations would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Glass Hill Alternative

The Glass Hill Alternative would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S2-D1 and S2-D2

The variations would have short- and long-term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Mill Creek Alternative

The Mill Creek Alternative would have short- term low residual impacts on mule deer and elk. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Management Indicator Species and USFS Sensitive Species

Alternative Routes and Route Variations

The environmental consequences for MIS and USFS sensitive species are described in Appendix F.

Conclusion

All alternative routes and route variations would result in short-term, long-term, and permanent effects on wildlife habitat and wildlife species. A summary of effects on Greater Sage-Grouse, migratory birds including raptors, and big game are provided below.

Greater Sage-Grouse

All alternative routes cross Greater Sage-Grouse GHMA and would have moderate residual impacts on Greater Sage-Grouse from adverse effects such as loss of habitat, increased avian predation, and habitat avoidance. PHMA would not be crossed by any of the alternative routes and no leks occur within 3.1 miles of any of the alternative routes. In addition to seasonal restrictions implemented during sensitive periods and other avoidance and minimization measures to reduce impacts on Greater Sage-Grouse, the B2H Project would be required to achieve a net conservation gain for Greater Sage-Grouse through compensatory mitigation as described in the Mitigation Framework (Appendix C).

The Applicant's Proposed Action Alternative and the Glass Hill Alternative share an alignment where they cross GHMA and would have the greatest impact on Greater Sage-Grouse, as more habitat would be crossed as compared to the Mill Creek Alternative.

Migratory Birds Including Raptors

All alternative routes and route variations would result in moderate residual impacts on raptors and other migratory birds from removal or disturbance to nesting sites, and from the disruption of bald and golden eagle breeding and foraging behavior. Avoidance and minimization measures, including limiting B2H Project activities and implementing spatial restrictions during the nesting season, would reduce impacts on migratory birds during construction and operation of the B2H Project. Removal of and disturbance to nesting habitat would not negatively affect raptors and other migratory birds appreciably due to the small amount of habitat affected compared to the large home ranges of these species. Habitat disturbed during construction would be reclaimed and would restore migratory bird habitats similar to those disturbed. While the resulting habitats may cause a shift in avian species use, population-level effects on migratory birds are not anticipated to occur.

Impacts on migratory bird habitat would be greater with the Applicant's Proposed Action Alternative with Variation S2-C2 and the Mill Creek Alternative from crossing the Ladd Marsh Important Bird Areas, compared to the other alternative routes which do not cross any Important Bird Areas. The Mill Creek Alternative would also have the highest impact on bald and golden eagles from crossing within 0.5 and 5 miles of a greater number of bald and golden eagle nests than the other alternative routes.

Big Game

All alternative routes would have low residual impacts on big game. In addition to other direct and indirect effects, short- and long-term habitat loss would occur, but would not negatively affect big game appreciably due to the small amount of habitat affected compared to the large home ranges of these species. Disturbance to big game during sensitive periods would be minimized through the implementation of seasonal restrictions.

The Applicant's Proposed Action Alternative and the Glass Hill Alternative share an alignment where they cross big game habitat and would have lower impacts from crossing less big game habitat than the Mill Creek Alternative.

Summary

None of the alternative routes considered in Segment 2 would clearly result in the least overall impacts on wildlife resources. The Mill Creek Alternative would result in the least impacts on Greater Sage-Grouse, but would have greater impacts on migratory birds and raptors from crossing the Ladd Marsh Important Bird Areas and crossing within 0.5 and 5 miles of a greater number of bald and golden eagle nests than the other alternative routes. The Mill Creek Alternative also would cross more big game habitat than the other alternative routes, although impacts would not negatively affect big game appreciably due to the small amount of habitat affected compared to the large home ranges of these species.

SEGMENT 3—BAKER VALLEY

Wildlife Habitat

Alternative Routes and Route Variations

The majority of habitat that would be most affected in Segment 3 is shrubland habitat, followed by forest/woodland habitat. RCAs and grassland also would be affected, but to a lesser extent. The amount of wildlife habitat types that would be disturbed by each alternative route in Segment 3 is presented in Table 3-127, and residual impacts on each wildlife habitat type is provided in Table 3-126 in Section 3.2.3.

The types of potential effects on each wildlife habitat type are described in detail at the beginning of Section 3.2.4.6. The primary impact on wildlife habitats would include habitat removal and fragmentation. The Applicant's Proposed Action and all alternatives and variations in Segment 3 would result in moderate residual impacts on shrubland and forest/woodland habitat types because they support a wide range of species and are slow to regenerate. Loss or adverse modification of native grassland habitats would result in moderate residual impacts because they are uncommon throughout the B2H Project area and, therefore, habitat for grassland species is limited. Although disturbance to RCAs is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible (Design Features 15 and 16), the B2H Project in Segment 3 would have moderate residual impacts on this valuable wildlife habitat type.

Special Status Species

Alternative Routes and Route Variations

The amount of each wildlife habitat that would be disturbed in Segment 3 is compared by alternative in Table 3-127 in Section 3.2.3. Special status species using wildlife habitats in Segment 3 are described at the beginning of Section 3.2.4.5. Potential effects on special status wildlife species would be similar to potential effects on other wildlife species that use the same habitat types. The types of potential effects on each wildlife habitat type are described in detail at the beginning of Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on special status wildlife include installing devices to deter raptor perching on transmission line structures and minimize an increase in predation,

minimization of removal of trees and other vegetation, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), limiting construction and maintenance activities during migratory bird nesting season, implementing seasonal and spatial restrictions for sensitive periods and habitats, conducting preconstruction surveys, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4).

The types of potential effects on special status wildlife species would be similar for all alternatives. Because mortality of special status species (without population-level effects) and temporary disturbance during critical or sensitive periods could occur (without population-level effects), the Proposed Action and all alternatives in Segment 3 could result in long-term moderate impacts on special status species. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Greater Sage-Grouse

Table 3-176 presents miles crossed and residual impacts on Greater Sage-Grouse PHMA and GHMA for all alternative routes and route variations in Segment 3. Levels of residual impacts and duration of impacts on Greater Sage-Grouse are described by alternative route and route variation below, and displayed in MV-9. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139).

Table 3-176. Greater Sage-Grouse Inventory Data and Residual Impacts for Segment 3—Baker Valley (miles crossed)

Alternative Route	Total Length (miles)	Inventory[1]		Residual Impacts[2]	
		Priority Habitat Management Areas	General Habitat Management Areas	High	Moderate
Applicant's Proposed Action	55.2	30.2	17.1	30.2	17.1
Variation S3-A1	*12.4*	*8.1*	*4.3*	*8.1*	*4.3*
Variation S3-A2	*12.2*	*9.0*	*3.2*	*9.0*	*3.2*
Variation S3-B1	*13.9*	*13.6*	*0.3*	*13.6*	*0.3*
Variation S3-B2	*14.4*	*4.2*	*3.6*	*4.2*	*3.6*
Variation S3-B3	*14.7*	*4.2*	*1.9*	*4.2*	*1.9*
Variation S3-B4	*14.3*	*2.3*	*1.2*	*2.3*	*1.2*
Variation S3-B5	*14.0*	*2.3*	*4.3*	*2.3*	*4.3*
Variation S3-C1	*21.1*	*8.5*	*5.3*	*8.5*	*5.3*
Variation S3-C2	*21.7*	*8.7*	*5.7*	*8.7*	*5.7*
Variation S3-C3	*21.0*	*0.0*	*1.1*	*0.0*	*1.1*
Variation S3-C4	*21.4*	*0.0*	*1.1*	*0.0*	*1.1*
Variation S3-C5	*21.0*	*0.0*	*1.1*	*0.0*	*1.1*
Variation S3-C6	*24.7*	*0.0*	*9.4*	*0.0*	*9.4*
Flagstaff A	55.3	18.9	21.1	18.9	21.1
Timber Canyon	70.3	0.0	28.8	0.0	28.8
Flagstaff A – Burnt River Mountain	55.3	10.4	16.9	10.4	16.9

Table 3-176. Greater Sage-Grouse Inventory Data and Residual Impacts for Segment 3—Baker Valley (miles crossed)					
Alternative Route	Total Length (miles)	Inventory[1]		Residual Impacts[2]	
		Priority Habitat Management Areas	General Habitat Management Areas	High	Moderate
Flagstaff B	56.0	20.8	18.7	20.8	18.7
Flagstaff B – Burnt River West	55.7	13.2	13.4	13.2	13.4
Flagstaff B – Durkee	59.6	12.3	22.8	12.3	22.8

Table Notes
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]Low levels of impacts on Greater Sage-Grouse are not anticipated as a result of B2H Project implementation.

Table 3-177 displays acreage of disturbance to Greater Sage-Grouse habitat types for each of the alternative routes and route variations.

Table 3-177. Anticipated Acres of Disturbance for Greater Sage-Grouse for Segment 3—Baker Valley			
Alternative Route	Total Acres of Disturbance	Priority Habitat Management Areas	General Habitat Management Areas
Applicant's Proposed Action	1,238	680	385
Variation S3-A1	*259*	*171*	*91*
Variation S3-A2	*252*	*186*	*66*
Variation S3-B1	*311*	*305*	*7*
Variation S3-B2	*315*	*92*	*79*
Variation S3-B3	*312*	*88*	*40*
Variation S3-B4	*300*	*49*	*25*
Variation S3-B5	*301*	*50*	*93*
Variation S3-C1	*502*	*202*	*126*
Variation S3-C2	*512*	*205*	*135*
Variation S3-C3	*515*	*0*	*27*
Variation S3-C4	*524*	*0*	*27*
Variation S3-C5	*576*	*0*	*30*
Variation S3-C6	*685*	*0*	*261*
Flagstaff A	1,228	422	471
Timber Canyon	1,691	0	694
Flagstaff A – Burnt River Mountain	1,241	232	376
Flagstaff B	1,239	461	414
Flagstaff B – Burnt River West	1,305	309	314
Flagstaff B – Durkee	1,422	293	544

Table Notes: Greater Sage-Grouse habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action would have long-term high and moderate residual impacts on Greater Sage-Grouse. Permanent high residual impacts would occur where PHMA is crossed as permanent

loss of PHMA and other impacts could result in population-level effects because PHMA represents areas identified as having the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Long-term moderate residual impacts would occur where GHMA is crossed because impacts would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. GHMA represents areas of occupied seasonal or year-round Greater Sage-Grouse habitat, but not areas with the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-177.

Potential direct effects on Greater Sage-Grouse could include mortality due to electrocution; in-flight collisions with transmission line infrastructure; collisions with construction and maintenance vehicles; fragmentation of habitats due to the introduction of tall structures, increased EMFs, and construction of new roads; loss and degradation of habitat quality and function; disturbance to breeding activities due to increased human presence and noise at lek locations; disturbance during sensitive periods resulting from human presence, vehicle use, and noise during construction and maintenance; and interruption and/or alteration of seasonal migrations and movements among populations. Along with the direct effects that would be expected within the footprint of the Applicant's Proposed Action Alternative, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 41.3 percent is Greater Sage-Grouse PHMA on the Baker Oregon PAC and 25.2 percent is GHMA. Impacts also would be expected on leks present within the 3.1-mile buffer (Table 3-176). Indirect effects in these areas could include alteration of the native sagebrush understory through introduction and spread of non-native, invasive plants and noxious weeds; avoidance of habitat due to potential increase in raptor predation pressure; disruption of nesting and breeding activities and avoidance of habitat due to vehicle noise and human presence resulting from public use of new access roads; increased mammalian predation risk; increased raptor and raven predation risk; and alteration of behavioral patterns due to increased predation pressure. The types of potential direct and indirect effects on Greater Sage-Grouse are described in detail at the beginning of Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on Greater Sage-Grouse are listed in Table 3-140 and include installing devices to deter raptor perching on transmission line structures, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), conducting preconstruction surveys, implementing seasonal restrictions for sensitive periods and habitats, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4). Seasonal restrictions for Greater Sage-Grouse would be similar to the seasonal restrictions identified in the Oregon ARMPAs (refer to Appendix B). Moreover, the B2H Project would be required to achieve a net conservation gain for Greater Sage-Grouse through compensatory mitigation as described in the Mitigation Framework (Appendix C).

Variations S3-A1 and S3-A2

The variations would have long-term high and moderate residual impacts on Greater Sage-Grouse. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action

Alternative. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-177.

Along with the direct effects that would be expected within the footprint of the variation, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 30.1 percent and 30.6 percent is Greater Sage-Grouse GHMA, for Variations S3-A1 and S3-A2, respectively, and 43.5 percent and 46.3 percent is PHMA on the Baker Oregon PAC, for Variations S3-A1 and S3-A2, respectively. Impacts also would be expected on leks present within the 3.1-mile buffer (Table 3-176). Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S3-B1, S3-B2, S3-B3, S3-B4, and S3-B5

The variations would have long-term high and moderate residual impacts on Greater Sage-Grouse. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-177. Impacts also would be expected on leks present within the 3.1-mile buffer (Table 3-176).

Along with the direct effects that would be expected within the footprint of the variation, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 6.4 percent, 6.5 percent, 6.4 percent, 6.5 percent, and 6.6 would be Greater Sage-Grouse GHMA and 62.7 percent, 42.6 percent, 41.7 percent, 40.2 percent, and 41.3 would be PHMA on the Baker Oregon PAC for Variations S3-B1 and S3-B2, Variation S3-B3, Variation S3-B4, Variation S3-B5, respectively. Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S3-C1 and S3-C2

The variations would have long-term high and moderate residual impacts on Greater Sage-Grouse. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-177.

Along with the direct effects that would be expected within the footprint of the variation, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 32.5 percent and 32.0 percent would be Greater Sage-Grouse GHMA, and 27.6 percent and 26.2 percent would be PHMA on the Baker Oregon PAC, for Variations S3-C1 and S3-C2, respectively. Impacts also would be expected on leks present within the 3.1-mile buffer (Table 3-176). Potential

direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S3-C3, S3-C4, S3-C5, and S3-C6

The variations would have moderate residual impacts on Greater Sage-Grouse. Long-term moderate residual impacts would result from impacts that would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. GHMA represents areas of occupied seasonal or year-round Greater Sage-Grouse habitat, but not areas with the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-177.

Along with the direct effects that would be expected within the footprint of the variation, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 23.5 percent, 23.2 percent, 22.4 percent, and 26.8 percent would be Greater Sage-Grouse GHMA, and 14.4 percent, 14.1 percent, 14.0 percent, and 14.2 percent would be PHMA on the Baker Oregon PAC, for Variations S3-C3, S3-C4, S3-C4 and S3-C5, respectively. Impacts also would be expected on leks present within the 3.1-mile buffer (Table 3-176). Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff A Alternative

The Flagstaff A Alternative would have long-term high and moderate residual impacts on Greater Sage-Grouse. Permanent high residual impacts would be caused by permanent loss of PHMA that results in population-level effects because PHMA represents areas identified as having the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Long-term moderate residual impacts would result from impacts that would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. GHMA represents areas of occupied seasonal or year-round Greater Sage-Grouse habitat, but not areas with the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-177.

Along with the direct effects that would be expected within the footprint of the variation, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 25.2 percent would be Greater Sage-Grouse GHMA and 34.8 percent would be PHMA on the Baker Oregon PAC. Impacts also would be expected on leks present within the 3.1-mile buffer

(Table 3-176). Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Timber Canyon Alternative

The Timber Canyon Alternative would have moderate residual impacts on Greater Sage-Grouse. Long-term moderate residual impacts would occur where GHMA is crossed because impacts would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. GHMA represents areas of occupied seasonal or year-round Greater Sage-Grouse habitat, but not areas with the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-177.

Along with the direct effects that would be expected within the footprint of the variation, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 33.6 percent would be Greater Sage-Grouse GHMA and 19.7 percent would be PHMA on the Baker Oregon PAC. Impacts also would be expected on leks present within the 3.1-mile buffer (Table 3-176). Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff A – Burnt River Mountain

The Flagstaff A – Burnt River Mountain Alternative would have long-term high and moderate residual impacts on Greater Sage-Grouse. Permanent high residual impacts would occur where PHMA is crossed as permanent loss of PHMA and other impacts could result in population-level effects because PHMA represents areas identified as having the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Long-term moderate residual impacts would occur where GHMA is crossed because impacts would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. GHMA represents areas of occupied seasonal or year-round Greater Sage-Grouse habitat, but not areas with the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-177.

Along with the direct effects that would be expected within the footprint of the variation, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 21.3 percent would be Greater Sage-Grouse GHMA and 29.1 percent would be PHMA on the Baker Oregon PAC. Impacts also would be expected on leks present within the 3.1-mile buffer

(Table 3-176). Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff B Alternative

The Flagstaff B Alternative would have long-term high and moderate residual impacts on Greater Sage-Grouse. Permanent high residual impacts would occur where PHMA is crossed as permanent loss of PHMA and other impacts could result in population-level effects because PHMA represents areas identified as having the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Long-term moderate residual impacts would occur where GHMA is crossed because impacts would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. GHMA represents areas of occupied seasonal or year-round Greater Sage-Grouse habitat, but not areas with the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-177.

Along with the direct effects that would be expected within the footprint of the variation, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 25.0 percent would be Greater Sage-Grouse GHMA and 35.0 percent would be PHMA on the Baker Oregon PAC. Impacts also would be expected on leks present within the 3.1-mile buffer (Table 3-176). Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff B – Burnt River West Alternative

The Flagstaff B – Burnt River West Alternative would have long-term high and moderate residual impacts on Greater Sage-Grouse. Permanent high residual impacts would occur where PHMA is crossed as permanent loss of PHMA and other impacts could result in population-level effects because PHMA represents areas identified as having the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Long-term moderate residual impacts would occur where GHMA is crossed because impacts would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. GHMA represents areas of occupied seasonal or year-round Greater Sage-Grouse habitat, but not areas with the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-177.

Along with the direct effects that would be expected within the footprint of the variation, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of

which 20.7 percent would be Greater Sage-Grouse GHMA and 29.9 percent would be PHMA on the Baker Oregon PAC. Impacts also would be expected on leks present within the 3.1-mile buffer (Table 3-176). Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff B – Durkee Alternative

The Flagstaff B – Durkee Alternative would have long-term high and moderate residual impacts on Greater Sage-Grouse. Permanent high residual impacts would occur where PHMA is crossed as permanent loss of PHMA and other impacts could result in population-level effects because PHMA represents areas identified as having the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Long-term moderate residual impacts would occur where GHMA is crossed because impacts would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. GHMA represents areas of occupied seasonal or year-round Greater Sage-Grouse habitat, but not areas with the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-177.

Along with the direct effects that would be expected within the footprint of the variation, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 22.7 percent would be Greater Sage-Grouse GHMA and 28.4 percent would be PHMA on the Baker Oregon PAC. Impacts also would be expected on leks present within the 3.1-mile buffer (Table 3-176). Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Migratory Birds Including Raptors

Applicant's Proposed Action Alternative

Direct impacts on raptors and other migratory birds during construction could include collision with B2H Project structures, electrocution, disturbance due to construction noise, fugitive dust, and visual disturbance. Raptors and other migratory birds are particularly sensitive to disturbance during the nesting period and some construction activities could cause nest failure or abandonment. The risk of collision risk already exists from existing transmission lines located along portions of the Applicant's Proposed Action; however, the risk of collision may be greater due to the increased size of the proposed transmission line towers. The types of potential effects on raptors and other migratory birds are described in detail at the beginning of Section 3.2.4.6.

Residual impact levels for raptors and other migratory birds have been determined in accordance with the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4. Because removal or disturbance to nesting sites for raptors and other migratory birds could occur, the Applicant's Proposed Action would result in long-term moderate residual impacts on raptors and other migratory birds. Short-term low residual impacts on bald and golden eagles would result from disruption of breeding and foraging behavior, and short-term moderate impacts on bald and golden eagles would result from disturbance to nesting sites. Short-term moderate residual impacts on bald and golden eagles would result from disruption of breeding and foraging behavior. Short-term moderate impacts from disturbance of nesting sites could occur if nests are located along the Applicant's Proposed Action during preconstruction surveys; no nests are currently known to occur within 0.5-mile of the Applicant's Proposed Action Alternative.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on raptors and other migratory birds include installing flight diverters, minimization of removal of trees and other vegetation, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), limiting construction and maintenance activities during migratory bird nesting season, implementing seasonal and spatial restrictions for sensitive periods and habitats, and conducting preconstruction surveys. The design features of the B2H Project for environmental protection and selective mitigation measures are described in detail in Table 2-7 and Table 2-13. In addition, adherence to the Applicant's Avian Protection Plan would minimize or avoid impacts from the B2H Project on raptors and other migratory birds.

Variations S3-A1 and S3-A2

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S3-B1

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative; however, the route does not parallel existing transmission lines, so no existing transmission line-collision risk exists. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S3-B2

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize

impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S3-B3, S3-B4, and S3-B5

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S3-C1, S3-C2, S3-C3, and S3-C4

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S3-C5

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative; however, the route does not parallel existing transmission lines, so no existing transmission line-collision risk exists. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S3-C6

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative; however, no bald and golden eagle nests are known occur within 0.5 mile, so short-term moderate impacts on eagles from disturbance to nesting sites would only be expected if nests are located along the route during preconstruction surveys. Also, no existing transmission line-collision risk exists, as the route does not parallel existing transmission lines. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff A Alternative

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Timber Canyon Alternative

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative; however, no bald and golden eagle nests are known occur within 0.5 mile, so short-term moderate impacts on eagles from disturbance to nesting sites would only be expected if nests are located along the route during preconstruction surveys. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff A – Burnt River Mountain Alternative

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff B Alternative

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff B – Burnt River West Alternative

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff B – Durkee Alternative

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Big Game

The direct and indirect effects of the B2H Project on big game species could incrementally contribute to other factors preventing mule deer, elk, and bighorn sheep populations from meeting ODFW's management objectives for these species. However, as described below, design features of the B2H

Project for environmental protection and selective mitigation measures will minimize impacts on WMUs and big game habitat.

Table 3-178 presents miles crossed and residual impacts on big game habitats for all alternative routes and route variations in Segment 3. Levels of residual impacts and duration of impacts on big game are described by alternative route and route variation below, and displayed in MV-10. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Table 3-178. Big Game Inventory Data and Residual Impacts for Segment 3—Baker Valley (miles crossed)

Alternative Route	Total Length (miles)	Inventory[1]			Residual Impacts[2]
		Bighorn Sheep Oregon Occupied Range	Mule Deer Winter Range	Elk Winter Range	Low
Applicant's Proposed Action	55.2	0.0	26.0	1.7	26.0
Variation S3-A1	*12.4*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S3-A2	*12.2*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S3-B1	*13.9*	*0.0*	*0.7*	*0.0*	*0.7*
Variation S3-B2	*14.4*	*0.0*	*4.3*	*0.0*	*4.3*
Variation S3-B3	*14.7*	*0.0*	*4.6*	*0.0*	*4.6*
Variation S3-B4	*14.3*	*0.0*	*4.6*	*0.0*	*4.6*
Variation S3-B5	*14.0*	*0.0*	*4.3*	*0.0*	*4.3*
Variation S3-C1	*21.1*	*0.0*	*17.5*	*1.7*	*17.5*
Variation S3-C2	*21.7*	*0.0*	*18.7*	*1.7*	*18.7*
Variation S3-C3	*21.0*	*0.0*	*21.1*	*4.9*	*21.1*
Variation S3-C4	*21.4*	*0.0*	*21.4*	*4.9*	*21.4*
Variation S3-C5	*21.0*	*0.8*	*21.0*	*10.0*	*21.0*
Variation S3-C6	*24.7*	*1.3*	*24.7*	*17.1*	*24.7*
Flagstaff A	55.3	0.0	29.6	1.7	29.6
Timber Canyon	70.3	0.0	37.1	43.1	59.0
Flagstaff A – Burnt River Mountain	55.3	0.0	33.2	4.9	33.2
Flagstaff B	56.0	0.0	29.9	1.7	29.9
Flagstaff B – Burnt River West	55.7	0.8	33.4	10.0	33.4
Flagstaff B – Durkee	59.6	1.3	37.1	17.1	37.1

Table Notes:
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]High or moderate levels of impacts on big game are not anticipated as a result of B2H Project implementation.

Table 3-179 displays acreage of disturbance on big game habitat for all alternatives and route variations in Segment 3.

Table 3-179. Anticipated Acres of Disturbance for Big Game for Segment 3—Baker Valley (acres)				
Alternative Route	**Total Disturbance**	**Bighorn Sheep Oregon Occupied Range**	**Mule Deer Winter Range**	**Elk Winter Range**
Applicant's Proposed Action	1,238	0	585	38
Variation S3-A1	*259*	*0*	*0*	*0*
Variation S3-A2	*252*	*0*	*0*	*0*
Variation S3-B1	*311*	*0*	*16*	*0*
Variation S3-B2	*315*	*0*	*94*	*0*
Variation S3-B3	*312*	*0*	*97*	*0*
Variation S3-B4	*300*	*0*	*97*	*0*
Variation S3-B5	*301*	*0*	*93*	*0*
Variation S3-C1	*502*	*0*	*417*	*40*
Variation S3-C2	*512*	*0*	*441*	*40*
Variation S3-C3	*515*	*0*	*517*	*120*
Variation S3-C4	*524*	*0*	*526*	*120*
Variation S3-C5	*576*	*22*	*576*	*274*
Variation S3-C6	*685*	*36*	*685*	*475*
Flagstaff A	1,228	0	661	38
Timber Canyon	1,691	0	893	1038
Flagstaff A – Burnt River Mountain	1,241	0	739	109
Flagstaff B	1,239	0	663	38
Flagstaff B – Burnt River West	1,305	19	782	234
Flagstaff B – Durkee	1,422	31	885	408
Table Note: Habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.				

Applicant's Proposed Action Alternative

The Applicant's Proposed Action would have short- and long-term low residual impacts on mule deer and elk. Anticipated acres of disturbance to big game are presented in Table 3-179. The Applicant's Proposed Action does not cross bighorn sheep designated habitat; therefore, impacts on bighorn sheep would not be anticipated. Short- and long-term residual impacts from the Applicant's Proposed Action would be low because impacts would have only minor adverse effects on big game and would not limit the long-term sustainability of populations.

Direct effects on big game could include vehicle collisions, noise and visual disturbance, and habitat loss and modification. Indirect effects could include increased disturbance to big game from increased human activity from use of new or improved access roads.

The types of potential effects on big game are described in detail at the beginning of Section 3.2.4.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on big game are listed in Table 3-140 and include implementing seasonal restrictions, limiting new or improved access to areas previously inaccessible,

leaving vegetation in place whenever possible, and reclaiming construction areas with an agency or landowner-approved seed mix (refer to Section 3.2.4.4).

Variations S3-A1 and S3-A2

The variations do not cross designated big game habitat; therefore, impacts on big game would not be anticipated.

Variations S3-B1 and S3-B2, S3-B3, S3-B4, and S3-B5

The variations would have short- and long-term low residual impacts on mule deer. The variations do not cross elk winter range or bighorn sheep designated habitat; therefore, impacts on elk and bighorn sheep would not be anticipated. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S3-C1, S3-C2, S3-C3, and S3-C4

The variations would have short- and long-term low residual impacts on mule deer and elk. The variations do not cross bighorn sheep designated habitat; therefore, impacts on bighorn sheep would not be anticipated. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S3-C5 and S3-C6

The variations would have short- and long-term low residual impacts on mule deer, elk, and bighorn sheep. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff A Alternative

The Flagstaff A Alternative would have short- and long-term low residual impacts on mule deer and elk. The Flagstaff A Alternative does not cross bighorn sheep designated habitat; therefore, impacts on bighorn sheep would not be anticipated. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Timber Canyon Alternative

Timber Canyon Alternative would have short- and long-term low residual impacts on mule deer and elk. The Timber Canyon Alternative does not cross bighorn sheep designated habitat; therefore, impacts on bighorn sheep would not be anticipated. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would

minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff A – Burnt River Mountain Alternative

The Flagstaff A – Burnt River Mountain Alternative would have short- and long-term low residual impacts on mule deer and elk. The Flagstaff A – Burnt River Mountain Alternative does not cross bighorn sheep designated habitat; therefore, impacts on bighorn sheep would not be anticipated. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff B Alternative

The Flagstaff B Alternative would have short- and long-term low residual impacts on mule deer and elk. The Flagstaff B Alternative does not cross bighorn sheep designated habitat; therefore, impacts on bighorn sheep would not be anticipated. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff B – Burnt River West Alternative

The Flagstaff B – Burnt River West Alternative would have short- and long-term low residual impacts on mule deer, elk, and bighorn sheep. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Flagstaff B – Durkee Alternative

The Flagstaff B – Durkee Alternative would have short- and long-term low residual impacts on mule deer, elk, and bighorn sheep. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Management Indicator Species and USFS Sensitive Species

Alternative Routes and Route Variations

The Timber Canyon Alternative is the only alternative route that crosses national forest land in Segment 3 and would, therefore, be the only route to potentially impact USFS MIS. The environmental consequences for MIS and USFS sensitive species are described in Appendix F.

Conclusion

All alternative routes and route variations would result in short-term, long-term, and permanent effects on wildlife habitat and wildlife species. A summary of effects on Greater Sage-Grouse, migratory birds including raptors, and big game are provided below.

Greater Sage-Grouse

All alternative routes cross Greater Sage-Grouse GHMA and PHMA in the Baker PAC, with the exception of the Timber Canyon Alternative, which only crosses GHMA. Residual impacts on Greater Sage-Grouse are anticipated to be high where PHMA is crossed and moderate where GHMA is crossed, from adverse effects such as loss of habitat, increased avian predation, and habitat avoidance. In addition to seasonal restrictions implemented during sensitive periods and other avoidance and minimization measures to reduce impacts on Greater Sage-Grouse, the B2H Project would be required to achieve a net conservation gain for Greater Sage-Grouse through compensatory mitigation as described in the Mitigation Framework (Appendix C).

The Applicant's Proposed Action Alternative with Variations S3-A2, S3-B1, and S3-C2 would have the greatest impact on Greater Sage-Grouse from crossing more PHMA than the other alternative routes. In addition, Variation S3-B1 of the Applicant's Proposed Action Alternative crosses higher quality habitat as it is located closer to the center of the Baker PAC and is further from other anthropogenic disturbances. Compared to the other alternative routes that cross PHMA, the Flagstaff A – Burnt River Mountain Alternative would have the lowest impact on Greater Sage-Grouse as it crosses the least amount of PHMA. The Flagstaff A – Burnt River Mountain, Flagstaff B – Burnt River West, and the Flagstaff B – Durkee alternatives all avoid PHMA to a greater extent that the Applicant's Proposed Action Alternative, and where they do cross PHMA, they are located on the periphery of PHMA and are colocated with existing anthropogenic disturbances. The Timber Canyon Alternative would have the lowest impact on Greater Sage-Grouse, as it completely avoids PHMA.

Migratory Birds Including Raptors

All alternative routes and route variations would result in moderate residual impacts on raptors and other migratory birds from removal or disturbance to nesting sites, and from the disruption of bald and golden eagle breeding and foraging behavior. Avoidance and minimization measures, including limiting B2H Project activities and implementing spatial restrictions during the nesting season, would reduce impacts on migratory birds during construction and operation of the B2H Project. Removal of and disturbance to nesting habitat would not negatively affect raptors and other migratory birds appreciably due to the small amount of habitat affected compared to the large home ranges of these species. Habitat disturbed during construction would be reclaimed and would restore migratory bird habitats similar to those disturbed. While the resulting habitats may cause a shift in avian species use, population-level effects on migratory birds are not anticipated to occur.

Compared to other alternative routes, the Timber Canyon Alternative would have the lowest impact on bald and golden eagles as no bald or golden eagle nests are known within 0.5 mile of the route, but the

Timber Canyon Alternative would affect the greatest amount of migratory bird habitat overall due to its longer length.

Big Game

All alternative routes would have low residual impacts on big game. In addition to other direct and indirect effects, short- and long-term habitat loss would occur, but would not negatively affect big game appreciably due to the small amount of habitat affected compared to the large home ranges of these species. Disturbance to big game during sensitive periods would be minimized through the implementation of seasonal restrictions. The Timber Canyon Alternative would have the greatest impact on big game from crossing more big game habitat than other alternative routes.

Summary

None of the alternative routes considered in Segment 3 would clearly result in the least overall impacts on wildlife resources. The Timber Canyon Alternative would result in the least impacts on Greater Sage-Grouse as no PHMA would be crossed, but would result in the greatest impacts on migratory birds and big game from crossing more habitat than the other alternative routes. However, impacts on migratory bird and big game habitat would not negatively affect these species appreciably due to the small amount of habitat affected compared to their large home ranges. Compared to the other alternative routes that cross Greater Sage-Grouse PHMA, the Flagstaff A – Burnt River Mountain Alternative would have the least impact on Greater Sage-Grouse as it crosses the least amount of PHMA.

SEGMENT 4—BROGAN

Wildlife Habitat

Alternative Routes and Route Variations

The majority of habitat that would be affected in Segment 4 is shrubland habitat. RCAs and grasslands also would be affected, but to a lesser extent. The amount of wildlife habitat types that would be disturbed by each alternative route and route variation in Segment 4 is presented in Table 3-131, and residual impacts on each wildlife habitat type is provided in Table 3-130 in Section 3.2.3.

The types of potential effects on each wildlife habitat type are described in detail at the beginning of Section 3.2.4.6. The primary impact on wildlife habitats would include habitat removal and fragmentation. The Proposed Action and all alternatives and variations in Segment 4 would result in moderate residual impacts on shrubland and forest/woodland habitat types because they support a wide range of species and are slow to regenerate. Loss or adverse modification of native grassland habitats would result in moderate residual impacts because they are uncommon throughout the B2H Project area and, therefore, habitat for grassland species is limited. Although disturbance to RCAs is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible (Design Features 15 and 16), the B2H Project in Segment 4 would have moderate residual impacts on this valuable wildlife habitat type.

Special Status Species

Alternative Routes and Route Variations

The amount of each wildlife habitat that would be disturbed in Segment 4 is compared by alternative in Table 3-131 in Section 3.2.3. Special status species using wildlife habitats in Segment 4 are described at the beginning of Section 3.2.4.5. Potential effects on special status wildlife species would be similar to potential effects on other wildlife species that use the same habitat types. The types of potential effects on each wildlife habitat type are described in detail at the beginning of Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on special status wildlife include installing devices to deter raptor perching on transmission line structures and minimize an increase in predation, minimization of removal of trees and other vegetation, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), limiting construction and maintenance activities during migratory bird nesting season, implementing seasonal and spatial restrictions for sensitive periods and habitats, conducting preconstruction surveys, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4).

The types of potential effects on special status wildlife species would be similar for all alternatives. Because mortality of special status species (without population-level effects) and temporary disturbance during critical or sensitive periods could occur (without population-level effects), the Proposed Action and all alternatives in Segment 4 could result in long-term moderate impacts on special status species. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Greater Sage-Grouse

Table 3-180 presents miles crossed and residual impacts on Greater Sage-Grouse PHMA and GHMA for all alternative routes and route variations in Segment 4. Levels of residual impacts and duration of impacts on Greater Sage-Grouse are described by alternative route and route variation below, and displayed in MV-9. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139).

Table 3-180. Greater Sage-Grouse Inventory Data and Residual Impacts for Segment 4—Brogan (miles crossed)

Alternative Route	Total Length (miles)	Inventory[1]		Residual Impacts[2]	
		Priority Habitat Management Areas	General Habitat Management Areas	High	Moderate
Applicant's Proposed Action	40.1	20.3	18.7	20.3	18.7
Variation S4-A1	*5.9*	*0.0*	*4.8*	*0.0*	*4.8*
Variation S4-A2	*6.0*	*0.0*	*4.8*	*0.0*	*4.8*
Variation S4-A3	*6.1*	*0.0*	*4.8*	*0.0*	*4.8*

Table 3-180. Greater Sage-Grouse Inventory Data and Residual Impacts for Segment 4—Brogan (miles crossed)					
Alternative Route	Total Length (miles)	Inventory[1]		Residual Impacts[2]	
		Priority Habitat Management Areas	General Habitat Management Areas	High	Moderate
Tub Mountain South	40.5	6.8	10.2	6.8	10.2
Willow Creek	34.6	15.5	14.5	15.5	14.5

Table Notes:
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]Low levels of impacts on Greater Sage-Grouse are not anticipated as a result of B2H Project implementation.

Table 3-181 displays acreage of disturbance to Greater Sage-Grouse habitat types for each of the alternative routes and route variations.

Table 3-181. Anticipated Acres of Disturbance for Greater Sage-Grouse for Segment 4—Brogan			
Alternative Route	Total Acres of Disturbance	Priority Habitat Management Areas	General Habitat Management Areas
Applicant's Proposed Action	953	480	442
Variation S4-A1	*154*	*0*	*125*
Variation S4-A2	*149*	*0*	*121*
Variation S4-A3	*153*	*0*	*122*
Tub Mountain South	901	151	227
Willow Creek	777	348	326

Table Note: Greater Sage-Grouse habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action would have long-term high and moderate residual impacts on Greater Sage-Grouse. Permanent high residual impacts would occur where PHMA is crossed as permanent loss of PHMA and other impacts could result in population-level effects because PHMA represents areas identified as having the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Long-term moderate residual impacts would occur where GHMA is crossed because impacts would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. GHMA represents areas of occupied seasonal or year-round Greater Sage-Grouse habitat, but not areas with the highest habitat value for maintaining sustainable Greater Sage-Grouse populations. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-181.

Potential direct effects on Greater Sage-Grouse could include mortality due to electrocution; in-flight collisions with transmission line infrastructure; collisions with construction and maintenance vehicles; fragmentation of habitats due to the introduction of tall structures, increased EMFs, and construction of new roads; loss and degradation of habitat quality and function; disturbance to breeding activities due to increased human presence and noise at lek locations; disturbance during sensitive periods resulting from human presence, vehicle use, and noise during construction and maintenance; and interruption and/or alteration of seasonal migrations and movements among populations.

Along with the direct effects that would be expected within the footprint of the Applicant's Proposed Action Alternative, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 47.8 percent would be Greater Sage-Grouse PHMA in the Cow Valley Oregon PAC and 38.4 percent would be GHMA. Impacts also would be expected on leks present in the 3.1-mile buffer (Table 3-180). Indirect effects on Greater Sage-Grouse could include alteration of the native sagebrush understory through introduction and spread of non-native, invasive plants and noxious weeds; avoidance of habitat due to potential increase in raptor predation pressure; disruption of nesting and breeding activities and avoidance of habitat due to vehicle noise and human presence resulting from public use of new access roads; increased mammalian predation risk; increased raptor and raven predation risk; and alteration of behavioral patterns due to increased predation pressure. The types of potential direct and indirect effects on Greater Sage-Grouse are described in detail at the beginning of Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on Greater Sage-Grouse are listed in Table 3-140 and include installing devices to deter raptor perching on transmission line structures, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), conducting preconstruction surveys, implementing seasonal restrictions for sensitive periods and habitats, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4) Seasonal restrictions for Greater Sage-Grouse would be similar to the seasonal restrictions identified in the Oregon ARMPAs (refer to Appendix B). Moreover, the B2H Project would be required to achieve a net conservation gain for Greater Sage-Grouse through compensatory mitigation as described in the Mitigation Framework (Appendix C).

Variations S4-A1, S4-A2, and S4-A3

The variations do not cross and would not be expected to have direct impacts on Greater Sage-Grouse PHMA; however, PHMA in the Cow Valley Oregon PAC is within 3.1 miles of the variations and indirect impacts would be anticipated. The variations do cross and would be expected to have direct and indirect impacts on Greater Sage-Grouse GHMA.

The variations would have long-term moderate residual impacts on Greater Sage-Grouse. The duration of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-181.

Along with the direct effects that would be expected within the footprint of the variations, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 38.0 percent, 38.6 percent, and 38.1 percent would be Greater Sage-Grouse GHMA and 26.8 percent, 25.5 percent, and 25.6 percent would be PHMA in the Cow Valley Oregon PAC for Variations S4-A1, S4-A2, and S4-A3 respectively. Impacts also would be expected on leks present within the 3.1-mile buffer (Table 3-180). Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Tub Mountain South Alternative

The Tub Mountain South Alternative would have long-term high and moderate residual impacts on Greater Sage-Grouse. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. However, compared to the Applicant's Proposed Action Alternative and the Willow Creek Alternative, the Tub Mountain South Alternative largely avoids PHMA. Where PHMA is crossed by the Tub Mountain South Alternative, the route follows the outer edge of PHMA, which is closer to anthropogenic disturbances and, thus, likely represent lower quality habitat. The Tub Mountain South Alternative route also crosses less GHMA, and crosses within 3.1 miles of fewer leks than the other two alternative routes.

Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-181. Along with the direct effects that would be expected within the footprint of the variation, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 27.4 percent would be Greater Sage-Grouse GHMA and 13.6 percent would be PHMA on the Baker Oregon PAC. Impacts also would be expected on leks present within the 3.1-mile buffer (Table 3-180). Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Willow Creek Alternative

The Willow Creek Alternative would have long-term high and moderate residual impacts on Greater Sage-Grouse. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. However, compared to the Applicant's Proposed Action Alternative, the Willow Creek Alternative crosses less PHMA and GHMA and crosses within 3.1 miles of a few number of leks. Where PHMA is crossed by the Willow Creek Alternative, the route follows closer to the outer edge of PHMA, which is closer to anthropogenic disturbances and, thus, likely represent lower quality habitat.

Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-181. Along with the direct effects that would be expected within the footprint of the variation, indirect effects on Greater Sage-Grouse would be anticipated within a 3.1-mile buffer around the route centerline, of which 39.7 percent would be Greater Sage-Grouse GHMA and 35.0 percent would be PHMA on the Baker Oregon PAC. Impacts also would be expected on leks present within the 3.1-mile buffer (Table 3-180). Potential direct and indirect effects on Greater Sage-Grouse would be similar to that described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Migratory Birds Including Raptors

Applicant's Proposed Action Alternative

Direct impacts on raptors and other migratory birds during construction could include collision with project structures, electrocution, disturbance due to construction noise, fugitive dust, and visual disturbance. Raptors and other migratory birds are particularly sensitive to disturbance during the nesting period and some construction activities could cause nest failure or abandonment. The risk of collision risk already exists from existing transmission lines located along portions of the Applicant's Proposed Action; however, the risk of collision may be greater due to the increased size of the proposed transmission line towers. The types of potential effects on raptors and other migratory birds are described in detail at the beginning of Section 3.2.4.6.

Residual impact levels for raptors and other migratory birds have been determined in accordance with the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4. Because removal or disturbance to nesting sites for raptors and other migratory birds could occur, the Applicant's Proposed Action would result in long-term moderate residual impacts on raptors and other migratory birds. Short-term moderate residual impacts on bald and golden eagles would result from disruption of breeding and foraging behavior, and short-term moderate impacts on bald and golden eagles would result from disturbance to nesting sites.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on raptors and other migratory birds include installing flight diverters, minimization of removal of trees and other vegetation, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), limiting construction and maintenance activities during migratory bird nesting season, implementing seasonal and spatial restrictions for sensitive periods and habitats, and conducting preconstruction surveys (refer to Section 3.2.4.4). In addition, adherence to the Applicant's Avian Protection Plan would minimize or avoid impacts from the B2H Project on raptors and other migratory birds.

Variations S4-A1, S4-A2, and S4-A3

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Tub Mountain South Alternative

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize

impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Willow Creek Alternative

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Big Game

The direct and indirect effects of the B2H Project on big game species could incrementally contribute to other factors preventing mule deer, elk, and pronghorn populations from meeting ODFW's management objectives for these species. However, as described below, design features of the B2H Project for environmental protection and selective mitigation measures will minimize impacts on WMUs and big game habitat.

Table 3-182 presents miles crossed and residual impacts on big game habitats for all alternative routes and route variations in Segment 4. Levels of residual impacts and duration of impacts on big game are described by alternative route and route variation below, and displayed in MV-10. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Table 3-182. Alternative Route Comparison for Big Game Inventory Data and Residual Impacts for Segment 4—Brogan (miles crossed)

Alternative Route	Total Length (miles)	Inventory[1]			Residual Impacts[2]
		Pronghorn Winter Range	Mule Deer Winter Range	Elk Winter Range	Low
Applicant's Proposed Action	40.1	0.0	26.0	35.4	40.1
Variation S4-A1	*5.9*	*0.0*	*5.9*	*5.9*	*5.9*
Variation S4-A2	*6.0*	*0.0*	*6.0*	*6.0*	*6.0*
Variation S4-A3	*6.1*	*0.0*	*6.1*	*6.1*	*6.1*
Tub Mountain South	40.5	13.1	37.0	24.1	38.3
Willow Creek	34.6	2.9	29.5	25.5	32.3

Table Notes:
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]High or moderate levels of impacts on Big Game are not anticipated as a result of B2H Project implementation.

Table 3-183 displays acreage of disturbance in big game habitat for all alternatives and route variations in Segment 4.

Table 3-183. Anticipated Acres of Disturbance for Big Game for Segment 4—Brogan Valley (acres)

Alternative Route	Total Disturbance	Pronghorn Winter Range	Mule Deer Winter Range	Elk Winter Range
Applicant's Proposed Action	953	0	615	837
Variation S4-A1	*154*	*0*	*154*	*154*
Variation S4-A2	*149*	*0*	*152*	*152*
Variation S4-A3	*153*	*0*	*155*	*155*
Tub Mountain South	901	292	824	536
Willow Creek	777	65	663	573

Table Note: Habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action would have short- and long-term low residual impacts on mule deer and elk. Anticipated acres of disturbance to big game are presented in Table 3-183. Short- and long-term residual impacts from the Applicant's Proposed Action would be low because impacts would have only minor adverse effects on big game and would not limit the long-term sustainability of populations. The Applicant's Proposed Action does not cross pronghorn winter range; therefore, impacts on pronghorn winter range would not be anticipated.

Direct effects on big game could include vehicle collisions, noise and visual disturbance, and habitat loss and modification. Indirect effects could include increased disturbance to big game from increased human activity from use of new or improved access roads. The types of potential effects on big game are described in detail at the beginning of Section 3.2.4.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on big game are listed in Table 3-140 and include implementing seasonal restrictions, limiting new or improved access to areas previously inaccessible, leaving vegetation in place whenever possible, and reclaiming construction areas with an agency or landowner-approved seed mix (refer to Section 3.2.4.4).

Variations S4-A1, S4-A2, and S4-A3

The variations would have short- and long-term low residual impacts on mule deer and elk. The variations do not cross pronghorn winter range; therefore, impacts on pronghorn winter range are not anticipated. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Tub Mountain South Alternative

The Tub Mountain Alternative would have short- and long-term low residual impacts on mule deer, elk, and pronghorn. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Willow Creek Alternative

The Willow Creek Alternative would have short- and long-term low residual impacts on mule deer, elk, and pronghorn. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Conclusion

All alternative routes and route variations would result in short-term, long-term, and permanent effects on wildlife habitat and wildlife species. A summary of effects on Greater Sage-Grouse, migratory birds including raptors, and big game are provided below.

Greater Sage-Grouse

All alternative routes cross Greater Sage-Grouse GHMA and PHMA in the Cow Valley PAC. Residual impacts on Greater Sage-Grouse are anticipated to be high where PHMA is crossed and moderate where GHMA is crossed, from adverse effects such as loss of habitat, increased avian predation, and habitat avoidance. In addition to seasonal restrictions implemented during sensitive periods and other avoidance and minimization measures to reduce impacts on Greater Sage-Grouse, the B2H Project would be required to achieve a net conservation gain for Greater Sage-Grouse through compensatory mitigation as described in the Mitigation Framework (Appendix C).

The Tub Mountain South Alternative would have the lowest impact on Greater Sage-Grouse, as it largely avoids PHMA. Where PHMA is crossed by the Tub Mountain South Alternative, the route follows the outer edge of PHMA, which is closer to anthropogenic disturbances and, thus, represent lower quality habitat. The Tub Mountain South Alternative route also crosses less GHMA, and crosses within 3.1 miles of a few number of leks than the other two alternative routes.

The Applicant's Proposed Action Alternative would have the greatest impact on Greater Sage-Grouse from crossing more PHMA and GHMA than the other two alternative routes. In addition, the Applicant's Proposed Action Alternative crosses higher quality habitat as it is located closer to the center of the Cow Valley PAC and a greater number of leks, and is further from anthropogenic disturbances.

Migratory Birds Including Raptors

All alternative routes and route variations would result in moderate residual impacts on raptors and other migratory birds from removal or disturbance to nesting sites, and from the disruption of bald and golden eagle breeding and foraging behavior. Avoidance and minimization measures, including limiting

B2H Project activities and implementing spatial restrictions during the nesting season, would reduce impacts on migratory birds during construction and operation of the B2H Project. Removal of and disturbance to nesting habitat would not negatively affect raptors and other migratory birds appreciably due to the small amount of habitat affected compared to the large home ranges of these species. Habitat disturbed during construction would be reclaimed and would restore migratory bird habitats similar to those disturbed. While the resulting habitats may cause a shift in avian species use, population-level effects on migratory birds are not anticipated to occur.

The Applicant's Proposed Action Alternative would have the highest impact on bald and golden eagles from crossing within 0.5 and 5 miles of a greater number of bald and golden eagle nests than the other alternative routes, but would affect less migratory bird habitat overall compared to the Willow Creek Alternative due to its shorter length.

Big Game

All alternative routes would have low residual impacts on big game. In addition to other direct and indirect effects, short- and long-term habitat loss would occur, but would not negatively affect big game appreciably due to the small amount of habitat affected compared to the large home ranges of these species. Disturbance to big game during sensitive periods would be minimized through the implementation of seasonal restrictions. The Willow Creek Alternative would have the lowest impact on big game from crossing less big game habitat than the other alternative routes.

Summary

The Tub Mountain South Alternative would result in the least overall impacts on wildlife resources compared to the other alternative routes in Segment 4 primarily because it would result in the least impacts on Greater Sage-Grouse, as it largely avoids PHMA. The Tub Mountain South Alternative also would result in the least impacts on bald and golden eagles. The Tub Mountain South Alternative would result in greater impacts on migratory bird and big game habitat from crossing more habitat as compared to the Willow Creek Alternative, but impacts would not negatively affect these species appreciably due to the small amount of habitat affected compared to their large home ranges.

SEGMENT 5—MALHEUR

Wildlife Habitat

Alternative Routes and Route Variations

The majority of habitat that would be affected in Segment 5 is shrubland habitat. RCAs and grasslands also would be affected, but to a lesser extent. In particular, the B2H Project would affect these three habitat types on the Owyhee River Below the Dam ACEC. The amount of wildlife habitat types that would be disturbed by each alternative route and route variation in Segment 5 is presented in Table 3-134 and residual impacts on each wildlife habitat type is provided in Table 3-135 in Section 3.2.3.

The types of potential effects on each wildlife habitat type are described in detail at the beginning of Section 3.2.4.6. The primary impact on wildlife habitats would include habitat removal and fragmentation. The Applicant's Proposed Action Alternative and all alternatives and variations in

Segment 5 would result in moderate residual impacts on shrubland and forest/woodland habitat types because they support a wide range of species and are slow to regenerate. Loss or adverse modification of native grassland habitats would result in moderate residual impacts because they are uncommon throughout the B2H Project area and, therefore, habitat for grassland species is limited. Although disturbance to RCAs is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible (Design Features 15 and 16), the B2H Project in Segment 5 would have moderate residual impacts on this valuable wildlife habitat type.

Special Status Species

Alternative Routes and Route Variations

The amount of each wildlife habitat that would be disturbed in Segment 5 is compared by alternative in Table 3-134 in Section 3.2.3. Special status species using wildlife habitats in Segment 5 are described at the beginning of Section 3.2.4.5. Potential effects on special status wildlife species would be similar to potential effects on other wildlife species that use the same habitat types. The types of potential effects on each wildlife habitat type are described in detail at the beginning of Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on special status wildlife include installing devices to deter raptor perching on transmission line structures and minimize an increase in predation, minimization of removal of trees and other vegetation, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), limiting construction and maintenance activities during migratory bird nesting season, implementing seasonal and spatial restrictions for sensitive periods and habitats, conducting preconstruction surveys, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4).

The types of potential effects on special status wildlife species would be similar for all alternatives. Because mortality of special status species (without population-level effects) and temporary disturbance during critical or sensitive periods could occur (without population-level effects), the Applicant's Proposed Action Alternative and all alternatives and variations in Segment 5 could result in long-term moderate impacts on special status species. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Columbia Spotted Frog

Table 3-184 presents miles crossed and residual impacts on Columbia spotted frog habitat for all alternative routes and route variations in Segment 5. Levels of residual impacts and duration of impacts on Columbia spotted frog are described by alternative route and route variation below, and displayed in MV-8. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139).

Table 3-184. Columbia Spotted Frog Inventory Data and Residual Impacts for Segment 5—Malheur (miles crossed)					
Alternative Route	Total Length (miles)	Inventory[1]		Residual Impacts[2]	
		Potentially Occupied Habitat (Higher Quality)	Suitable Habitat (High Potential)	Moderate	Low
Applicant's Proposed Action	40.4	0.0	1.8	0.0	1.8
Variation S5-A1	*7.4*	*0.0*	*0.5*	*0.0*	*0.5*
Variation S5-A2	*7.4*	*0.1*	*0.6*	*0.1*	*0.6*
Variation S5-B1	*2.5*	*0.0*	*0.7*	*0.0*	*0.7*
Variation S5-B2	*2.8*	*0.0*	*0.8*	*0.0*	*0.8*
Malheur S	43.5	0.9	2.0	0.9	2.0
Malheur A	43.1	0.9	2.0	0.9	2.0

Table Notes:
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]High levels of impacts on Columbia spotted frog are not anticipated as a result of B2H Project implementation.

Table 3-185 displays acreage of disturbance to Columbia spotted frog habitat types for each of the alternative routes and route variations.

Table 3-185. Anticipated Acres of Disturbance for Columbia Spotted Frog for Segment 5—Malheur			
Alternative Route	Total Acres of Disturbance	Potentially Occupied Habitat (Higher Quality)	Suitable Habitat (High Potential)
Applicant's Proposed Action	884	0	39
Variation S5-A1	*141*	*0*	*10*
Variation S5-A2	*147*	*2*	*12*
Variation S5-B1	*56*	*0*	*15*
Variation S5-B2	*57*	*0*	*16*
Malheur S	974	20	45
Malheur A	932	19	43

NOTES: Habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative would have long-term moderate and low residual impacts on Columbia spotted frog. Anticipated acres of disturbance to Columbia spotted frog habitat are presented in Table 3-185. The only Columbia spotted frog habitat types that the Applicant's Proposed Action Alternative cross are suitable habitat (high potential) and potentially occupied habitat (higher quality); therefore, impacts on other habitat types would not be anticipated. Long-term residual impacts would be moderate for potentially occupied habitat (higher quality) because impacts could have adverse effects on Columbia spotted frog, but would not reduce population viability. Long-term residual impacts would be low for suitable habitat (high potential) because impacts could have minor adverse effects on Columbia spotted frog, but would not reduce population viability.

Potential direct effects on Columbia spotted frog could include mortality; modification, fragmentation, and loss of habitat; displacement; and noise-related disturbance. Potential indirect effects on Columbia spotted frog could include alteration of native vegetation through introduction and spread of invasive plants and noxious weeds, increased predation risk, and increased water turbidity from fugitive dust. The types of potential direct and indirect effects on Columbia spotted frog are described in detail at the beginning of Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on Columbia spotted frog are listed in Table 3-140 and include avoiding or minimizing impacts on RCAs, conducting preconstruction surveys, implementing seasonal and spatial restrictions for sensitive periods and habitats, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4).

Variation S5-A1

Variation S5-A1 would have long-term low residual impacts on Columbia spotted frog. The only Columbia spotted frog habitat type that Variation S5-A1 crosses is suitable habitat (high potential); therefore, impacts on other habitat types would not be anticipated. Long-term residual impacts would be low because impacts could have minor adverse effects on Columbia spotted frog, but would not reduce population viability. Anticipated acres of disturbance to Columbia spotted frog habitat are presented in Table 3-185.

Potential direct and indirect effects on Columbia spotted frog would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Columbia spotted frog would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S5-A2

Variation S5-A2 would have long-term moderate and low residual impacts on Columbia spotted frog. The only Columbia spotted frog habitat types that Variation S5-A2 crosses are suitable habitat (high potential) and potentially occupied habitat (higher quality); therefore, impacts on other habitat types are not anticipated. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to Columbia spotted frog habitat are presented in Table 3-185.

Potential direct and indirect effects on Columbia spotted frog would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Columbia spotted frog would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S5-B1 and S5-B2

Variations S5-B1 and S5-B2 would have long-term low residual impacts on Columbia spotted frog. The only Columbia spotted frog habitat type that Variations S5-B1 and S5-B2 cross is suitable habitat (high potential); therefore, impacts on other habitat types would not be anticipated. Long-term residual impacts would be low because impacts could have minor adverse effects on Columbia spotted frog, but would not reduce population viability. Anticipated acres of disturbance to Columbia spotted frog habitat are presented in Table 3-185.

Potential direct and indirect effects on Columbia spotted frog would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Columbia spotted frog would be the same as those described for the Applicant's Proposed Action Alternative.

Malheur S and Malheur A Alternatives

The Malheur S and Malheur S Alternatives would have long-term moderate and low residual impacts on Columbia spotted frog. The only Columbia spotted frog habitat types that the Malheur S and Malheur S Alternatives cross are suitable habitat (high potential) and potentially occupied habitat (higher quality); therefore, impacts on other habitat types would not be anticipated. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to Columbia spotted frog habitat are presented in Table 3-185.

Potential direct and indirect effects on Columbia spotted frog would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Columbia spotted frog would be the same as those described for the Applicant's Proposed Action Alternative.

Greater Sage-Grouse

Table 3-186 presents miles crossed and residual impacts on Greater Sage-Grouse habitat for all alternative routes and route variations in Segment 5. Levels of residual impacts and duration of impacts on Greater Sage-Grouse are described by alternative route and route variation below, and displayed in MV-9. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139).

Table 3-186. Alternative Route Comparison for Greater Sage-Grouse Inventory Data and Residual Impacts for Segment 5—Malheur (miles crossed)					
Alternative Route	Total Length (miles)	Inventory[1]		Residual Impacts[2]	
		Priority Habitat Management Areas	General Habitat Management Areas	High	Moderate
Applicant's Proposed Action	40.4	0.0	11.2	0.0	11.2
Variation S5-A1	*7.4*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S5-A2	*7.4*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S5-B1	*2.5*	*0.0*	*0.2*	*0.0*	*0.2*
Variation S5-B2	*2.8*	*0.0*	*1.1*	*0.0*	*1.1*
Malheur S	43.5	0.0	22.4	0.0	22.4
Malheur A	43.1	0.0	25.6	0.0	25.6

Table Notes:
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]Low levels of impacts on Greater Sage-Grouse are not anticipated as a result of B2H Project implementation.

Table 3-187 displays acreage of disturbance to Greater Sage-Grouse habitat types for each of the alternative routes and route variations.

Table 3-187. Anticipated Acres of Disturbance for Greater Sage-Grouse for Segment 5—Malheur			
Alternative Route	Total Acres of Disturbance	Priority Habitat Management Areas	General Habitat Management Areas
Applicant's Proposed Action	884	0	245
Variation S5-A1	*141*	*0*	*0*
Variation S5-A2	*147*	*0*	*0*
Variation S5-B1	*56*	*0*	*4*
Variation S5-B2	*57*	*0*	*22*
Malheur S	974	0	501
Malheur A	932	0	554

Table Note: Greater Sage-Grouse habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action would not be expected to have impacts on Greater Sage-Grouse PHMA or leks, as neither occur within 3.1 miles. The Applicant's Proposed does cross and would be expected to have direct and indirect impacts on Greater Sage-Grouse GHMA.

The Applicant's Proposed Action would have long-term moderate residual impacts on Greater Sage-Grouse. Long-term moderate residual impacts would occur where GHMA is crossed because impacts would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-187.

Potential direct effects on Greater Sage-Grouse could include mortality due to electrocution; in-flight collisions with transmission line infrastructure; collisions with construction and maintenance vehicles; fragmentation of habitats due to the introduction of tall structures, increased EMFs, and construction of

new roads; loss and degradation of habitat quality and function; disturbance to breeding activities due to increased human presence and noise at lek locations; disturbance during sensitive periods resulting from human presence, vehicle use, and noise during construction and maintenance; and interruption and/or alteration of seasonal migrations and movements among populations. Along with the direct effects that would be expected within the footprint of the Applicant's Proposed Action Alternative, indirect effects on Greater Sage-Grouse would be anticipated in a 3.1-mile buffer around the route centerline, of which 25.9 percent is GHMA. Indirect effects on Greater Sage-Grouse could include alteration of the native sagebrush understory through introduction and spread of non-native, invasive plants and noxious weeds; avoidance of habitat due to potential increase in raptor predation pressure; disruption of nesting and breeding activities and avoidance of habitat due to vehicle noise and human presence resulting from public use of new access roads; increased mammalian predation risk; increased raptor and raven predation risk; and alteration of behavioral patterns due to increased predation pressure. The types of potential direct and indirect effects on Greater Sage-Grouse are described in detail at the beginning of Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on Greater Sage-Grouse are listed in Table 3-140 and include installing devices to deter raptor perching on transmission line structures, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), conducting preconstruction surveys, implementing seasonal restrictions for sensitive periods and habitats, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4). Seasonal restrictions for Greater Sage-Grouse would be similar to the seasonal restrictions identified in the Oregon ARMPAs (refer to Appendix B). Moreover, the B2H Project would be required to achieve a net conservation gain for Greater Sage-Grouse through compensatory mitigation as described in the Mitigation Framework (Appendix C).

Variation S5-A1 and S5-A2

Greater Sage-Grouse GHMA occurs in the study corridors of Variations S5-A1 and S5-A2. However, only indirect effects would be expected, as the route variations do not cross GHMA. The route variations are not within 3.1 miles of other designated habitat types or leks; therefore, identifiable impacts would not be anticipated on other designated habitat types or leks.

Indirect effects on Greater Sage-Grouse would be anticipated in a 3.1-mile buffer around the variations' centerline, of which 5.7 percent is GHMA for Variation S5-A1 and 9.5 percent is GHMA for Variation S5-A2. Potential indirect effects on Greater Sage-Grouse would be similar to those described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Variation S5-B1 and S5-B2

Greater Sage-Grouse GHMA occurs in the study corridors of Variations S5-B1 and Variations S5-B2. However, only indirect effects would be expected, as the route variations do not cross GHMA. The route variations are not within 3.1 miles of other designated habitat types or leks; therefore, identifiable impacts would not be anticipated on other designated habitat types or leks.

Variations S5-B1 and S5-B2 would have long-term moderate residual impacts on Greater Sage-Grouse. Long-term moderate residual impacts would result from impacts that would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-187.

Along with the direct effects that would be expected within the footprint of the variations, indirect effects on Greater Sage-Grouse would be anticipated in a 3.1-mile buffer around the variations' centerline, of which 29.9 percent is GHMA for Variation S5-B1 and 29.0 percent is GHMA for Variation S5-B2. Potential direct and indirect effects on Greater Sage-Grouse would be similar to those described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Malheur S and Malheur A Alternatives

Neither PHMA nor leks occur in the study corridors of the Malheur S and Malheur A Alternatives; therefore, identifiable impacts would not be expected on PHMA or leks. The alternative routes do cross and would be expected to have direct and indirect impacts on Greater Sage-Grouse GHMA.

The Malheur S and Malheur A Alternatives would have long-term moderate residual impacts on Greater Sage-Grouse. Long-term moderate residual impacts would result from impacts that would have adverse effects on Greater Sage-Grouse, but would not reduce population viability. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-187.

Along with the direct effects that would be expected within the footprint of the route variations, indirect effects on Greater Sage-Grouse would be anticipated in a 3.1-mile buffer around the alternative routes' centerline, of which 55.6 percent is GHMA for the Malheur A Alternative, and 53.9 percent is GHMA for the Malheur S Alternative. Potential direct and indirect effects on Greater Sage-Grouse would be similar to those described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Migratory Birds Including Raptors

Applicant's Proposed Action Alternative

Direct impacts on raptors and other migratory birds during construction could include collision with B2H Project structures, electrocution, disturbance due to construction noise, fugitive dust, and visual disturbance. Raptors and other migratory birds are particularly sensitive to disturbance during the nesting period and some construction activities could cause nest failure or abandonment. The types of potential effects on raptors and other migratory birds are described in detail at the beginning of Section 3.2.4.6.

Residual impact levels for raptors and other migratory birds have been determined in accordance with the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described under Methods in Section 3.2.4.4. Because removal or disturbance to nesting sites for raptors and other migratory birds could occur, the Applicant's Proposed Action would result in long-term moderate residual impacts on raptors and other migratory birds. Short-term moderate residual impacts on bald and golden eagles would result from disruption of breeding and foraging behavior, and short-term moderate impacts on bald and golden eagles would result from disturbance to nesting sites.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on raptors and other migratory birds include installing flight diverters, minimization of removal of trees and other vegetation, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), limiting construction and maintenance activities during migratory bird nesting season, implementing seasonal and spatial restrictions for sensitive periods and habitats, and conducting preconstruction surveys (refer to Section 3.2.4.4). In addition, adherence to the Applicant's Avian Protection Plan would minimize or avoid impacts from the B2H Project on raptors and other migratory birds.

Variations S5-A1, S5-A2, S5 B-1, and S5-B2

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Malheur S and Malheur A Alternatives

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. Additionally, the risk of in-flight collisions already exists from an existing 500-kV transmission line located along portions of the Malheur S and Malheur A Alternatives. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Big Game

The direct and indirect effects of the B2H Project on big game species could incrementally contribute to other factors preventing mule deer, elk, and pronghorn populations from meeting ODFW's management objectives for these species. However, as described below, design features of the B2H Project for environmental protection and selective mitigation measures will minimize impacts on WMUs and big game habitat.

Table 3-188 presents miles crossed and residual impacts on big game habitats for all alternative routes and route variations in Segment 5. Levels of residual impacts and duration of impacts on big game are described by alternative route and route variation below, and displayed in MV-10. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Table 3-188. Big Game Inventory Data and Residual Impacts for Segment 5—Malheur (miles crossed)

Alternative Route	Total Length (miles)	Inventory[1]			Residual Impacts[2]
		Pronghorn Winter Range	Mule Deer Winter Range	Elk Winter Range	Low
Applicant's Proposed Action	40.4	12.8	24.6	2.2	38.2
Variation S5-A1	*7.4*	*5.5*	*1.3*	*0.0*	*5.8*
Variation S5-A2	*7.4*	*6.0*	*0.2*	*0.0*	*6.2*
Variation S5-B1	*2.5*	*0.0*	*2.5*	*0.0*	*2.5*
Variation S5-B2	*2.8*	*0.0*	*2.8*	*0.0*	*2.8*
Malheur S	43.5	14.7	20.6	2.2	32.6
Malheur A	43.1	16.4	20.0	2.2	32.0

Table Notes:
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]High or moderate levels of impacts on big game are not anticipated as a result of B2H Project implementation.

Table 3-189 displays acreage of disturbance in big game habitat for all alternatives and route variations in Segment 5.

Table 3-189. Anticipated Acres of Disturbance for Big Game for Segment 5—Malheur (acres)

Alternative Route	Total Disturbance	Pronghorn Winter Range	Mule Deer Winter Range	Elk Winter Range
Applicant's Proposed Action	884	280	539	48
Variation S5-A1	*141*	*105*	*25*	*0*
Variation S5-A2	*147*	*119*	*4*	*0*
Variation S5-B1	*56*	*0*	*54*	*0*
Variation S5-B2	*57*	*0*	*57*	*0*
Malheur S	974	329	461	49
Malheur A	932	355	432	48

Table Note: Habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action would have short- and long-term low residual impacts on mule deer, pronghorn, and elk (MV-10, Table 3-188). Anticipated acres of disturbance to big game are presented in Table 3-189. Short- and long-term residual impacts from the Applicant's Proposed Action would be low because impacts would have only minor adverse effects on mule deer, pronghorn, and elk and would not limit the long-term sustainability of populations.

Direct effects on big game could include vehicle collisions, noise and visual disturbance, and habitat loss and modification. Indirect effects could include increased disturbance to big game from increased human activity from use of new or improved access roads. The types of potential effects on big game are described in detail at the beginning of Section 3.2.4.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on big game are listed in Table 3-140 and include implementing seasonal restrictions, limiting new or improved access to areas previously inaccessible, leaving vegetation in place whenever possible, and reclaiming construction areas with an agency or landowner-approved seed mix (refer to Section 3.2.4.4).

Variations S5-A1 and S5-A2

The variations would have short- and long-term low residual impacts on mule deer and pronghorn. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative. The variations do not cross elk winter range; therefore, impacts on elk winter range would not be anticipated.

Variations S5-B1 and S5-B2

The variations would have short- and long-term low residual impacts on mule deer. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative. The variations do not cross elk or pronghorn winter range; therefore, impacts on pronghorn and elk winter range would not be anticipated.

Malheur S and Malheur A Alternatives

The Malheur S and Malheur A Alternatives would have short- and long-term low residual impacts on mule deer, elk, and pronghorn. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative.

Conclusion

All alternative routes and route variations would result in short-term, long-term, and permanent effects on wildlife habitat and wildlife species. A summary of effects on Columbia spotted frog, Greater Sage-Grouse, migratory birds including raptors, and big game are provided below.

Columbia Spotted Frog

All alternative routes would have low residual impacts from crossing Columbia spotted frog suitable habitat (high potential). In addition, the Malheur S Alternative, Malheur A Alternative, and the Applicant's Proposed Action Alternative with Variation S5-A2 would result in moderate residual impacts from crossing Columbia spotted frog potentially occupied habitat (higher quality). In addition to other direct and indirect effects, habitat loss and fragmentation would occur where these habitat types are crossed by the alternative routes. Design features of the B2H Project for environmental protection and selective mitigation measures, including avoiding or minimizing impacts on RCAs, minimizing the spatial extent of construction activities, limiting new or improved access to areas previously inaccessible, and limiting removal of vegetation, as well as reclamation, would reduce impacts on Columbia spotted frog.

The Malheur S Alternative and Malheur A Alternative would have the same magnitudes of impact on Columbia spotted frog, as they cross the same potentially occupied habitat (higher quality) and the same amount of suitable habitat (high potential), and would have the highest impact on Columbia spotted frog from crossing more habitat overall than the Applicant's Proposed Action Alternative.

Greater Sage-Grouse

All alternative routes cross Greater Sage-Grouse GHMA and would have moderate residual impacts on Greater Sage-Grouse from adverse effects such as loss of habitat, increased avian predation, and habitat avoidance. PHMA would not be crossed by any of the alternative routes and no leks occur within 3.1 miles of any of the alternative routes. In addition to seasonal restrictions implemented during sensitive periods and other avoidance and minimization measures to reduce impacts on Greater Sage-Grouse, the B2H Project would be required to achieve a net conservation gain for Greater Sage-Grouse through compensatory mitigation as described in the Mitigation Framework (Appendix C).

The Applicant's Proposed Action Alternative would have the lowest impact on Greater Sage-Grouse, as it crosses the least amount of GHMA. Where GHMA is crossed by the Applicant's Proposed Action Alternative, the route follows the outer edge of GHMA, which is closer to anthropogenic disturbances and, thus, represent lower quality habitat. The Malheur A Alternative would have the greatest impact on Greater Sage-Grouse from crossing more GHMA than the other two alternative routes.

Migratory Birds Including Raptors

All alternative routes and route variations would result in moderate residual impacts on raptors and other migratory birds from removal or disturbance to nesting sites, and from the disruption of bald and golden eagle breeding and foraging behavior. Avoidance and minimization measures, including limiting B2H Project activities and implementing spatial restrictions during the nesting season, would reduce impacts on migratory birds during construction and operation of the B2H Project. Removal of and

disturbance to nesting habitat would not negatively affect raptors and other migratory birds appreciably due to the small amount of habitat affected compared to the large home ranges of these species. Habitat disturbed during construction would be reclaimed and would restore migratory bird habitats similar to those disturbed. While the resulting habitats may cause a shift in avian species use, population-level effects on migratory birds are not anticipated to occur.

Compared to other alternative routes, the Applicant's Proposed Action Alternative would have the lowest impacts on bald and golden eagles as it crosses within 0.5 and 5 miles of the fewest number of bald and golden eagle nests, but the Applicant's Proposed Action Alternative would affect the greatest amount of migratory bird habitat overall due to its longer length.

Big Game

All alternative routes would have low residual impacts on big game. In addition to other direct and indirect effects, short- and long-term habitat loss would occur, but would not negatively affect big game appreciably due to the small amount of habitat affected compared to the large home ranges of these species. Disturbance to big game during sensitive periods would be minimized through the implementation of seasonal restrictions. The Applicant's Proposed Action Alternative would have the greatest impact on big game from crossing more big game habitat than other alternative routes.

Summary

The Applicant's Proposed Action Alternative would result in the least overall impacts on wildlife resources compared to the other alternative routes in Segment 5 because it would result in the least impacts on Columbia spotted frog, Greater Sage-Grouse, and bald and golden eagles. The Applicant's Proposed Action Alternative would result in greater impacts on migratory bird and big game habitat from crossing more habitat than the other alternative routes, but impacts would not negatively affect these species appreciably due to the small amount of habitat affected compared to their large home ranges.

SEGMENT 6—TREASURE VALLEY

Wildlife Habitat

Alternative Routes and Route Variations

The majority of wildlife habitat that would be affected in Segment 6 is shrubland. RCAs also would be affected, but to a lesser extent. The amount of each wildlife habitat type that would be disturbed by the Applicant's Proposed Action Alternative and route variations in Segment 6 is presented in Table 3-137, and residual impacts on each wildlife habitat type is provided in Table 3-136 in Section 3.2.3.

The types of potential effects on each wildlife habitat type are described in detail at the beginning of Section 3.2.4.6. The primary impact on wildlife habitats would include habitat removal and fragmentation. The Applicant's Proposed Action and route variations in Segment 6 would result in moderate residual impacts on shrubland habitat because they support a wide range of species and are slow to regenerate. Although disturbance to RCAs is anticipated to be largely avoided through spanning and eliminating surface disturbance where feasible (Design Features 15 and 16), the Applicant's

Proposed Action and route variations in Segment 6 would have moderate residual impacts on this valuable wildlife habitat type.

Special Status Species

Alternative Routes and Route Variations

The amount of each wildlife habitat that would be disturbed in Segment 6 is compared by alternative in Table 3-137 in Section 3.2.3. Special status species using wildlife habitats in Segment 6 are described at the beginning of Section 3.2.4.5. Potential effects on special status wildlife species would be similar to potential effects on other wildlife species that use the same habitat types. The types of potential effects on each wildlife habitat type are described in detail at the beginning of Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on special status wildlife include installing devices to deter raptor perching on transmission line structures and minimize an increase in predation, minimization of removal of trees and other vegetation, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), limiting construction and maintenance activities during migratory bird nesting season, implementing seasonal and spatial restrictions for sensitive periods and habitats, conducting preconstruction surveys, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4).

The types of potential effects on special status wildlife species would be similar for the Applicant's Proposed Action Alternative and the route variations. Because mortality of special status species (without population-level effects) and temporary disturbance during critical or sensitive periods could occur (without population-level effects), the Applicant's Proposed Action and route variations in Segment 6 could result in long-term moderate impacts on special status species. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Columbia Spotted Frog

Table 3-190 presents miles crossed and residual impacts on Columbia spotted frog (Great Basin distinct population segment) habitat for the Applicant's Proposed Action Alternative and route variations in Segment 6. Levels of residual impacts and duration of impacts on Columbia spotted frog are described by alternative route and route variation below, and displayed in MV-8. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139).

Table 3-190. Columbia Spotted Frog Inventory Data and Residual Impacts for Segment 6—Treasure Valley (miles crossed)			
Alternative Route	Total Length (miles)	Inventory[1]	Residual Impacts[2]
		Suitable Habitat (High Potential)	Low
Applicant's Proposed Action	28.0	2.1	2.1
Variation S6-A1	*9.3*	*1.0*	*1.0*
Variation S6-A2	*8.9*	*0.3*	*0.3*
Variation S6-B1	*14.4*	*0.7*	*0.7*
Variation S6-B2	14.1	*0.5*	*0.5*

Table Notes:
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]High and moderate levels of impacts on Columbia spotted frog are not anticipated as a result of B2H Project implementation in Segment 6.

Table 3-191 displays acreage of disturbance to Columbia spotted frog habitat for the Applicant's Proposed Action and route variations.

Table 3-191. Anticipated Acres of Disturbance for Columbia Spotted Frog for Segment 6—Treasure Valley		
Alternative Route	Total Acres of Disturbance	Suitable Habitat (High Potential)
Applicant's Proposed Action	613	46
Variation S6-A1	*205*	*22*
Variation S6-A2	*196*	*7*
Variation S6-B1	*312*	*15*
Variation S6-B2	*309*	*11*

Table Notes: Habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action would have long-term low residual impacts on Columbia spotted frog. The only Columbia spotted frog habitat type that the Applicant's Proposed Action Alternative crosses is suitable habitat (high potential); therefore, impacts on other habitat types would not be anticipated. Long-term residual impacts would be low for suitable habitat (high potential) because impacts could have minor adverse effects on Columbia spotted frog, but would not reduce population viability. Anticipated acres of disturbance to Columbia spotted frog habitat are presented in Table 3-191.

Potential direct effects on Columbia spotted frog could include mortality; modification, fragmentation, and loss of habitat; displacement; and noise-related disturbance. Potential indirect effects on Columbia spotted frog could include alteration of native vegetation through introduction and spread of invasive plants and noxious weeds, increased predation risk, and increased water turbidity from fugitive dust. The types of potential direct and indirect effects on Columbia spotted frog are described in detail at the beginning of Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on Columbia spotted frog are listed in

Table 3-140 and include avoiding or minimizing impacts on RCAs, conducting preconstruction surveys, implementing seasonal and spatial restrictions for sensitive periods and habitats, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4).

Variations S6-A1 and S6-A2

Variations S6-A1 and S6-A2 would have long-term low residual impacts on Columbia spotted frog. The only Columbia spotted frog habitat type that Variation S6-A1 and S6-A2 cross is suitable habitat (high potential); therefore, impacts on other habitat types are not anticipated. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to Columbia spotted frog habitat are presented in Table 3-191.

Potential direct and indirect effects on Columbia spotted frog would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Columbia spotted frog would be the same as those described for the Applicant's Proposed Action Alternative.

Variations S6-B1 and S6-B2

Variations S6-B1 and S6-B2 would have long-term low residual impacts on Columbia spotted frog. The only Columbia spotted frog habitat type that Variations S6-B1 and S6-B2 cross is suitable habitat (high potential); therefore, impacts on other habitat types are not anticipated. The duration and levels of residual impacts would be the same as the Applicant's Proposed Action Alternative. Anticipated acres of disturbance to Columbia spotted frog habitat are presented in Table 3-191.

Potential direct and indirect effects on Columbia spotted frog would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Columbia spotted frog would be the same as those described for the Applicant's Proposed Action Alternative.

Greater Sage-Grouse

Table 3-192 presents miles crossed and residual impacts on Greater Sage-Grouse habitat for the Applicant's Proposed Action Alternative and route variations in Segment 6. Levels of residual impacts and duration of impacts on Greater Sage-Grouse are described by alternative route and route variation below, and displayed in MV-9. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139).

Table 3-192. Sage-Grouse Inventory Data and Residual Impacts for Segment 6—Treasure Valley (miles crossed)						
Alternative Route	Total Length (miles)	Inventory[1]			Residual Impacts[3]	
		Priority Habitat Management Areas	Important Habitat Management Areas[2]	General Habitat Management Areas	High	Moderate
Applicant's Proposed Action	28.0	0.0	22.3	0.0	22.3	0.0
Variation S6-A1	*9.3*	*0.0*	*6.7*	*0.0*	*6.7*	*0.0*
Variation S6-A2	*8.9*	*0.0*	*5.9*	*0.0*	*5.9*	*0.0*
Variation S6-B1	*14.4*	*0.0*	*13.5*	*0.0*	*13.5*	*0.0*
Variation S6-B2	*14.1*	*0.0*	*13.7*	*0.0*	*13.7*	*0.0*

Table Notes:
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]Some portions of Important Habitat Management Areas consist of lands that serve as management buffers between developed areas and Priority Habitat Management Areas and are not identified as areas with ecological site characteristics suitable for Greater Sage-Grouse habitat or occupancy.
[3]Low levels of impacts on Greater Sage-Grouse are not anticipated as a result of B2H Project implementation.

Table 3-193 displays acreage of disturbance to Greater Sage-Grouse habitat types for the Applicant's Proposed Action Alternative and route variations.

Table 3-193. Anticipated Acres of Disturbance for Greater Sage-Grouse for Segment 6—Treasure Valley				
Alternative Route	Total Acres of Disturbance	Priority Habitat Management Areas	Important Habitat Management Areas[1]	General Habitat Management Areas
Applicant's Proposed Action	613	0	488	0
Variation S6-A1	*205*	*0*	*148*	*0*
Variation S6-A2	*196*	*0*	*130*	*0*
Variation S6-B1	*312*	*0*	*292*	*0*
Variation S6-B2	*309*	*0*	*300*	*0*

Table Notes:
Greater Sage-Grouse habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.
[1] Some portions of Important Habitat Management Areas consist of lands that serve as management buffers between developed areas and Priority Habitat Management Areas and are not identified as areas with ecological site characteristics suitable for Greater Sage-Grouse habitat or occupancy.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative would have direct and indirect impacts on Greater Sage-Grouse habitat in IHMA. No PHMA, GHMA, or leks occur in the study corridor of the Applicant's Proposed Action; therefore, no identifiable impacts on PHMA, GHMA, or leks would be expected.

The Applicant's Proposed Action Alternative would have long-term high residual impacts on Greater Sage-Grouse. Permanent high residual impacts would occur where IHMA is crossed as permanent loss of IHMA and other impacts could result in population-level effects due to the importance of this habitat type in providing a management buffer for the PHMA. However, portions of IHMA crossed are lands that serve as management buffers for Priority Habitat Management Areas and to connect patches of Priority Habitat Management Areas, and are not identified as areas with ecological site characteristics suitable for Greater Sage-Grouse habitat or occupancy. Therefore, in some areas, identifiable impacts on Greater Sage-Grouse habitat in IHMA would not be expected. Anticipated acres of disturbance to Greater Sage-Grouse habitat are presented in Table 3-193.

Potential direct effects on Greater Sage-Grouse could include mortality due to electrocution; in-flight collisions with transmission line infrastructure; collisions with construction and maintenance vehicles; fragmentation of habitats due to the introduction of tall structures, increased EMFs, and construction of new roads; loss and degradation of habitat quality and function; disturbance to breeding activities due to increased human presence and noise at lek locations; disturbance during sensitive periods resulting from human presence, vehicle use, and noise during construction and maintenance; and interruption and/or alteration of seasonal migrations and movements among populations.

Along with the direct effects that would be expected in the footprint of the Applicant's Proposed Action Alternative, indirect effects on Greater Sage-Grouse would be anticipated in a 3.1-mile buffer around the route centerline, of which 2.4 percent is GHMA and 49.5 percent is IHMA. Indirect effects on Greater Sage-Grouse could include alteration of the native sagebrush understory through introduction and spread of non-native, invasive plants and noxious weeds; avoidance of habitat due to potential increase in raptor predation pressure; disruption of nesting and breeding activities and avoidance of habitat due to vehicle noise and human presence resulting from public use of new access roads; increased mammalian predation risk; increased raptor and raven predation risk; and alteration of behavioral patterns due to increased predation pressure. The types of potential direct and indirect effects on Greater Sage-Grouse are described in detail at the beginning of Section 3.2.4.6.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on Greater Sage-Grouse are listed in Table 3-140 and include installing devices to deter raptor perching on transmission line structures, minimizing electrocution and collision through avian-safe design standards (APLIC 2006, 2012), conducting preconstruction surveys, implementing seasonal restrictions for sensitive periods and habitats, and limiting new or improved access to areas previously inaccessible (refer to Section 3.2.4.4). Seasonal restrictions for Greater Sage-Grouse would be similar to the seasonal restrictions identified in the Oregon ARMPAs (refer to Appendix B). Moreover, the B2H Project would be required to achieve a net conservation gain for Greater Sage-Grouse through compensatory mitigation as described in the Mitigation Framework (Appendix C).

Variations S6-A1 and S6-A2

No leks, PHMA, or GHMA are in the study corridors of the variations and, therefore, identifiable impacts on leks, PHMA, and GHMA would not be expected. Variations S6-A1 and S6-A2 do cross IHMA; however, portions of IHMA crossed are lands that serve as management buffers for Priority Habitat Management Areas and to connect patches of Priority Habitat Management Areas, and are not identified as areas with ecological site characteristics suitable for Greater Sage-Grouse habitat or occupancy.

Variations S6-B1 and S6-B2

Variations S6-B1 and S6-B2 would have direct and indirect impacts on Greater Sage-Grouse habitat in IHMA. No leks, PHMA, or GHMA occur in the study corridor of the Applicant's Proposed Action Alternative and, therefore, identifiable impacts on PHMA, GHMA, and leks would not be expected.

Along with the direct effects that would be expected in the footprint of the variations, indirect effects on Greater Sage-Grouse would be anticipated in a 3.1-mile buffer around the variations' centerline, of which 38.9 percent is IHMA and 4.1 percent is GHMA for Variation S6-B1, and 37.5 percent is IHMA and 2.8 percent is GHMA for Variation S6-B2. Types of potential direct and indirect effects on Greater Sage-Grouse would be similar to those described for the Applicant's Proposed Action Alternative.

The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on Greater Sage-Grouse would be the same as those described for the Applicant's Proposed Action Alternative.

Migratory Birds Including Raptors

Applicant's Proposed Action Alternative

Direct impacts on raptors and other migratory birds during construction could include collision with B2H Project structures, electrocution, disturbance due to construction noise, fugitive dust, and visual disturbance. Raptors and other migratory birds are particularly sensitive to disturbance during the nesting period and some construction activities could cause nest failure or abandonment. The types of potential effects on raptors and other migratory birds are described in detail at the beginning of Section 3.2.4.6.

Residual impact levels for raptors and other migratory birds have been determined in accordance with the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4. Because removal or disturbance to nesting sites for raptors and other migratory birds could occur, the Applicant's Proposed Action Alternative would result in long-term moderate residual impacts on raptors and other migratory birds. Short-term moderate residual impacts on bald and golden eagles would result from disruption of breeding and foraging behavior, and short-term moderate impacts on bald and golden eagles would result from disturbance to nesting sites.

Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize or avoid impacts from the B2H Project on raptors and other migratory birds include installing flight diverters, minimization of removal of trees and other vegetation, minimizing electrocution

and collision through avian-safe design standards (APLIC 2006, 2012), limiting construction and maintenance activities during migratory bird nesting season, implementing seasonal and spatial restrictions for sensitive periods and habitats, and conducting preconstruction surveys (refer to Section 3.2.4.4). In addition, adherence to the Applicant's Avian Protection Plan would minimize or avoid impacts from the B2H Project on raptors and other migratory birds.

Variations S6-A1, S6-A2, S6-B1, and S6-B2

The types of potential effects on raptors and other migratory birds and residual impact levels would be similar to those described for the Applicant's Proposed Action Alternative. The design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on raptors and other migratory birds would be the same as those described for the Applicant's Proposed Action Alternative.

Big Game

The direct and indirect effects of the B2H Project on big game species could incrementally contribute to other factors preventing mule deer and bighorn sheep populations from meeting ODFW's and IDFG's management objectives for these species. However, as described below, design features of the B2H Project for environmental protection and selective mitigation measures will minimize impacts on WMUs and big game habitat.

Table 3-194 presents miles crossed and residual impacts on big game habitats for the Applicant's Proposed Action Alternative and route variations in Segment 6. Levels of residual impacts and duration of impacts on big game are described by alternative route and route variation below, and displayed in MV-10. Residual impact levels are based on the criteria for assessing level of impacts on wildlife (Table 3-139) and duration of impacts follow the criteria described in Section 3.2.4.4.

Table 3-194. Big Game Inventory Data and Residual Impacts for Segment 6—Treasure Valley (miles crossed)

Alternative Route	Total Length (miles)	Inventory[1]		Residual Impacts[2]
		Bighorn Sheep Population Management Units	Mule Deer Winter Range	Low
Applicant's Proposed Action	28.0	17.5	8.0	21.3
Variation S6-A1	*9.3*	*6.7*	*2.3*	*9.0*
Variation S6-A2	*8.9*	*6.8*	*1.9*	*8.7*
Variation S6-B1	*14.4*	*10.8*	*4.2*	*10.8*
Variation S6-B2	*14.1*	*13.2*	*4.8*	*13.2*

Table Notes:
[1]Miles crossed will not equal the total length as habitat may not be contiguous over the entire alternative route.
[2]High or moderate levels of impacts on Big Game are not anticipated as a result of B2H Project implementation.

Table 3-195 displays acreage of disturbance in big game habitat for the Applicant's Proposed Action Alternative and route variations in Segment 6.

Table 3-195. Anticipated Acres of Disturbance for Big Game for Segment 6—Treasure Valley (acres)			
Alternative Route	**Total Disturbance**	**Bighorn Sheep Population Management Units**	**Mule Deer Winter Range**
Applicant's Proposed Action	613	383	175
Variation S6-A1	*205*	*148*	*51*
Variation S6-A2	*196*	*150*	*42*
Variation S6-B1	*312*	*234*	*91*
Variation S6-B2	*309*	*289*	*105*
Table Notes: Habitat may not be contiguous over the entire alternative route, and disturbance to habitat may not equal total disturbance. Acres in the table are rounded and, therefore, columns may not sum exactly.			

Applicant's Proposed Action Alternative

The Applicant's Proposed Action would have short- and long-term low residual impacts on mule deer and bighorn sheep (MV-10, Table 3-194). Anticipated acres of disturbance to big game are presented in Table 3-195.

Short- and long-term residual impacts from the Applicant's Proposed Action would be low because impacts would have only minor adverse effects on mule deer and bighorn sheep and would not limit the long-term sustainability of populations.

Direct effects on big game could include vehicle collisions, noise and visual disturbance, and habitat loss and modification. Indirect effects could include increased disturbance to big game from increased human activity from use of new or improved access roads. The types of potential effects on big game are described in detail at the beginning of Section 3.2.4.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts from the B2H Project on big game are listed in Table 3-140 and include implementing seasonal restrictions, limiting new or improved access to areas previously inaccessible, leaving vegetation in place whenever possible, and reclaiming construction areas with an agency or landowner-approved seed mix (refer to Section 3.2.4.4).

Variations S6-A1 and S6-A2

The variations would have short- and long-term low residual impacts on mule deer and bighorn sheep. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative. The variations do not cross other big game habitat types; therefore, impacts on other habitat types would not be anticipated.

Variations S6-B1 and S6-B2

The variations would have short- and long-term low residual impacts on mule deer and bighorn sheep. The types of potential effects on big game, the design features of the B2H Project for environmental protection, and the selective mitigation measures that would minimize impacts from the B2H Project on big game would be the same as those described for the Applicant's Proposed Action Alternative. The

variations do not cross other big game habitat types; therefore, impacts on other habitat types would not be anticipated.

Conclusion

The Applicant's Proposed Action Alternative and route variations would result in short-term, long-term, and permanent effects on wildlife habitat and wildlife species. A summary of effects on Columbia spotted frog, Greater Sage-Grouse, migratory birds including raptors, and big game are provided below.

Columbia Spotted Frog

The Applicant's Proposed Action Alternative and route variations would have low residual impacts from crossing Columbia spotted frog suitable habitat (high potential). In addition to other direct and indirect effects, habitat loss and fragmentation would occur where suitable habitat is crossed. Design features of the B2H Project for environmental protection and selective mitigation measures, including avoiding or minimizing impacts on RCAs, minimizing the spatial extent of construction activities, limiting new or improved access to areas previously inaccessible, and limiting removal of vegetation, as well as reclamation, would reduce impacts on Columbia spotted frog.

Variation S6-A1 would have greater impacts than Variation S6-A2, as more suitable habitat (high potential) is crossed. Variation S6-B1 would have greater impacts than Variation S6-B2 as more suitable habitat (high potential) is crossed.

Greater Sage-Grouse

The Applicant's Proposed Action Alternative and route variations do not cross Greater Sage-Grouse PHMA or GHMA but do cross IHMA. No leks occur within 3.1 miles of any of the route variations. In addition to seasonal restrictions implemented during sensitive periods and other avoidance and minimization measures to reduce impacts on Greater Sage-Grouse, the B2H Project would be required to achieve a net conservation gain for Greater Sage-Grouse through compensatory mitigation as described in the Mitigation Framework (Appendix C).

The IHMA crossed by Variations S6-A1 and S6-A2 are not identified as lands used by Greater Sage-Grouse, but are lands that serve as management buffers for PHMA and to connect patches of PHMA. Therefore, identifiable impacts on Greater Sage-Grouse habitat in IHMA would not be expected. The IHMA crossed by Variations S6-B1 and S6-B2 contains land identified as used by Greater Sage-Grouse. Variation S6-B1 is closer to the existing 500-kV transmission line than Variation S6-B2 and is closer to the edge of IMHA, and may therefore be located in an area of lower quality habitat.

Migratory Birds Including Raptors

The Applicant's Proposed Action Alternative and route variations would result in moderate residual impacts on raptors and other migratory birds from removal or disturbance to nesting sites, and from the disruption of bald and golden eagle breeding and foraging behavior. Avoidance and minimization measures, including limiting B2H Project activities and implementing spatial restrictions during the nesting season, would reduce impacts on migratory birds during construction and operation of the B2H

Project. Removal of and disturbance to nesting habitat would not negatively affect raptors and other migratory birds appreciably due to the small amount of habitat affected compared to the large home ranges of these species. Habitat disturbed during construction would be reclaimed and would restore migratory bird habitats similar to those disturbed. While the resulting habitats may cause a shift in avian species use, population-level effects on migratory birds are not anticipated to occur.

For each variation option, the variations would affect similar amounts of migratory bird habitat overall due to their similar lengths. Variation S6-A1 would have a higher impact on bald and golden eagles than Variation S6-A2, as Variation S6-A1 crosses within 0.5 mile of bald and golden eagle nests and Variation S6-A2 does not. Variation S6-B1 would have a higher impact on bald and golden eagle than Variation S6-B2 from crossing within 0.5 mile of a greater number of bald and golden eagle nests.

Big Game

The Applicant's Proposed Action Alternative and route variations would have low residual impacts on big game. In addition to other direct and indirect effects, short- and long-term habitat loss would occur, but would not negatively affect big game appreciably due to the small amount of habitat affected compared to the large home ranges of these species. Disturbance to big game during sensitive periods would be minimized through the implementation of seasonal restrictions. Variations S6-A1 and S6-A2 would have similar impacts on big game from crossing a similar amount of big game habitat. Variation S6-B1 would have lower impacts on big game than Variation S6-B2 from crossing less big game habitat.

Summary

Variation S6-A2 would result in the least overall impacts on wildlife resources compared to Variation S6-A1 as it would result in the least impacts on Columbia spotted frog, Greater Sage-Grouse, and bald and golden eagles. Neither Variation S6-B1 nor Variation S6-B2 would clearly result in the least overall impacts on wildlife resources. Variation S6-B1 would have the least impacts on Greater Sage-Grouse and big game, but would result in greater impacts on Columbia spotted frog and bald and golden eagles.

3.2.5 FISH RESOURCES

3.2.5.1 INTRODUCTION

This section describes the affected environment and environmental consequences of construction, operation, and maintenance of the B2H Project on fisheries resources. The B2H Project would pass through multiple fish habitat types that currently are occupied by native resident and migratory fish species and would overlap with known habitats for special status fish species. Fish species and habitat analyzed include ESA threatened, endangered, candidate, and proposed species and designated critical habitat; Essential Fish Habitat (EFH); other resident and anadromous fish species; and BLM, USFS, and state sensitive species.

3.2.5.2 REGULATORY FRAMEWORK

FEDERAL

Endangered Species Act

The ESA (16 U.S.C. 1531–1544), as amended, established broad protection for species that are at risk of extinction. Species listed under the ESA are protected from any action that would constitute harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting the species and from any attempt to engage in any such conduct. Section 7 of the ESA requires that federal agencies, in consultation with the USFWS and the National Oceanic and Atmospheric Administration (NOAA) Fisheries (also called the NMFS), must ensure that any action authorized, funded, or carried out by the federal agency is not likely to jeopardize the continued existence of an endangered, threatened, or proposed listed species or result in the destruction or adverse modification of a critical habitat of a species. Agencies are required to use the best scientific and commercial data available to fulfill this charge.

The USFWS and NOAA Fisheries share responsibility for implementing the Federal ESA as it relates to fish. In general, the USFWS has oversight of terrestrial and resident freshwater species, and the NOAA Fisheries has oversight of marine and anadromous species.

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996, establishes procedures intended to identify, conserve, and enhance EFH for those species regulated under a federal fisheries management plan. The MSA requires federal agencies to consult with NOAA Fisheries regarding actions or proposed actions that may adversely affect EFH (Section 305(b)(2)). EFH is defined under the MSA as those waters and substrate necessary to fish for “spawning, breeding, and feeding, for growth to maturity.”

PACFISH and INFISH Strategies

The Interim Strategy for Managing Anadromous Fish-Producing Watersheds in Western Oregon and Washington, Idaho, and Portions of California (PACFISH) (USFS and BLM 1995) and the Interim Strategies for Managing Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana, and Portions of Nevada (INFISH) (USFS 1995), as well as biological opinions and

the Updated Interior Columbia Basin Strategy–Memorandum #1920 (BLM/EPA/USFS/USFWS/NOAA 04/18/2014), provide the components (goals, objectives, standards, guidelines, and hierarchical analysis) needed to protect and conserve steelhead, salmon, and inland native fish and their habitats on BLM- and USFS-administered lands. PACFISH and INFISH were developed as ecosystem-based interim strategies designed to arrest the degradation of habitat and begin the restoration of aquatic habitat and riparian areas on lands administered by the USFS and BLM. The intent of the strategies is to restore the ecological health and productivity of watersheds that contain present or potential anadromous and inland native fish habitat. The Finding of No Significant Impact for the Environmental Assessment in the Decision Notice/Decision Record for these interim strategies amended LUPs in the planning area for this EIS. The BLM Oregon/Washington and the Idaho state directors directed the BLM administrative units to apply the INFISH strategy in watersheds that contain current bull trout habitat (BLM 1995). PACFISH and INFISH remain in place until longer-term management strategies are completed.

The PACFISH and INFISH strategies include the following components: riparian goals, watershed-scale riparian management objectives (RMOs), riparian habitat conservation areas (RHCAs), standards and guidelines, key watersheds, and watershed analysis. Riparian goals provide management context for proposed activities. Watershed-scale RMOs for stream channel, riparian, and watershed conditions are numeric criteria that describe the features of good aquatic habitat and were developed to provide the criteria against which attainment, or progress toward attainment, of the riparian goals are measured. RMOs provide the target toward which managers will be aiming as they conduct resource management activities across the landscape. PACFISH and INFISH require that proposed actions within RHCAs do not prevent or retard attainment of RMOs. RHCAs are portions of watersheds where riparian-dependent resources receive primary emphasis and management activities are subject to specific standards and guidelines. RHCAs include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems. More detailed discussion on RHCAs can be found within Sections 3.2.2-Water and 3.2.3-Vegetation.

Additional riparian area protections are outlined in Oregon's Forest Practices Act and OAR 629-635 and 629-640 as summarized below in the *Oregon Regulation of Riparian Vegetation* subsection.

Conservation Agreement for Pacific Lamprey

The Conservation Agreement for Pacific lamprey (*Entosphenus tridentatus*) in the States of Alaska, Washington, Oregon, Idaho, and California 2012 (Agreement Number BLM-OR930-1225) was developed as a cooperative effort between natural resource agencies and tribes to reduce threats to Pacific lamprey and improve associated habitats and population status. Cooperative efforts through the Agreement are intended to (a) develop regional implementation plans derived from existing information and plans, (b) implement conservation actions, (c) promote scientific research, and (d) monitor and evaluate the effectiveness of those actions. Additionally, BMPs to minimize adverse effects on Pacific lamprey (USFWS 2010) would be incorporated into any stream-disturbing activity (e.g., aquatic habitat restoration, prescribed fire, recreational development, grazing, gravel extraction/mining, water diversions, etc.) on USFS- and BLM-managed lands throughout the range of Pacific lamprey.

Special Status Species Management

Both the USFS and the BLM have established lists of species they consider "at risk" on lands they manage. BLM Manual 6840 provides the BLM's special status species management policy and guidance for the conservation of special status species and their habitats. BLM sensitive species are managed under the special status species policy to ensure that actions taken by the BLM are consistent with the conservation of special status species and do not contribute to the listing of any species under the Federal ESA. USFS Manual 2670 directs each regional forester to designate sensitive species on public lands administered by the USFS. Per the manual, sensitive species are defined as "plant or animal species identified by a regional forester for which population viability is a concern, as evidenced by a significant current or predicted downward trend in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution."

U.S. Forest Service Management Indicator Species

The USFS also designates MIS. USFS Manual 2620.5(1) (USFS 1991) defines MIS as "plant and animal species, communities, or special habitats selected for emphasis in planning, and which are monitored during forest plan implementation to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent." Each national forest designates its own list of MIS. The Wallowa-Whitman National Forest has five MIS or groups that could occur in the B2H Project area. Two fish species in the B2H Project area are identified as MIS: the redband trout (*O. mykiss gairdneri*) and steelhead (*Oncorhynchus mykiss)*. A USFS report on aquatic MIS in the Wallowa-Whitman National Forest is included in Appendix F.

State

Comprehensive Wildlife Conservation Strategies

The IDFG and ODFW have published comprehensive wildlife conservation strategies aimed at encouraging land-managing activities that conserve and enhance wildlife habitat (IDFG 2005; ODFW 2006). These state conservation strategies were established to create a conservation plan to conserve the states' species of greatest conservation need and to provide a common framework that would enable conservation partners (federal, state, and private) to jointly implement a long-term approach for the benefit of those species. The conservation strategies (also known as conservation plans) are not regulatory documents, so they are not intended to be prescriptive, and the species identified are not equivalent to an official state listing as threatened, endangered, or fully protected. However, these conservation strategies do identify species of greatest conservation need, identify the key habitats for each species and the regions within the state where they can be found, recommend actions to improve species' population status and habitat conditions, and describe an approach for long-term monitoring of species. In general, the species identified as species of greatest conservation need are those that have demonstrated a conservation need (due to population or habitat conditions) or where demographic data are lacking. The 2005 Oregon Comprehensive Wildlife Conservation Strategy lists 224 species of greatest conservation need, which include 166 vertebrate species and 58 invertebrate species (ODFW

2006). A revised Wildlife Conservation Strategy for Oregon is currently under review by the USFWS. The Idaho Comprehensive Wildlife Conservation Strategy establishes 229 species of greatest conservation need, which include 126 vertebrate species and 103 invertebrate species (IDFG 2005). The IDFG is in the process of drafting a new state wildlife action plan that will supersede the comprehensive wildlife conservation strategies, but the plan has not been released at this time.

Fish species present in the B2H Project area that are addressed in the comprehensive wildlife conservation strategies include steelhead, redband trout, bull trout (*Salvelinus confluentus*), coho salmon (*O. kisutch*), Pacific lamprey, and Chinook salmon (O. *tshawytscha*).

Idaho Stream Channel Protection Act (Idaho Code Title 42, Chapter 38)

The Idaho Stream Channel Protection Act (Idaho Code Title 42, Chapter 38) protects streams from modifications that would adversely affect their ability to provide habitat for fish and wildlife. The IDWR must approve in advance any work being done on continuously flowing streams, and a permit is required before beginning any work that would alter a stream channel.

Oregon Fish Passage Regulations

The Oregon Fish Passage regulations (ORS 509.580 through 910 and OAR 635, Division 412) provide for the protection of upstream and downstream native migratory fish passage. The regulations prohibit construction of artificial obstructions across any waters that currently are inhabited or historically were inhabited by native migratory fish without providing for passage for the fish. At minimum, new stream crossings on fish-bearing streams must adhere to the ODFW fish passage design standards. If these new structures are to be located on streams with ESA-listed fish species, the structures also must adhere to NMFS/USFWS design standards.

Clean Water Act

Oregon also has regulations governing removal of or placement of fill in streams and wetlands. These regulations are implemented by the ODSL and the ODFW to protect streams and wetlands (ORS 196.795-990). Oregon regulations as well as federal regulations for removal of or placement of fill in streams and wetlands are described in more detail in Section 3.2.2.2.

Oregon Endangered Species Act

The Oregon ESA of 1987 requires state agencies to develop programs to manage and protect endangered species and to follow guidelines for threatened species. Responsibility for these species falls to the ODFW. Species can be Oregon state listed as endangered or threatened, proposed as endangered or threatened, or a candidate for listing (ORBIC 2010). The ODFW also maintains a sensitive species list, under which species can be designated critical or vulnerable. Critical sensitive species are imperiled with extirpation from a specific geographic area of the state because of small population sizes, habitat loss or degradation, and/or immediate threats. Critical species may decline to the point of qualifying as endangered or threatened if conservation actions are not taken. Vulnerable sensitive species are facing one or more threats to their populations and/or habitats. Vulnerable species

are not currently imperiled with extirpation from a specific geographic area or the state but could become so with continued or increased threats to populations or habitats, or both (ORBIC 2010). The Oregon ESA and implementing regulations limit disturbances to sensitive species and establish penalties for violations. The regulations would affect both the locations and operations of B2H Project facilities.

Oregon Habitat Mitigation Policy

The ODFW's Habitat Mitigation Policy (OAR 635-415-000) requires or recommends mitigation for impacts on or losses of fish and wildlife habitat caused by development projects. Development projects may include, but are not limited to, the planning, construction, and operational activities of local, state, and federal agencies. Priority for mitigation actions shall be given to habitat of native fish and wildlife species. Mitigation can involve habitat restoration, the posting of a bond, mitigation banks, or other means, depending on the habitat category of the affected area.

Oregon Regulation of Riparian Vegetation

Oregon's Forest Practices Act and OAR 629-635 and 629-640 regulate the protection of riparian management areas and streamside vegetation on private lands. The purpose of OAR 629-635 is to protect water while focusing on measures in riparian areas to maintain and improve, where necessary, water quality parameters necessary to provide fish habitat. OAR 629-640-0400 defines specific instructions for retaining vegetation along streams and within riparian management areas. Prior to construction activities, these plans must be developed and reviewed by the state to ensure compliance with riparian protection measures.

3.2.5.3 Issues Identified for Analysis

The following list summarizes the fisheries-related issues that were raised by the public, Native American tribes, or federal and state agencies during scoping, as well as the issues that must be considered as stipulated by laws or regulations.

- Would proposed B2H Project activities result in loss of riparian vegetation that would affect stream temperature, organic input, large woody debris supply, or stream bank stability? Would these changes be temporary or permanent?
- Would there be in-stream sediment increases from road and right-of-way construction and ongoing road runoff that would affect fish?
- Could hazardous substances in runoff, such as oils and herbicides from construction and maintenance-related activities, affect fish?
- Would new stream-crossing activities like culvert installation impede fish passage?
- Could stream-crossing structures impede natural large woody debris, water, or sediment movement?
- What precautions would be taken to prevent invasive aquatic species from being introduced from construction, operations, and maintenance actions? How would stream crossings modify fish habitat? Would adding hard bank structures reduce habitat quality?

- What would be the effects of in-stream construction on fish that may be present in the crossing area?
- Would water withdrawals from streams entrain or impinge fish?
- What effects would blasting near or in streams have on fish?
- Would tribes' access to fish be affected by construction, operation, and/or decommissioning of the B2H Project?
- How would the use of herbicide affect fish species?

3.2.5.4 METHODS

The general study methods used to analyze the impacts of the B2H Project in this EIS are described in Sections 3.1.3 and 2.5.1. This section discusses how the study methods are applied to assess the impacts of the B2H Project on fish.

DATA SOURCES

Initial methods to determine stream areas with fish resources of concern included examining existing literature and analysis of the B2H Project relative to streams crossed or potentially affected. GIS analyses were conducted to determine fish distributions by species and facility intersections with streams. The analyses included obtaining the best available geospatial data on fish distribution (current) and overlaying the B2H Project. Information on fish presence in many streams outside those containing anadromous fish was limited, so assumptions were made concerning where fish likely were present. These assumptions were based on species habitat requirements, known regional distributions, and historic distribution information. Species-specific field surveys were not conducted for this EIS to determine presence, absence, or abundance for any fish species.

Streams crossed by the B2H Project and fish species present in these streams were determined from several sources. The location of the Proposed Action relative to stream locations initially was determined through analysis of the transmission line centerlines and GIS layers. The stream database from the NHD layer was used to determine presence of perennial, intermittent, and ephemeral streams as defined in the NHD. Locations of fish and their life stages primarily were determined through the StreamNet database and ODFW online database; the Oregon Department of Forestry stream database, which classifies streams as fish or non-fish streams; Chinook salmon data from the Confederated Tribes of the Umatilla Indian Reservation (CTUIR); and the IDEQ stream-type designation. Also, GIS data acquisition focused on obtaining the current and potential historical distribution of ESA-listed species, designated critical habitat, and EFH. Information was gathered at the subwatershed level. A subwatershed is defined as a sixth-level HUC (12 digit code).The list of special status fish species was derived by compiling lists of federal endangered, threatened, and candidate species that occur in Oregon and Idaho from the NOAA Fisheries and USFWS; state listed as endangered, threatened, and sensitive species in Oregon, and sensitive USFS and BLM species that occur in Oregon and Idaho. This list was narrowed down to only species that have ranges overlapping the B2H Project area or, for rarer species, those with observation locations and/or suitable habitat within the B2H Project area.

Staff biologists reviewed the developed layers and additional data, and made additions based on stream characteristics and known proximity to fish streams. The fish distribution was then further refined through review by state and federal agency personnel, as well as tribal biologists, who provided additional information about historical and current fish distribution, including lamprey. Federal agency reviewers included Richard Pastor, June Galloway, and Jason Sutter of the BLM and Brad Lovatt of the USFS. State agency reviewers included Tim Bailey and Nigel Seidel of ODFW. Information gained from the agency review was used to further modify and finalize the fish distribution layer.

Analysis Area

In general, the analysis area (study corridor) used for the assessment of fish resources consists of fish-bearing streams crossed by the centerline of all alternative routes and route variations and potential fish-bearing stream segments 1,000 feet downstream and 1,000 feet upstream of all such crossings, as well as approximately 300 feet distance on either side of the stream.

Impact Assessment and Mitigation Planning

Criteria for Assessing Level of Impacts

The criteria used to assess impacts were developed collaboratively with the cooperating agencies to assess the level of potential impacts on fish resources associated with B2H Project implementation and to allow comparison of the alternative routes. Impact criteria were determined with consideration of a species' legal status, regulatory protection, and susceptibility to temporary or permanent disturbances. Table 3-196 summarizes the criteria used to assess impacts on fish resources.

Table 3-196. Criteria for Assessing Intensity of Impacts on Fish Resources

Intensity of Impacts	Description
High	• Mortality of a federally endangered, threatened, or candidate fish species • Mortality of sensitive and other nonlisted fish or permanent displacement from habitat that results in population-level effects • Permanent displacement of federally endangered, threatened, or candidate fish from the habitats on which they depend • Permanent loss of habitat that results in population-wide effects on nonlisted fish • Permanent loss or modification of designated critical or suitable habitat for federally endangered, threatened, or candidate fish • Permanent loss or modification of riparian or aquatic habitat
Moderate	• Impacts that have adverse effects on aquatic species but do not severely limit the long-term sustainability of populations • Permanent loss of suitable habitat for sensitive fish • Mortality of sensitive fish that does not reduce population viability • Disturbance to nonlisted fish during a critical or sensitive period • Permanent displacement of nonlisted fish from important occupied or suitable habitat that does not have population-level effects • Temporary disturbance of sensitive or federally endangered, threatened, candidate, or proposed fish species • Temporary loss or modification of riparian or aquatic habitats that provide value to native fish

Table 3-196. Criteria for Assessing Intensity of Impacts on Fish Resources	
Intensity of Impacts	**Description**
Low	• Impacts that have only minor adverse effects on species and do not limit the long-term sustainability of populations (e.g., indirect effects or impacts in areas of preexisting disturbance) • Loss of suitable habitat for nonlisted species that does not result in population-level effects • Limited or incidental mortality of nonlisted species that does not result in population-level effects • Temporary displacement of nonlisted fish from seasonal habitats • Temporary loss or modification of riparian or aquatic habitat that provide little value to fish

Effects Analysis

Assessment of Initial Impacts

Initial impacts are those effects resulting from the implementation of the B2H Project, with consideration of design features of the B2H Project for environmental protection. These design features would be implemented throughout the B2H Project area and are expected to reduce initial impacts on fish resources. Initial impacts on fish resources were assigned using the criteria for assessing impacts identified in Table 3-196. The design features relevant to fish resources are summarized below.

- ***Design Feature 1 (Plan of Development)***. A POD would be prepared for implementation and maintenance of the B2H Project to provide direction to the Applicant's construction personnel, construction contractors and crews, CIC, environmental monitors, and agency personnel regarding specification of construction and to provide direction to the agencies and Applicant's personnel for operation and maintenance of the B2H Project. The POD would contain implementation plans and detailed mapping to facilitate execution of environmental protection, selective mitigation measures, and conservation measures.

  The implementation plans, prepared based on requirements from land-managing and/or regulatory agencies, would outline the direction for adhering to the requirements during construction, operation, and maintenance of the B2H Project. The plans would contribute to avoiding, minimizing, rectifying, reducing, eliminating, or compensating for effects of the B2H Project on the environment. The plans would be incorporated into the POD, which would be approved by the agencies prior to commencing construction. Execution of the POD would be a condition of the ROD and stipulation for the right-of-way grant and other authorizations.
- ***Design Feature 2 (Environmental Training for All Personnel)***. Prior to construction, the CIC would instruct all personnel on the protection of cultural, paleontological, ecological, and other natural resources such as (a) federal and state laws regarding antiquities, paleontological resources, and plants and wildlife, including collection and removal; (b) the importance of these resources; (c) the purpose and necessity of protecting them; and (d) reporting and procedures for stop work.

  This procedure is mandatory to educate all construction and maintenance personnel on the requirements for environmental protection during construction and for maintenance activities set

forth in the POD, with the intent of avoiding, minimizing, reducing, or eliminating effects on the environment.

- ***Design Feature 4 (Preconstruction Surveys for Sensitive Species)***. Preconstruction surveys for special status species, threatened and endangered species, or other species of particular concern would be considered in accordance with the B2H Biological Survey Work Plan, which was previously approved by the Applicant and the appropriate land-managing or wildlife-management agencies (e.g., BLM, USFWS, state wildlife agencies, etc.). In cases for which such species are identified, appropriate action would be taken to avoid adverse impacts on the species and its habitat. Amendments to the work plan would be made based on the best available science. Surveys for fish species are not anticipated; fish species will be presumed present in all watersheds that agency data indicate presence.

  While the surveys or the results of the surveys are not measures that avoid, reduce, minimize, or eliminate over-time effects on the special status species, the results of the surveys would be used to generate professional recommendations for mitigation and/or conservation measures to protect the species. The resulting mitigation and/or conservation measures would be incorporated into the POD.

- ***Design Feature 5 (Spatial Extent of Construction Activities)***. The spatial limits of construction activities, including vehicle movement, would be predetermined with activity restricted to and confined within those limits. No paint or permanent discoloring agents indicating survey or construction limits would be applied to rocks, vegetation, structures, fences, etc.

  Restricting all construction activities and vehicle movement to the areas granted for right-of-way, easement, and special-use authorization would avoid disturbance outside the area granted. Also, this design feature precludes use of permanent discoloring agents inside or outside the area granted for the B2H Project.

- ***Design Feature 9 (Use of Access Routes Outside of Right-of-Way)***. All vehicle movement outside the right-of-way would be restricted to predesignated access, contractor-acquired access, public roads, overland travel routes, or crossings of streams approved in advance by the applicable land-managing agency or landowner.

  Similar to Design Feature 4, restricting vehicle movement would preclude disturbance outside areas essential for B2H Project-related travel to avoid B2H Project effects outside of the right-of-way.

- ***Design Feature 15 (Reduce Impacts on Riparian Areas)***. Consistent with the BLM and USFS riparian management policies, surface-disturbing activities would be avoided in defined segments of Riparian Conservation Areas[1], using the following delineation criteria, unless exception criteria defined by the BLM are met or with agency approval of acceptable measures

[1]Distances represent default Riparian Conservation Area widths recommended in PACFISH, and are consistent with PACFISH (BLM/USFS 02/24/1995) and INFISH (USFS 07/28/1995) strategies, and the Updated Interior Columbia Basin Strategy – Memorandum Number 1920 (BLM/EPA/USFS/USFWS/NOAA 4/18/2014).

to protect riparian resources and habitats by avoiding or minimizing stormwater runoff, sedimentation, and disturbance of riparian vegetation, habitats, and wildlife species:

- Fish-bearing streams: 300 feet slope distance on either side of the stream, or to the extent of additional delineation criteria, whichever is greatest.
- Perennial non-fish-bearing streams: 150 feet slope distance on either side of the stream, or to the extent of additional delineation criteria, whichever is greatest.
- Ponds, lakes, reservoirs, and wetlands greater than 1 acre: 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs, or from the edge of the wetland, pond or lake, or to the extent of additional delineation criteria, whichever is greatest.
- Intermittent or seasonally flowing streams and wetlands greater than 1 acre: In watersheds that support ESA-listed fish species and/or designated critical habitat, 100 feet slope distance from the edge of the stream channel or wetland to the outer edge of riparian vegetation, whichever is greatest.
- In watersheds that do not have current, documented presence of ESA-listed fish species and/or designated critical habitat, 50 feet slope distance from the edge of the stream channel or wetland to the outer edge of riparian vegetation, whichever is greatest.

Mitigation measures, such as micro-siting road locations, would be developed on a site-specific basis, in consultation and coordination with the BLM and other federal land-managing agencies, and incorporated into the final POD. This would reduce potential for direct and indirect impacts on riparian areas and the vegetation, fish, and wildlife habitats associated with them by avoiding, minimizing, reducing, and/or eliminating over-time modification of these areas through development of site-specific mitigations.

- ***Design Feature 16 (Span Riparian Communities/Water Courses)***. Based on biological resources surveys and results of Section 7 consultation (with USFWS and NMFS), state and federally designated sensitive plants, fisheries, habitat, wetlands, riparian areas, springs, wells, water courses, or rare/slow regenerating vegetation communities would be flagged and structures would be placed to allow spanning of these features, where feasible, within the limits of standard structure design. Surveys for fish species are not anticipated; fish species will be presumed present in all watersheds that agency data indicate presence.

  Spanning riparian communities and/or water courses would avoid, minimize and/or reduce potential for impacts on riparian areas and water courses by siting B2H Project facilities outside of these areas.

- ***Design Feature 17 (Work During Wet Periods)***. If work were required during wet periods with saturated soil conditions, vehicles would not be allowed to travel when soils are moist enough for deep rutting (4 or more inches deep) to occur unless prefabricated equipment pads (matting) were installed over the saturated areas or other measures were implemented to prevent rutting. Equipment with low-ground-pressure tires, wide tracks, or balloon tires would be used when possible.

This would avoid, minimize, and/or reduce potential for impacts on riparian and soil resources by avoiding work in these areas during wet periods and/or by taking measures that would reduce and minimize disturbance of these areas if work in them could not be avoided during wet periods.

- ***Design Feature 18 (Crossing of Dry Washes)***. Crossings of dry washes would be made during dry conditions, when possible. Repeated crossings would be limited to the extent possible but constrained to the same location with appropriate stabilization to reduce erosion potential.

  This would avoid and minimize potential for impacts on water quality and stream structure and function by limiting crossing periods and the frequency of the crossings.

- ***Design Feature 19 (Canal and/or Ditch Crossings)***. Canal and/or ditch crossings would require placement of temporary bridges or improvement of existing crossings.

  This is intended to avoid or minimize damage to water-delivery infrastructure and/or interference with delivery of water.

- ***Design Feature 20 (Reduce Potential for Aquatic Invasive Species)***. Interagency-developed methods of avoidance, inspection, and sanitization as described in the *Operational Guidelines for Aquatic Invasive Species Prevention* and Equipment Cleaning (USFS 2009) would be adhered to. If control of fugitive dust near sensitive waterbodies is necessary, water would be obtained from treated municipal sources or drafted from sources known to contain no aquatic invasive species. Support vehicles, drill rigs, water trucks and drafting equipment would be inspected and sanitized, as needed, following interagency-approved operational guidelines.

  This would avoid, reduce, and/or minimize the potential for spread of aquatic invasive species through adherence with methods to prevent the transport of these invasive species during construction activities associated with the B2H Project.

Mitigation Planning and Effectiveness

In addition to the design features of the B2H Project for environmental protection, selective mitigation measures would be applied where feasible to reduce potential impacts on fish resources or where required to comply with law, regulation, or agency policy. For any alternative route selected, the Applicant would coordinate with the BLM, other land-managing agencies, or private landowners, as appropriate, to refine the implementation of mitigation for fish resources at specific locations. The selective mitigation measures that would be applied to fish resources are summarized below:

- ***Selective Mitigation Measure 1 (Limit Widening of Existing Roads in Areas of Sensitive Soils, Vegetation and/or Stream Crossing)***. In areas where soils, vegetation, and/or streams are sensitive to disturbance, existing roads are to be used for construction access and/or B2H Project maintenance will not, as much as possible/practicable, be widened or otherwise upgraded except in areas needed to make existing roads passable and safe.
- ***Selective Mitigation Measure 2 (Use Existing Access and/or Stream Crossing for Sensitive Resources Avoidance)***. Existing access and/or stream crossings would be used as

much as possible/practicable for construction and maintenance to avoid disturbance of sensitive resources crossed by the B2H Project. Minimizing ground-disturbing construction activities in the vicinity of fish-bearing streams would limit soil disturbance, thereby minimizing the potential for increased erosion and sedimentation. Where applied, this measure is expected to reduce impacts on fish resources by limiting disturbance associated with new access roads.

- ***Selective Mitigation Measure 4 (Minimize Slope Cut and Fill for Access and Work Areas)***. The alignment of new access roads will follow the landform contours where practicable to minimize ground disturbance or reduce scarring (visual contrast), or both, of the landscape. Modification to the size or configuration of the structure work areas, or both, facilitated by minor structure design adjustments (e.g., altering leg length) will be used to minimize cut and fill slopes and blend contours with existing topography. Additionally, soil amendments or mineral emulsions will be applied, or grading techniques, such as slope rounding and slope scarification, will be used to blend road and structure work area cuts into the landscape in areas of steep terrain where grading is necessary, in rocky areas, or where soil color would create strong landscape contrasts.

  Minimizing slope cut and fill reduces ground disturbance and potential habitat fragmentation. Water runoff is less likely to accelerate soil erosion, thus minimizing (1) potential damage from rutting and drilling, which, in turn, protects adjacent vegetation and (2) potential sedimentation into nearby fish-bearing streams.

- ***Selective Mitigation Measure 5 (Minimize Vegetation Clearing for Operational Clearances)***. Removal of vegetation in the right-of-way would be minimized to limit disturbance to timber resources, slow growing vegetation communities, and protect sensitive habitat, subject to structure- and conductor-clearance requirements. Trees and other vegetation would be removed selectively (e.g., edge feathering) to blend the edge of the right-of-way into adjacent vegetation patterns, as practicable and appropriate. Minimizing vegetation clearing also reduces the potential for erosion and potential sedimentation in nearby fish-bearing streams.
- ***Selective Mitigation Measure 8 (Span and/or Avoid Sensitive Features)***. Within the limits of standard tower design, structures will be located to allow conductors to avoid identified sensitive features, such as dwellings/buildings and span sensitive existing land uses, natural features, hazardous substance remediation sites, and cultural resource sites. This could be accomplished through methods such as selective tower placement, spanning sensitive features, or realigning the B2H Project centerline (micro-siting).

  Flexibility in the placement of towers allows sensitive features to be avoided. Realigning the towers along an alternative route or realigning the alternative route (micro-siting), to the extent practicable, can result in avoiding or minimizing direct and indirect impacts on resources (e.g., fish-bearing streams), as well as land uses.

- ***Selective Mitigation Measure 12 (Seasonal and Spatial Fish and Wildlife Restrictions)***. To minimize disturbance to identified fish and wildlife species during sensitive periods, construction, operation, and maintenance activities would be restricted in designated areas unless exceptions

are granted by the Authorized Officer or his/her designated representative and other applicable regulatory agencies (e.g., USFWS, NMFS, state wildlife agencies).

Additional Conservation Measures for Fish and Associated Waterways

Additional measures that would be applied to reduce potential impacts on fish resources and associated waterways are outlined as follows:

Roadway/Stormwater Management

During the construction of access roads, BLM and USFS road construction standards and Oregon Department of Environmental Quality (DEQ) 1200-C permit stormwater and erosion control conservation measures and BMPs will be followed. These include, but are not limited to, the following:

- Road Location
  - Locate temporary and permanent roads and landings on stable locations, e.g., ridge tops, stable benches or flats, and gentle-to-moderate side slopes. Minimize construction on steep slopes, slide areas and high landslide hazard locations.
  - Locate temporary and permanent road construction or improvement to minimize the number of stream crossings.
  - Avoid locating roads and landings in wetlands, RCAs, floodplains and waters of the state. Avoid locating landings in areas that can contribute to dry draws and swales.
  - Locate roads and landings to minimize total transportation system mileage. Renovate or improve existing roads or landings when it would cause less adverse environmental impact. Where roads traverse land in another ownership, investigate options for using those roads before constructing new roads.
- Road Design
  - Design road cut and fill slopes with stable angles, to minimize erosion and prevent slope failure.
  - Construct road fills to prevent fill failure using inorganic material, compaction, buttressing, subsurface drainage, rock facing or other effective means.
  - Design roads crossing low-lying areas so that water does not pond on the upslope side of the road. Provide cross drains at short intervals to ensure free drainage.
- Waterway Crossing
  - Waterways that support ESA-listed fish, or designated as critical habitat, or both will be completely spanned
  - For fish-bearing waterways that do not support ESA-listed fish or waterways that are not designated as critical habitat, use no-fill structures (e.g., portable mats, temporary bridges, or improved hardened crossings) for temporary stream crossings when practicable. When not practicable, design temporary stream crossings with the least amount of fill and construct with coarse material to facilitate removal upon completion (See Design Feature 18).

- Stormwater/Drainage
  - Install underdrain structures when roads cross or expose springs, seeps, or wet areas rather than allowing intercepted water to flow down gradient in ditch lines.
  - Effectively drain the road surface by using crowning, insloping or outsloping, grade reversals (rolling dips) and waterbars or a combination of these methods. Avoid concentrated discharge onto fill slopes unless the fill slopes are stable and erosion proofed.
  - Outslope temporary and permanent low volume roads to provide surface drainage on road gradients up to 6 percent unless there is a traffic hazard from the road shape.
  - Consider using broad-based drainage dips and/or leadoff ditches in lieu of cross drains for low volume roads. Locate these surface water drainage measures where they will not drain into wetlands, floodplains and waters of the state.
  - Avoid use of outside road berms unless designed to protect road fills. If road berms are used, breach to accommodate drainage where fill slopes are stable. A road berm will be used within an RCA only if the berm helps to avoid or minimize impacts on fish habitat.
  - Divert road and landing runoff water away from headwalls, slide areas, high landslide hazard locations or steep erodible fill slopes.
  - Design landings to disperse surface water to vegetated stable areas.
  - Disconnect road runoff to stream channels by outsloping the road approach. If outsloping is not possible, use runoff control, erosion control and sediment containment measures. These may include using additional cross drain culverts, ditch lining, and catchment basins. Minimize ditch flow conveyance to stream through cross drain placement above stream crossing.
  - Locate cross drains to prevent or minimize runoff and sediment conveyance to wetlands, RCAs, floodplains and waters of the state. Implement sediment reduction techniques such as settling basins, brush filters, sediment fences and check dams to prevent or minimize sediment conveyance.
- Sediment/Erosion Control
  - Locate waste disposal areas outside wetlands, RCAs, floodplains and unstable areas to minimize risk of sediment delivery to waters of the state. Apply surface erosion control prior to the wet season. Prevent overloading areas which may become unstable.
  - Phase clearing and grading to the maximum extent practicable to prevent exposed inactive areas from becoming sources of erosion.
  - Preserve existing vegetation and revegetate open areas when practical.
  - Use temporary sediment control measures (e.g., check dams, silt fencing, bark bags, filter strips and mulch) to slow runoff and contain sediment from road construction areas. Remove any accumulated sediment and the control measures when work or haul is complete. When long-term structural sediment control measures are incorporated, remove any accumulated sediment to retain capacity of the control measure.

- Limit road and landing construction, reconstruction, or renovation activities to the dry season. Ensure erosion control measures are properly functioning and that additional erosion control measures are on site to allow for immediate storm-proofing if necessary.
- Apply native seed and certified weed free mulch to cut and fill slopes, ditch lines, and waste disposal sites with the potential for sediment delivery to wetlands, RCAs, floodplains and waters of the state. Apply upon completion of construction and as early as possible to increase germination and growth. Reseed if necessary to accomplish erosion control. Select seed species that are fast growing, and provide ample ground cover and soil-binding properties. Apply mulch that will stay in place and at site-specific rates to prevent erosion.
- Place sediment-trapping materials or structures such as straw bales, jute netting, or sediment basins at the base of newly constructed fill or side slopes where sediment could be transported to waters of the state. Keep materials away from culvert outlets.
- Use biotechnical stabilization and soil bioengineering techniques to control bank erosion (e.g., commercially produced matting and blankets, native live plants or cuttings, dead plant material, rock, or other inert structure).
- Suspend ground-disturbing activity if projected/forecasted rain will saturate soils to the extent that there is potential for movement of sediment from the road to wetlands, floodplains, or waters of the state (See Design Feature 17). Cover or temporarily stabilize exposed soils during work suspension. Upon completion of ground-disturbing activities, immediately stabilize fill material over stream crossing structures. Measures could include but not be limited to erosion control blankets and mats, soil binders, soil tackifiers, or slash placement.
- Wind Erosion/Dust Control – apply water as needed to avoid wind-blown soil.
- When conducting erosion control measures, apply fertilizer in a manner to prevent direct fertilizer entry to wetlands, RCAs, floodplains, or waters of the state.
- Stormproof open resource roads receiving infrequent maintenance to reduce road erosion and reduce the risk of washouts by concentrated water flows. Stormproof temporary roads if retained overwinter.
- At the end of each workday soil stockpiles must be stabilized or covered, or other BMPs must be implemented to prevent discharges to surface waters or conveyance systems leading to surface waters.
- Suspend storm proofing/decommissioning operations and cover or otherwise temporarily stabilize all exposed soil if conditions develop that cause a potential for sediment-laden runoff to enter a wetland, floodplain or waters of the state. Resume operations when conditions allow turbidity standards to be met.
- Remove snow on haul roads in a manner that will protect roads and adjacent resources. Retain a minimum layer (2 to 4 inches) of compacted snow on the road surface. Provide drainage through the snow bank at periodic intervals to allow for snow melt to drain off the road surface.
- Maintain road surface by applying appropriate gradation of aggregate and suitable particle hardness to protect road surfaces from rutting and erosion under active haul activities where runoff drains to wetlands, RCAs, floodplains, or waters of the state.

- BMP Maintenance
  - Establish and promptly implement procedures for maintenance and repair of erosion and sediment control measures.

Staging

- Establish staging areas for storage of vehicles, equipment, and fuels to minimize erosion into or contamination of streams and floodplains.
- Place staging areas 300 feet or more from any natural waterbody or wetland in areas where topography does not restrict such a distance unless Project Engineer determines that topographic restrictions or other site characteristics necessitate the placement of a staging site use closer to the edge of a natural waterbody/wetland.
- For staging areas closer than 300 feet to the edge of a natural waterbody/wetland, sediment and pollution control measures will be put in place before and during staging activities to protect the natural waterbody/wetland. Staging areas closer than 300 feet will be approved by agency biologist before staging occurs.

Solid Waste and Hazardous Materials Management

- Implement the following BMPs when applicable:
  - written spill prevention and response procedures
  - employee training on spill prevention and proper disposal procedures
  - spill kits in all vehicles
  - regular maintenance schedule for vehicles and machinery
  - material delivery and storage controls, training and signage, and covered storage areas for waste and supplies
  - hazardous materials will be stored per state law guidelines (e.g., secondary containment)

Heavy Equipment Use

- Choice of equipment—Heavy equipment will be commensurate with the Project and will be operated in a manner that minimizes adverse effects on the environment (e.g., minimally sized, low-pressure tires, minimal hard turn paths for tracked vehicles, and temporary mats or plates within wet areas or sensitive soils)
- The fueling, cleaning and inspection for petroleum products and invasive weeds will be implemented as follows:
  - Store and fuel equipment in staging areas after daily use.
  - Inspect daily for fluid leaks before leaving the vehicle staging area for operation.

Concrete

- No uncured concrete or form materials will be allowed to enter active stream channels.

Blasting

The following conservation measures/BMPs for blasting will be incorporated into a Project-specific blasting plan that meets all state and federal requirements. No in-water blasting will occur as part of the Project.

- No implosive splicing or subsurface blasting will occur within 300 feet of a perennial waterway or waterway that supports ESA-listed fish or designated critical habitat.
- Subsurface blasting activities will adhere to guidelines similar and/or identical to those set forth in the Endangered Species Act Section 7(a)(2) Formal Consultation for the Sawtooth National Forest's Programmatic Road Maintenance Activities; Upper Salmon River Subbasin HUC 17060201; Custer and Blaine Counties, Idaho (NMFS 2013a) or as determined during this consultation.
  - Table 3-197 shows the proposed minimum setback distances from the habitat of ESA-listed fish for blasting activities.

Table 3-197. Relationship Between Explosive Charge Weight in Substrates and Required Minimum Setback Distances (Feet) from A Waterbody Occupied or Potentially Occupied by ESA-Listed Fish to Avoid Adverse Effects

Substrate	Explosive Charge Weight in Pounds								
	0.5	1	2	5	10	25	100	500	1,000
	Minimum Setback Distances (feet)								
Rock	30	50	80	120	170	270	530	1,180	1,670
Frozen Material	40	50	70	110	160	250	500	1,120	1,580
Stiff Clay, Gravel, Ice	30	40	60	100	140	220	440	990	1,400
Clay Silt, Dense Sand	30	40	50	80	120	180	370	820	1,160
Medium to Dense Sand	20	30	50	70	100	160	320	720	1,020
Medium Organic Clay-Spawning/Rearing	15	20	30	50	70	100	210	460	660
Medium Organic Clay- Incubation	19	27	38	60	85	135	270	600	850
Soft Organic Clay-Spawning/Rearing	15	20	30	40	60	100	190	440	620
Soft Organic Clay- Incubation	19	27	38	60	85	135	270	600	850

Table Note: Described combinations of charge weight and setbacks, by substrate, will produce up to 2 pounds per square inch (psi) hydrostatic overpressure on the swim bladder of fish, or 0.5 inches per second (ips) vibration velocity. Both values are the known thresholds for adverse effects on individual fish (hydrostatic overpressure) and for incubating eggs (vibration velocity) (NMFS 2013a).

- Blasting within the setback distances identified in Table 3-197 will occur within the in-water work windows identified in Table 3-198 as much as practicable. Table 3-198 presents the seasonal restrictions based on Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources (ODFW 2008) for waterways that are crossed/paralleled by the Project and support ESA-listed fish or critical habitat, or both.

Table 3-198. Seasonal Restrictions for Waterways Crossed/Paralleled by the B2H Project and that Support ESA-Listed Fish and/or Critical Habitat	
Waterway	**In-Water Work Period[1]**
Bear Creek	July 1 to October 31
West Birch Creek	July 1 to October 31
California Gulch	July 1 to October 31
East Birch Creek	July 1 to October 31
Dry Creek	July 1 to October 15
Grande Ronde River	July 1 to October 15
Rock Creek	July 1 to October 15
Sheep Creek	July 1 to October 15
Mill Creek	July 1 to October 15
Ladd Creek	July 1 to October 15
Table Note: Oregon guidelines for in-water work are outlined because all the streams that are crossed by the Project which support ESA-listed fish that fall under the jurisdiction of the NOAA Fisheries are located in Oregon.	

- Occurrences in which blasting is necessary outside the in-water work window and within the setback distances provided in Table 3-197 are anticipated to be rare and only to occur under unavoidable circumstances.
  - If blasting is anticipated to exceed protective guidelines, NOAA Fisheries and ODFW will be contacted, and selective mitigation measures will be developed as necessary. Mitigation measures may include ensuring fish are not in the stream near the blasting site and/or in-water monitoring for pressure changes resulting from blasting.
- Additional conservation measures/BMPS that will be incorporated into the Project-specific blasting plan for implementation are as follows:
- Use controlled blasting techniques to minimize loss of material on steep slopes or into wetlands, RCAs, floodplains and waters of the state.
  - Waste material will not be side cast within RCAs.
  - Waste material will be loaded and hauled to appropriate disposal locations.
- Non-explosive or micro-explosive alternatives, such as Betonamit® or an equivalent, will be used where possible to reduce resource impacts.
- All shots should be fired in pre-drilled or dug holes that are small in diameter, shallow, and properly stemmed or back-filled.
- Place sandbags or other fill over loaded holes, over each shot to increase stemming.
- All holes will be individually primed with electric blasting cap or NONEL blasting cap.
- In multiple hole shots:
  - No two-holes side by side will be fired simultaneously.
  - Blasting caps with millisecond delay will be used.
  - At least 50 milliseconds of delay will be used.

- Do not exceed a powder factor of one-half pound of explosives per cubic yard of solid rock. Do not exceed ¼ pound per cubic yard of explosive when air gapping boulders.

Herbicides

- Chemical control of vegetation or noxious weeds will use BLM- or USFS-approved herbicides on all federally, state, or privately owned lands. Table 3-199 lists all herbicides approved for Project use and the lands allowing their use.

Table 3-199. Herbicides Approved for B2H Project Use By Jurisdiction

Herbicide	Bureau of Land Management	U.S. Forest Service	All Others
2,4-D	✓		✓
Aminopyralid	✓		✓
Chlorsulfuron	✓	✓	✓
Clopyralid	✓	✓	✓
Dicamba	✓		✓
Diflufenzopyr + Dicamba	✓		✓
Fluridone	✓		✓
Fluroxypyr	✓		✓
Glyphosate	✓	✓	✓
Hexazinone	✓		✓
Imazapic	✓	✓	✓
Imazapyr	✓	✓	✓
Metsulfuron Methyl	✓	✓	✓
Picloram	✓	✓	✓
Rimsulfuron	✓		✓
Sethoxydim		✓	✓
Sulfometuron Methyl	✓	✓	✓
Triclopyr	✓	✓	✓

The following conservation measures/BMPS for herbicide use are similar and/or identical to those outlined in ARBO II (NMFS 2013b), and will be incorporated into a Project-specific herbicide plan that meets state and federal requirements:

- General Guidance
  - Use herbicides only in an integrated weed or vegetation management context where all treatments are considered and various methods are used individually or in concert to maximize the benefits while reducing the undesirable effects.
  - Carefully consider herbicide impacts on fish, wildlife, non-target native plants, and other resources when making herbicide choices.
  - Treat only the minimum area necessary for effective control. Herbicides may be applied by selective, hand-held, backpack, or broadcast equipment in accordance with state and federal law and only by certified and licensed applicators to specifically target invasive plant species.
  - Herbicide application rates will follow label directions, unless site-specific analysis determines a lower maximum rate is needed to reduce non-target impacts.

  - An herbicide safety/spill response plan is required for all projects to reduce the likelihood of spills, misapplication, reduce potential for unsafe practices, and to take remedial actions in the event of spills. Spill plan contents will follow agency direction.
  - Pesticide applicator report must be completed within 24 hours of application.

- Herbicide Adjuvants – When recommended by the label, an approved aquatic surfactant will be used to improve uptake. The surfactants R-11, Polyethoxylated tallow amine (POEA), and herbicides that contain POEA (e.g., Roundup) will not be used.
- Herbicide Carriers – Herbicide carriers (solvents) are limited to water or specifically labeled vegetable oil.
- Herbicide Mixing – Herbicides will be mixed more than 150 feet from any natural waterbody to minimize the risk of such an accidental discharge. Impervious material will be placed beneath mixing areas in such a manner as to contain any spills associated with mixing/refilling. Spray tanks shall be washed further than 300 feet away from surface water. All hauling and application equipment shall be free from leaks and operating as intended.
- Herbicide Application Methods – Liquid forms of herbicides will be applied as follows:
  - Broadcast spraying using booms mounted on ground-based vehicles (this consultation does not include aerial applications.)
  - Spot spraying with hand held nozzles attached to back pack tanks or vehicles and hand-pumped sprayers to apply herbicide directly onto small patches or individual plants.
  - Hand/selective through wicking and wiping, basal bark, frill (“hack and squirt”), stem injection, or cut-stump.
  - Dyes or colorants, (e.g., Hi-Lite, Dynamark) will be used to assist in treatment assurance and minimize over-spraying within 100 feet of live water.
- Aerial spraying will not occur as part of the Project.
- Minimization of Herbicide Drift and Leaching – Herbicide drift and leaving will be minimized as follows:
  - Do not spray when wind speeds exceed 10 miles per hour to reduce the likelihood of spray/dust drift. Winds of 2 miles per hour or less are indicative of air inversions. The applicator must confirm the absence of an inversion before proceeding with the application whenever the wind speed is 2 miles per hour or less.
  - Be aware of wind directions and potential for herbicides to affect aquatic habitat area downwind.
  - Keep boom or spray as low as possible to reduce wind effects.
  - Avoid or minimize drift by utilizing appropriate equipment and settings (e.g., nozzle selection, adjusting pressure, drift reduction agents, etc.) Select proper application equipment (e.g., spray equipment that produces 200-800 micron diameter droplets [Spray droplets of 100 microns or less are most prone to drift]).
  - Follow herbicide label directions for maximum daytime temperature permitted (some types of herbicide volatilize in hot temperatures).

- Do not spray during periods of adverse weather conditions (snow or rain imminent, fog, etc.) Wind and other weather data will be monitored and reported for all pesticide applicator reports.
- Herbicides shall not be applied when the soil is saturated or when a precipitation event likely to produce direct runoff to fish-bearing waters from a treated site is forecasted by NOAA National Weather Service or other similar forecasting service within 48 hours following application. Soil-activated herbicides can be applied as long as label is followed. Do not conduct any applications during periods of heavy rainfall.

- Herbicide buffer distances – The following no-application buffers – which are measured in feet and are based on herbicide formula, stream type, and application – will be observed during herbicide applications (Table 3-200). Herbicide applications based on a combination of approved herbicides will use the most conservative buffer for any herbicide included. Buffer widths are measured as map distance perpendicular to the bankfull for streams, the upland boundary for wetlands, or the upper bank for roadside ditches.

Table 3-200. No-Application Buffer Widths for Herbicide Application, by Stream Types and Application Methods

Herbicides	Perennial Streams and Wetlands and Intermittent Streams and Roadside Ditches with Flowing or Standing Water Present			Dry Intermittent Streams, Dry Intermittent Wetlands, and Dry Roadside Ditches		
	Broadcast Spraying	Spot Spraying	Hand Selective	Broadcast Spraying	Spot Spraying	Hand Selective
Labeled for Aquatic Use						
Aquatic Glyphosate	100	waterline	waterline	50	0	0
Aquatic Imazapyr	100	waterline	waterline	50	0	0
Aquatic Triclopyr-TEA	not allowed	15	waterline	not allowed	0	0
Aquatic 2,4-D (amine)	100	waterline	waterline	50	0	0
Low Risk to Aquatic Organisms						
Aminopyralid	100	waterline	waterline	50	0	0
Dicamba	100	15	15	50	0	0
Dicamba+diflufenzopyr	100	12	12	50	0	0
Imazapic	100	15	bankfull elevation	50	0	0
Clopyralid	100	15	bankfull elevation	50	0	0
Metsulfuron-methyl	100	15	bankfull elevation	50	0	0
Moderate Risk to Aquatic Organisms						
Imazapyr	100	50	bankfull elevation	50	15	bankfull elevation
Sulfometuron-methyl	100	50	5	50	15	bankfull elevation
Chlorsulfuron	100	50	bankfull elevation	50	15	bankfull elevation

Table 3-200. No-Application Buffer Widths for Herbicide Application, by Stream Types and Application Methods						
Herbicides	Perennial Streams and Wetlands and Intermittent Streams and Roadside Ditches with Flowing or Standing Water Present			Dry Intermittent Streams, Dry Intermittent Wetlands, and Dry Roadside Ditches		
	Broadcast Spraying	Spot Spraying	Hand Selective	Broadcast Spraying	Spot Spraying	Hand Selective
High Risk to Aquatic Organisms						
Triclopyr-BEE	Not Allowed	150	150	not allowed	150	150
Picloram	100	50	50	100	50	50
Sethoxydim	100	50	50	100	50	50
2,4-D (ester)	100	50	50	100	50	50
Table Source: ARBO II (NMFS 2013b)						

- Not included in the table are Fluridone, Fluroxypyr, Hexazinone, and Rimsulfuron.
  - Fluridone is an aquatic herbicide. Herbicides will not be used in-water (aquatic plants will not be removed) as part of the Project. Therefore, Fluridone will not be used within watersheds that support ESA-listed fish or critical habitat.
  - Registered use of Fluroxypyr, Hexazinone, and Rimsulfuron is not appropriate in riparian and aquatic habitats, they are only approved for terrestrial habitats. Therefore, these three herbicides will not be used within 300 feet of a waterway regardless of application method.
- The following will not occur as part of the Project:
  - Herbicides will not be used in-water (aquatic plants will not be removed)
  - Aerial spraying will not occur

Drilling (Geotechnical Investigations)

- Drilling will not occur within waterways or RCAs
- Water used for drilling will be procured from existing municipal sources
- Drill recovery/recycling pits, and any associated waste or spoils will be completely isolated from surface waters, off-channel habitats, and wetlands.
- All waste or spoils will be covered if precipitation is falling or imminent.
- All drilling equipment, drill recovery and recycling pits, and any waste or spoil produced, will be contained and then completely recovered and recycled or disposed of as necessary to prevent entry into any waterway.
  - Note - It is anticipated that only a minor amount of water will be used during drilling because the bore holes are anticipated to be shallow. At this scale, the drilling fluids are minimal and generally absorbed by soil to create a cake around the drill hole. A minor amount of water sometimes occurs at the surface but there is generally not enough to collect.

- If a drill boring case breaks and drilling fluid or waste is visible in water or a wetland, make all possible efforts to contain the waste and contact ODFW and NMFS/USFWS within 48 hours.

Residual Impacts

Residual impacts are the impacts on resources anticipated to occur from B2H Project activities after the application of selective mitigation measures described in the Mitigation Planning and Effectiveness section. The application of selective mitigation measures is anticipated to reduce the level of residual impacts associated with B2H Project construction and maintenance from the initial levels. The level of anticipated residual impacts on fish resources was assessed using the criteria presented in Table 3-196. Table 3-201 summarizes the level of anticipated initial and residual impacts on fish resources, as well as the relevant design features and selective mitigation measures.

Table 3-201. Summary of Initial Impacts and Residual Impact Levels for Fish Resources

Resource	Design Features of the B2H Project for Environmental Protection	Initial Impact	Selective Mitigation Measure	Residual Impact
Bull trout critical habitat	1, 2, 4, 5, 9, 15, 16, 17, 18, 19, 20	High	1, 2, 4, 5, 8, 12	Moderate
Snake river spring/summer-run Chinook critical habitat	1, 2, 4, 5, 9, 15, 16, 17, 18, 19, 20	High	1, 2, 4, 5, 8, 12	Moderate
Middle Columbia River steelhead critical habitat	1, 2, 4, 5, 9, 15, 16, 17, 18, 19, 20	High	1, 2, 4, 5, 8, 12	Moderate
Snake River steelhead critical habitat	1, 2, 4, 5, 9, 15, 16, 17, 18, 19, 20	High	1, 2, 4, 5, 8, 12	Moderate
Redband trout occupied streams	1, 2, 4, 5, 9, 15, 16, 17, 18, 19, 20	Moderate	1, 2, 4, 5, 8, 12	Low
Coho essential fish habitat	1, 2, 4, 5, 9, 15, 16, 17, 18, 19, 20	High	1, 2, 4, 5, 8, 12	Moderate
Chinook essential fish habitat	1, 2, 4, 5, 9, 15, 16, 17, 18, 19, 20	High	1, 2, 4, 5, 8, 12	Moderate

Additional Analysis

In addition to the assessment of residual impacts on fish resources, the extent of disturbance to fish resources was estimated based on the B2H Project description. Prior to final engineering design, the location of B2H Project features such as new access roads, upgrades to existing roads, overland access, transmission line structures, or other B2H Project facilities, are not identified. The total extent of disturbance (in acres) due to construction of features such as the access network (construction of new roads, upgrades to existing roads, overland access travel), transmission line structures, and other B2H Project facilities was estimated over the entire length of an alternative route using the access model developed for the B2H Project and the Applicant's B2H Project description (refer to Chapter 2). Disturbance associated with the construction of the B2H Project was assumed to occur at a constant density per mile of transmission line, and was calculated for each alternative route based on the total estimated disturbance and total length of each alternative route. The estimated density of disturbance (in acres per mile) for each alternative route was used to calculate the extent of disturbance on vegetation communities (in acres) in RCAs with fish resources crossed by an alternative route.

B2H Project impacts on water resources were considered using revised geospatial mapping data compiled from several different sources and a visual review with updated aerial imagery. The specific datasets and compilation methods are described in greater detail in Section 3.2.5.4.

This information guided qualitative discussions assessing B2H Project impacts on fish resources using the criteria presented in Table 3-196.

3.2.5.5 Affected Environment

The B2H Project crosses eleven 4th-level HUC subbasins which are considered to have either anadromous or resident fish populations. General effects on fish are discussed at the subbasin level (4th level HUC); effects on special status fish, EFH and critical habitat are discussed at the subwatershed level (6th level HUC). The following subbasins are crossed by the proposed B2H Project:

- Middle Columbia-Lake Wallula subbasin (HUC 17070101 in the in the Middle Columbia River Basin)
- Willow subbasin (HUC 17070104 in the Middle Columbia River Basin)
- Umatilla subbasin (HUC 17070103, Middle Columbia River Basin)
- Upper Grande Ronde subbasin (HUC 17060104, Lower Snake River Basin)
- Powder subbasin (HUC 17050203, Middle Snake River Basin)
- Burnt subbasin (HUC 17050202, Middle Snake River Basin)
- Brownlee Reservoir subbasin (HUC 17050201, Middle Snake River Basin)
- Willow subbasin (HUC 17050119, Middle Snake River Basin)
- Lower Malheur subbasin (HUC 17050117, Middle Snake River Basin)
- Lower Owyhee subbasin (HUC 17050110, Middle Snake River Basin)
- Middle Snake-Succor subbasin (HUC 17050103 in the Middle Snake River Basin)

The six B2H segments roughly correspond with hydrologic basin boundaries in the B2H Project area.

The fish species and habitat in the study corridor are primarily coldwater resident and anadromous species; however some areas do support native warm-water fish species. Many of the species of major interest provide important commercial, tribal, and recreational fishery resources in the northwest. Fish habitat quality varies by location, orientation, geographic land form, vegetation, and past and current land uses. Shoreline/bank vegetation, particularly large trees in the riparian areas, helps moderate temperature and supply input of organic debris in the form of leaves, terrestrial insects, and large woody debris.

Anadromous Fish

Anadromous fish spawn in freshwater, rear for varied periods, and then migrate as juveniles to the ocean before returning as adults to freshwater streams, rivers, and lakes to spawn. Three species of anadromous salmonids are present in the study corridor, including Chinook salmon, coho salmon, and steelhead. Varied races of these species are assumed to be in the study corridor, including Snake River spring/summer-run Chinook salmon, Middle Columbia River summer steelhead and Snake River

Basin summer steelhead, depending on the river system. Pacific lamprey also may be present within the study corridor.

Resident Fish

Resident fish complete their life cycle entirely in the freshwater system. The native subspecies of rainbow trout (*O. mykiss*) is known within the study corridor as inland Columbia Basin redband trout. Bull trout, a native char species, also is present in part of the B2H Project area. Mountain whitefish (*Prosopium williamsoni*) is another native salmonid present in cold water systems and may be present in some of larger cold water systems in the B2H Project area. Other common fish species present in many of the streams in the study corridor include suckers (*Catostomus* spp.), northern pikeminnow (*Ptychocheilus oregonensis*), peamouth (*Mylocheilus caurinus*), redside shiner (*Richardsonius balteatus*), daces (*Rhinichthys* spp.), and sculpins (*Cottus* spp.)

Special Status Fish

Special status species addressed in this section include fish species that are:

- Listed as threatened or endangered, proposed for listing, or identified as a candidate for listing by the USFWS or NOAA Fisheries under the Federal ESA.
- Listed as threatened or endangered, proposed for listing, or identified as a candidate for listing by the Oregon under the Oregon ESA of 1987 (Sections 496.171–496.170).
- Listed by the BLM or USFS as a sensitive species or a USFS MIS.
- Listed as a species of concern by the USFWS or NOAA Fisheries under the Federal ESA, or as a sensitive species by Oregon.
- Listed as a commercial salmon species under the MSA.

Based on an assessment of known species distributions and habitats in the study corridor, 10 special status species, including four ESA-listed as threatened fish species, (as well as associated critical habitat) have the potential to occur in the study corridor. The ESA-listed fish that have the potential to occur in the B2H Project area include:

- Middle Columbia River Distinct Population Segment (DPS) steelhead
- Snake River Basin DPS steelhead
- Snake River Evolutionarily Significant Unit (ESU) spring/summer-run Chinook salmon
- Columbia River DPS bull trout

Fall-run Chinook salmon occurs in the Snake River Basin, however neither the Applicant's Proposed Action Alternative nor any of the alternative routes crosses any streams with suitable habitat or designated critical habitat for this species. Special status fish species in the B2H Project area are listed in Table 3-202 and are briefly summarized below.

Table 3-202. Special Status and Management Indicator Fish Species in the Study Corridor

Common Name	Scientific Name	Relevant Laws, Regulations, and Policies	Federal and State Status	Habitat Status
Middle Columbia River steelhead[1]	*Oncorhynchus mykiss*	ESA, CH, BLM, USFS, MIS, ODFW	F (T), S (C)	CH (PCEs for spawning, rearing, migration), ESH (all habitat types)
Snake River Basin steelhead[1,2]	*Oncorhynchus mykiss*	ESA, CH, BLM, USFS, MIS, ODFW	F (T), S (V)	CH (PCEs for spawning, rearing, migration), ESH (all habitat types)
Snake River Chinook spring/summer-run	*Oncorhynchus tshawytscha*	ESA, CH, MSA-EFH, BLM, USFS, ODFW	F (T), O (T)	EFH (rearing, migration), ESH (all habitat types)
Bull trout	*Salvelinus confluentus*	ESA, CH, BLM, USFS, ODFW	F (T), S (C)	CH (PCE for migration)
Coho salmon	*Oncorhynchus kisutch*	MSA-EFH	Not applicable	EFH (rearing, migration), ESH (all habitat types)
Redband trout	*Oncorhynchus mykiss gairdneri*	SOC, BLM, USFS, MIS, ODFW	S (V)	Not applicable
Rainbow trout	*Oncorhynchus mykiss*	MIS	Not applicable	Not applicable
Pacific lamprey	*Entosphenus tridentatus*	SOC, ODFW; USFS	F (SOC), S (V)	Not applicable
Western brook lamprey	*Lampetra richardsoni*	ODFW	S (V)	Not applicable

Table Notes:

[1]Only summer-run occurs within the study corridor.

[2]This information is based on modeling of potential habitat for Snake River Basin steelhead in Segment 3. Steelhead do not currently occupy any of the Powder River subbasin or other areas in Segment 3. This subspecies was historically sympatric with redband trout in these tributary areas of the Snake River, but the anadromous life history form was extirpated by construction of the Hells Canyon Dam Complex.

BLM = Bureau of Land Management

CH = critical habitat

EFH = Essential Fish Habitat

ESA =Endangered Species Act

F (T) = federally threatened

MIS = management indicator species

MSA = Magnuson-Stevens Act

ODFW = Oregon Department of Fish and Wildlife

PCE = primary constituent element

S (C)= critical sensitive species

S (V) = vulnerable sensitive species

SOC = species of concern

USFS = U.S. Forest Service

Fish Species Description and Status

Umatilla River Subbasin (Segment 1)

Middle Columbia River Summer Steelhead (*Oncorhynchus mykiss*)

The Middle Columbia River (MCR) steelhead DPS was first listed as threatened under the ESA on March 25, 1999 (64 FR 14517). After a status review by NOAA Fisheries, the DPS was again listed as threatened on January 5, 2006 (71 FR 834) and updated (no change in status occurred) on April 14, 2014 (79 FR 20802). Critical habitat encompasses all river reaches, including estuarine areas, adjacent riparian zones, and tributaries within the range of this DPS as designated on September 2, 2005 (70 FR 52630).

This DPS includes all naturally spawned steelhead populations below natural and artificial impassable barriers in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to and including the Yakima River, Washington, and progeny of seven artificial propagation programs. This DPS excludes steelhead from the Snake River Basin (NMFS 2016a).

Currently, 17 extant populations occur within this DPS. The populations fall into four major population groups (NMFS 2014):

- Yakima River Basin (four extant populations)
- Umatilla/Walla Walla drainages (three extant and one extirpated populations)
- John Day River drainage (five extant populations)
- Cascades Eastern Slope Tributaries (five extant and two extirpated populations)

Of the four major population groups, the Umatilla/Walla Walla drainages group falls within the B2H Project area.

MCR summer steelhead adults return to the Columbia River from March through October after having spent from one to three years in the ocean. Adults spawn from January to June in the year following their entry into freshwater. Juvenile summer steelhead will smolt and migrate to the ocean in May and June. Most wild summer steelhead migrate to the ocean at age 2, while most hatchery smolts migrate at age 1. In contrast, winter steelhead return to the Columbia River from November through April after having spent two years in the ocean. Adults spawn from December through June. Juvenile winter steelhead smolt and migrate to the ocean in May and June. Wild winter steelhead juveniles spend two or three years rearing in freshwater, while hatchery juveniles spend only one year rearing in freshwater (Northwest Power and Conservation Council [NPCC] 2004a).

MCR summer steelhead are found in the Umatilla River subbasin and occasionally in the Willow Creek subbasin. Umatilla River origin summer steelhead adults typically enter the Columbia River from the Pacific Ocean in June through August of the year before spawning. Entry into the Umatilla River begins in August, peaks in March and is mostly complete by May 1 (NPCC 2004a). Spawning in the Umatilla River and tributary streams usually occurs from mid-February to early June with peak spawning in early to mid-April. Juvenile steelhead emerge from redds in late April through early July, and most rear

through two winter seasons before migrating as smolts from the Umatilla River into the Columbia River (NPCC 2004a).

Current major production areas of MCR summer steelhead in the Umatilla subbasin include Birch Creek and its tributaries, and Meacham Creek and its tributaries. Historically, Butter Creek and McKay Creek upstream of McKay Reservoir also may have supported MCR steelhead populations. Adult steelhead also are occasionally found in Willow Creek, and a population of resident redband trout is found there. Willow Creek and its tributaries may have historically had a population of steelhead (NPCC 2004a).

The B2H Project would cross the several waterways which support MCR steelhead in the Umatilla subbasin. Critical habitat for MCR steelhead is designated in the areas of these streams that would be crossed by the Project route (MV-11).

Chinook Salmon (*Oncorhynchus tshawytscha*)

The following information is excerpted from the NPCC subbasin plan for the Umatilla River/Willow Creek subbasin (NPCC 2004a). The endemic spring Chinook population went extinct in the Umatilla/Willow subbasin in the early 1900s. In 1986, spring Chinook salmon were re-introduced into the subbasin. These fish were from Carson Hatchery stock which is a mixture of upriver spring Chinook races that spawn above Bonneville Dam. This stock enters the Columbia River from the ocean from February through April. Entry into the Umatilla River begins in late March, peaks in May, and is mostly complete by the end of June (NPCC 2004a). The majority (approximately 75 percent) of A-run enters the Umatilla River in May. Little is known of historical spring Chinook salmon distribution in the Umatilla River subbasin. However, oral testimony from tribal members and immigrants indicates that the North Fork Umatilla, McKay Creek above the reservoir, and the North Fork of Meacham Creek once had harvestable levels of spring Chinook salmon (NPCC 2004a). In addition, spawning occurred in the mainstem from the forks (RM 89.5) to the confluence of McKay Creek (RM 50.5) and in McKay, Birch, and Butter creeks (NPCC 2004a). Spring Chinook salmon may currently utilize the lower reach of Birch Creek for rearing and migration (MV-11). A portion of Lower Birch Creek is designated as EFH for Chinook salmon; however, this portion of the creek is outside of the effects analysis for the B2H Project. The Umatilla River within the analysis area is designated as EFH for Chinook salmon.

Coho Salmon (*Oncorhynchus kisutch*)

The following information is excerpted from the NPCC subbasin plan for the Umatilla River/Willow Creek subbasin (NPCC 2004a). As with Chinook salmon, coho went extinct in the Umatilla/Willow subbasin early in the twentieth century. From 1966 to 1969 and then starting again in 1987 hatchery reared coho smolts have been introduced into the Umatilla River. These smolts are from Tanner Creek (lower Columbia River) stock. Adult coho salmon returning to the Umatilla River typically enter the river from mid-September through mid-December (Contor et al. 1997; NPCC 2004a). Most returns are adults but three year olds (jacks) are common and have averaged about 9 percent of the total returns since 1988. Spawning has been observed in late October and throughout November and December with a few observations made in January (NPCC 2004a).

Coho emerge from the gravel in February, March or April depending on the location of the redds in the winter and the associated water temperature and spawn time. Most juvenile coho rear one summer and one winter in the Umatilla before migrating to the Columbia River in April and May. The current distribution of coho salmon is limited to the Umatilla River subbasin; coho are not found in the Willow Creek subbasin (NPCC 2004a). According to StreamNet data, the mainstem Umatilla River within the analysis area and the mainstem of Birch Creek downstream of Pilot Rock is currently utilized by coho salmon for spawning and rearing (StreamNet 2016). Amendment 18 of the Pacific Coast Salmon Plan (PFMC and NMFS 2014) designated EFH under the MSA for coho salmon within portions of the Umatilla River and Birch Creek, including within the analysis area (MV-11).

Upper Grande Ronde River Subbasin (Segments 1 and 2)

Snake River Basin Steelhead (*Oncorhynchus mykiss*)

The SRB steelhead DPS was first listed as threatened on August 18, 1997 (62 FR 43937). After a status review, the DPS was reaffirmed as threatened on January 5, 2006 (71 FR 834) and again updated (no change in status occurred) on April 14, 2014 (79 FR 20802). The DPS includes all naturally spawning populations of A-run and B-run steelhead originating below natural and manmade impassable barriers in the Snake River and its tributaries. Critical habitat encompasses all river reaches, including estuarine areas, adjacent riparian zones, and tributaries within the range of this DPS as designated on September 2, 2005 (70 FR 52630).

The SRB DPS historically supported more than 55 percent of total steelhead production in the Columbia River Basin and continues to produce a large percentage. SRB steelhead spawn and rear in all tributaries used by Snake River Chinook salmon as well as many additional smaller tributaries (BLM and USFS 2013).

The Interior Columbia Technical Recovery Team (ICTRT) has identified 24 extant populations within this DPS, organized into six major population groups. The six groups include the following (NMFS 2016b):

- Lower Snake River (two extant populations)
- Grande Ronde River (four extant populations)
- Clearwater River (five extant populations)
- Salmon River (twelve extant populations)
- Imnaha River (one extant population)

The ICTRT also identified a number of potential historical populations associated with watersheds above the Hells Canyon Dam complex on the mainstem Snake River, a barrier to anadromous migration (NMFS 2014).

Of the six major population groups, the Grande Ronde River groups fall in the proposed B2H Project area.

Adult SRB steelhead return to mainstem rivers from late summer through fall, where they hold in larger rivers for several months before moving upstream into smaller tributaries. Adult dispersal toward spawning areas varies with elevation, with the majority of adults dispersing into tributaries from March through May, with earlier dispersal at lower elevations and later dispersal at higher elevations. Spawning begins shortly after fish reach spawning areas, typically during a rising hydrograph but prior to peak flows. Steelhead, typically, select spawning areas at the downstream end of pools, in gravels ranging in size from 0.5 to 4.5 inches in diameter. Juveniles emerge from redds in 4 to 8 weeks, depending on temperature. After emergence, fry have poor swimming ability and initially move from the redds into shallow, low-velocity areas in side channels and along channel margins to escape high velocities and predators; the young fish progressively move toward deeper water as they grow in size. Juveniles typically reside in fresh water for 2 to 3 years or longer depending on water temperature and growth rate. Smolts in the Snake River Basin migrate downstream during spring runoff, from March to mid-June depending on elevation (BLM and USFS 2013).

SRB steelhead exhibit two distinct morphological forms, identified as A-run and B-run fish, which are distinguished by differences in body size, run timing, and length of ocean residence. B- run fish predominantly reside in the ocean for 2 years, while A-run fish typically spend only 1 year in the ocean. As a result of this difference, B-run steelhead are typically larger than A-run steelhead. The smaller size of A-run adults allows them to spawn in smaller headwater streams and tributaries. The differences between the two fish stocks represent an important component of phenotypic and genetic diversity of the SRB steelhead DPS, exhibited through the asynchronous timing of ocean residence, segregation of spawning by stream size, and possible differences in the habitats the fish use in the ocean (BLM and USFS 2013).

SRB summer steelhead and designated critical habitat occur in several streams crossed by the B2H Project in the Upper Grande Ronde River subbasin in Segment 2 (MV-11).

Snake River Spring Chinook Salmon (*Oncorhynchus tshawytscha*)

The SR spring/summer-run Chinook salmon ESU was first listed as threatened on April 22, 1992 (57 FR 14653), and after a status review was again listed as threatened on June 28, 2005 (70 FR 37160) and updated (no change in status occurred) April 14, 2014 (79 FR 20802). Critical habitat encompasses all river reaches, including estuarine areas, adjacent riparian zones, and tributaries within the range of this ESU as designated on October 25, 1999 (64 FR 57399).

This ESU includes all naturally spawned populations of spring/summer-run Chinook salmon in the mainstem Snake River and the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins; and progeny of 15 artificial propagation programs (NMFS 2014).

The ICTRT currently believes there are 28 extant and four extirpated populations of SR spring/summer-run Chinook salmon. SR spring/summer-run Chinook salmon are divided into the following major population groups (NMFS 2016b):

- Lower Snake River (one extant and one extirpated population)
- Grande Ronde and Imnaha Rivers (six extant and two extirpated populations)
- South Fork Salmon River (four extant populations)
- Middle Fork Salmon River (nine extant populations)
- Upper Mainstem Salmon River (eight extant and one extirpated population)

Each of these populations faces a “high” risk of extinction. Although recent natural spawning abundance estimates have increased, all populations remain below minimum natural origin abundance thresholds (NMFS 2014).

Of the five major population groups, the Grande Ronde/Imnaha River groups fall within the proposed B2H Project area.

Adult SR spring/summer Chinook salmon enter the Columbia River on their upstream spawning migration from February through March and arrive at their natal tributaries from June through August. Spawning occurs in August and September. Juveniles exhibit a river-type life history strategy, rearing in their natal streams during their first summer of life before beginning their migration to the ocean the following spring. After reaching the ocean as smolts, the fish typically rear 2 to 3 years in the ocean before beginning their migration back to freshwater (BLM and USFS 2013).

In the Upper Grande Ronde River subbasin (Segment 2), the B2H Project would cross occupied Snake River spring/summer Chinook salmon habitat in the mainstem Grande Ronde River and Rock Creek. ESA-listed Snake River Chinook salmon have been observed within the lower four miles of Rock Creek during surveys in 2015 conducted by CTUIR and the Columbia River Intertribal Fisheries Commission (Pers. Comm. Les Naylor, CTUIR, August and September 2015).

Critical habitat also is designated for this ESU in the same areas.

Coho Salmon (*Oncorhynchus kisutch*)

Coho salmon were extirpated from the Grande Ronde subbasin in the 1980s (NPCC 2004b). However, because of historical use by coho salmon within the subbasin, current use by Chinook salmon, and potential passage into the subbasin above downstream dams, Amendment 18 of the Pacific Coast Salmon Plan (PFMC and NMFS 2014) designated EFH under the MSA for coho salmon within portions of the Grande Ronde River Subbasin.

The B2H Project crosses the Grande Ronde River and Rock Creek, located within the Upper Grande Ronde River subbasin, which are designated as coho salmon EFH. Coho salmon EFH mapping is incomplete in the B2H Project analysis area; therefore, Chinook salmon EFH is used as the surrogate for the EFH resource inventory.

Umatilla River, Upper Grande Ronde River, and Powder River Subbasins (Segments 1, 2, and 3)

Columbia River Basin Bull Trout (*Salvelinus confluentus*)

The following information is excerpted from the Biological Assessment for programmatic actions by the BLM and the USFS within the Blue Mountains region of Oregon and Washington (BLM and USFS 2013). The CR DPS of bull trout was listed as a threatened species on June 10, 1998 (63 FR 31647). The final rule to designate critical habitat for bull trout was published in the *Federal Register* October 18, 2010 (50 CFR Part 17).

Bull trout historically occurred in major river drainages in the Pacific Northwest from about 41°N to 60°N latitude, from the southern limits in the McCloud River in northern California and the Jarbidge River in Nevada, north to the headwaters of the Yukon River in the Northwest Territories, Canada. Bull trout exhibit both resident and migratory life-history strategies through much of their current range. These include anadromous (migratory between salt and fresh water), resident, adfluvial (lake-dwelling), and fluvial (migratory stream- and river-dwelling) populations. Resident bull trout complete their life cycles in the tributary streams in which they spawn and rear. Migratory bull trout spawn in tributary streams, and juvenile fish rear from 1 to 4 years before migrating to a lake, river, or saltwater to mature.

Bull trout are most often associated with undisturbed habitat characterized by diverse cover and structure (e.g., LWD, undercut banks, boulders, and pools). Maintaining bull trout populations requires stream channel and flow stability. Bull trout appear to have more specific habitat requirements than other salmonids, which limits their spawning to cold, clean, generally pristine streams, often within headwater reaches. Bull trout do not reach breeding maturity until 3 to 5 years of age at lengths of approximately 250 millimeters or larger. Large bull trout typically inhabit pools containing concentrations of woody debris. Very few bull trout inhabit areas without some wood component (Buchanan et al. 1997). Spawning usually occurs during September and October in headwater streams when water temperatures are below 50°F. Depending on water temperature, incubation is normally 100 to 145 days, with eggs remaining in spawning gravels up to six inches (in) deep until spring, when the fry emerge. Water temperatures above 59°F are thought to limit bull trout distribution.

ESA-listed CR bull trout are present within the first two segments of the B2H Project area. Bull trout are also present within Segment 3; however, they are not present within the B2H Project analysis area. Within these three segments bull trout are present within the following subbasins:

- Segment 1 – Umatilla/Willow Subbasin
- Segment 2 – Upper Grande Ronde Subbasin
- Segment 3 – Powder River Subbasin

Also, the B2H Project area is located within the geographic regions associated with the 2015 USFWS Mid-Columbia Recovery Unit Implementation Plan for Bull Trout. Within these geographic regions, the Mid-Columbia Recovery Unit comprises 24 core areas, three of which, Umatilla, Upper Grande Ronde, and Powder River, are located within the B2H Project area.

Because of poor water quality conditions in much of the Umatilla subbasin, bull trout are isolated in the headwaters of the Umatilla River and Meacham Creek. However, bull trout have been found to use the mainstem of the Umatilla River for migration. It appears that spawning and rearing is restricted to the North and South Forks of the Umatilla River and the North Fork Meacham Creek. While bull trout have been documented in other streams within the subbasin such as the North Fork of Meacham Creek, South Fork Umatilla River, lower McKay Creek, Iskuulpa Creek and Ryan Creek, little abundance data exist for these streams (NPCC 2004a).

Within the Grande Ronde River subbasin, bull trout currently spawn and rear in the Upper Grande Ronde River and tributary streams of the upper river where critical habitat also is designated (USFWS 2010). These stream reaches are located upstream of the area where the Proposed Action would cross the Grande Ronde River. However, bull trout can migrate in the mainstem river through the area of the Project where critical habitat also is designated for migration.

Within the Powder River subbasin, bull trout are currently restricted to the headwater areas of Lake Creek, upper Powder River (Silver Creek and Little Cracker Creek), Rock Creek, Big Muddy Creek, Salmon Creek, Pine Creek, N. Powder River, Anthony Creek, Indian Creek, and Wolf Creek. Bull trout are suspected to be in Eagle Creek (NPCC 2004b). Critical habitat for bull trout is designated in some of these streams, including the Powder River from the confluence of Wolf Creek to the confluence of North Powder River, North Powder River, and Wolf Creek above the confluence with the Powder River (USFWS 2010). The B2H Project would not cross any stream reaches designated as critical habitat for bull trout within the Powder River subbasin.

At the time of initial listing as a threatened species, bull trout were estimated to have been extirpated from approximately 60 percent of their historical range. Reasons for bull trout decline include: habitat loss and fragmentation, interaction with nonnative species, poor water quality, and fish passage issues (USFWS 2015). The 2015 USFWS Bull Trout Recovery Plan outlines conservation actions needed to boost populations in six recovery units. Two of the recovery units, the Mid-Columbia Recovery Unit and the Upper Snake Recovery Unit, are located in the B2H Project area.

The only waterways crossed by the B2H Project that support bull trout and are designated as critical habitat are the Umatilla River and Grande Ronde River. It is anticipated that waterways occupied by bull trout would be spanned; therefore, the B2H Project would not impact bull trout recovery efforts.

Pacific Lamprey (*Entosphenus tridentatus*)

The Pacific lamprey (*Entosphenus tridentatus*, formerly *Lampetra tridentata*) is an anadromous and parasitic fish. Pacific lamprey were historically widespread along the West Coast of North America; however, their abundance is declining and their distribution is contracting throughout their historical range (USFWS 2012).

Pacific lamprey are jawless fishes which lack paired fins, vertebrae, or a swim bladder and possess an elongated, cylindrical body and suctorial disk mouth. Adult Pacific lamprey cannot jump, but can pull themselves over obstacles if the surface is wetted and they are able to get a complete seal with their suctorial disk.

Pacific Lamprey spend between 6 months to 3.5 years in the marine environment before returning to freshwater during spring and summer months. They spend approximately 1 year in freshwater habitat before spawning. Spawning generally occurs between March and July in gravel bottom streams. Suitable habitat for ammocoetes consists of low-velocity pools and stream margins with a dominant substrate of fine silt, sand, or small gravels. Ammocoetes are mostly sedentary, remaining burrowed in the stream substrate for 3 to 7 years, filter feeding on algae, diatoms, and detritus. Out-migration to the marine environment generally occurs with rising stream and river flows in late winter or early spring (USFWS 2010).

Pacific lamprey distribution has been divided into ten Regional Management Units (RMUs). The B2H Project area is located within the Columbia River Basin Regions (Lower Columbia/Willamette, Mid-Columbia, Upper Columbia, Snake, Mainstem) RMU. Within this RMU, Pacific lamprey are at 'high risk' throughout much of the Columbia River Basin, particularly in the Snake River, the Mid-Columbia and the Upper Columbia regions. The main threats affecting these RMUs include restricted mainstem and tributary passage, stream and floodplain degradation, and 'small population' effects (USFWS 2010).

Based on StreamNet data, Pacific lamprey are mapped only within the Mid-Columbia River in Segment 1 of the B2H Project area (StreamNet 2016). However, according to Western Native Fishes Committee data, Pacific lamprey are verified within their historic range within Segments 1 through 3 of the B2H Project area, although specific locations of lamprey presence is not available. Pacific lamprey within Segments 4 through 6 are not verified and/or are extirpated within their historic range (WNFC 2011).

Based on ODFW data, Pacific lamprey occupy the mainstem Umatilla River and are assumed potentially present within perennial tributaries, including lower Meacham Creek. The CTUIR has been actively working to restore Pacific lamprey populations to the Umatilla River basin through translocation, and led the effort to enhance passage throughout the Umatilla basin for adult lamprey. Adult lamprey passage structures have been installed on all three of Reclamation's diversions on the mainstem Umatilla River (Reclamation 2013).

Redband Trout (*Oncorhynchus mykiss gairdneri*)

Inland Columbia Basin redband trout, a subspecies of *O. mykiss,* occupies inland watersheds of the Columbia River Basin in central and eastern Oregon as well portions of southwestern Idaho within the B2H Project area. Within this broad distributional area, habitats vary from higher elevation cold water streams to lower elevation warmer desert-type streams that are often associated with periods of low stream flows and high water temperatures (May et al. 2012). Redband trout are estimated to occupy 43 percent of historically occupied stream habitats in Oregon and 35 percent in Idaho (May et al. 2012).

Redband trout occur in all perennial fish- bearing streams and some intermittent seasonal streams in the B2H Project area. The presence of riparian vegetation is positively associated with the occurrences and density of redband trout (Dauwalter et al. 2015). The following descriptive information is partially excerpted from the NPCC subbasin plan for the John Day River in central Oregon (NPCC 2005).

The species *O. mykiss* is one of the most taxonomically complicated groups in Oregon. Currens (1997) suggests that separate groups of redband trout evolved in large river systems, such as the Columbia, Deschutes, Klamath and Sacramento rivers. Ancestral redband trout probably reached the Sacramento-San Joaquin basin from the south during the second half of the Pleistocene Epoch and penetrated the Columbia, Fraser, and Athabasca river basins between 30,000 and 50,000 years ago (Behnke 1992; NPCC 2005).

Redband trout tend to spawn in rivers and streams during the spring months of March, April and May. Cool, clean, well-oxygenated water is necessary for the eggs to survive. Redband trout fry emerge from the gravel in June and July. For the most part, they live near where they were spawned. Redband trout are three years old at maturity, with size varying depending on the productivity of individual waters (NPCC 2005; ODFW 1996). After young trout emerge from the spawning gravel, they often rear in low-velocity areas associated with stream margin habitats, high cover areas and interstitial spaces. Adults require habitat for resting and feeding and, thus, are generally found in areas of abundant cover associated with deep pools, large organic material, undercut stream banks and overhanging vegetation. Over-winter sites, characterized by low-velocity areas with cover, including large woody debris, are important to all age classes (Bjornn and Reiser 1991; NPCC 2005).

Steelhead and redband trout are sympatric (occupying the same range without loss of identity from interbreeding) in all basins that contain steelhead. Sympatric populations with different life histories form different populations due to assortative mating, but are not reproductively isolated from each other (Currens 1987; NPCC 2005). Each morphology appears to be able to produce offspring of the other type. Redband males have been observed to pair with steelhead females, particularly when steelhead populations are small. Redband trout populations also occur above barriers to anadromous fish (Kostow 1995; NPCC 2005).

Redband trout occur sympatrically with MCR summer steelhead in various streams within the Umatilla River subbasin (Project Segments 1 and 2). Both of these subspecies occur in several streams that would be crossed by the Proposed Action. Redband trout and SRB summer steelhead occur sympatrically in numerous streams within the Upper Grande Ronde River subbasin (Segment 2). Both of these subspecies occur in several streams that would be crossed by the Proposed Action. Within the Upper Grande Ronde River subbasin and the study corridor, redband trout also occur in stream reaches not occupied by SRB steelhead, including Little Graves Creek, Little Rock Creek, upper Ladd Creek, and East Fork Ladd Creek.

Within the Powder River subbasin and the study corridor for the B2H Project, the distribution of redband trout is widespread. The steelhead life history was extirpated above Thief Valley Dam in 1932 and completely extirpated from the subbasin with construction of the Hell’s Canyon Complex of dams. However, redband trout within the subbasin exhibit resident, fluvial and adfluvial life histories in various locations in the subbasin depending, in part, on the presence of passage barriers (NPCC 2004b). Redband trout may occur in several streams that would be crossed by the B2H Project (MV-11).

TRADITIONAL FOODS

Traditional foods are an integral part of Native American culture; water and fish have been and continue to be important staples for tribes in the northwest.

Water is considered both a traditional food and a resource that facilitates the production of many other traditional foods. Therefore, good water quality and sufficient water quantity in rivers and streams within the B2H Project area is not only important as a traditional food source, but also important in supporting river-derived traditional foods such as fish.

Fish have been one of the most affected traditional food resources, due in large part to dam creation and irrigation allotment, limiting the water present in many regional rivers and creeks (CCRH 2016b, 2016c). Fish that occur in the B2H Project area and are considered a traditional food source for southern Columbia Plateau and northern Great Basin tribal groups include salmonids (Chinook salmon, coho salmon, steelhead, rainbow/redband trout, and whitefish), sturgeon, and eel (lamprey). It is anticipated that all perennial streams and some intermittent streams within the B2H Project area support at least one traditional food fish.

SEGMENT 1—MORROW-UMATILLA

Segment 1 begins in the Middle Columbia-Lake Wallula subbasin in the northwest, crosses the Umatilla subbasin and concludes in the Upper Grande Ronde subbasin to the southeast.

Table 3-203 presents the resource inventory for fish resources crossed by all alternative routes and route variation centerlines in Segment 1.

Table 3-203. Fish Resources Inventory Data for Segment 1—Morrow-Umatilla

Alternative Route	Total Length (miles)	Resource Inventory (miles crossed)				
		Bull Trout Critical Habitat	Chinook Salmon Essential Fish Habitat[1]	Middle Columbia River Steelhead Critical Habitat	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams
Applicant's Proposed Action	91.9	0.0	0.0	0.1	0.1	1.6
Variation S1-B1	*6.4*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*
Variation S1-B2	*6.4*	*0.0*	*0.0*	*0.0*	*0.4*	*0.4*
East of Bombing Range Road	92.3	0.0	0.0	0.1	0.1	1.6
Applicant's Proposed Action – Southern Route	99.1	0.0	0.0	0.4	0.1	1.6
West of Bombing Range Road – Southern Route	95.6	0.0	0.0	0.7	0.1	2.0
Longhorn	88.2	0.0	0.0	0.1	0.1	1.6

Table 3-203. Fish Resources Inventory Data for Segment 1—Morrow-Umatilla						
Alternative Route	Total Length (miles)	Resource Inventory (miles crossed)				
		Bull Trout Critical Habitat	Chinook Salmon Essential Fish Habitat[1]	Middle Columbia River Steelhead Critical Habitat	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams
Interstate 84	84.7	0.2	0.3	0.3	0.1	2
Variation S1-A1	*18.5*	*0.1*	*0.2*	*0.1*	*0.0*	*0.6*
Variation S1-A2	*18.5*	*0.2*	*0.2*	*0.2*	*0.0*	*0.3*
Interstate 84 – Southern Route	93.4	0.2	0.3	0.6	0.1	2.0
Table Note: Chinook salmon EFH is used as the surrogate for the EFH resource inventory.						

Although coho salmon EFH is present within Segment 1, coho salmon EFH mapping is incomplete in the B2H Project analysis area; therefore, Chinook salmon EFH is used as the surrogate for the EFH resource inventory. Coho salmon EFH is described where applicable in the following sections.

Table 3-204 summarizes fish presence in streams crossed by all alternative route and route variation centerlines in Segment 1.

Table 3-204. Fish Presence in Segment 1—Morrow-Umatilla			
Alternative Route	Total Length (miles)	Streams Crossed	Fish Presence
Applicant's Proposed Action	91. 9	Butter Creek	Redband trout
		Birch Creek	Redband trout Steelhead Steelhead critical habitat Coho EFH
		McKay Creek	Redband trout
		Rail Creek	Redband trout
		Little Beaver Creek	Redband trout
		Beaver Creek	Redband trout
		Dry Creek	Redband trout Steelhead Steelhead critical habitat
Variation S1-B1	*6.4*	*Dry Creek*	*Redband trout* *Steelhead* *Steelhead critical habitat*
Variation S1-B2	*6.4*	*Dry Creek*	*Redband trout* *Steelhead* *Steelhead critical habitat*
		Unnamed Stream, previously California Gulch (LLID 1182983453761)	*Redband trout* *Steelhead* *Steelhead critical habitat*

Table 3-204. Fish Presence in Segment 1—Morrow-Umatilla			
Alternative Route	**Total Length (miles)**	**Streams Crossed**	**Fish Presence**
East of Bombing Range Road	92.3	Butter Creek	Redband trout
		Birch Creek	Redband trout Steelhead Steelhead critical habitat Coho EFH
		McKay Creek	Redband trout
		Rail Creek	Redband trout
		Little Beaver Creek	Redband trout
		Beaver Creek	Redband trout
		Dry Creek	Redband trout Steelhead Steelhead critical habitat
Applicant's Proposed Action – Southern Route	99.1	Butter Creek	Redband trout
		West Birch Creek	Redband trout Steelhead Steelhead critical habitat
		California Gulch	Redband trout Steelhead Steelhead critical habitat
Applicant's Proposed Action – Southern Route	99.1	East Birch Creek	Redband trout
		McKay Creek	Redband trout
		Rail Creek	Redband trout
		Little Beaver Creek	Redband trout
		Beaver Creek	Redband trout
		Dry Creek	Redband trout Steelhead Steelhead critical habitat
West of Bombing Range Road – Southern Route	95.6	Little Butter Creek	Redband trout
		Butter Creek (3 times)	Redband trout
		Bear Creek	Steelhead Steelhead critical habitat Redband trout
		West Birch Creek	Redband trout Steelhead Steelhead critical habitat
		California Gulch	Redband trout Steelhead Steelhead critical habitat
		East Birch Creek	Redband trout
		McKay Creek	Redband trout
		Rail Creek	Redband trout
		Little Beaver Creek	Redband trout
		Beaver Creek	Redband trout

Table 3-204. Fish Presence in Segment 1—Morrow-Umatilla			
Alternative Route	**Total Length (miles)**	**Streams Crossed**	**Fish Presence**
West of Bombing Range Road – Southern Route	95.6	Dry Creek	Redband trout Steelhead Steelhead critical habitat
Longhorn	88.2	Butter Creek	Redband trout
		Birch Creek	Redband trout Steelhead Steelhead critical habitat
		Rail Creek	Redband trout
		McKay Creek	Redband trout
		Little Beaver Creek	Redband trout
		Beaver Creek	Redband trout
		Dry Creek	Redband trout Steelhead Steelhead critical habitat
Interstate 84	84.7	Butter Creek	Redband trout
		Umatilla River (2 times)	Steelhead Steelhead critical habitat Bull trout Bull trout critical habitat Coho EFH Chinook salmon EFH Pacific lamprey Redband trout
		Birch Creek	Steelhead Steelhead critical habitat Redband trout
		Rail Creek	Redband trout
		McKay Creek	Redband trout
		Little Beaver Creek	Redband trout
		Beaver Creek	Redband trout
		Dry Creek	Redband trout Steelhead Steelhead critical habitat
Variation S1-A1	*18.5*	*Umatilla River*	*Steelhead* *Steelhead critical habitat* *Bull trout* *Bull trout critical habitat* *Coho EFH* *Chinook salmon EFH* *Pacific lamprey* *Redband trout*

Table 3-204. Fish Presence in Segment 1—Morrow-Umatilla			
Alternative Route	**Total Length (miles)**	**Streams Crossed**	**Fish Presence**
Variation S1-A2	*18.5*	*Umatilla River*	*Steelhead* *Steelhead critical habitat* *Bull trout* *Bull trout critical habitat* *Coho EFH* *Chinook salmon EFH* *Pacific lamprey* *Redband trout*
Interstate 84 – Southern Route	93.4	Butter Creek	Redband Trout
		Umatilla River (2 times)	Steelhead Steelhead critical habitat Bull trout Bull trout critical habitat Coho EFH Chinook salmon EFH Pacific lamprey Redband trout
Interstate 84 – Southern Route	93.4	West Birch Creek	Steelhead Steelhead critical habitat Redband trout
		California Gulch	Steelhead Steelhead critical habitat Redband trout
		East Birch Creek	Steelhead Steelhead critical habitat Redband trout
		McKay Creek	Redband trout
		Rail Creek	Redband trout
		Little Beaver Creek	Redband trout
		Beaver Creek	Redband trout
		Dry Creek	Steelhead Steelhead critical habitat Redband trout
Table Note: EFH = Essential fish habitat			

Applicant's Proposed Action Alternative

Federally Listed and Candidate Fish Species

This alternative route crosses Birch Creek (Link 1-63) and Dry Creek (Link 1-77), which support federally listed MCR and SRB steelhead, respectively.

Sensitive Fish Species

This alternative route crosses Butter Creek (Link 1-45), Birch Creek (Link 1-63), McKay Creek (Link 1-63), Rail Creek (Link 1-65), Little Beaver Creek (Link 1-65), Beaver Creek (Link 1-65), and Dry Creek (Link 1-77). These streams support redband trout.

Protected Fish Habitats

This alternative route crosses Birch Creek (Link 1-63) and Dry Creek (Link 1-77). Designated critical habitat for MCR steelhead is present in Birch Creek and designated critical habitat for SRB steelhead is present in Dry Creek. Coho salmon and associated EFH is present in this segment of Birch Creek.

Variation S1-B1

The variations in this series include Variation S1-B1 and S1-B2. Variation S1-B1 follows a slightly more southern alignment than Variation S1-B2.

Federally Listed and Candidate Fish Species

This variation crosses Dry Creek (Link 1-77) which supports SRB steelhead.

Sensitive Fish Species

This variation crosses Dry Creek (Link 1-77) which supports redband trout.

Protected Fish Habitats

This variation crosses Dry Creek (Link 1-77) which supports designated critical habitat for SRB steelhead.

Variation S1-B2

Variation S1-B2 follows a slightly more northern alignment than Variation S1-B1.

Federally Listed and Candidate Fish Species

This variation crosses Dry Creek (Link 1-75) and an unnamed stream previously named California Gulch (LLID 1182983453761) near the confluence of the two streams. Both streams support SRB steelhead.

Sensitive Fish Species

This variation crosses Dry Creek (Link 1-75) and an unnamed stream previously named California Gulch (LLID 1182983453761) (Link 1-75) near the confluence of the two streams. Both streams support redband trout.

Protected Fish Habitats

This variation crosses Dry Creek (Link 1-75) and an unnamed stream previously named California Gulch (LLID 1182983453761) near the confluence of the two streams. Both streams support designated critical habitat for SRB steelhead.

Additional Action – 69-Kilovolt Line Replacement

Federally Listed and Candidate Fish Species

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Protected Fish Habitats

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

East of Bombing Range Road Alternative

Federally Listed and Candidate Fish Species

This alternative route crosses Birch Creek (Link 1-63), which supports federally listed MCR steelhead, and Dry Creek (Link 1-77), which supports federally listed SRB steelhead.

Sensitive Fish Species

This alternative crosses Butter Creek (Link 1-45), Birch Creek (Link 1-63), McKay Creek (Link 1-63), Rail Creek (Link 1-65), Little Beaver Creek (Link 1-65), Beaver Creek (Link 1-65), and Dry Creek (Link 1-77). These streams support redband trout.

Protected Fish Habitats

This alternative crosses Birch Creek (Link 1-63) and Dry Creek (Link 1-77). Designated critical habitat for MCR steelhead is present in Birch Creek and designated critical habitat for SRB steelhead is present in Dry Creek. Coho salmon and associated EFH is present within this segment of Birch Creek.

Applicant's Proposed Action – Southern Route Alternative

Federally Listed and Candidate Fish Species

This alternative crosses West Birch Creek (Link 1-83), California Gulch (Link 1-66), and East Birch Creek (Link 1-66), which support federally listed MCR steelhead. This alternative also crosses Dry Creek (Link 1-77), which supports federally listed SRB steelhead.

Sensitive Fish Species

This alternative crosses Butter Creek (Link 1-45), West Birch Creek (Link 1-83), California Gulch (Link 1-66), East Birch Creek (Link 1-66), McKay Creek (Link 1-66), Rail Creek (Link 1-65), Little Beaver Creek (Link 1-65), Beaver Creek (Link 1-65), and Dry Creek (Link 1-77). These streams support redband trout.

Protected Fish Habitats

This alternative crosses West Birch Creek (Link 1-83), California Gulch (Link 1-66), and East Birch Creek (Link 1-66), which support designated critical habitat for MCR steelhead. Designated critical habitat for SRB steelhead is present in Dry Creek (Link 1-77).

Additional Action – 69-Kilovolt Line Replacement

Federally Listed and Candidate Fish Species

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Protected Fish Habitats

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

West of Bombing Range Road – Southern Route Alternative

Federally Listed and Candidate Fish Species

This alternative crosses Bear Creek (Link 1-64), West Birch Creek (Link 1-64), California Gulch (Link 1-66), and East Birch Creek (Link 1-66), all of which support federally listed MCR steelhead. This alternative also crosses Dry Creek (Link 1-77), which supports federally listed SRB steelhead.

Sensitive Fish Species

This alternative crosses Little Butter Creek (Link 1-36), Butter Creek three times (Link 1-36, 1-62, and 1-64), Bear Creek (Link 1-64), West Birch Creek (Link 1-64), California Gulch (Link 1-66), East Birch Creek (Link 1-66), McKay Creek (Link 1-66), Rail Creek (Link 1-65), Little Beaver Creek (Link 1-65), Beaver Creek (Link 1-65), and Dry Creek (Link 1-77). These streams support redband trout.

Protected Fish Habitats

This alternative crosses Bear Creek (Link 1-64), West Birch Creek (Link 1-64), California Gulch (Link 1-66), and East Birch Creek (Link 1-66). Designated critical habitat for MCR steelhead is present in these streams. Designated critical habitat for SRB steelhead is present in Dry Creek.

Additional Action – 69-Kilovolt Line Replacement

Federally Listed and Candidate Fish Species

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Protected Fish Habitats

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Longhorn Alternative

Federally Listed and Candidate Fish Species

This alternative crosses Birch Creek (Link 1-63) and Dry Creek (Link 1-77), which support federally listed MCR and SRB steelhead, respectively.

Sensitive Fish Species

This alternative crosses Butter Creek (Link 1-45), Birch Creek (Link 1-63), McKay Creek (Link 1-63), Rail Creek (Link 1-65), Little Beaver Creek (Link 1-65), Beaver Creek (Link 1-65), and Dry Creek (Link 1-77). These streams support redband trout.

Protected Fish Habitats

This alternative crosses Birch Creek (Link 1-63) and Dry Creek (Link 1-77). Designated critical habitat for MCR steelhead is present in Birch Creek, and designated critical habitat for SRB steelhead is present in Dry Creek. Coho salmon and associated EFH is present within this segment of Birch Creek.

Interstate 84 Alternative and Variations

Federally Listed and Candidate Fish Species

This alternative crosses the Umatilla River twice (Link 1-23 and 1-31) and Birch Creek (Link 1-63), which support federally listed MCR steelhead. The Umatilla River also supports federally listed bull trout. This alternative also crosses Dry Creek (Link 1-77), which supports federally listed SRB steelhead.

Sensitive Fish Species

This alternative crosses Butter Creek (Link 1-23), the Umatilla River twice (Link 1-23 and 1-31), Birch Creek (Link 1-63), McKay Creek (Link 1-63), Rail Creek (Link 1-65), Little Beaver Creek (Link 1-65), Beaver Creek (Link 1-65), and Dry Creek (Link 1-77). These streams support redband trout, and the Umatilla River supports Pacific lamprey.

Protected Fish Habitats

This alternative crosses the Umatilla River twice (Link 1-23 and 1-31), and Birch Creek (Link 1-63), which support designated critical habitat for MCR steelhead. Designated critical habitat for SRB steelhead is present in Dry Creek (Link 1-77). Designated critical habitat for bull trout is present in the Umatilla River. Chinook and coho salmon and their associated EFH is present within this segment of the Umatilla River. Coho salmon and associated EFH is present in this portion of Birch Creek.

Variation S1-A1

The variations in this series include Variation S1-A1 and S1-A2. Variation S1-A1 follows a slightly more northern alignment than Variation S1-A2. Variation S1-A1 crosses the Umatilla River at the same location as the Interstate 84 Alternative.

Federally Listed and Candidate Fish Species

This variation crosses the Umatilla River (Link 1-31) which supports federally listed MCR steelhead and bull trout.

Sensitive Fish Species

This variation crosses the Umatilla River (Link 1-31) which supports redband trout and Pacific lamprey.

Protected Fish Habitats

This variation crosses the Umatilla River (Link 1-31) which supports designated critical habitat for MCR steelhead and bull trout. Chinook and coho salmon and their associated EFH is present within this segment of the Umatilla River.

Variation S1-A2

Variation S1-A2 follows a slightly more southern alignment than Variation S1-A1.

Federally Listed and Candidate Fish Species

As with Variation S1-A2, this variation crosses only the Umatilla River (Link 1-37) which supports federally listed MCR steelhead and bull trout.

Sensitive Fish Species

As with Variation S1-A2, this variation crosses only the Umatilla River (Link 1-37), which supports redband trout and Pacific lamprey.

Protected Fish Habitats

As with Variation S1-A2, this variation crosses only the Umatilla River (Link 1-37) which supports designated critical habitat for MCR steelhead and bull trout. Chinook and coho salmon and their associated EFH is present within this segment of the Umatilla River.

Interstate 84 – Southern Route Alternative

Federally Listed and Candidate Fish Species

This alternative crosses the Umatilla River twice (Link 1-23 and 1-31), West Birch Creek (Link 1-83), California Gulch (Link 1-66), and East Birch Creek (Link 1-66), all of which support federally listed MCR steelhead. This alternative also crosses Dry Creek (Link 1-77), which supports federally listed SRB steelhead. The Umatilla River also supports federally listed bull trout.

Sensitive Fish Species

This alternative crosses Butter Creek, the Umatilla River twice (Link 1-23 and 1-31), West Birch Creek (Link 1-83), California Gulch (Link 1-66), East Birch Creek (Link 1-66), McKay Creek (Link 1-66), Rail Creek (Link 1-65), Little Beaver Creek (Link 1-65), Beaver Creek (Link 1-65), and Dry Creek (Link 1-77). These streams support redband trout. The Umatilla River also supports Pacific lamprey.

Protected Fish Habitats

This alternative crosses the Umatilla River twice (Link 1-23 and 1-31), West Birch Creek (Link 1-83), California Gulch (Link 1-66), and East Birch Creek (Link 1-66), which support designated critical habitat

for MCR steelhead. Designated critical habitat for SRB steelhead is present in Dry Creek (Link 1-77). Designated critical habitat for bull trout is present in the Umatilla River. Chinook and coho salmon and their associated EFH is present within this segment of the Umatilla River.

SEGMENT 2—BLUE MOUNTAINS

Segment 2 begins in the Wallowa-Whitman National Forest and Umatilla subbasin in the northwest, crosses the Upper Grande Ronde River subbasin and ends in the Clover Creek Valley to the southeast. Streams in this segment drain to the Snake River to the north.

Table 3-205 presents the resource inventory for fish resources crossed by all alternative route and route variation centerlines in Segment 2.

Table 3-205. Fish Resources Inventory Data for Segment 2—Blue Mountains

Alternative Route	Total Length (miles)	Resource Inventory (miles crossed)				
		Bull Trout Critical Habitat	Chinook Salmon Critical Habitat[1]	Middle Columbia River Steelhead Critical Habitat[2]	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams
Applicant's Proposed Action	33.8	0.1	0.3	0.0	0.7	2.3
Variation S2-A1	*2.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S2-A2	*2.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S2-B1	*3.7*	*0.0*	*0.2*	*0.0*	*0.4*	*0.4*
Variation S2-B2	*3.8*	*0.0*	*0.2*	*0.0*	*0.4*	*0.3*
Variation S2-C1	*9.3*	*0.0*	*0.0*	*0.0*	*0.2*	*0.3*
Variation S2-C2	*8.8*	*0.0*	*0.0*	*0.0*	*0.3*	*0.6*
Variation S2-E1	*2.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*
Variation S2-E2	*2.6*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*
Variation S2-F1	*12.1*	*0.0*	*0.0*	*0.0*	*0.0*	*1.3*
Variation S2-F2	*12.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.9*
Glass Hill	33.7	0.1	0.1	0.0	0.6	2.6
Variation S2-D1	*4.3*	*0.0*	*0.0*	*0.0*	*0.5*	*0.4*
Variation S2-D2	*4.1*	*0.0*	*0.0*	*0.0*	*0.4*	*0.4*
Mill Creek	34.0	0.1	0.2	0.0	0.6	1.4

Table Notes:
[1]Chinook salmon Critical Habitat is used as a surrogate for Chinook salmon and coho salmon Essential Fish Habitat
[2]MCR steelhead or associated critical habitat does not occur in Segment 2.

Table 3-206 summarizes fish presence in streams crossed by all alternative route and route variation centerlines in Segment 2.

Table 3-206. Fish Presence in Segment 2—Blue Mountains			
Alternative Route	**Total Length (miles)**	**Streams Crossed**	**Fish Presence**
Applicant's Proposed Action	33.8	Ladd Creek	SRB Steelhead Steelhead critical habitat Redband trout
		Grande Ronde River	SRB Steelhead Steelhead critical habitat SR Chinook salmon Chinook salmon critical habitat Chinook salmon EFH Bull trout Bull trout critical habitat Coho salmon EFH `Redband trout
Applicant's Proposed Action	33.8	Rock Creek	SRB Steelhead Steelhead critical habitat SR Chinook salmon Chinook salmon critical habitat Chinook salmon EFH Coho salmon EFH Redband trout
		Sheep Creek	Redband trout
		Graves Creek	SRB Steelhead Steelhead critical habitat Redband trout
		Powder River	Redband trout
Applicant's Proposed Action	33.8	Unnamed stream (1181152452353)	SRB Steelhead Steelhead critical habitat Redband trout
Variation S2-A1	*2.8*	*None*	*None*
Variation S2-A2	*2.9*	*None*	*None*
Variation S2-B1	*3.7*	*Rock Creek*	*SRB Steelhead* *Steelhead critical habitat* *SR Chinook salmon* *Chinook salmon critical habitat* *Chinook salmon EFH* *Coho salmon EFH* *Redband trout*
		Sheep Creek	*Redband trout*
Variation S2-B1	*3.7*	*Graves Creek*	*SRB Steelhead* *Steelhead critical habitat* *Redband trout*

Table 3-206. Fish Presence in Segment 2—Blue Mountains			
Alternative Route	**Total Length (miles)**	**Streams Crossed**	**Fish Presence**
Variation S2-B2	*3.8*	*Rock Creek*	*SRB Steelhead* *Steelhead critical habitat* *SR Chinook salmon* *Chinook salmon critical habitat* *Chinook salmon EFH* *Coho salmon EFH* *Redband trout*
		Sheep Creek	*SRB Steelhead* *Steelhead critical habitat* *Redband trout*
Variation S2-C1	*9.3*	*Unnamed stream (1181152452353)*	*SRB Steelhead* *Steelhead critical habitat* *Redband trout*
Variation S2-C2	*8.8*	*Sheep Creek*	*SRB Steelhead* *Steelhead critical habitat* *Redband trout*
Variation S2-E1	*2.3*	*Unnamed stream (1180138451966)*	*Redband Trout*
Variation S2-E2	*2.6*	*Unnamed stream (1180138451966)*	*Redband Trout*
Variation S2-F1	*12.1*	*Powder River*	*Redband trout*
Variation S2-F2	*12.2*	*Powder River*	*Redband trout*
Glass Hill	*33.7*	Ladd Creek	SRB Steelhead Steelhead critical habitat Redband trout
		Grande Ronde River	SRB Steelhead Steelhead critical habitat SR Chinook salmon Chinook salmon critical habitat Chinook salmon EFH Coho salmon EFH Bull trout Bull trout critical habitat Redband trout
		Rock Creek	SRB Steelhead Steelhead critical habitat SR Chinook salmon Chinook salmon critical habitat Chinook salmon EFH Coho salmon EFH Redband trout
		Graves Creek	SRB Steelhead Steelhead critical habitat Redband trout
		Powder River	Redband trout

Table 3-206. Fish Presence in Segment 2—Blue Mountains			
Alternative Route	**Total Length (miles)**	**Streams Crossed**	**Fish Presence**
Glass Hill	33.7	Unnamed stream (1181404452558)	SRB Steelhead Steelhead critical habitat Redband trout
		Unnamed stream (1181152452353)	SRB Steelhead Steelhead critical habitat Redband trout
Variation S2-D1	*4.3*	*Rock Creek*	*SRB Steelhead* *Steelhead critical habitat* *SR Chinook salmon*
		Graves Creek	*SRB Steelhead* *Steelhead critical habitat* *Redband trout*
		Unnamed stream (1181404452558)	*SRB Steelhead* *Steelhead critical habitat* *Redband trout*
		Unnamed stream (1181152452353)	*SRB Steelhead* *Steelhead critical habitat* *Redband trout*
Variation S2-D2	*4.1*	*Unnamed stream (1181152452353)*	*SRB Steelhead* *Steelhead critical habitat* *Redband trout*
		Rock Creek	*SRB Steelhead* *Steelhead critical habitat* *Redband trout*
		Graves Creek	*SRB Steelhead* *Steelhead critical habitat* *Redband trout*
Mill Creek	34.0	Mill Creek	SRB Steelhead Steelhead critical habitat Redband trout
		Ladd Creek	SRB Steelhead Steelhead critical habitat Redband trout
		Rock Creek	SRB Steelhead Steelhead critical habitat SR Chinook salmon Chinook salmon critical habitat Chinook salmon EFH Coho salmon EFH Redband trout

Table 3-206. Fish Presence in Segment 2—Blue Mountains			
Alternative Route	**Total Length (miles)**	**Streams Crossed**	**Fish Presence**
Mill Creek	34.0	Grande Ronde River	SRB Steelhead Steelhead critical habitat SR Chinook salmon Chinook salmon critical habitat Chinook salmon EFH Coho salmon EFH Bull trout Bull trout critical habitat Redband trout
		Powder River	Redband trout
Table Notes: EFH = Essential fish habitat SR = Snake River SRB = Snake River Basin			

Applicant's Proposed Action Alternative

Federally Listed and Candidate Fish Species

The Applicant's Proposed Action Alternative crosses Ladd Creek (Link 2-52), the Grande Ronde River (Link 2-20), Rock Creek (Link 2-35), Graves Creek (Link 2-35), and an unnamed stream (1181152452353) (Link 2-47), which support federally listed SRB steelhead. The Grande Ronde River and Rock Creek support federally listed SR Chinook salmon.

Sensitive Fish Species

The Applicant's Proposed Action Alternative crosses Ladd Creek (Link 2-52), the Grande Ronde River (Link 2-20), Rock Creek (Link 2-35), Sheep Creek (Link 2-35), Graves Creek (Link 2-35), Powder River (Link 2-85), and an unnamed stream (1181152452353) (Link 2-47), which support redband trout.

Protected Fish Habitats

The Applicant's Proposed Action Alternative crosses Ladd Creek (Link 2-52), the Grande Ronde River (Link 2-20), Rock Creek (Link 2-35), Graves Creek (Link 2-35), and an unnamed stream (1181152452353) (Link 2-47), which support designated critical habitat for SRB steelhead. The Grande Ronde River and Rock Creek also support SR Chinook salmon designated critical habitat. Coho salmon and Chinook salmon EFH is present within the Grande Ronde River and Rock Creek.

Variation S2-A1

The variations in this series include Variation S2-A1 and S2-A2. Variation S2-A1 follows a slightly more northern alignment than Variation S2-A2.

Federally Listed and Candidate Fish Species

Variation S2-A1, as with Variation S2-A2, does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S2-A1, as with Variation S2-A2, does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

Variation S2-A1, as with Variation S2-A2, does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S2-A2

Variation S2-A2 follows a slightly more southerly alignment than Variation S2-A1.

Federally Listed and Candidate Fish Species

As with Variation S2-A1, Variation S2-A2 does not cross any streams that support federally listed or candidate species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with Variation S2-A1, Variation S2-A2 does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with Variation S2-A1, Variation S2-A2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S2-B1

The variations in this series include Variation S2-B1 and S2-B2. Variation S2-B1 follows a slightly more southerly alignment than Variation S2-B2, slightly south of the Mill Creek Alternative.

Federally Listed and Candidate Fish Species

Variation S2-B1 crosses Rock Creek (Link 2-35) and Graves Creek (Link 2-35), which support federally listed SRB steelhead. Rock Creek also supports SR Chinook salmon. Variation S2-B1 and Variation S2-B2 cross two waterways which support federally listed fish species.

Sensitive Fish Species

Variation S2-B1 crosses Rock Creek (Link 2-35), Sheep Creek (Link 2-35), and Graves Creek (Link 2-35). These streams support redband trout. Variation S2-B1 crosses three waterways which support redband trout, Variation S2-B2 crosses two.

Protected Fish Habitats

Variation S2-B1 crosses Rock Creek (Link 2-35) and Graves Creek (Link 2-35), which support designated critical habitat for SRB steelhead. Rock Creek also supports critical habitat for SR Chinook salmon. Coho salmon and Chinook salmon EFH is present within Rock Creek. Variation S2-B1 and Variation S2-B2 cross two waterways which support protected fish habitats.

Variation S2-B2

Variation S2-B2 follows a slightly more northerly alignment than Variation S2-B1, south of the Mill Creek Alternative.

Federally Listed and Candidate Fish Species

This alternative crosses Rock Creek (Link 2-25) and Sheep Creek (Link 2-25), which support federally listed SRB steelhead. Rock Creek also supports SR Chinook salmon. Both variations, Variation S2-B2 and Variation S2-B1, cross two waterways which support federally listed fish species.

Sensitive Fish Species

Variation S2-B2 crosses Rock Creek (Link 2-25) and Sheep Creek (Link 2-25). These streams support redband trout. Variation S2-B2 crosses two waterways which support redband trout, Variation S2-B1 crosses three.

Protected Fish Habitats

Variation S2-B2 crosses Rock Creek (Link 2-25) and Sheep Creek (Link 2-25), which support designated critical habitat for SRB steelhead. Rock Creek also supports critical habitat for SR Chinook salmon. Coho salmon and Chinook salmon EFH is present within Rock Creek. Variation S2-B2 and Variation S2-B1 cross two waterways which support protected fish habitats.

Variation S2-C1

The variations in this series include Variation S2-C1 and S2-C2. Variation S2-C1 follows a slightly more westerly alignment than Variation S2-C2.

Federally Listed and Candidate Fish Species

Variation S2-C1 crosses an unnamed stream (1181152452353) (Link 2-47), which supports federally listed SRB steelhead. Both variations, Variation S2-C1 and Variation S2-C2, cross one waterway which supports federally listed steelhead.

Sensitive Fish Species

Variation S2-C1 crosses an unnamed stream (1181152452353) (Link 2-47), which supports redband trout. Both variations, Variation S2-C1 and Variation S2-C2, cross one waterway which supports redband trout.

Protected Fish Habitats

Variation S2-C1 crosses an unnamed stream (1181152452353) (Link 2-47), which supports designated critical habitat for SRB steelhead. Both variations, Variation S2-C1 and Variation S2-C2, cross one waterway which supports steelhead critical habitat.

Variation S2-C2

Variation S2-C2 follows a slightly more easterly alignment than Variation S2-C1.

Federally Listed and Candidate Fish Species

Variation S2-C2 crosses Sheep Creek (Link 2-48), which supports federally listed SRB steelhead. Both variations, Variation S2-C2 and Variation S2-C1, cross one waterway which supports federally listed steelhead.

Sensitive Fish Species

Variation S2-C2 crosses Sheep Creek (Link 2-48), which supports redband trout. Both variations, Variation S2-C2 and Variation S2-C1, cross one waterway which supports redband trout.

Protected Fish Habitats

Variation S2-C2 crosses Sheep Creek (Link 2-48), which supports designated critical habitat for SRB steelhead. Both variations, Variation S2-C2 and Variation S2-C1, cross one waterway which supports steelhead critical habitat.

Variation S2-E1

The variations in this series include Variation S2-E1 and S2-E2. Variation S2-E1 follows a slightly more southwesterly alignment than Variation S2-E2, slightly north of Baldy Mountain,

Federally Listed and Candidate Fish Species

Variation S2-E1, as with Variation S2-E2, does not cross any streams that support federally listed or candidate species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S2-E1, as with Variation S2-E2, crosses an unnamed stream (1180138451966) (Link 2-60), which supports redband trout. Both variations, Variation S2-E1 and Variation S2-E2, cross one waterway which supports redband trout.

Protected Fish Habitats

Variation S2-E1, as with Variation S2-E2, does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S2-E2

Variation S2-E2 follows a slightly more northern alignment than Variation S2-E1, slightly north of Baldy Mountain and south of Ladd Canyon.

Federally Listed and Candidate Fish Species

As with Variation S2-E1, Variation S2-E2 does not cross any streams that support federally listed or candidate species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S2-E2 crosses an unnamed stream (1180138451966) (Link 2-55), which supports redband trout. Both variations, Variation S2-E2 and Variation S2-E1, cross one waterway which supports redband trout.

Protected Fish Habitats

As with Variation S2-E1, Variation S2-E2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S2-F1

The variations in this series include Variation S2-F1 and S2-F2. Variation S2-F1 follows a slightly more southwesterly alignment than Variation S2-F2.

Federally Listed and Candidate Fish Species

Variation S2-F1, as with Variation S2-F2, does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S2-F1 crosses the Powder River (Link 2-85), which supports redband trout.

Protected Fish Habitats

Variation S2-F1, as with Variation S2-F2, does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S2-F2

Variation S2-F2 follows a slightly more northerly alignment than Variation S2-F1.

Federally Listed and Candidate Fish Species

As with Variation S2-F1, Variation S2-F2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with S2-F1, Variation S2-F2 crosses the Powder River (Link 2-90), which supports redband trout.

Protected Fish Habitats

As with Variation S2-F1, Variation S2-F2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Glass Hill Alternative

The Glass Hill Alternative and variations generally parallel the Applicant's Proposed Action Alternative in Segment 2, however the Glass Hill Alternative passes to the south and west of Glass Hill.

Federally Listed and Candidate Fish Species

The Glass Hill Alternative crosses Ladd Creek (Link 2-52), the Grande Ronde River (Link 2-20), Rock Creek (Link 2-42), Graves Creek (Link 2-42), and unnamed streams (1181152452353 [Link 2-47] and 1181404452558 [Link 2-42]), which support federally listed SRB steelhead. The Grande Ronde River and Rock Creek also support federally listed SR Chinook salmon. The Glass Hill Alternative is similar to the Applicant's Proposed Action Alternative except for it crosses unnamed stream (1181404452558).

Sensitive Fish Species

The Glass Hill Alternative crosses Ladd Creek (Link 2-52), the Grande Ronde River (Link 2-20), Rock Creek (Link 2-42), Graves Creek (Link 2-42), Powder River (Link 2-85), and unnamed streams (1181152452353 [Link 2-47] and 1181404452558 [Link 2-42]), which support redband trout. The Glass Hill Alternative is similar to the Applicant's Proposed Action Alternative except for it crosses unnamed stream (1181404452558) but does not cross Sheep Creek.

Protected Fish Habitats

The Glass Hill Alternative crosses Ladd Creek (Link 2-52), the Grande Ronde River (Link 2-20), Rock Creek (Link 2-42), Graves Creek (Link 2-42), and unnamed streams (1181152452353 [Link 2-47] and 1181404452558 [Link 2-42]), which support designated critical habitat for SRB steelhead. The Grande Ronde River and Rock Creek also support SR Chinook salmon designated critical habitat. Coho salmon and Chinook salmon EFH is present within the Grande Ronde River and Rock Creek. The Glass Hill Alternative is similar to the Applicant's Proposed Action Alternative except for it crosses unnamed stream (1181404452558).

Variation S2-D1

The variations in this series include Variation S2-D1 and S2-D2. Variation S2-D1 follows a slightly more northerly alignment than Variation S2-D2.

Federally Listed and Candidate Fish Species

Variation S2-D1 crosses Rock Creek (Link 2-42), Graves Creek (Link 2-42), and unnamed streams (1181152452353 [Link 2-47] and 1181404452558 [Link 2-42]), which support federally listed SRB steelhead. This portion of Rock Creek does not support federally listed SR Chinook salmon. Variation S2-D1 is similar to Variation S2-D2 except it crosses unnamed stream (1181404452558).

Sensitive Fish Species

Variation S2-D1 crosses Rock Creek (Link 2-42), Graves Creek (Link 2-42), and unnamed streams (1181152452353 [Link 2-47] and 1181404452558 [Link 2-42]), which support redband trout. Variation S2-D1 is similar to Variation S2-D2 except it crosses unnamed stream (1181404452558).

Protected Fish Habitats

Variation S2-D1 crosses Rock Creek (Link 2-42), Graves Creek (Link 2-42), and unnamed streams (1181152452353 [Link 2-47] and 1181404452558 [Link 2-42]), which support SRB steelhead designated critical habitat. Variation S2-D1 is similar to Variation S2-D2 except it crosses unnamed stream (1181404452558).

Variation S2-D2

Variation S2-D2 follows a slightly more southerly alignment than Variation S2-D1.

Federally Listed and Candidate Fish Species

Variation S2-D2 crosses Rock Creek (Link 2-46), Graves Creek (Link 2-46), and an unnamed stream (1181152452353) (Link 2-46), which support federally listed SRB steelhead. Variation S2-D2 is similar to Variation S2-D1 except it does not cross unnamed stream (1181404452558).

Sensitive Fish Species

Variation S2-D2 crosses Rock Creek (Link 2-46), Graves Creek (Link 2-46), and an unnamed stream (1181152452353) (Link 2-46). These streams support redband trout. Variation S2-D2 is similar to Variation S2-D1 except it does not cross unnamed stream (1181404452558).

Protected Fish Habitats

Variation S2-D2 crosses Rock Creek (Link 2-46), Graves Creek (Link 2-46), and an unnamed stream (1181152452353) (Link 2-46), which support SRB steelhead designated critical habitat. Variation S2-D2 is similar to Variation S2-D1 except it does not cross unnamed stream (1181404452558).

Mill Creek Alternative

The Mill Creek Alternative is routed to the north and east of the Applicant's Proposed Action Alternative.

Federally Listed and Candidate Fish Species

The Mill Creek Alternative crosses Mill Creek (Link 2-12), Ladd Creek (Link 2-63), the Grande Ronde River (Link 2-10), and Rock Creek (Link 2-10), which support federally listed SRB steelhead. The Grande Ronde River and Rock Creek also support federally listed SR Chinook salmon. The Mill Creek Alternative is different to the Applicant's Proposed Action Alternative in that it does not cross Graves Creek or unnamed stream (1181152452353) but crosses Mill Creek.

Sensitive Fish Species

The Mill Creek Alternative crosses Mill Creek (Link 2-12), Ladd Creek (Link 2-63), the Grande Ronde River (Link 2-10), Rock Creek (Link 2-10), and the Powder River (Link 2-90). These streams support redband trout. The Mill Creek Alternative is different to the Applicant's Proposed Action Alternative in that it does not cross Sheep Creek, Graves Creek or unnamed stream (1181152452353) but crosses Mill Creek.

Protected Fish Habitats

The Mill Creek Alternative crosses Mill Creek (Link 2-12), Ladd Creek (Link 2-63), the Grande Ronde River (Link 2-10), and Rock Creek (Link 2-10), which support SRB steelhead designated critical habitat. The Grande Ronde River and Rock Creek also support SR Chinook salmon designated critical habitat. Coho salmon and Chinook salmon EFH is present within the Grande Ronde River and Rock Creek. The Mill Creek Alternative is different to the Applicant's Proposed Action Alternative in that it does not cross Graves Creek or unnamed stream (1181152452353) but crosses Mill Creek.

SEGMENT 3—BAKER VALLEY

Segment 3 begins in the Powder River subbasin in the northwest, crosses the Lower Powder Valley near the Missouri Flats, into the Durkee Valleys and ends in the Burnt River subbasin to the southeast near Weatherby. Streams in this segment drain generally toward the Snake River to the east – southeast.

Table 3-207 presents the resource inventory for fish resources crossed by all alternative route and route variation centerlines in Segment 3.

Table 3-207. Fish Resources Inventory Data for Segment 3—Baker Valley						
Alternative Route	Total Length (miles)	Resource Inventory (miles crossed)				
		Bull Trout Critical Habitat	Chinook Salmon Critical Habitat[1]	Middle Columbia River Steelhead Critical Habitat[2]	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams
Applicant's Proposed Action	55.2	0.0	0.0	0.0	0.0	3.8
Variation S3-A1	*12.4*	*0.0*	*0.0*	*0.0*	*0.0*	*1.1*
Variation S3-A2	*12.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.5*
Variation S3-B1	*13.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S3-B2	*14.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S3-B3	*14.7*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S3-B4	*14.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S3-B5	*14.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S3-C1	*21.1*	*0.0*	*0.0*	*0.0*	*0.0*	*2.6*
Variation S3-C2	*21.7*	*0.0*	*0.0*	*0.0*	*0.0*	*2.8*
Variation S3-C3	*21.1*	*0.0*	*0.0*	*0.0*	*0.0*	*2.2*
Variation S3-C4	*21.4*	*0.0*	*0.0*	*0.0*	*0.0*	*2.0*
Variation S3-C5	*21.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.1*
Variation S3-C6	*24.7*	*0.0*	*0.0*	*0.0*	*0.0*	*1.4*
Flagstaff A	55.3	0.0	0.0	0.0	0.0	3.8
Timber Canyon	70.3	0.0	0.0	0.0	0.0	5.1
Flagstaff A – Burnt River Mountain	55.3	0.0	0.0	0.0	0.0	3.4
Flagstaff B	56.0	0.0	0.0	0.0	0.0	3.8
Flagstaff B – Burnt River West	55.7	0.0	0.0	0.0	0.0	1.7
Flagstaff B – Durkee	59.6	0.0	0.0	0.0	0.0	2.6

Table Notes:
[1]Chinook salmon and SRB steelhead have been extirpated from their historic range in Segment 3 – no critical habitat designated.
[2]MCR steelhead or associated critical habitat does not occur in Segment 3.

Table 3-208 summarizes fish presence in streams crossed by all alternative route and route variation centerlines in Segment 3.

Table 3-208. Fish Presence in Segment 3—Baker Valley			
Alternative Route	Total Length (miles)	Streams Crossed	Fish Presence
Applicant's Proposed Action	55.2	Burnt River	Redband trout
		Dixie Creek	Redband trout
		Durkee Creek	Redband trout
		Manning Creek	Redband trout
		Pritchard Creek	Redband trout
		Sisley Creek	Redband trout
		Unity Creek	Redband trout

Table 3-208. Fish Presence in Segment 3—Baker Valley			
Alternative Route	**Total Length (miles)**	**Streams Crossed**	**Fish Presence**
Variation S3-A1	*12.4*	*Gentry Creek*	*Redband trout*
Variation S3-A2	*12.2*	*Gentry Creek*	*Redband trout*
Variation S3-B1	*13.9*	*None*	*None*
Variation S3-B2	*14.4*	*None*	*None*
Variation S3-B3	*14.7*	*None*	*None*
Variation S3-B4	*14.3*	*None*	*None*
Variation S3-B5	*14.0*	*None*	*None*
Variation S3-C1	*21.1*	*Burnt River*	*Redband trout*
		Dixie Creek	*Redband trout*
		Durkee Creek	*Redband trout*
		Manning Creek	*Redband trout*
		Sisley Creek	*Redband trout*
		Unity Creek	*Redband trout*
		Swayze Creek	*Redband trout*
Variation S3-C1	*21.1*	*North Fork Swayze Creek*	*Redband trout*
		Low Creek	*Redband trout*
Variation S3-C2	*21.7*	*Burnt River*	*Redband trout*
		Dixie Creek	*Redband trout*
		Durkee Creek	*Redband trout*
		Manning Creek	*Redband trout*
		Sisley Creek	*Redband trout*
		Unity Creek	*Redband trout*
		Swayze Creek	*Redband trout*
		North Fork Swayze Creek	*Redband trout*
		Low Creek	*Redband trout*
Variation S3-C3	*21.1*	*Burnt River*	*Redband trout*
		Shirttail Creek	*Redband trout*
		Powell Creek	*Redband trout*
		Alder Creek	*Redband trout*
		Low Creek	*Redband trout*
		Dixie Creek	*Redband trout*
Variation S3-C4	*21.4*	*Burnt River*	*Redband trout*
		Shirttail Creek	*Redband trout*
		Powell Creek	*Redband trout*
		Alder Creek	*Redband trout*
		Low Creek	*Redband trout*
		Dixie Creek	*Redband trout*
		Banks Ditch	*Redband trout*

Table 3-208. Fish Presence in Segment 3—Baker Valley			
Alternative Route	**Total Length (miles)**	**Streams Crossed**	**Fish Presence**
Variation S3-C5	*21.0*	*Burnt River*	*Redband trout*
		Shirttail Creek	*Redband trout*
		Powell Creek	*Redband trout*
		Alder Creek	*Redband trout*
		Low Creek	*Redband trout*
		Dixie Creek	*Redband trout*
Variation S3-C6	*24.7*	*Burnt River*	*Redband trout*
		Dixie Creek	*Redband trout*
		North Fork Dixie Creek	*Redband trout*
		Alder Creek	*Redband trout*
		Low Creek	*Redband trout*
Flagstaff A	55.3	Burnt River	Redband trout
		Dixie Creek	Redband trout
		Durkee Creek	Redband trout
		Manning Creek	Redband trout
		Pritchard Creek	Redband trout
		Sisley Creek	Redband trout
		Unity Creek	Redband trout
Timber Canyon	70.3	Beagle Creek	Redband trout
		Big Creek	Redband trout
		Burnt River	Redband trout
		Chalk Creek	Redband trout
		Dixie Creek	Redband trout
		Gold Creek	Redband trout
		Goose Creek	Redband trout
		Lick Creek	Redband trout
		McCurry Creek	Redband trout
		North Fork Daly Creek	Redband trout
		Powder River (twice)	Redband trout
		Sisley Creek	Redband trout
		Unnamed Stream (1172125447534 [previously Rock Gulch])	Redband trout
		Unnamed Stream (1176329450110 [previously Bazine Creek])	Redband trout

Table 3-208. Fish Presence in Segment 3—Baker Valley			
Alternative Route	**Total Length (miles)**	**Streams Crossed**	**Fish Presence**
Flagstaff A – Burnt River Mountain	55.3	Alder Creek	Redband trout
		Burnt River	Redband trout
		Burnt River	Redband trout
		Dixie Creek	Redband trout
		Powell Creek	Redband trout
		Shirttail Creek	Redband trout
Flagstaff B	56.0	Burnt River	Redband trout
		Dixie Creek	Redband trout
		Durkee Creek	Redband trout
		Manning Creek	Redband trout
		Pritchard Creek	Redband trout
		Sisley Creek	Redband trout
		Unity Creek	Redband trout
Flagstaff B – Burnt River West	55.7	Alder Creek	Redband trout
		Burnt River	Redband trout
		Dixie Creek	Redband trout
		Powell Creek	Redband trout
Flagstaff B – Durkee	59.6	Alder Creek	Redband trout
		Burnt River	Redband trout
		Dixie Creek	Redband trout
		North Fork Dixie Creek (twice)	Redband trout
		Unnamed stream (1174727444702)	Redband trout
		Unnamed stream (1174799444659)	Redband trout

Applicant's Proposed Action Alternative

Federally Listed and Candidate Fish Species

The Applicant's Proposed Action Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

The Applicant's Proposed Action Alternative crosses the Burnt River (Link 3-92), Dixie Creek (Link 3-92), Durkee Creek (Link 3-58), Manning Creek (Link 3-78), Pritchard Creek (Link 3-58), Sisley Creek (Link 3-82), and Unity Creek (Link 3-58), which support redband trout.

Protected Fish Habitats

The Applicant's Proposed Action Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this action are anticipated.

Variation S3-A1

The variations in this series include Variation S3-A1 and S3-A2. Variation S3-A1 follows a slightly more southern alignment than Variation S3-A2.

Federally Listed and Candidate Fish Species

Variation S3-A1, as with Variation S3-A2, does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-A1 crosses Gentry Creek (Link 3-4), which supports redband trout. Variation S3-A1 is similar to Variation S3-A2.

Protected Fish Habitats

Variation S3-A1, as with Variation S3-A2, does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-A2

Variation S3-A2 follows a slightly more northern alignment than Variation S3-A1.

Federally Listed and Candidate Fish Species

As with Variation S3-A1, Variation S3-A2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with Variation S3-A1, Variation S3-A2 crosses Gentry Creek (Link 3-12), which supports redband trout.

Protected Fish Habitats

As with Variation S3-A1, Variation S3-A2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-B1

The variations in this series include Variation S3-B1 through S3-B5. Variation S3-B1 follows a more easterly alignment than Variation S3-B2 through Variation S3-B5.

Federally Listed and Candidate Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support federally listed or other candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-B2

Variation S3-B2 follows a southern alignment that is located between Variation S3-B1 and Variation S3-B3 through Variation S3-B5.

Federally Listed and Candidate Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support federally listed or other candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-B3

Variation S3-B3 follows a southern alignment that is located just west of Variation S3-B2.

Federally Listed and Candidate Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support federally listed or other candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-B4

Variation S3-B4 follows a southern alignment that is located in between Variation S3-B3 and Variation S3-B5 for most of its length, then jogs to the west of Variation S3-B3 and remains west and south for the remainder of the alignment.

Federally Listed and Candidate Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support federally listed or other candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-B5

Variation S3-B5 follows a southern alignment that begins west of Variation S3-B4, then crosses Variation S3-B4 and Variation S3-B3 at the approximate midpoint of the alignment and parallels Variation S3-B2 along the south to the alignment terminus.

Federally Listed and Candidate Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support federally listed or other candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-C1

The variations in this series include Variation S3-C1 through S3-C6. Variation S3-C1 follows a southeastern alignment and is the most northeast Variation in the S3-C variations.

Federally Listed and Candidate Fish Species

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-C1 crosses the Burnt River (Link 3-92), Dixie Creek (Link 3-92), Durkee Creek (Link 3-58), Manning Creek (Link 3-78), Sisley Creek (Link 3-82), Low Creek (Link 3-58), Swayze Creek (Link 3-80), North Fork Swayze Creek (Link 3-78), and Unity Creek (Link 3-58), which support redband trout.

Variation S3-C1 crosses the same number of streams as S3-C2 and both variations cross more streams than the rest of the S3-C variations.

Protected Fish Habitats

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-C2

Variation S3-C2 follows a southeastern alignment and generally parallels Variation S3-C1 for most of the alignment.

Federally Listed and Candidate Fish Species

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-C2 crosses the Burnt River (Link 3-92), Dixie Creek (Link 3-92), Durkee Creek (Link 3-42), Manning Creek (Link 3-78), Sisley Creek (Link 3-82), Low Creek (Link 3-42), Swayze Creek (Link 3-80), North Fork Swayze Creek (Link 3-78), and Unity Creek (Link 3-42), which support redband trout. Variation S3-C2 crosses the same number of streams as S3-C1 and both variations cross more streams than the rest of the S3-C variations.

Protected Fish Habitats

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-C3

Variation S3-C3 follows a southeastern alignment and generally parallels the northern edge of Variation S3-C4 for most of the alignment.

Federally Listed and Candidate Fish Species

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-C3 crosses the Burnt River (Link 3-64), Dixie Creek (Link 3-92), Powell Creek (Link 3-72), Shirttail Creek (Link 3-72), Alder Creek (Link 3-60), and Low Creek (Link 3-60), which support redband trout. This variation crosses the same streams as S3-C5 and both variations cross fewer streams than Variations S3-C1, S3-C2, and S3-C4 but cross one more stream than Variation S3-C6.

Protected Fish Habitats

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-C4

Variation S3-C4 follows a southeastern alignment and generally parallels the southern edge of Variation S3-C3 for most of the alignment.

Federally Listed and Candidate Fish Species

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-C4 crosses the Burnt River (Link 3-68), Dixie Creek (Link 3-92), Powell Creek (Link 3-72), Shirttail Creek (Link 3-72), Alder Creek (Link 3-60), Low Creek (Link 3-60), and Banks Ditch (Link 3-68), which support redband trout. Variation S3-C4 crosses fewer streams than Variations S3-C1 and S3-C2 but crosses more streams than the rest of the variations in the S3-C series.

Protected Fish Habitats

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-C5

Variation S3-C5 follows a southern alignment initially then turns to the southeast and splits off from Variation S3-C6. Variation S3-C5 does not parallel any other variations within the S3-C variations.

Federally Listed and Candidate Fish Species

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-C5 crosses the Burnt River (Link 3-71), Dixie Creek (Link 3-73), Powell Creek (Link 3-73), Shirttail Creek (Link 3-73), Alder Creek (Link 3-60), and Low Creek (Link 3-60), which support redband trout. Variation S3-C5 crosses the same streams as Variation S3-C3 and both variations cross fewer streams than Variations S3-C1, S3-C2, and S3-C4 but cross one more stream than Variation S3-C6.

Protected Fish Habitats

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-C6

Variation S3-C6 follows a southern route away from the other variations in the S3-C section and turns back to the east before reconnecting to near the Applicant's Proposed Action Alternative south of Dixie.

Federally Listed and Candidate Fish Species

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-C6 crosses the Burnt River (Link 3-74), Dixie Creek (Link 3-90), Alder Creek (Link 3-60), Low Creek (Link 3-60), and North Fork Dixie Creek (Link 3-74), which support redband trout. Variation S3-C6 crosses the fewest number of streams than the rest of the S3-C series.

Protected Fish Habitats

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Flagstaff A Alternative

The Flagstaff A Alternative follows a southeastern alignment and generally parallels the Flagstaff A – Burnt Mountain Alternative for most of the alignment, diverging from the Flagstaff A – Burnt Mountain Alternative around Durkee.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Flagstaff A Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

As with the Applicant's Proposed Action Alternative, the Flagstaff A Alternative crosses the Burnt River (Link 3-92), Dixie Creek (Link 3-92), Durkee Creek (Link 3-58), Manning Creek (Link 3-78), Pritchard Creek (Link 3-58), Sisley Creek (Link 3-82), and Unity Creek (Link 3-58), which support redband trout.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Flagstaff A Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Timber Canyon Alternative

The Timber Canyon Alternative crosses to the north of, and not across, the Thief Valley Reservoir and bends to the southeast inside the Wallowa-Whitman National Forest. The Timber Canyon Alternative curves back to the west and south, just past the Brownlee Reservoir, but does not cross the Brownlee Reservoir.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Timber Canyon Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

The Timber Canyon Alternative crosses Beagle Creek (Link 3-6), Big Creek (Link 3-8), the Burnt River (Link 3-92), Chalk Creek (Link 3-8), Dixie Creek (Link 3-92), Gold Creek (Link 3-8), Goose Creek (Link 3-8), Lick Creek (Link 3-6), McCurry Creek (Link 3-6), North Fork Daly Creek (Link 3-8), the Powder River (twice) (Link 3-6 and 3-8), Sisley Creek (Link 3-82), and unnamed streams (1172125447534 [previously Rock Gulch - Link 3-8] and 1176329450110 [previously Bazine Creek - Link 3-6]), which support redband trout. The Timber Canyon Alternative crosses eight more waterways which support redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Timber Canyon Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Flagstaff A – Burnt River Mountain Alternative

The Flagstaff A – Burnt River Mountain Alternative generally parallels the southern side of the Flagstaff A Alternative for the northern half of its alignment, then diverts slightly south and away from the Flagstaff A Alternative north of Durkee south to Weatherby.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Flagstaff A – Burnt River Mountain Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

The Flagstaff A - Burnt River Mountain Alternative crosses Alder Creek (Link 3-60), the Burnt River (Link 3-64), Dixie Creek (Link 3-92), Powell Creek (Link 3-72), and Shirttail Creek (Link 3-72), which support redband trout. The Flagstaff A – Burnt River Mountain Alternative crosses two fewer streams which support redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Flagstaff A – Burnt River Mountain Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Flagstaff B Alternative

The Flagstaff B Alternative generally parallels the northern side of the Flagstaff B – Burnt River West Alternative for the northern half of its alignment, then parallels the southern side of the Flagstaff A Alternative north of Durkee south to Weatherby.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Flagstaff B Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

As with the Applicant's Proposed Action Alternative, the Flagstaff B Alternative crosses the Burnt River (Link 3-92), Dixie Creek (Link 3-92), Durkee Creek (Link 3-58), Manning Creek (Link 3-78), Pritchard Creek (Link 3-58), Sisley Creek (Link 3-82), and Unity Creek (Link 3-58), which support redband trout.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Flagstaff B Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Flagstaff B – Burnt River West Alternative

The Flagstaff B – Burnt River West Alternative generally parallels the southern side of the Flagstaff B Alternative for the northern half of its alignment, then diverts south in the area of Durkee and continues south to Weatherby.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Flagstaff B – Burnt River West Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

The Flagstaff B - Burnt River West Alternative crosses Alder Creek (Link 3-60), the Burnt River (Link 3-71), Dixie Creek (Link 3-73), and Powell Creek (Link 3-73), which support redband trout. The Flagstaff B – Burnt River West Alternative crosses three fewer streams which support redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Flagstaff B – Burnt River West Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Flagstaff B – Durkee Alternative

The Flagstaff B – Durkee Alternative generally parallels the southern side of the Flagstaff B – Burnt River Mountain Alternative for the northern half of its alignment, then diverts south and away from the Flagstaff B – Burnt Mountain Alternative southwest of Durkee.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Flagstaff B – Durkee Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

The Flagstaff B – Durkee Alternative crosses Alder Creek (Link 3-60), the Burnt River (Link 3-74), Dixie Creek (Link 3-90), North Fork Dixie Creek (twice) (Link 3-74 and 3-90), and unnamed streams (1174727444702 [Link 3-90] and 1174799444659 [Link 3-90]), which support redband trout. The Flagstaff B – Durkee Alternative crosses the similar number of waterways which support redband trout as the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Flagstaff B – Durkee Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

SEGMENT 4—BROGAN

Segment 4 begins in the Burnt River subbasin in the north, crosses through the Brownlee Reservoir subbasin and routes to the southwest through the Willow subbasin, ending in the Bully subbasin. Streams in this Segment drain generally toward the Snake River to the east – southeast.

Table 3-209 presents the resource inventory for fish resources crossed by all alternative route and route variation centerlines in Segment 4.

Table 3-209. Fish Resources Inventory Data for Segment 4—Brogan

Alternative Route	Total Length (miles)	Resource Inventory (miles crossed)				
		Bull Trout Critical Habitat	Chinook Salmon Critical Habitat	Middle Columbia River Steelhead Critical Habitat	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams
Applicant's Proposed Action	40.1	0.0	0.0	0.0	0.0	1.0
Variation S4-A1	*5.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.3*
Variation S4-A2	*6.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.3*
Variation S4-A3	*6.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.3*
Tub Mountain South	40.5	0.0	0.0	0.0	0.0	1.5
Willow Creek	34.6	0.0	0.0	0.0	0.0	0.9

Table 3-210 summarizes fish presence in streams crossed by all alternative route and route variation centerlines in Segment 4.

Table 3-210. Fish Presence in Segment 4—Brogan

Alternative Route	Length (miles)	Streams Crossed	Resource Inventory (miles)
Applicant's Proposed Action	40.1	Willow Creek	Redband trout
Variation S4-A1	*5.9*	*Goodman Creek*	*Redband trout*
Variation S4-A2	*6.0*	*Goodman Creek*	*Redband trout*
Variation S4-A3	*6.1*	*Goodman Creek*	*Redband trout*
Tub Mountain South	40.5	Goodman Creek	Redband trout
		Birch Creek	Redband trout
		Benson Creek	Redband trout
		Durbin Creek	Redband trout
		Willow Creek	Redband trout
Willow Creek	34.6	Goodman Creek	Redband trout
		Birch Creek	Redband trout
		Benson Creek	Redband trout
		Durbin Creek	Redband trout
		Willow Creek	Redband trout

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative and the Willow Creek Alternative begins at Dixie Creek in the Burnt River subbasin and proceeds south between Table Rock and the Burnt River valley.

Federally Listed and Candidate Fish Species

The Applicant's Proposed Action Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

The Applicant's Proposed Action Alternative crosses Willow Creek (Link 4-65), which supports redband trout.

Protected Fish Habitats

The Applicant's Proposed Action Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this action are anticipated.

Variation S4-A1

The variations in this series include Variation S4-A1 through S4-A3. Variation S4-A1 would generally parallel the Applicant's Proposed Action Alternative for its alignment, however taking a more western route than Variations S4-A2 and S4-A3.

Federally Listed and Candidate Fish Species

As with Variations S4-A2 and S4-A3, this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S4-A1 crosses Goodman Creek (Link 4-13), which supports redband trout. All variations in this series cross only Goodman Creek.

Protected Fish Habitats

As with Variations S4-A2 and S4-A3, this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S4-A2

Variation S4-A2 would generally parallel the Applicant's Proposed Action Alternative for its alignment, however taking a more eastern route than Variations S4-A1 and S4-A3.

Federally Listed and Candidate Fish Species

As with Variations S4-A1 and S4-A3, this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S4-A2 crosses Goodman Creek (Link 4-17), which supports redband trout. All variations in this series cross Goodman Creek.

Protected Fish Habitats

As with Variations S4-A1 and S4-A3, this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S4-A3

Variation S4-A3 would generally parallel the Applicant's Proposed Action Alternative for its alignment, this alignment would be located between Variations S4-A1 and S4-A2.

Federally Listed and Candidate Fish Species

As with Variations S4-A1 and S4-A3, this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S4-A3 crosses Goodman Creek (Link 4-17), which supports redband trout. All variations in this series cross only Goodman Creek.

Protected Fish Habitats

As with Variations S4-A1 and S4-A3, this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Tub Mountain South Alternative

The Tub Mountain South Alternative would generally parallel the Applicant's Proposed Action Alternative for its alignment south to Tub Mountain, then continue to the south and east toward the Snake River. The Tub Mountain South Alternative curves south past Love Reservoir and back west into Alkali Flats and ends at the Coyote Springs.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Tub Mountain South Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

The Tub Mountain South Alternative crosses Goodman Creek (Link 4-17), Birch Creek (Link 4-75), Benson Creek (Link 4-30), Durbin Creek (Link 4-30), and Willow Creek (Link 4-75), which support redband trout. The Tub Mountain South Alternative crosses four more streams than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Tub Mountain South Alternative does not cross any streams that support sensitive fish species. No identifiable impacts from this alternative are anticipated.

Willow Creek Alternative

The Willow Creek Alternative would generally parallel the Applicant's Proposed Action Alternative for its alignment south to Lost Tom Mountain, then continue to the south to Striped Mountain, then curve back west across the Willow Creek Valley and turns south toward Coyote Springs.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Willow Creek Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

The Willow Creek Alternative crosses Goodman Creek (Link 4-13), Birch Creek (Link 4-40), Benson Creek (Link 4-35), Durbin Creek (Link 4-35), and Willow Creek (Link 4-60), which support redband trout. The Willow Creek Alternative crosses four more streams than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Willow Creek Alternative does not cross any streams that support sensitive fish species. No identifiable impacts from this alternative are anticipated.

SEGMENT 5—MALHEUR

Segment 5 begins in the Bully River subbasin near Coyote Springs and proceeds south across Cottonwood Creek and Bully Creek, both headwaters areas to the Bully Creek Reservoir. Segment 5 continues south, crossing into the Lower Malheur subbasin, crossing Lower Malheur Canyon and the Malheur River. In the area of Vine Hill, the Applicant's Proposed Action Alternative turns east and cross the upper Cow Hollow, then turns south into the Lower Owyhee subbasin and crosses the Owyhee River near Mitchell Butte. The Applicant's Proposed Action Alternative continues south southeast

toward the Segment terminus near Succor Creek. Streams in this Segment drain generally toward the Snake River to the east.

Table 3-211 presents the resource inventory for fish resources crossed by all alternative route and route variation centerlines in Segment 5.

Table 3-211. Fish Resources Inventory Data for Segment 5—Malheur

Alternative Route	Total Length (miles)	Resource Inventory (miles crossed)				
		Bull Trout Critical Habitat	Chinook Salmon Critical Habitat	Middle Columbia River Steelhead Critical Habitat	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams
Applicant's Proposed Action	40.4	0.0	0.0	0.0	0.0	1.1
Variation S5-A1	7.4	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S5-A2	7.4	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Variation S5-B1	2.5	*0.0*	*0.0*	*0.0*	*0.0*	*0.6*
Variation S5-B2	2.8	*0.0*	*0.0*	*0.0*	*0.0*	*0.2*
Malheur S	43.5	*0.0*	*0.0*	*0.0*	*0.0*	*0.5*
Malheur A	43.1	*0.0*	*0.0*	*0.0*	*0.0*	*0.5*

Table 3-212 summarizes fish presence in streams crossed by all alternative route and route variation centerlines in Segment 5.

Table 3-212. Fish Presence in Segment 5—Malheur

Alternative Route	Total Length (miles)	Streams Crossed	Fish Presence
Applicant's Proposed Action	40.4	Owyhee River	Redband trout
		Bully Creek	Redband trout
		Cottonwood Creek	Redband trout
		Malheur River	Redband trout
Variation S5-A1	*7.4*	*None*	*None*
Variation S5-A2	*7.4*	*None*	*None*
Variation S5-B1	*2.5*	*Owyhee River*	*Redband trout*
Variation S5-B2	*2.8*	*Owyhee River*	*Redband trout*
Malheur S	43.5	Owyhee River	Redband trout
		Bully Creek	Redband trout
		Cottonwood Creek	Redband trout
		Malheur River	Redband trout
Malheur A	43.1	Owyhee River	Redband trout
		Bully Creek	Redband trout
		Cottonwood Creek	Redband trout
		Malheur River	Redband trout

Applicant's Proposed Action Alternative

Federally Listed and Candidate Fish Species

The Applicant's Proposed Action Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

The Applicant's Proposed Action Alternative crosses the Owyhee River (Link 5-55), Bully Creek (Link 5-1), Cottonwood Creek (Link 5-1), and the Malheur River (Link 5-5), which support redband trout.

Protected Fish Habitats

The Applicant's Proposed Action Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this action are anticipated.

Variation S5-A1

The variations in this series include Variation S5-A1 and S5-A2. Variation S5-A1 would generally parallel the Applicant's Proposed Action Alternative for most of its alignment; however it takes a slightly northern route compared to Variation S5-A2.

Federally Listed and Candidate Fish Species

Variation S5-A1, as with Variation S5-A2, does not cross any streams or other fish resources. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S5-A1, as with Variation S5-A2, does not cross any streams or other fish resources. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

Variation S5-A1, as with Variation S5-A2, does not cross any streams or other fish resources. No identifiable impacts from this variation are anticipated.

Variation S5-A2

Variation S5-A2 would generally parallel the Applicant's Proposed Action Alternative for most of its alignment; however it takes a slightly southern route compared to Variation S5-A1.

Federally Listed and Candidate Fish Species

As with Variation S5-A1, Variation S5-A2 does not cross any streams that support special status fish species or protected fish habitats. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with Variation S5-A1, Variation S5-A2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with Variation S5-A1, Variation S5-A2 does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Variation S5-B1

The variations in this series include Variation S5-B1 and S5-B2. Variation S5-B1 would generally parallel the Applicant's Proposed Action Alternative near the Owyhee River; however it takes a slightly southern route compared to Variation S5-B2.

Federally Listed and Candidate Fish Species

Variation S5-B1, as with Variation S5-B2, does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S5-B1, similar to Variation S5-B2, crosses the Owyhee River (Link 5-55), which supports redband trout.

Protected Fish Habitats

Variation S5-B1, as with Variation S5-B2, does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S5-B2

Variation S5-B2 would generally parallel the Applicant's Proposed Action Alternative for most of its alignment; however it takes a slightly more northern route across the Owyhee River compared to Variation S5-B1.

Federally Listed and Candidate Fish Species

As with Variation S5-B1, Variation S5-B2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Similar to Variation S5-B1, Variation S5-B2 crosses the Owyhee River (Link 5-45), which supports redband trout.

Protected Fish Habitats

As with Variation S5-B1, Variation S5-B2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Malheur S Alternative

The Malheur S Alternative would generally parallel the Applicant's Proposed Action Alternative until crossing U.S. Route 20 west of Vale, Oregon; the Malheur S Alternative then veers south, generally paralleling the Malheur A Alternative for most of its length until reaching Government Corral Spring, then the Malheur S Alternative runs generally east and south to its terminus near Succor Creek.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Malheur S Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

As with the Applicant's Proposed Action Alternative, the Malheur S Alternative crosses the Owyhee River (Link 5-30), Bully Creek (Link 5-1), Cottonwood Creek (Link 5-1), and the Malheur River (Link 5-5), which support redband trout.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Malheur S Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Malheur A Alternative

The Malheur A Alternative would generally parallel the Applicant's Proposed Action Alternative until crossing U.S. Route 20 west of Vale, Oregon; the Malheur A Alternative then veers south, generally paralleling the Malheur S Alternative for most of its length until reaching Government Corral Spring, then the Malheur A Alternative runs generally south then east to its terminus near Succor Creek.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Malheur A Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

As with the Applicant's Proposed Action Alternative, the Malheur A Alternative crosses the Owyhee River (Link 5-35), Bully Creek (Link 5-1), Cottonwood Creek (Link 5-1), and the Malheur River (Link 5-5), which support redband trout.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Malheur A Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

SEGMENT 6—TREASURE VALLEY

The Treasure Valley Segment is located entirely in Owyhee County, Idaho, and includes the Proposed Action from the Oregon/Idaho border to the Project's terminus at the Hemingway Substation.

Table 3-213 presents the resource inventory for fish resources crossed by all alternative route and route variation centerlines in Segment 6.

Table 3-213. Fish Resources Inventory Data for Segment 6—Treasure Valley						
Alternative Route	Total Length (miles)	Resource Inventory (miles crossed)				
		Bull Trout Critical Habitat	Chinook Salmon Critical Habitat	Middle Columbia River Steelhead Critical Habitat	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams
Applicant's Proposed Action	28.0	0.0	0.0	0.0	0.0	0.8
Variation S6-A1	*9.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*
Variation S6-A2	*8.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*
Variation S6-B1	*14.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.4*
Variation S6-B2	*14.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.4*

Table 3-214 summarizes fish presence in streams crossed by all alternative route and route variation centerlines in Segment 6.

Table 3-214. Fish Presence in Segment 6—Treasure Valley			
Alternative Route	Total Length (miles)	Streams Crossed	Fish Presence
Applicant's Proposed Action	28.0	Succor Creek	Redband trout
		Reynolds Creek	Redband trout
		Jump Creek	Redband trout
Variation S6-A1	*9.3*	*Poison Creek*	*Redband trout*
Variation S6-A2	*8.9*	*Poison Creek*	*Redband trout*
Variation S6-B1	*14.4*	*Jump Creek*	*Redband trout*
Variation S6-B2	*14.1*	*Jump Creek*	*Redband trout*

Applicant's Proposed Action Alternative

Federally Listed and Candidate Fish Species

The Applicant's Proposed Action Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

The Applicant's Proposed Action Alternative crosses Succor Creek (Link 6-1), Reynolds Creek, and Jump Creek (Link 6-25), which support redband trout.

Protected Fish Habitats

The Applicant's Proposed Action Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this action are anticipated.

Variation S6-A1

The variations in this series include Variation S6-A1 and S6-A2. Variation S6-A1 would generally parallel the Applicant's Proposed Action Alternative for most of its alignment; however it deviates slightly to the south of Variation S6-A2.

Federally Listed and Candidate Fish Species

Variation S6-A1, as with Variation S6-A2, does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S6-A1 crosses Poison Creek (Link 6-20), which supports redband trout. Both Variation S6-A1 and S6-A2 cross Poison Creek.

Protected Fish Habitats

Variation S6-A1, as with Variation S6-A2, does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S6-A2

Variation S6-A2 would generally parallel the Applicant's Proposed Action Alternative for most of its alignment; however it deviates slightly to the north of Variation S6-A1.

Federally Listed and Candidate Fish Species

As with Variation S6-A1, Variation S6-A2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S6-A2 crosses Poison Creek (Link 6-15), which supports redband trout. Both Variation S6-A2 and S6-A1 cross Poison Creek.

Protected Fish Habitats

As with Variation S6-A1, Variation S6-A2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S6-B1

The variations in this series include Variation S6-B1 and S6-B2. Variation S6-B1 would generally parallel the Applicant's Proposed Action Alternative for most of its alignment; however it deviates slightly to the north of Variation S6-B2.

Federally Listed and Candidate Fish Species

Variation S6-B1, as with Variation S6-B2, does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S6-B1, similar to Variation S6-B2, crosses Jump Creek (Link 6-25), which supports redband trout.

Protected Fish Habitats

As with Variation S6-B2, Variation S6-B1 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S6-B2

Variation S6-B2 would generally parallel the Applicant's Proposed Action Alternative for most of its alignment; however it deviates slightly to the south of Variation S6-B1.

Federally Listed and Candidate Fish Species

As with Variation S6-B1, Variation S6-B2 does not cross any stream which support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with Variation S6-B1, Variation S6-B2 crosses Jump Creek (Link 6-30), which supports redband trout.

Protected Fish Habitats

As with Variation S6-B1, Variation S6-B2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

3.2.5.6 Environmental Consequences (Results of Analysis)

Types of Potential Effects

Most direct and indirect effects on fish and aquatic resources from the B2H Project would result from three major B2H Project-related activities: construction and use of stream-crossing access roads, management of riparian and forest vegetation, and ground-disturbing activities and other B2H Project activities in proximity to waterbodies.

Access Roads

In general, the analysis area (study corridor) used for the assessment of fish resources consists of fish-bearing streams crossed by the centerline of alternative routes and route variations. No specific access road stream crossings are used as part of this analysis. However, streams directly crossed by access roads have the greatest potential to be affected by B2H Project activities. Direct effects on fish could include fish mortality during construction of access roads if fish are present at the time in-stream activities to construct stream crossings are conducted. However, no in-water work, or work below the ordinary high water mark (OHW), is anticipated to occur in streams that support ESA-listed fish, designated critical habitat, and/or EFH.

Direct effects also would include short-term loss of aquatic habitat or a reduction in overall habitat quality through an increase of erosion and sedimentation and removal of vegetation as a result of construction of access roads or transmission structures in aquatic habitats. The major potential direct effects on fish resources from stream crossings are a short-term downstream increase in suspended sediment and turbidity resulting in the potential for fish impedance. Increased sedimentation is likely to result in reduced egg-to-fry survival (NMFS 2015). Fine sediment fills the interstitial spaces of spawning substrate, which results in a decrease in flow over the eggs that normally would provide oxygen to the eggs and carry away metabolic waste (NMFS 2015).

Impacts from increased erosion and sediment transport from upland locations during construction would be limited to the area of construction and approximately 300 feet downstream[2] of construction and would be short term during construction activities.

New crossings of waterbodies will be avoided to the extent practicable by using existing crossings, but some new crossings are expected. No new access road crossings, or modifications of existing crossings below OHW, will occur in waterways that support ESA-listed fish, designated critical habitat, and/or EFH. Furthermore, no new crossings, or modifications of existing crossings below OHW, will occur within 1,000 feet upstream of waterways, including tributaries that support ESA-listed fish, designated critical habitat, and/or EFH.

For perennial fish-bearing waterways that do not support ESA-listed fish, designated critical habitat, and/or EFH, existing structures will be used when feasible; however, new or modified channel-spanning structures may be used where required. All proposed channel spanning structure designs or modifications developed for fish-bearing streams meet Oregon Fish Passage criteria outlined in OAR Division 412 and will be implemented with approval by ODFW. For seasonal/ephemeral streams, new or modified channel-spanning structures, existing fords, or existing fords that require minor modifications to stabilize (e.g., portable mats, minimal amount of coarse fill) will be used.

Furthermore, no new culverts will be installed and no existing culverts will be replaced as part of the Project.

As the engineering plans are further developed for access roads, site-specific crossings would be designed and other crossing types may be used. Locations where access roads cross streams (perennial, intermittent, or ephemeral) that have historic or current populations of native migratory fish (OAR 635-412-0005(32)) state and federal fish passage rules and regulations would be addressed and final crossing plans would be determined through consultation with federal and state agencies, as requested. Based on determinations by federal and state agencies regarding presence of migratory fish species and passage needs at specific stream crossings, fish passage plans would be developed for streams that trigger state or federal fish passage laws.

Because it is anticipated that some fish-bearing streams would require in-water work, or work below OHW, structures may impede natural large woody debris, water, or sediment movement. However, crossing types would be specified by jurisdictional agencies at the time of final engineering design, and crossings of fish-bearing streams would be designed to allow natural flow, fish passage, and to reduce downstream sediment disturbance and bank erosion during use of the road for B2H Project operations. Furthermore, all disturbed sites will be stabilized in accordance with National Pollutant Discharge Elimination System standards.

The crossing types currently planned for use are detailed in the Revised POD and are summarized in Chapter 2.

[2]300 feet is based on the Department of Environmental Quality Technical Basis for Revising Turbidity Criteria (2005).

Non-fish-bearing seasonal waterways would be crossed when water is not flowing in the channels and applicable design features and selective mitigation measures would be followed.

Vegetation Removal

Removal of riparian vegetation could result in increases in water temperature and have effects on fish habitat. In general, higher water temperatures decrease dissolved oxygen and can stress fish. Impacts associated with the removal of streamside vegetation would range from short to long term, depending on whether the vegetation removal would be short term for construction or long term for operations.

Vegetation removal within riparian areas (Refer to RCAs in Section 3.2.3) generally would occur in the right-of-way (wire zone and border zone) and on access roads. A majority of the trees within the wire zone would be permanently removed except for low-growing trees and shrubs as well as trees within valley bottoms. After initial clearing, vegetation in the wire zone would be maintained to consist of native grasses, legumes, herbs, ferns, and other low-growing shrubs that remain under 20 to 25 feet tall at maturity. Vegetation in the border zone would be maintained to consist of tall shrubs or short trees (up to 34 feet high at maturity), grasses, and forbs. Additionally, the cleared areas would be replanted, where practicable, with a variety of native species, helping to restore vegetation communities. Therefore, minimal impacts on organic input and large wood recruitment are anticipated.

Long-term loss of vegetation and trees near streams and on the right-of-way may cause an increase in solar exposure and slight localized increase in surface water temperature because stream temperature in vegetated riparian settings can be influenced strongly by the presence or absence of shade (Danehy et al. 2005). Water temperature impacts would be greatest along waterbodies that are small, slow-moving and shallow. Thinning or removal of vegetation within or adjacent to riparian areas also could contribute to long-term local increases in sedimentation.

The majority of stream crossings for the B2H Project would occur in shrublands, outside of forested areas. Shrub canopy cover typically is concentrated along the edges of a stream. Overhead sun imparts maximum solar radiation directly onto the deeper middle portions of the stream.

Indirect effects from vegetation removal as a result of road construction may include the potential to add sediment and turbidity to streams that are not crossed directly. Although the level of effect would be less than from direct road-stream crossings, construction activities on these nearby roads and facilities still could contribute sediment to streams.

New road construction would have a higher likelihood of creating sediment runoff to streams, and at greater levels, than would the upgrading of existing roads, given the much lower ground disturbance involved in the latter. Operations and maintenance activities near fish-bearing streams would be infrequent (approximately one time per year) and limited to the specific areas of maintenance activity.

Special Status Species

Direct effects on federally listed fish species and other sensitive fish species would be similar to those effects described above for all other fish species.

Direct effects would be similar for all of the special status species that occur in the study area and would include displacement, disruption of habitats, and increased sedimentation which could modify fish behavior, including decreasing the ability to avoid predators (NMFS 2015). Indirect effects on special status fish species associated with the B2H Project would be limited in extent and magnitude. Indirect effects could include potential temporary increases in turbidity and sedimentation associated with operation and maintenance activities near fish-bearing streams.

Protected Fish Habitats

Critical habitat is identified by the NOAA Fisheries and the USFWS for many Federal ESA threatened and endangered fish species and is designated for several fish species in the B2H Project area. EFH is designated under the MSA for commercial Pacific salmon species, including for Chinook salmon and coho salmon within the B2H Project area. Direct effects on critical habitat and salmon EFH would include physical, chemical, or biological alterations of the waters or substrate and other ecosystem components, if such alterations reduce the quality or quantity of the habitat (50 CFR 600.810).

No in-water work is anticipated within designated critical habitat or EFH-designated streams; however, in-water work may be required in fish-bearing habitats that do not support ESA-listed fish species but do support USFS, BLM, or state special status fish species. Components of the B2H Project with the potential to adversely affect designated critical habitat, EFH, and habitats that support BLM, USFS, or state special status species include the removal of terrestrial and riparian vegetation, construction and operation of new access roads, the upgrade of existing access roads, and risk of accidental spills and leaks of hazardous materials.

Construction activities occurring for new access roads, upgrade of existing access roads, or other structures directly would affect habitats that support special status species as well as designated critical habitat and salmon EFH by temporarily increasing sedimentation and temporarily decreasing natural cover and availability of forage. These impacts would be localized to the areas of construction activity and would be short term for the duration of B2H Project construction. Also, in-water work, or work below OHW, will adhere to Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources (ODFW 2008).

Indirect effects on critical habitat, EFH, and habitats that support special status species would include temporary increases in turbidity and sedimentation associated with long-term periodic operation and maintenance activities near these designated streams.

Direct and indirect impacts from increases in turbidity and sediment will be minimized with the implementation of design features of the B2H Project for environmental protection and selective mitigation measures outlined in the Effects Analysis - Assessment of Initial Impacts section below

The information presented here is a summary of effects on the watersheds that the B2H Project would cross. Watershed road density is an indicator used by the NOAA Fisheries and the USFWS in the evaluation of watershed condition. The condition of a watershed is one of several metrics used to evaluate fish habitat condition. The NMFS (1996) has defined three classes of watershed condition:

- “properly functioning” (road density of less than 2 miles per square mile)
- “at risk” (road density from 2 to 3 miles per square mile), and
- “not properly functioning” (road density greater than 3 miles per square mile)

Higher road density often is correlated with increased peak stream flows and increased sediment to streams, both considered adverse conditions for fish. Peak flow, for example, can cause accelerated bank erosion; excessively scour stream bottoms, including spawning redds; disturb benthic organisms that are important food sources for fish; or wash out in-stream structures, such as large wood, that supply important stream habitat components.

The average existing road density across all 105 subwatersheds is 1.6 miles per square mile. The density range among the subwatersheds ranges from 0.5 to 5.7 miles per square mile. As described in Section 2.3.4.1, existing roads would be used in their present condition without improvements to the extent possible; however, new access roads (including new primitive roads or new bladed roads) would be constructed for the B2H Project. New access roads would result in increased road densities, but since the B2H Project facilities have not been fully designed and locations of the transmission line access roads are not known, increases in road densities for each subwatershed cannot be calculated. For the purpose of estimating impacts, ground disturbance associated with upgrading existing roads or constructing new roads was predicted through the development of a model based on the typical design characteristics of the 500-kV transmission line and ancillary facilities (Section 2.5.1). Estimated ground disturbance from access road per mile of transmission line is presented in Table 2-7. Increases in road densities in the subwatersheds crossed by the B2H Project could be moved into a category of greater risk to fish resources from possible increased flow and sedimentation.

Some increase in peak runoff and sedimentation may occur in these subwatersheds, but with relatively few miles added per subwatershed, the effects should be minimal. The effects from the B2H Project on spawning and rearing habitat in streams in these basins resulting from the road contribution would be slight. Similar effects are anticipated from the alternatives.

In summary, some relative increase in risk categorization to subwatershed conditions would occur. The increase in risk to watershed conditions should be slight because the number of new road miles added by the proposed B2H Project would be relatively low.

Habitat Removal

No in-water work is anticipated within waterways that support ESA-listed fish species, designated critical habitat, and/or EFH-designated streams; therefore, impacts on these in-stream habitats from construction would be minimal. However, in-water work may be required within fish-bearing waterways that do not support ESA-listed fish species but do support USFS, BLM, or state special status fish species.

Vegetation removal within riparian areas generally would occur in the right-of-way (wire zone and border zone) and on access roads. A majority of the trees in the wire zone would be removed except for low-growing trees and shrubs as well as trees in valley bottoms. After initial clearing, vegetation in

the wire zone would be maintained to consist of native grasses, legumes, herbs, ferns, and other low-growing shrubs that remain under 20 to 25 feet tall at maturity. Vegetation in the border zone would be maintained to consist of tall shrubs or short trees (up to 34 feet high at maturity), grasses, and forbs. Additionally, the cleared areas would be replanted, where practicable, with a variety of native species, helping to restore vegetation communities.

Water Withdrawal

Much of the water that would be used during construction activities would be used for dust suppression on access roads and to mix concrete for foundations. Water to be used during construction would be procured from municipal or commercial sources; therefore, so surface water withdrawals would be required. Because no new water rights would be required; impacts on fish from water withdrawal is not anticipated.

Noise

No in-water work is anticipated within waterways that support ESA-listed fish species, designated critical habitat, and/or EFH; therefore, impacts on listed species from construction noise would be minimal to ESA-listed fish species. However, in-water work may occur in waterways that support USFS, BLM, or state special status species.

To minimize impacts on fish from noise, all in-water work will occur during seasonal restrictions based on Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources (ODFW 2008).

Blasting

Implosive splicing and in-ground blasting is anticipated to occur during the B2H Project. The detonation of explosives in or near a body of water produces post-detonation compressive shock waves characterized by a rapid rise to a high peak pressure, followed by a rapid decay to a below-ambient hydrostatic pressure. Such a rapid pressure change may induce serious barotraumas to fish if blasting does not occur a sufficient distance from a body of water (the “setback” distance) (NMFS 2011). The range of charges for ground blasting will vary greatly with type, depth, strength and other physical properties of the rock to be blasted; therefore, without known locations of potential blasting, and geotechnical or foundation design data, specific information regarding ground blasting will not be available until construction begins. However, direct effects from blasting are anticipated to be reduced with the implementation of design features of the B2H Project for environmental protection and selective mitigation measures, such as seasonal restrictions and buffer distances, as described in the Effects Analysis - Assessment of Initial Impacts section below. Therefore, a B2H Project-specific blasting plan, for blasting and implosive splicing, that meets all state and federal requirements, including seasonal restrictions and buffer distances, would be developed and approved by the appropriate agency or agencies (e.g., the BLM, USFS, USFWS, and the NOAA Fisheries) for inclusion in the POD, prior to the start of field activities and would be executed appropriately for the B2H Project. No in-water blasting would occur as part of the B2H Project.

Noxious Weeds/Herbicides

The Applicant is responsible for ensuring that noxious weeds are identified and controlled during construction, operation, and maintenance of B2H Project facilities and that all federal, state, county, and other local requirements are satisfied. The management of noxious weeds would be considered throughout all stages of the B2H Project. Construction personnel would be educated regarding identified problem areas, the importance of preventive measures, and treatment methods. Specific preventive measures would be implemented to counteract the spread of noxious weeds during construction, operation, and maintenance activities. Preconstruction and postconstruction treatment methods would be applied to areas where noxious weeds are present. Noxious weed control typically would employ herbicide application and all noxious-weed-control activities would follow applicable BLM or USFS guidelines on federally managed lands. Additional measures to reduce the spread of noxious weeds, including avoidance, topsoil separation, and vehicle washing, would be followed as established in the Reclamation, Revegetation, and Monitoring Framework Plan.

Herbicide use during construction and operation of the B2H Project may cause short-term reduction in water quality due to herbicide drift and runoff. If not managed properly, herbicide use may result in direct impacts on fish by modifying fish behavior, including decreasing the ability of predator avoidance (NMFS 2015). In areas where federally listed and special status fish species are present, noxious-weed-control methods, approved herbicides, and buffers would be implemented, as described in the Effects Analysis - Assessment of Initial Impacts section below. Therefore, with the implementation of the Applicant's Noxious Weed Management Plan and Water Resources Protection Plan (to be included in the POD), the probability of direct impacts on fish is anticipated to be minimal.

Predator/Prey Relationships

Altered predator/prey relationships may result from increased sediment into waterways and removal of riparian vegetation. Impacts on water quality, such as an increase in turbidity and fine sediment, can alter predator/prey relationships by reducing the ability of predator avoidance and success in catching prey (NMFS 2015). Also, removal of riparian vegetation may decrease cover for juvenile fish, which may result in an increase in avian predation.

Fugitive Dust and Sedimentation

Fugitive dust resulting from construction activities and use of B2H Project access roads could result in indirect effects on fish resources in the form of increased turbidity to streams.

Dust production is expected only during construction activities and use of access roads that have not yet revegetated; operation and regular maintenance of the transmission line are not expected to produce an appreciable amount of dust or turbidity in streams.

As part of the B2H Project and several conservation measures are proposed that will minimize the potential for sediment transport from upland areas. Also, salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such seasonal high pulse exposures (NMFS 2012). Therefore, the increases in suspended sediment and turbidity plumes resulting from B2H Project-

related activities are not likely to kill or injure salmonids or other sensitive fish but may impede adult passage and juvenile rearing, as fish would avoid the area for the duration of the impact (NMFS 2012). As previously stated, several conservation measures are proposed that would minimize the potential for excessive B2H Project-related turbidity and impacts on fish in the B2H Project area.

Release of Pollutants

Accidental release of fuel, oil, and other contaminants may occur during construction and maintenance of the B2H Project. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonids at high levels of exposure and also can cause chronic lethal, and acute and chronic sublethal, effects on aquatic organisms (NMFS 2012). Development and implementation of a Spill Prevention, Containment, and Countermeasures Plan and a Hazardous Materials Management Plan (to be included in the POD), would include containment measures for construction-related chemical hazards and would reduce the likelihood for chemical releases during the B2H Project. In addition, construction specifications would require proper placement, containment, and use of harmful materials within the B2H Project area to minimize accidental discharge of these materials.

Design features of the B2H Project for environmental protection and selective mitigation measures developed to minimize the accidental discharge of pollutants to waterways are described in the Effects Analysis - Assessment of Initial Impacts section below.

Direct and Indirect Impacts

The analysis of impacts on fish and other aquatic species considered what the B2H Project construction and operations activities would be based on the B2H Project description (refer to Chapter 2) and impacts presented for similar projects and actions in the literature. This analysis considered the nature of the affected waterbodies; likely in-stream disturbances and nearby ground-disturbing activities due to the Project footprint, including access roads; types of affected vegetation and quantity of cleared riparian areas, proposed right-of-way maintenance methods, proposed stream crossing methods, and the design features and selective mitigation measures that would be implemented to reduce disturbance to fish resources.

Tables 3-204, 3-206, 3-208, 3-210, 3-212, and 3-214 indicate known fish species where present at a transmission line crossing and those within 1,000 feet downstream of a crossing. While some other fish species may be present in some of these streams, specific species designations are not indicated in the ODFW or StreamNet databases. A final site assessment and final engineering design of each access road-stream crossing would be conducted prior to construction to identify the fish species present and the appropriate design features and selective mitigation measures to apply to reduce and avoid impacts. This assessment would include consideration of site-specific conditions which may indicate the need for maintaining and/or improving passage for native migratory fish at some proposed road crossings of fish-bearing intermittent streams.

Traditional Foods

Restricted access to harvest areas, poor water quality, and a depletion of resources, such as water and salmon, can adversely affect tribal communities. The B2H Project could temporarily restrict tribal access to traditional harvest areas during construction, but access would not be restricted long-term. Availability of fish resources would not be affected by the B2H Project. The following temporary impacts on water and fish may occur:

The Project may affect water by:

- transport of sediment to waterways from upland locations (construction of new access roads and vegetation clearing)

The Project may affect fish by:

- temporarily increasing turbidity above baseline levels as a result of sediment transport from upland locations (construction of new access roads and vegetation clearing), potentially resulting in behavioral harassment
- altering predator-prey relationships as a result of sediment transport into waterways from upland locations and temporary removal of riparian vegetation

The Project is not anticipated to:

- restrict tribal access to harvest areas
- decrease water quantity, as no new water rights will be required
- kill fish, as fish removal from in-water work areas will occur where needed
- block fish from migrating to/from harvest areas, as fish-passage criteria will be followed where required

Conservation measures to reduce negative effects on water and fish include design features of the B2H Project for environmental protection and selective mitigation measures that are applied to mitigate site- and/or resource-specific impacts of the B2H Project (Refer to Section 3.2.5.4). As a result, impacts on traditional fish foods are anticipated to be minimal.

No Action Alternative

Under the No Action alternative, the proposed B2H Project would not be approved by the BLM or USFS and the impacts associated with the B2H Project would not occur. As such, there would be no direct or indirect impacts on fish or aquatic habitats.

Segment 1—Morrow-Umatilla

The alternatives in Segment 1 cross between 6 and 11 waterways with fish presence, construct new access roads, remove riparian vegetation, and control noxious weeds through herbicide use.

The number or location of access road crossings will not be available until a route is selected for construction and final design and engineering is completed. However, the construction of new access

roads and the upgrades of existing access roads can cause the loss of streamside vegetation, increased sedimentation or pollution runoff to waterways, potential blockage of fish passage, and loss of necessary habitat over the life of the B2H Project.

In Segment 1, no new access road crossings, or modifications of existing road crossings below OHW, would occur in waterways that support ESA-listed fish, designated critical habitat, and/or EFH. Furthermore, no new crossings, or modifications of existing crossings below OHW, would occur within 1,000 feet upstream of waterways, including tributaries that support ESA-listed fish, designated critical habitat, and/or EFH.

For perennial fish-bearing waterways that do not support ESA-listed species, designated critical habitat, and/or EFH, existing structures would be used when feasible; however, new or modified channel-spanning structures may be used where required. All proposed channel spanning structure designs or modifications for fish-bearing streams would be implemented with approval by ODFW. For seasonal/ephemeral streams, new or modified channel-spanning structures, existing fords, or existing fords that require minor modifications to stabilize (e.g., portable mats, minimal amount of coarse fill) would be used. Fords would not be created within waterways that support ESA-listed species, designated critical habitat, and/or EFH, or within tributaries 1,000 feet upstream of these areas.

Also, no new access roads will be constructed in the RCA of a waterway that supports ESA-listed fish, designated critical habitat, and/or EFH. However, short segments of new access roads would be constructed within RCAs of waterways that do not support ESA-listed fish, designated critical habitat, and/or EFH.

Furthermore, no new culverts would be installed and no existing culverts would be replaced as part of the Project in Segment 1.

The differences in impacts on fish resources between the alternatives and variations within Segment 1 are mainly related to the number of stream crossings and the extent of vegetation removal that would be required. Table 3-215 presents the residual impacts on all alternative routes and route variations in Segment 1.

Table 3-215. Fish Resources Inventory Data and Residual Impacts for Segment 1—Morrow-Umatilla									
Alternative Route	Total Length (miles)	Inventory Data (miles crossed)					Residual Impacts (miles crossed)		
		Bull Trout Critical Habitat	Chinook Salmon Essential Fish Habitat[1]	Middle Columbia River Steelhead Critical Habitat	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams	None	Low	Moderate
Applicant's Proposed Action	91.9	0	0	0.1	0.1	1.6	90.3	1.4	0.2
Variation S1-B1	*6.4*	*0*	*0*	*0*	*0.1*	*0.1*	*6.3*	*0*	*0.1*
Variation S1-B2	*6.4*	*0*	*0*	*0*	*0.4*	*0.4*	*6*	*0*	*0.4*
East of Bombing Range Road	92.3	0	0	0.1	0.1	1.6	90.7	1.4	0.2
Applicant's Proposed Action – Southern Route	99.1	0	0	0.4	0.1	1.6	97.5	1.1	0.5
West of Bombing Range Road – Southern Route	95.6	0	0	0.7	0.1	2	93.6	1.2	0.8
Longhorn	88.2	0	0	0.1	0.1	1.6	86.6	1.4	0.2
Interstate 84	84.7	0.2	0.3	0.3	0.1	2	82.7	1.5	0.5
Variation S1-A1	*18.5*	*0.1*	*0.2*	*0.1*	*0*	*0.6*	*17.9*	*0.4*	*0.2*
Variation S1-A2	*18.5*	*0.2*	*0.2*	*0.2*	*0*	*0.3*	*18.2*	*0.1*	*0.2*
Interstate 84 – Southern Route	93.4	0.2	0.3	0.6	0.1	2	86.6	1.4	0.2

Table Note: Chinook salmon EFH is used as the surrogate for the EFH resource inventory.

Applicant's Proposed Action Alternative

This alternative crosses Butter Creek, Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Birch Creek and Dry Creek support federally listed steelhead. The Birch Creek riparian area is approximately 200 feet wide at the line crossing. The Dry Creek riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), the Applicant's Proposed Action Alternative is anticipated to result in 0.1 mile of moderate residual impacts on MCR steelhead and SRB steelhead.

Sensitive Fish Species

Butter Creek, Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 350 feet. Based on the impact criteria used in this analysis (Table 3-196), the Applicant's Proposed Action Alternative is anticipated to result in approximately 1.6 miles of low residual impacts on redband trout.

Protected Fish Habitats

Birch Creek and Dry Creek contain designated critical habitat for steelhead DPSs. Coho salmon and associated EFH is present within this segment of Birch Creek. The Birch Creek vegetated riparian area is approximately 200 feet wide at the line crossing. The Dry Creek vegetated riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), the Applicant's Proposed Action Alternative is anticipated to result in approximately 0.1 mile of moderate residual impacts on both MCR and SRB steelhead critical habitat and approximately 0.1 mile of coho EFH.

Variation S1-B1

This variation crosses Dry Creek. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Dry Creek supports federally listed SRB steelhead. The Dry Creek riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), this variation is anticipated to result in 0.1 mile of moderate residual impacts on SRB steelhead.

Sensitive Fish Species

Dry Creek supports redband trout. The Dry Creek riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), this variation is anticipated to result in approximately 0.1 mile of low residual impacts on redband trout.

Protected Fish Habitats

Dry Creek supports designated critical habitat for SRB steelhead. The Dry Creek vegetated riparian area is approximately 140 feet wide at the line crossing.

Variation S1-B2

This variation crosses Dry Creek and an unnamed stream formerly named California Gulch (LLID 1182983453761) near the confluence of the two streams. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and

sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Dry Creek and an unnamed stream formerly named California Gulch (LLID 1182983453761) near the confluence of the two streams support SRB steelhead. The Dry Creek/California Gulch riparian area is approximately 300 feet wide at the line crossing. This variation crosses one more stream inhabited by federally listed fish compared to the Applicant's Proposed Action Alternative, and is anticipated to result in approximately 0.4 mile of moderate residual impact on SRB steelhead.

Sensitive Fish Species

Dry Creek and an unnamed stream formerly named California Gulch (LLID 1182983453761) near the confluence of the two streams support redband trout. The Dry Creek/unnamed stream riparian area is approximately 300 feet wide at the line crossing. This variation crosses one more stream inhabited by sensitive fish compared to the Applicant's Proposed Action Alternative. Based on the impact criteria used in this analysis (Table 3-196), this variation is anticipated to result in approximately 0.1 mile of low residual impacts on redband trout.

Protected Fish Habitats

Dry Creek and an unnamed stream formerly named California Gulch (LLID 1182983453761) near the confluence of the two streams support designated critical habitat for SRB steelhead. The Dry Creek/unnamed stream riparian area is approximately 300 feet wide at the line crossing. This variation crosses one more stream inhabited by federally listed fish compared to the Applicant's Proposed Action Alternative. Based on the impact criteria used in this analysis (Table 3-196), this variation is anticipated to result in approximately 0.4 mile of moderate residual impacts on SRB steelhead critical habitat.

Additional Action – 69-Kilovolt Line Replacement

Federally Listed and Candidate Fish Species

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Protected Fish Habitats

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

East of Bombing Range Road Alternative

This alternative crosses Butter Creek, Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Birch Creek and Dry Creek support federally listed steelhead. The Birch Creek riparian area is approximately 200 feet wide at the line crossing. The Dry Creek riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in 0.1 mile of moderate residual impacts on MCR steelhead and SRB steelhead.

Sensitive Fish Species

Butter Creek, Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 350 feet. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in approximately 1.6 miles of low residual impacts on redband trout.

Protected Fish Habitats

Birch Creek and Dry Creek support designated critical habitat for steelhead DPSs. Coho salmon and associated EFH is present within this segment of Birch Creek. The Birch Creek vegetated riparian area is approximately 200 feet wide at the line crossing. The Dry Creek vegetated riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in approximately 0.1 mile of moderate residual impacts on both MCR and SRB steelhead critical habitat and approximately 0.1 mile of coho EFH.

Applicant's Proposed Action – Southern Route Alternative

This alternative crosses Butter Creek, West Birch Creek, California Gulch, East Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

West Birch Creek, California Gulch, East Birch Creek, and Dry Creek support federally listed MCR steelhead. At the location of the crossings, the vegetated riparian width for West Birch Creek is approximately 120 feet, for California Gulch is approximately 50 feet, and for East Birch Creek is approximately 85 feet. The Dry Creek vegetated riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in 0.4 mile of moderate residual impacts on MCR steelhead and 0.1 mile of moderate residual impacts on SRB steelhead.

Sensitive Fish Species

Butter Creek, West Birch Creek, California Gulch, East Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 350 feet. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in approximately 1.6 miles of low residual impacts on redband trout.

Protected Fish Habitats

West Birch Creek, California Gulch, East Birch Creek, and Dry Creek support designated critical habitat for MCR steelhead. At the location of the crossings, the vegetated riparian width for West Birch Creek is approximately 120 feet, for California Gulch is approximately 50 feet, and for East Birch Creek is approximately 85 feet. The Dry Creek vegetated riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in approximately 0.4 mile of moderate residual impacts on MCR steelhead critical habitat and 0.1 mile of moderate residual impact on SRB steelhead critical habitat.

Additional Action – 69-Kilovolt Line Replacement

Federally Listed and Candidate Fish Species

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Protected Fish Habitats

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

West of Bombing Range Road – Southern Route Alternative

This alternative crosses Little Butter Creek, Butter Creek three times, Bear Creek, West Birch Creek, California Gulch, East Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects

on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Bear Creek, West Birch Creek, California Gulch, East Birch Creek, and Dry Creek support federally listed MCR steelhead. At the location of the crossings, the vegetated riparian width for Bear Creek is approximately 25 feet wide, for West Birch Creek is approximately 75 feet, for California Gulch is approximately 50 feet, and for East Birch Creek is approximately 85 feet. The Dry Creek vegetated riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-201), this alternative is anticipated to result in 0.7 mile of moderate residual impacts on MCR steelhead and 0.1 mile of moderate residual impacts on SRB steelhead.

Sensitive Fish Species

This alternative crosses Butter Creek, Butter Creek three times. Bear Creek, West Birch Creek, California Gulch, East Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 350 feet. Based on the impact criteria used in this analysis (Table 3-201), this alternative is anticipated to result in approximately 2.0 miles of low residual impacts on redband trout.

Protected Fish Habitats

Bear Creek, West Birch Creek, California Gulch, East Birch Creek and Dry Creek support designated critical habitat for MCR steelhead. At the location of the crossings, the vegetated riparian width for Bear Creek is approximately 25 feet wide, for West Birch Creek is approximately 75 feet, for California Gulch is approximately 50 feet, and for East Birch Creek is approximately 85 feet. The Dry Creek vegetated riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-201), this alternative is anticipated to result in approximately 0.7 mile of moderate residual impacts on MCR steelhead critical habitat and 0.1 mile of moderate residual impact on SRB steelhead critical habitat.

<u>Additional Action – 69-Kilovolt Line Replacement</u>

Federally Listed and Candidate Fish Species

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Protected Fish Habitats

Design Options 1, 2, and 3 do not cross any streams or other fish resources. No identifiable impacts from this action are anticipated.

Longhorn Alternative

This alternative crosses Butter Creek, Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Birch Creek and Dry Creek support federally listed steelhead. The Birch Creek riparian area is approximately 200 feet wide at the line crossing. The Dry Creek riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in 0.1 mile of moderate residual impacts on MCR steelhead and SRB steelhead.

Sensitive Fish Species

Butter Creek, Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 350 feet. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in approximately 1.6 miles of low residual impacts on redband trout.

Protected Fish Habitats

Birch Creek and Dry Creek support designated critical habitat for steelhead DPSs. Coho salmon and associated EFH is present within this segment of Birch Creek. The Birch Creek vegetated riparian area is approximately 200 feet wide at the line crossing. The Dry Creek vegetated riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in approximately 0.1 mile of moderate residual impacts on both MCR and SRB steelhead critical habitat and approximately 0.1 mile of coho EFH.

Interstate 84 Alternative

This alternative crosses Butter Creek, the Umatilla River twice, Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and

water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

The Umatilla River, Birch Creek, and Dry Creek support federally listed MCR steelhead. The Umatilla River also supports federally listed bull trout. The vegetated riparian area at the westernmost crossing of the Umatilla River is approximately 150 feet, and the second crossing of the Umatilla River is 100 feet. The Birch Creek vegetated riparian area is approximately 200 feet wide at the line crossing. The Dry Creek riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in 0.2 mile of moderate residual impacts on bull trout, 0.3 mile of moderate residual impacts on MCR steelhead, and 0.1 mile of moderate residual impacts on SRB steelhead.

Sensitive Fish Species

Butter Creek, the Umatilla River, Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek support redband trout. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in approximately 2.0 miles of low residual impacts on redband trout.

Protected Fish Habitats

The Umatilla River, Birch Creek, and Dry Creek support designated critical habitat for MCR steelhead. Designated critical habitat for bull trout is present in the Umatilla River. Chinook and coho salmon and their associated EFH is present within this segment of the Umatilla River. Coho salmon and associated EFH is present in this portion of Birch Creek. The vegetated riparian area at the westernmost crossing of the Umatilla River is approximately 150 feet, and the easternmost crossing of the Umatilla River is 100 feet. The Birch Creek vegetated riparian area is approximately 200 feet wide at the line crossing. The Dry Creek riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in approximately 0.2 mile of moderate residual impacts on bull trout critical habitat, 0.3 mile of moderate residual impacts on MCR steelhead critical habitat, 0.1 mile of moderate residual impacts on SRB steelhead critical habitat, and approximately 0.3 mile of impacts on coho and Chinook salmon EFH.

Variation S1-A1

This variation crosses the Umatilla River at the same location as the Interstate 84 Alternative. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

The Umatilla River supports federally listed MCR steelhead and bull trout. The vegetated riparian area at this crossing of the Umatilla River is approximately 100 feet. Based on the impact criteria used in this analysis (Table 3-196), this variation is anticipated to result in 0.1 mile of moderate residual impacts on bull trout and 0.1 mile of moderate residual impacts on MCR steelhead.

Sensitive Fish Species

The Umatilla River supports redband trout. The vegetated riparian area at the westernmost crossing of the Umatilla River is approximately 150 feet, and the easternmost crossing of the Umatilla River is 100 feet. Based on the impact criteria used in this analysis (Table 3-196), this variation is anticipated to result in approximately 0.6 mile of low residual impacts on redband trout.

Protected Fish Habitats

The Umatilla River supports designated critical habitat for MCR steelhead and bull trout. Chinook and coho salmon and their associated EFH is present within this segment of the Umatilla River. The vegetated riparian area at the westernmost crossing of the Umatilla River is approximately 150 feet, and the easternmost crossing of the Umatilla River is 100 feet. Based on the impact criteria used in this analysis (Table 3-196), this variation is anticipated to result in approximately 0.1 mile of moderate residual impacts on bull trout critical habitat, 0.1 mile of moderate residual impacts on MCR steelhead critical habitat, and approximately 0.2 mile of impacts on coho and Chinook salmon EFH.

Variation S1-A2

This variation crosses the Umatilla River approximately 13 miles downstream from the easternmost crossing of the Umatilla River. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

The Umatilla River supports federally listed MCR steelhead and bull trout. The vegetated riparian area at the crossing of the Umatilla River is approximately 150 feet. Based on the impact criteria used in this analysis (Table 3-196), this variation is anticipated to result in 0.2 mile of moderate residual impacts on bull trout and 0.2 mile of moderate residual impacts on MCR steelhead.

Sensitive Fish Species

The Umatilla River supports redband trout. The vegetated riparian area at the crossing of the Umatilla River is approximately 150 feet. Based on the impact criteria used in this analysis (Table 3-196), this variation is anticipated to result in 0.3 mile of moderate residual impacts on redband trout.

Protected Fish Habitats

The Umatilla River supports designated critical habitat for MCR steelhead and bull trout. Chinook and coho salmon and their associated EFH is present within this segment of the Umatilla River. The vegetated riparian area at the crossing of the Umatilla River is approximately 150 feet. Based on the impact criteria used in this analysis (Table 3-196), this variation is anticipated to result in 0.2 mile of moderate residual impacts on bull trout and 0.2 mile of moderate residual impacts on MCR steelhead, and approximately 0.2 mile of impacts on coho and Chinook salmon EFH.

Interstate 84 – Southern Route Alternative

This alternative crosses Butter Creek, the Umatilla River twice, West Birch Creek, California Gulch (LLID 1188020454085), East Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

The Umatilla River, West Birch Creek, California Gulch (LLID 1188020454085), East Birch Creek, and Dry Creek support federally listed MCR steelhead. The Umatilla River also supports federally listed bull trout. The vegetated riparian area at the westernmost crossing of the Umatilla River is approximately 150 feet, and the second crossing of the Umatilla River is 100 feet. At the location of the other crossings, the vegetated riparian width for West Birch Creek is approximately 120 feet, for California Gulch is approximately 50 feet, and for East Birch Creek is approximately 85 feet. The Dry Creek riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in 0.2 mile of moderate residual impacts on bull trout, 0.6 mile of moderate residual impacts on MCR steelhead, and 0.1 mile of moderate residual impacts on SRB steelhead.

Sensitive Fish Species

Butter Creek, the Umatilla River twice, West Birch Creek, California Gulch (LLID 1188020454085), East Birch Creek, McKay Creek, Rail Creek, Little Beaver Creek, Beaver Creek, and Dry Creek support redband trout. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in approximately 2.0 miles of low residual impacts on redband trout.

Protected Fish Habitats

The Umatilla River, West Birch Creek, California Gulch (LLID 1188020454085), East Birch Creek, and Dry Creek support designated critical habitat for MCR steelhead. Designated critical habitat for bull trout is present in the Umatilla River. Chinook and coho salmon and their associated EFH is present within this segment of the Umatilla River. The vegetated riparian area at the westernmost crossing of

the Umatilla River is approximately 150 feet, and the second crossing of the Umatilla River is 100 feet. At the location of the other crossings, the vegetated riparian width for West Birch Creek is approximately 120 feet, for California Gulch is approximately 50 feet, and for East Birch Creek is approximately 85 feet. The Dry Creek riparian area is approximately 140 feet wide at the line crossing. Based on the impact criteria used in this analysis (Table 3-196), this alternative is anticipated to result in approximately 0.2 mile of moderate residual impacts on bull trout critical habitat, 0.3 mile of moderate residual impacts on MCR steelhead critical habitat, 0.1 mile of moderate residual impacts on SRB steelhead critical habitat, and approximately 0.3 mile of impacts on coho and Chinook salmon EFH.

Conclusion

All alternative routes in Segment 1 cross streams that support MCR and SRB steelhead and MCR and SRB steelhead critical habitat, as well as streams that support redband trout. In addition, the Interstate 84 Alternative and Interstate 84 – Southern Route Alternative cross streams that support bull trout, bull trout critical habitat, and Chinook salmon EFH. For all alternative routes, moderate residual impacts are anticipated where streams that support ESA-listed fish, critical habitat, and/or EFH are crossed, and low residual impacts are anticipated where streams that support redband trout are crossed. The West of Bombing Range Road – Southern Route Alternative and the Interstate 84 Alternative are anticipated to result in greater residual impacts on fish resources than the other alternative routes as a greater distance of streams that support redband trout and ESA-listed fish, critical habitat, and/or EFH are crossed.

SEGMENT 2—BLUE MOUNTAINS

The alternatives in Segment 2 cross approximately numerous waterways with fish presence, construct new access roads, remove riparian vegetation, and control noxious weeds through herbicide use.

The number or location of access road crossings will not be available until a route is selected for construction and final design and engineering is completed. However, the construction of new access roads and the upgrades of existing access roads can cause the loss of streamside vegetation, increased sedimentation or pollution runoff to waterways, potential blockage of fish passage, and loss of necessary habitat over the life of the B2H Project.

In Segment 2, no new access road crossings, or modifications of existing road crossings below OHW, would occur in waterways that support ESA-listed fish, designated critical habitat, and/or EFH. Furthermore, no new crossings, or modifications of existing crossings below OHW, would occur within 1,000 feet upstream of waterways, including tributaries that support ESA-listed fish, designated critical habitat, and/or EFH.

For perennial fish-bearing waterways that do not support ESA-listed fish, designated critical habitat, and/or EFH, existing structures would be used when feasible; however, new or modified channel-spanning structures may be used where required. All proposed channel spanning structure designs or modifications for fish-bearing streams would be implemented with approval by ODFW. For seasonal/ephemeral streams, new or modified channel-spanning structures, existing fords, or existing fords that require minor modifications to stabilize (e.g., portable mats, minimal amount of coarse fill)

would be used. Fords would not be created within waterways that support ESA-listed species, designated critical habitat, and/or EFH, or within tributaries 1,000 feet upstream of these areas.

Also, no new access roads will be constructed within the RCA of a waterway that supports ESA-listed fish, designated critical habitat, and/or EFH. However, short segments of new access roads would be constructed within RCAs of waterways that do not support ESA-listed fish, designated critical habitat, and/or EFH.

Furthermore, no new culverts would be installed and no existing culverts would be replaced as part of the Project within Segment 2.

The differences in impacts on fish resources between the alternatives and variations within Segment 2 are mainly related to the number of stream crossings and the extent of vegetation removal that would be required.

Table 3-216 presents the residual impacts on all alternative routes and route variations in Segment 2.

Table 3-216. Fish Resources Inventory Data and Residual Impacts for Segment 2—Blue Mountain

Alternative Route	Total Length (miles)	Inventory Data (miles crossed)					Residual Impacts (miles crossed)		
		Bull Trout Critical Habitat	Chinook Salmon Critical Habitat[1]	Middle Columbia River Steelhead Critical Habitat[2]	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams	None	Low	Moderate
Applicant's Proposed Action	33.8	0.1	0.3	0.0	0.7	2.3	31.3	1.8	0.7
Variation S2-A1	*2.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*2.8*	*0.0*	*0.0*
Variation S2-A2	*2.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*2.9*	*0.0*	*0.0*
Variation S2-B1	*3.7*	*0.0*	*0.2*	*0.0*	*0.4*	*0.4*	*3.2*	*0.1*	*0.4*
Variation S2-B2	*3.8*	*0.0*	*0.2*	*0.0*	*0.4*	*0.3*	*3.4*	*0.0*	*0.4*
Variation S2-C1	*9.3*	*0.0*	*0.0*	*0.0*	*0.2*	*0.3*	*8.9*	*0.2*	*0.2*
Variation S2-C2	*8.8*	*0.0*	*0.0*	*0.0*	*0.3*	*0.6*	*8.1*	*0.4*	*0.3*
Variation S2-E1	*2.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*2.2*	*0.1*	*0.0*
Variation S2-E2	*2.6*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*2.5*	*0.1*	*0.0*
Variation S2-F1	*12.1*	*0.0*	*0.0*	*0.0*	*0.0*	*1.3*	*10.8*	*1.3*	*0.0*
Variation S2-F2	*12.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.9*	*11.3*	*0.9*	*0.0*
Glass Hill	33.7	0.1	0.1	0.0	0.6	2.6	31.0	2.1	0.6
Variation S2-D1	*4.3*	*0.0*	*0.0*	*0.0*	*0.5*	*0.4*	*3.8*	*0.0*	*0.5*
Variation S2-D2	*4.1*	*0.0*	*0.0*	*0.0*	*0.4*	*0.4*	*3.7*	*0.0*	*0.4*
Mill Creek	34.0	0.1	0.2	0.0	0.6	1.4	32.5	0.9	0.6

Table Notes:
[1]Chinook salmon Critical Habitat is used as a surrogate for Chinook salmon and coho salmon Essential Fish Habitat
[2]MCR steelhead or associated critical habitat does not occur in Segment 2.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative crosses Ladd Creek, the Grande Ronde River, Rock Creek, Sheep Creek, Graves Creek, the Powder River, and an unnamed stream (1181152452353). These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Ladd Creek, the Grande Ronde River, Rock Creek, Graves Creek, and an unnamed stream (1181152452353) support federally listed SRB steelhead. The Grande Ronde River and Rock Creek support federally listed SR Chinook salmon. Vegetated riparian zones at these streams vary from approximately 50 feet to 300 feet. Based on the impact criteria used in this analysis (Table 3-196), the Applicant's Proposed Action Alternative is anticipated to result in 0.7 mile of moderate residual impacts on SRB steelhead and 0.3 mile of moderate residual impacts on SR Chinook salmon.

Sensitive Fish Species

Ladd Creek, the Grande Ronde River, Rock Creek, Sheep Creek, Graves Creek, the Powder River, and an unnamed stream (1181152452353) support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 300 feet. Based on the impact criteria used in this analysis (Table 3-196), the Applicant's Proposed Action Alternative is anticipated to result in approximately 2.3 miles of low residual impacts on redband trout.

Protected Fish Habitats

Ladd Creek, the Grande Ronde River, Rock Creek, Graves Creek, and an unnamed stream (1181152452353) support designated critical habitat for SRB steelhead. The Grande Ronde River and Rock Creek support designated critical habitat for SR Chinook salmon. Coho salmon and Chinook salmon EFH is present within the Grande Ronde River and Rock Creek. Vegetated riparian zones at these streams vary from approximately 50 feet to 300 feet. Based on the impact criteria used in this analysis (Table 3-196), the Applicant's Proposed Action Alternative is anticipated to result in approximately 0.7 mile of moderate residual impacts on SRB steelhead critical habitat, 0.3 mile of moderate residual impacts on SR Chinook salmon critical habitat, and approximately 0.3 mile of residual impacts on Chinook salmon and coho EFH.

Variation S2-A1

Variation S2-A1 does not cross any streams that support special status fish species or protected fish habitats. No identifiable impacts from this variation are anticipated.

Federally Listed and Candidate Fish Species

As with Variation S2-A2, Variation S2-A1 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with Variation S2-A2, Variation S2-A1 does not cross any streams with support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with Variation S2-A2, Variation S2-A1 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S2-A2

As with Variation S2-A1, Variation S2-A2 does not cross any streams that support special status fish species or protected fish habitats. No identifiable impacts from this variation are anticipated.

Federally Listed and Candidate Fish Species

As with Variation S2-A1, Variation S2-A2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with Variation S2-A1, Variation S2-A2 does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with Variation S2-A1, Variation S2-A2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S2-B1

Variation S2-B1 crosses Rock Creek, Sheep Creek, and Graves Creek. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Variation S2-B1 crosses Rock Creek and Graves Creek, which support federally listed SRB steelhead. Rock Creek also supports SR Chinook salmon. Vegetated riparian zones at these streams vary from approximately 50 feet to 200 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-B1 is anticipated to result in 0.4 mile of moderate residual impacts on SRB steelhead and 0.2 mile of moderate residual impacts on SR Chinook salmon. Variation S2-B1 is anticipated to result in

similar impacts on SRB steelhead and SR Chinook salmon as Variation S2-B2 except impacts will occur at different stream crossing locations.

Sensitive Fish Species

Variation S2-B1 crosses Rock Creek, Sheep Creek, and Graves Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 300 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-B1 is anticipated to result in approximately 0.4 mile of low residual impacts on redband trout. Variation S2-B1 is anticipated to result in slightly greater impacts on redband trout than Variation S2-B2.

Protected Fish Habitats

Variation S2-B1 crosses Rock Creek and Graves Creek, which support designated critical habitat for SRB steelhead. Rock Creek also supports critical habitat for SR Chinook salmon. Coho salmon and Chinook salmon EFH is present within Rock Creek. Vegetated riparian zones at these streams vary from approximately 50 feet to 200 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-B1 is anticipated to result in approximately 0.4 mile of moderate residual impacts on SRB steelhead critical habitat, 0.2 mile of moderate residual impacts on SR Chinook salmon critical habitat, and approximately 0.2 mile of moderate residual impacts on Chinook salmon and coho EFH. Variation S2-B1 is anticipated to result in similar impacts on protected fish habitats as Variation S2-B2 except impacts will occur at different stream crossing locations.

Variation S2-B2

Variation S2-B2 crosses Rock Creek and Sheep Creek. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Variation S2-B2 crosses Rock Creek and Sheep Creek, which support federally listed SRB steelhead. Rock Creek also supports SR Chinook salmon. Vegetated riparian zones at these streams vary from approximately 50 feet to 300 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-B2 is anticipated to result in 0.4 mile of moderate residual impacts on SRB steelhead and 0.2 mile of moderate residual impacts on SR Chinook salmon. Variation S2-B2 is anticipated to result in similar impacts on SRB steelhead and SR Chinook salmon as Variation S2-B1 except impacts will occur at different stream crossing locations.

Sensitive Fish Species

Variation S2-B2 crosses Rock Creek and Sheep Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 300 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-B2 is anticipated to result in approximately 0.3

mile of low residual impacts on redband trout. Variation S2-B2 is anticipated to result in slightly less impacts on redband trout than Variation S2-B1.

Protected Fish Habitats

Variation S2-B2 crosses Rock Creek and Sheep Creek, which support designated critical habitat for SRB steelhead. Rock Creek also supports critical habitat for SR Chinook salmon. Coho salmon and Chinook salmon EFH is present within Rock Creek. Vegetated riparian zones at these streams vary from approximately 50 feet to 300 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-B2 is anticipated to result in approximately 0.4 mile of moderate residual impacts on SRB steelhead, 0.2 mile of moderate residual impacts on SR Chinook salmon, and approximately 0.2 mile of moderate residual impacts on Chinook salmon and coho EFH. Variation S2-B2 is similar to Variation S2-B1 for impacts on protected fish habitats except impacts will occur at different stream crossing locations.

Variation S2-C1

Variation S2-C1 crosses an unnamed stream (1181152452353). This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Variation S2-C1 crosses an unnamed stream (1181152452353), which supports federally listed SRB steelhead. Vegetated riparian zone at the crossing is 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-C1 is anticipated to result in 0.2 mile of moderate residual impacts on SRB steelhead. Variation S2-C1 is anticipated to result in slightly less impacts on SRB steelhead than Variation S2-C2.

Sensitive Fish Species

Variation S2-C1 crosses an unnamed stream (1181152452353), which supports redband trout. Vegetated riparian zone at the crossing is approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-C1 is anticipated to result in 0.3 mile of low residual impacts on redband trout. Variation S2-C1 would have approximately 0.3 mile less impacts on redband trout than that of Variation S2-C2.

Protected Fish Habitats

Variation S2-C1 crosses an unnamed stream (1181152452353), which supports designated critical habitat for SRB steelhead. Vegetated riparian zone at the crossing is approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-C1 is anticipated to result in 0.2 mile of moderate residual impacts on SRB steelhead critical habitat. Variation S2-C1 is anticipated to result in slightly less impacts on protected fish habitat than Variation S2-C2.

Variation S2-C2

Variation S2-C1 crosses Sheep Creek. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Variation S2-C2 crosses Sheep Creek, which supports federally listed SRB steelhead. Vegetated riparian zone at the crossing is approximately 200 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-C2 is anticipated to result in 0.3 mile of moderate residual impacts on SRB steelhead. Variation S2-C2 is anticipated to result in slightly greater impacts on SRB steelhead than Variation S2-C1.

Sensitive Fish Species

Variation S2-C2 crosses Sheep Creek, which supports redband trout. Vegetated riparian zone at the crossing is approximately 200 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-C2 is anticipated to result in 0.6 mile of low residual impacts on redband trout. Variation S2-C2 would have approximately 0.3 mile greater impacts on redband trout than that of Variation S2-C1.

Protected Fish Habitats

Variation S2-C2 crosses Sheep Creek, which supports designated critical habitat for SRB steelhead. Vegetated riparian zone at the crossing is approximately 200 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-C2 is anticipated to result in 0.3 mile of moderate residual impacts on SRB steelhead critical habitat. Variation S2-C2 is anticipated to result in slightly greater impacts on protected fish habitat than Variation S2-C1.

Variation S2-E1

Variation S2-E1 does not cross any streams that support federally listed or candidate fish species. However, Variation S2-E1 crosses an unnamed stream (1180138451966), which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variation S2-E2, Variation S2-E1 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S2-E1 crosses an unnamed stream (1180138451966), which supports redband trout. Vegetated riparian zones at this stream is approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-E1 is anticipated to result in 0.1 mile of low residual impacts on redband trout. Variation S2-E1 is anticipated to have similar impacts on redband trout as Variation S2-E2 except impacts will occur at different stream crossing locations.

Protected Fish Habitats

As with Variation S2-E2, Variation S2-E1 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S2-E2

Variation S2-E2 does not cross any streams that support federally listed or candidate fish species. However, Variation S2-E2 crosses an unnamed stream (1180138451966), which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variation S2-E1, Variation S2-E2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S2-E2 crosses an unnamed stream (1180138451966), which supports redband trout. Vegetated riparian zones at this stream is approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-E2 is anticipated to result in 0.1 mile of low residual impacts on redband trout. Variation S2-E2 is anticipated to have similar impacts on redband trout as Variation S2-E1 except impacts will occur at different stream crossing locations.

Protected Fish Habitats

As with Variation S2-E1, Variation S2-E2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S2-F1

Variation S2-F1 crosses the Powder River. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The

types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variation S2-F2, Variation S2-F1 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S2-F1 crosses the Powder River, which supports redband trout. Vegetated riparian zone at the crossing is 100 feet to 200 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-F1 is anticipated to result in 1.3 mile of low residual impacts on redband trout. S2-F1 is anticipated to result in approximately 0.4 mile greater impacts on redband trout than Variation S2-F2.

Protected Fish Habitats

As with Variation S2-F2, Variation S2-F1 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S2-F2

Variation S2-F2 crosses the Powder River. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variation S2-F1, Variation S2-F2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S2-F2 crosses the Powder River, which supports redband trout. Vegetated riparian zone at the crossing is 100 feet to 200 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-F2 is anticipated to result in 0.9 mile of low residual impacts on redband trout. Variation S2-F2 is anticipated to result in approximately 0.4 mile fewer impacts on redband trout than Variation S2-F1.

Protected Fish Habitats

As with Variation S2-F1, Variation S2-F2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Glass Hill Alternative

The Glass Hill Alternative crosses Ladd Creek, the Grande Ronde River, Rock Creek, Graves Creek, Powder River, and unnamed streams (1181152452353 and 1181404452558). These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

The Glass Hill Alternative crosses Ladd Creek, the Grande Ronde River, Rock Creek, Graves Creek, and unnamed streams (1181152452353 and 1181404452558), which support federally listed SRB steelhead. The Grande Ronde River and Rock Creek also support federally listed SR Chinook salmon. Vegetated riparian zones at these streams vary from approximately 50 feet to 300 feet. Based on the impact criteria used in this analysis (Table 3-196), the Glass Hill Alternative is anticipated to result in 0.6 mile of moderate residual impacts on SRB steelhead and 0.1 mile of moderate residual impacts on SR Chinook salmon. The Glass Hill Alternative is anticipated to result in slightly less impacts on SRB steelhead and SR Chinook salmon than the Applicant's Proposed Action Alternative.

Sensitive Fish Species

The Glass Hill Alternative crosses Ladd Creek, the Grande Ronde River, Rock Creek, Graves Creek, and unnamed streams (1181152452353 and 1181404452558), which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 300 feet. Based on the impact criteria used in this analysis (Table 3-196), the Glass Hill Alternative is anticipated to result in approximately 2.6 miles of low residual impacts on redband trout. The Glass Hill Alternative is anticipated to result in approximately 0.3 mile of greater impacts on redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

The Glass Hill Alternative crosses Ladd Creek, the Grande Ronde River, Rock Creek, Graves Creek, and unnamed streams (1181152452353 and 1181404452558), which support designated critical habitat for SRB steelhead. The Grande Ronde River and Rock Creek support designated critical habitat for SR Chinook salmon. Coho salmon and Chinook salmon EFH is present within the Grande Ronde River and Rock Creek. Vegetated riparian zones at these streams vary from approximately 50 feet to 300 feet. Based on the impact criteria used in this analysis (Table 3-196), the Glass Hill Alternative is anticipated to result in approximately 0.6 mile of moderate residual impacts on SRB steelhead critical habitat, 0.1 mile of moderate residual impacts on SR Chinook salmon critical habitat, and approximately 0.1 mile of residual impacts on Chinook salmon and coho EFH. The Glass Hill Alternative is anticipated to result in slightly less impacts on protected fish habitats than the Applicant's Proposed Action Alternative.

Variation S2-D1

Variation S2-D1 crosses Rock Creek, Graves Creek, Powder River, and unnamed streams (1181152452353 and 1181404452558). These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Variation S2-D1 crosses Rock Creek, Graves Creek, and unnamed streams (1181152452353 and 1181404452558), which support federally listed SRB steelhead. Vegetated riparian zones at these streams vary from approximately 50 feet to 200 feet. Based on the impact criteria used in this analysis (Table 3-196), the Variation S2-D1 is anticipated to result in 0.5 mile of moderate residual impacts on SRB steelhead. Variation S2-D1 is anticipated to result in slightly greater impacts on SRB steelhead than Variation S2-D2.

Sensitive Fish Species

Variation S2-D1 crosses Rock Creek, Graves Creek, and unnamed streams (1181152452353 and 1181404452558), which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 200 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-D1 is anticipated to result in 0.4 mile of low residual impacts on redband trout. Variation S2-D1 is anticipated to have similar impacts on redband trout as Variation S2-D2 except impacts will occur at different stream crossing locations.

Protected Fish Habitats

Variation S2-D1 crosses Rock Creek, Graves Creek, and unnamed streams (1181152452353 and 1181404452558), which support SRB steelhead designated critical habitat. Vegetated riparian zones at these streams vary from approximately 50 feet to 200 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-D1 is anticipated to result in approximately 0.5 mile of moderate residual impacts on SRB steelhead critical habitat. Variation S2-D1 is anticipated to result in slightly greater impacts on SRB steelhead critical habitat than Variation S2-D2.

Variation S2-D2

Variation S2-D2 crosses Rock Creek, Graves Creek, Powder River, and unnamed stream (1181152452353). These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing

access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

Variation S2-D2 crosses Rock Creek, Graves Creek, and unnamed stream (1181152452353), which support federally listed SRB steelhead. Vegetated riparian zones at these streams vary from approximately 50 feet to 200 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-D2 is anticipated to result in 0.4 mile of moderate residual impacts on SRB steelhead. Variation S2-D2 is anticipated to result in slightly less impacts on SRB steelhead than Variation S2-D1.

Sensitive Fish Species

Variation S2-D2 crosses Rock Creek, Graves Creek, and unnamed stream 1152452353], which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 200 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-D2 is anticipated to result in 0.4 mile of low residual impacts on redband trout. Variation S2-D2 is anticipated to have similar impacts on redband trout as Variation S2-D1 except impacts will occur at different stream crossing locations.

Protected Fish Habitats

Variation S2-D2 crosses Rock Creek, Graves Creek, and unnamed stream (1181152452353), which support SRB steelhead designated critical habitat. Vegetated riparian zones at these streams vary from approximately 50 feet to 200 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S2-D2 is anticipated to result in 0.4 mile of moderate residual impacts on SRB steelhead critical habitat. S2-D2 is anticipated to result in slightly less impacts on SRB steelhead designated critical habitat than Variation S2-D1.

Mill Creek Alternative

The Mill Creek Alternative crosses Mill Creek, Ladd Creek, the Grande Ronde River, Rock Creek, and the Powder River. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

The Mill Creek Alternative crosses Mill Creek, Ladd Creek, the Grande Ronde River, and Rock Creek, which support federally listed SRB steelhead. The Grande Ronde River and Rock Creek also support federally listed SR Chinook salmon. Vegetated riparian zones at these streams vary from approximately 50 feet to 400 feet. Based on the impact criteria used in this analysis (Table 3-196), the Mill Creek Alternative is anticipated to result in 0.6 mile of moderate residual impacts on SRB steelhead and 0.2

mile of moderate residual impacts on SR Chinook salmon. The Mill Creek is anticipated to result in slightly less impacts on SRB steelhead and SR Chinook salmon than the Applicant's Proposed Action Alternative.

Sensitive Fish Species

The Mill Creek Alternative crosses Mill Creek, Ladd Creek, the Grande Ronde River, Rock Creek, and the Powder River, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 400 feet. Based on the impact criteria used in this analysis (Table 3-196), the Mill Creek Alternative is anticipated to result in approximately 1.4 miles of low residual impacts on redband trout. The Mill Creek Alternative is anticipated to result in approximately 0.9 mile of fewer impacts on redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

The Mill Creek Alternative crosses Mill Creek, Ladd Creek, the Grande Ronde River, and Rock Creek, which support federally SRB steelhead critical habitat. The Grande Ronde River and Rock Creek also support SR Chinook salmon designated critical habitat. Coho salmon and Chinook salmon EFH is present within the Grande Ronde River and Rock Creek. Vegetated riparian zones at these streams vary from approximately 50 feet to 400 feet. Based on the impact criteria used in this analysis (Table 3-196), the Mill Creek Alternative is anticipated to result in 0.6 mile of moderate, residual impacts on SRB steelhead critical habitat and 0.2 mile of moderate, residual impacts on SR Chinook salmon critical habitat and approximately 0.2 mile of moderate, residual impacts on coho salmon and Chinook salmon EFH. The Mill Creek is anticipated to result in slightly less impacts on protected fish habitats than the Applicant's Proposed Action Alternative.

Conclusion

All alternative routes in Segment 2 cross streams that support SRB steelhead, Chinook salmon, bull trout, and associated protected fish habitats, as well as streams that support redband trout. For all alternative routes, moderate residual impacts are anticipated where streams that support ESA-listed fish and associated protected fish habitats are crossed, and low residual impacts are anticipated where streams that support redband trout are crossed. The Glass Hill Alternative is anticipated to result in greater residual impacts on fish resources than the other alternative routes as a greater distance of streams that support redband trout, ESA-listed fish, and associated protected fish habitats are crossed.

SEGMENT 3—BAKER VALLEY

The alternatives in Segment 3 cross numerous waterways with fish presence, construct new access roads, remove riparian vegetation, and control noxious weeds through herbicide use.

The number or location of access road crossings will not be available until a route is selected for construction and final design and engineering is completed. However, the construction of new access roads and the upgrades of existing access roads can cause the loss of streamside vegetation, increased sedimentation or pollution runoff to waterways, potential blockage of fish passage, and loss of necessary habitat over the life of the B2H Project.

Waterways in Segment 3 within the B2H analysis area do not support ESA-listed fish, designated critical habitat, and/or EFH; however, waterways within Segment 3 do support special status fish species[3]. For perennial fish-bearing waterways within Segment 3, existing structures would be used when feasible; however, new or modified channel-spanning structures, including in-water work, may be used where required. All proposed channel spanning structure designs or modifications for fish-bearing streams would be implemented with approval by ODFW. For seasonal/ephemeral streams, new or modified channel-spanning structures, existing fords, or existing fords that require minor modifications to stabilize (e.g., portable mats, minimal amount of coarse fill) would be used.

Also, short segments of new access roads that do not cross a waterway would be constructed in RCAs of waterways that support special status fish species.

The differences in impacts on fish resources between the alternatives and variations within Segment 3 are mainly related to the number of stream crossings and the extent of vegetation removal that would be required.

Table 3-217 presents the residual impacts on all alternative routes and route variations in Segment 3.

Table 3-217. Fish Resources Inventory Data and Residual Impacts for Segment 3—Baker Valley

Alternative Route	Total Length (miles)	Inventory Data (miles crossed)					Residual Impacts (miles crossed)		
		Bull Trout Critical Habitat	Chinook Salmon Critical Habitat[1]	Middle Columbia River Steelhead Critical Habitat[2]	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams	None	Low	Moderate
Applicant's Proposed Action	55.2	0.0	0.0	0.0	0.0	3.8	51.4	3.8	0.0
Variation S3-A1	*12.4*	*0.0*	*0.0*	*0.0*	*0.0*	*1.1*	*11.3*	*1.1*	*0.0*
Variation S3-A2	*12.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.5*	*11.7*	*0.5*	*0.0*
Variation S3-B1	*13.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0*	*13.9*	*0.0*	*0.0*
Variation S3-B2	*14.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0*	*14.4*	*0.0*	*0.0*
Variation S3-B3	*14.7*	*0.0*	*0.0*	*0.0*	*0.0*	*0*	*14.7*	*0.0*	*0.0*
Variation S3-B4	*14.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0*	*14.3*	*0.0*	*0.0*
Variation S3-B5	*14.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0*	*14.0*	*0.0*	*0.0*
Variation S3-C1	*21.1*	*0.0*	*0.0*	*0.0*	*0.0*	*2.6*	*18.5*	*2.6*	*0.0*
Variation S3-C2	*21.7*	*0.0*	*0.0*	*0.0*	*0.0*	*2.8*	*18.9*	*2.8*	*0.0*
Variation S3-C3	*21.1*	*0.0*	*0.0*	*0.0*	*0.0*	*2.2*	*18.9*	*2.2*	*0.0*
Variation S3-C4	*21.4*	*0.0*	*0.0*	*0.0*	*0.0*	*2*	*19.4*	*2*	*0.0*
Variation S3-C5	*21.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.1*	*19.9*	*1.1*	*0.0*
Variation S3-C6	*24.7*	*0.0*	*0.0*	*0.0*	*0.0*	*1.4*	*23.3*	*1.4*	*0.0*
Flagstaff A	55.3	0.0	0.0	0.0	0.0	3.8	51.5	3.8	0.0

[3] Federally listed bull trout and bull trout critical habitat are present within Segment 3 (e.g. Eagle Creek) but are not present within the B2H Project analysis area.

Table 3-217. Fish Resources Inventory Data and Residual Impacts for Segment 3—Baker Valley

Alternative Route	Total Length (miles)	Inventory Data (miles crossed)					Residual Impacts (miles crossed)		
		Bull Trout Critical Habitat	Chinook Salmon Critical Habitat[1]	Middle Columbia River Steelhead Critical Habitat[2]	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams	None	Low	Moderate
Timber Canyon	70.3	0.0	0.0	0.0	0.0	5.1	65.2	5.1	0.0
Flagstaff A – Burnt River Mountain	55.3	0.0	0.0	0.0	0.0	3.4	51.9	3.4	0.0
Flagstaff B	56.0	0.0	0.0	0.0	0.0	3.8	52.2	3.8	0.0
Flagstaff B – Burnt River West	55.7	0.0	0.0	0.0	0.0	1.7	54	1.7	0.0
Flagstaff B – Durkee	59.6	0.0	0.0	0.0	0.0	2.6	57	2.6	0.0

Table Notes:
[1]Chinook salmon and SRB steelhead have been extirpated from their historic range in Segment 3 – no critical habitat designated.
[2]MCR steelhead or associated critical habitat does not occur in Segment 3.

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative does not cross any streams that support federally listed or candidate fish species. However, the Applicant's Proposed Action Alternative crosses the Burnt River, Dixie Creek, Durkee Creek, Manning Creek, Pritchard Creek, Sisley Creek, and Unity Creek, which support redband trout. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

The Applicant's Proposed Action Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

The Applicant's Proposed Action Alternative crosses the Burnt River, Dixie Creek, Durkee Creek, Manning Creek, Pritchard Creek, Sisley Creek, and Unity Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), the Applicant's Proposed Action Alternative is anticipated to result in approximately 3.8 miles of low, residual impacts on redband trout.

Protected Fish Habitats

The Applicant's Proposed Action Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this action are anticipated.

Variation S3-A1

Variation S3-A1 does not cross any streams that support federally listed or candidate fish species. However, Variation S3-A1 crosses Gentry Creek, which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variation S3-A2, Variation S3-A1 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-A1 crosses Gentry Creek, which support redband trout. Vegetated riparian zones at this stream is approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S3-A1 is anticipated to result in approximately 1.1 miles of low, residual impacts on redband trout. Variation S3-A1 is anticipated to have approximately 0.6 mile greater impacts on redband trout than Variation S3-A2.

Protected Fish Habitats

As with Variation S3-A2, Variation S3-A1 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-A2

Variation S3-A2 does not cross any streams that support federally listed or candidate fish species. However, Variation S3-A2 crosses Gentry Creek, which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variation S3-A1, Variation S3-A2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-A2 crosses Gentry Creek, which supports redband trout. Vegetated riparian zones at this stream is approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S3-A2 is anticipated to result in approximately 0.5 mile of low, residual impacts on redband trout. Variation S3-A2 is anticipated to have approximately 0.6 mile fewer impacts on redband trout than Variation S3-A1.

Protected Fish Habitats

As with Variation S3-A1, Variation S3-A2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-B1

Variation S3-B1 does not cross any streams that support special status fish species or protected fish habitats. No identifiable impacts from this variation are anticipated.

Federally Listed and Candidate Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support federally listed or other candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-B2

Variation S3-B2 does not cross any streams that support special status fish species or protected fish habitats. No identifiable impacts from this variation are anticipated.

Federally Listed and Candidate Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support federally listed or other candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-B3

Variation S3-B3 does not cross any streams that support special status fish species or protected fish habitats. No identifiable impacts from this variation are anticipated.

Federally Listed and Candidate Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), S3-B this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-B4

Variation S3-B4 does not cross any streams that support special status fish species or protected fish habitats. No identifiable impacts from this variation are anticipated.

Federally Listed and Candidate Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-B5

Variation S3-B5 does not cross any streams that support special status fish species or protected fish habitats. No identifiable impacts from this variation are anticipated.

Federally Listed and Candidate Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with all S3-B variations (Variations S3-B1 through S3-B5), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-C1

Variation S3-C1 does not cross any streams that support federally listed or candidate fish species. However, Variation S3-C1 crosses the Burnt River, Dixie Creek, Durkee Creek, Manning Creek, Sisley Creek, Low Creek, Swayze Creek, North Fork Swayze Creek, and Unity Creek, which support redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection Project design features and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-C1 crosses the Burnt River, Dixie Creek, Durkee Creek, Manning Creek, Sisley Creek, Low Creek, Swayze Creek, North Fork Swayze Creek, and Unity Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S3-C1 is anticipated to result in approximately 2.6 miles of low, residual impacts on redband trout. Variation S3-C1 is anticipated to result in less impacts on redband trout than Variation S3-C2 but a greater impact on redband trout than the rest of the S3-C variations.

Protected Fish Habitats

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-C2

Variation S3-C2 does not cross any streams that support federally listed or candidate fish species. However, Variation S3-C2 crosses the Burnt River, Dixie Creek, Durkee Creek, Manning Creek, Sisley Creek, Low Creek, Swayze Creek, North Fork Swayze Creek, and Unity Creek, which support redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially

resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-C2 crosses the Burnt River, Dixie Creek, Durkee Creek, Manning Creek, Sisley Creek, Low Creek, Swayze Creek, North Fork Swayze Creek, and Unity Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S3-C2 is anticipated to result in approximately 2.8 miles of low, residual impacts on redband trout. Variation S3-C2 is anticipated to result in greater impacts on redband trout than the rest of the S3-C variations.

Protected Fish Habitats

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-C3

Variation S3-C3 does not cross any streams that support federally listed or candidate fish species. However, Variation S3-C3 crosses the Burnt River, Shirttail Creek, Powell Creek, Alder Creek, Low Creek, and Dixie Creek, which support redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-C3 crosses the Burnt River, Shirttail Creek, Powell Creek, Alder Creek, Low Creek, and Dixie Creek, which support redband trout. Vegetated riparian zones at these streams vary from

approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S3-C3 is anticipated to result in approximately 2.2 miles of low, residual impacts on redband trout. Variation S3-C3 is anticipated to result in less impacts on redband trout than Variation S3-C1 and S3-C2 but a greater impact on redband trout than Variations S3-C4 through S3-C6.

Protected Fish Habitats

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-C4

Variation S3-C4 does not cross any streams that support federally listed or candidate fish species. However, Variation S3-C4 crosses the Burnt River, Shirttail Creek, Powell Creek, Alder Creek, Low Creek, Dixie Creek, and Banks Ditch, which support redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-C4 crosses the Burnt River, Shirttail Creek, Powell Creek, Alder Creek, Low Creek, Dixie Creek, and Banks Ditch, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S3-C4 is anticipated to result in approximately 2.0 miles of low, residual impacts on redband trout. Variation S3-C4 is anticipated to result in less impacts on redband trout than Variation S3-C1 through S3-C3 but a greater impact on redband trout than Variations S3-C5 and S3-C6.

Protected Fish Habitats

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-C5

Variation S3-C5 does not cross any streams that support federally listed or candidate fish species. However, Variation S3-C5 crosses the Burnt River, Shirttail Creek, Powell Creek, Alder Creek, Low Creek, and Dixie Creek, which support redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section

3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-C5 crosses the Burnt River, Shirttail Creek, Powell Creek, Alder Creek, Low Creek, and Dixie Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S3-C5 is anticipated to result in approximately 1.1 miles of low, residual impacts on redband trout. Variation S3-C5 is anticipated to result in fewer impacts on redband trout than the rest of the S3-C variations.

Protected Fish Habitats

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S3-C6

Variation S3-C6 does not cross any streams that support federally listed or candidate fish species. However, Variation S3-C6 crosses the Burnt River, Dixie Creek, Alder Creek, Low Creek, and North Fork Dixie Creek, which support redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S3-C6 crosses the Burnt River, Dixie Creek, Alder Creek, Low Creek, and North Fork Dixie Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S3-C6 is anticipated to result in approximately 1.4 miles of low, residual impacts on redband

trout. Variation S3-C6 is anticipated to result in less impacts on redband trout than Variation S3-C1 through S3-C4 but a greater impact on redband trout than Variations S3-C5.

Protected Fish Habitats

As with all S3-C variations (Variations S3-C1 through S3-C6), this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Flagstaff A Alternative

As with the Applicant's Proposed Action Alternative, the Flagstaff A Alternative does not cross any streams that support federally listed or candidate fish species. Also, similar to the Applicant's Proposed Action Alternative, the Flagstaff A Alternative crosses the Burnt River, Dixie Creek, Durkee Creek, Manning Creek, Pritchard Creek, Sisley Creek, and Unity Creek, which support redband trout. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

The Flagstaff A Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

Similar to the Applicant's Proposed Action Alternative, the Flagstaff A Alternative crosses the Burnt River, Dixie Creek, Durkee Creek, Manning Creek, Pritchard Creek, Sisley Creek, and Unity Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), the Flagstaff A Alternative is anticipated to result in approximately 3.8 miles of low, residual impacts on redband trout. The Flagstaff A Alternative is anticipated to result in similar impacts on redband trout as the Applicant's Proposed Action Alternative except impacts will occur at different stream crossing locations.

Protected Fish Habitats

The Flagstaff A Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Timber Canyon Alternative

As with the Applicant's Proposed Action Alternative, the Timber Canyon Alternative does not cross any streams that support federally listed or candidate fish species. However, the Timber Canyon Alternative crosses Beagle Creek, Big Creek, the Burnt River, Chalk Creek, Dixie Creek, Gold Creek, Goose Creek, Lick Creek, McCurry Creek, North Fork Daly Creek, the Powder River (twice), Sisley Creek, and

unnamed streams (1172125447534 [previously Rock Gulch] and 1176329450110 [previously Bazine Creek]), which support redband trout. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Timber Canyon Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

The Timber Canyon Alternative crosses Beagle Creek, Big Creek, the Burnt River, Chalk Creek, Dixie Creek, Gold Creek, Goose Creek, Lick Creek, McCurry Creek, North Fork Daly Creek, the Powder River (twice), Sisley Creek, and unnamed streams (1172125447534 [previously Rock Gulch] and 1176329450110 [previously Bazine Creek]), which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 200 feet. Based on the impact criteria used in this analysis (Table 3-196), the Timber Canyon Alternative is anticipated to result in approximately 5.1 miles of low, residual impacts on redband trout. The Timber Canyon Alternative is anticipated to result in approximately 1.3 miles of greater impacts on redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Timber Canyon Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Flagstaff A – Burnt River Mountain Alternative

As with the Applicant's Proposed Action Alternative, the Flagstaff A – Burnt River Mountain Alternative does not cross any streams that support federally listed or candidate fish species. However, the Flagstaff A – Burnt River Mountain Alternative crosses Alder Creek, the Burnt River, Dixie Creek, Powell Creek, and Shirttail Creek, which support redband trout. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Flagstaff A – Burnt River Mountain Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

The Flagstaff A - Burnt River Mountain Alternative crosses Alder Creek, the Burnt River, Dixie Creek, Powell Creek, and Shirttail Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), the Flagstaff A – Burnt River Mountain Alternative is anticipated to result in approximately 3.4 miles of low, residual impacts on redband trout. The Flagstaff A – Burnt River Mountain Alternative is anticipated to result in approximately 0.4 mile of fewer impacts on redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Flagstaff A – Burnt River Mountain Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Flagstaff B Alternative

As with the Applicant's Proposed Action Alternative, the Flagstaff B Alternative does not cross any streams that support federally listed or candidate fish species. Also, similar to the Applicant's Proposed Action Alternative, the Flagstaff B Alternative crosses the Burnt River, Dixie Creek, Durkee Creek, Manning Creek, Pritchard Creek, Sisley Creek, and Unity Creek, which support redband trout. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Flagstaff B Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

Similar to the Applicant's Proposed Action Alternative, the Flagstaff B Alternative crosses the Burnt River, Dixie Creek, Durkee Creek, Manning Creek, Pritchard Creek, Sisley Creek, and Unity Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), the Flagstaff B

Alternative is anticipated to result in approximately 3.8 miles of low, residual impacts on redband trout. The Flagstaff B Alternative is anticipated to result in similar impacts on redband trout as the Applicant's Proposed Action Alternative except impacts will occur at different stream crossing locations.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Flagstaff B Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Flagstaff B – Burnt River West Alternative

As with the Applicant's Proposed Action Alternative, the Flagstaff B – Burnt River West Alternative does not cross any streams that support federally listed or candidate fish species. However, the Flagstaff B – Burnt River West Alternative crosses Alder Creek, the Burnt River, Dixie Creek, and Powell Creek, which support redband trout. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Flagstaff B – Burnt River West Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

The Flagstaff B - Burnt River West Alternative crosses Alder Creek, the Burnt River, Dixie Creek, and Powell Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), the Flagstaff B – Burnt River West Alternative is anticipated to result in approximately 1.7 miles of low, residual impacts on redband trout. The Flagstaff B – Burnt River West Alternative is anticipated to result in approximately 2.1 miles of fewer impacts on redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Flagstaff B – Burnt River West Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this action are anticipated.

Flagstaff B – Durkee Alternative

As with the Applicant's Proposed Action Alternative, the Flagstaff B – Durkee Alternative does not cross any streams that support federally listed or candidate fish species. However, the Flagstaff B – Durkee Alternative crosses Alder Creek, the Burnt River, Dixie Creek, North Fork Dixie Creek (twice), and unnamed streams (1174727444702 and 1174799444659), which support redband trout. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Flagstaff B – Durkee Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

The Flagstaff B – Durkee Alternative crosses Alder Creek, the Burnt River, Dixie Creek, North Fork Dixie Creek (twice), and unnamed streams (1174727444702 and 1174799444659), which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), the Flagstaff B – Durkee Alternative is anticipated to result in approximately 2.6 miles of low, residual impacts on redband trout. The Flagstaff B – Durkee Alternative is anticipated to result in approximately 1.2 miles of fewer impacts on redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Flagstaff B – Durkee Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Conclusion

None of the alternative routes in Segment 3 cross streams that support ESA-listed fish, critical habitat, and/or EFH; however, all of the alternative routes in Segment 3 cross streams that support redband trout. Low residual impacts are anticipated where streams that support redband trout are crossed. The Timber Canyon Alternative is anticipated to result in greater residual impacts on fish resources than the other alternative routes as a greater distance of streams that support redband trout are crossed.

SEGMENT 4—BROGAN

The alternatives in Segment 4 cross numerous waterways with fish presence, construct new access roads, remove riparian vegetation, and control noxious weeds through herbicide use.

The number or locations of access road crossings will not be available until a route is selected for construction and final design and engineering is completed. However, the construction of new access roads and the upgrades of existing access roads can cause the loss of streamside vegetation, increased sedimentation or pollution runoff to waterways, potential blockage of fish passage, and loss of necessary habitat over the life of the B2H Project.

Waterways within Segment 4 do not support ESA-listed fish, designated critical habitat, and/or EFH; however, waterways within Segment 4 do support special status fish species. For perennial fish-bearing waterways within Segment 4, existing structures would be used when feasible; however, new or modified channel-spanning structures may be used where required. All proposed channel spanning structure designs or modifications for fish-bearing streams would be implemented with approval by ODFW. For seasonal/ephemeral streams, new or modified channel-spanning structures, existing fords, or existing fords that require minor modifications to stabilize (e.g., portable mats, minimal amount of coarse fill) would be used.

Also, short segments of new access roads that do not cross a waterway would be constructed within RCAs of waterways that support special status fish species.

The differences in impacts on fish resources between the alternatives and variations within Segment 4 are mainly related to the number of stream crossings and the extent of vegetation removal that would be required.

Table 3-218 presents the residual impacts on all alternative routes and route variations in Segment 4.

Table 3-218. Fish Resources Inventory Data and Residual Impacts for Segment 4—Brogan

Alternative Route	Total Length (miles)	Inventory Data (miles crossed)					Residual Impacts (miles crossed)		
		Bull Trout Critical Habitat	Chinook Salmon Critical Habitat	Middle Columbia River Steelhead Critical Habitat	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams	None	Low	Moderate
Applicant's Proposed Action	40.1	0.0	0.0	0.0	0.0	1.0	39.1	1.0	0.0
Variation S4-A1	*5.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.3*	*5.6*	*0.3*	*0.0*
Variation S4-A2	*6.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.3*	*5.7*	*0.3*	*0.0*
Variation S4-A3	*6.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.3*	*5.8*	*0.3*	*0.0*
Tub Mountain South	40.5	0.0	0.0	0.0	0.0	1.5	39.0	1.5	0.0
Willow Creek	34.6	0.0	0.0	0.0	0.0	0.9	33.7	0.9	0.0

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative does not cross any streams that support federally listed or candidate fish species. However, the Applicant's Proposed Action Alternative crosses Willow Creek, which supports redband trout. This crossing would result in removal of tall vegetation that would

decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

The Applicant's Proposed Action Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

The Applicant's Proposed Action Alternative crosses Willow Creek, which supports redband trout. Vegetated riparian zones at this stream is approximately 50 feet. Based on the impact criteria used in this analysis (Table 3-196), the Applicant's Proposed Action Alternative is anticipated to result in approximately 1.0 mile of low, residual impacts on redband trout.

Protected Fish Habitats

The Applicant's Proposed Action Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this action are anticipated.

Variation S4-A1

Variation S4-A1 does not cross any streams that support federally listed or candidate fish species. However, Variation S4-A1 crosses Goodman Creek, which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variations S4-A2 and S4-A3, this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S4-A1 crosses Goodman Creek, which supports redband trout. Vegetated riparian zones at this stream is approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S4-A1 is anticipated to result in approximately 0.3 mile of low, residual impacts on redband trout. Variation S4-A1 is anticipated to result in similar impacts on redband trout as Variations S4-A2 and S4-A3 except impacts will occur at different stream crossing locations.

Protected Fish Habitats

As with Variations S4-A2 and S4-A3, this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S4-A2

Variation S4-A2 does not cross any streams that support federally listed or candidate fish species. However, Variation S4-A2 crosses Goodman Creek, which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variations S4-A1 and S4-A3, this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S4-A2 crosses Goodman Creek, which supports redband trout. Vegetated riparian zones at this stream is approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S4-A2 is anticipated to result in approximately 0.3 mile of low, residual impacts on redband trout. Variation S4-A2 is anticipated to result in similar impacts on redband trout as Variations S4-A1 and S4-A3 except impacts will occur at different stream crossing locations.

Protected Fish Habitats

As with Variations S4-A1 and S4-A3, this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S4-A3

Variation S4-A3 does not cross any streams that support federally listed or candidate fish species. However, Variation S4-A3 crosses Goodman Creek, which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variations S4-A1 and S4-A3, this variation does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S4-A3 crosses Goodman Creek, which supports redband trout. Vegetated riparian zones at this stream is approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S4-A3 is anticipated to result in approximately 0.3 mile of low, residual impacts on redband trout. Variation S4-A3 is anticipated to result in similar impacts on redband trout as Variations S4-A1 and S4-A2 except impacts will occur at different stream crossing locations.

Protected Fish Habitats

As with Variations S4-A1 and S4-A3, this variation does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Tub Mountain South Alternative

The Tub Mountain South Alternative does not cross any streams that support federally listed or candidate fish species. However, the Tub Mountain South Alternative crosses Goodman Creek, Birch Creek, Benson Creek, Durbin Creek, and Willow Creek, which support redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Tub Mountain South Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

The Tub Mountain South Alternative crosses Goodman Creek, Birch Creek, Benson Creek, Durbin Creek, and Willow Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), The Tub Mountain South Alternative is anticipated to result in approximately 1.5 miles of low, residual impacts on redband trout. The Tub Mountain South Alternative is anticipated to result in approximately 0.5 mile greater impacts on redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Tub Mountain South Alternative does not cross any streams that support sensitive fish species. No identifiable impacts from this alternative are anticipated.

Willow Creek Alternative

The Willow Creek Alternative does not cross any streams that support federally listed or candidate fish species. However, the Willow Creek Alternative crosses Goodman Creek, Birch Creek, Benson Creek, Durbin Creek, and Willow Creek, which support redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Willow Creek Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

The Willow Creek Alternative crosses Goodman Creek, Birch Creek, Benson Creek, Durbin Creek, and Willow Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), The Willow Creek Alternative is anticipated to result in approximately 0.9 mile of low, residual impacts on redband trout. The Willow Creek Alternative is anticipated to result in slightly less impacts on redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Willow Creek Alternative does not cross any streams that support sensitive fish species. No identifiable impacts from this alternative are anticipated.

Conclusion

None of the alternative routes in Segment 4 cross streams that support ESA-listed fish, critical habitat, and/or EFH; however, all of the alternative routes in Segment 4 cross streams that support redband trout. Low residual impacts are anticipated where streams that support redband trout are crossed. The Tub Mountain South Alternative is anticipated to result in greater residual impacts on fish resources than the other alternative routes as a greater distance of streams that support redband trout are crossed.

SEGMENT 5—MALHEUR

The alternatives in Segment 5 cross numerous waterways with fish presence, construct new access roads, remove riparian vegetation, and control noxious weeds through herbicide use.

The number or locations of access road crossings will not be available until a route is selected for construction and final design and engineering is completed. However, the construction of new access

roads and the upgrades of existing access roads can cause the loss of streamside vegetation, increased sedimentation or pollution runoff to waterways, potential blockage of fish passage, and loss of necessary habitat over the life of the B2H Project.

Waterways within Segment 5 do not support ESA-listed fish, designated critical habitat, and/or EFH; however, waterways within Segment 5 do support special status fish species. For perennial fish-bearing waterways within Segment 5, existing structures would be used when feasible; however, new or modified channel-spanning structures may be used where required. All proposed channel spanning structure designs or modifications for fish-bearing streams would be implemented with approval by ODFW. For seasonal/ephemeral streams, new or modified channel-spanning structures, existing fords, or existing fords that require minor modifications to stabilize (e.g., portable mats, minimal amount of coarse fill) would be used.

Also, short segments of new access roads that do not cross a waterway would be constructed within RCAs of waterways that support special status fish species.

The differences in impacts on fish resources between the alternatives and variations within Segment 5 are mainly related to the number of stream crossings and the extent of vegetation removal that would be required.

Table 3-219 presents the residual impacts on all alternative routes and route variations in Segment 5.

Table 3-219. Fish Resources Inventory Data and Residual Impacts for Segment 5—Malheur

Alternative Route	Total Length (miles)	Inventory Data (miles crossed)					Residual Impacts (miles crossed)		
		Bull Trout Critical Habitat	Chinook Salmon Critical Habitat	Middle Columbia River Steelhead Critical Habitat	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams	None	Low	Moderate
Applicant's Proposed Action	40.4	0.0	0.0	0.0	0.0	1.1	39.3	1.1	0.0
Variation S5-A1	*7.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*7.4*	*0.0*	*0.0*
Variation S5-A2	*7.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*7.4*	*0.0*	*0.0*
Variation S5-B1	*2.5*	*0.0*	*0.0*	*0.0*	*0.0*	*0.6*	*1.9*	*0.6*	*0.0*
Variation S5-B2	*2.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.2*	*2.6*	*0.2*	*0.0*
Malheur S	43.5	0.0	0.0	0.0	0.0	0.5	43.0	0.5	0.0
Malheur A	43.1	0.0	0.0	0.0	0.0	0.5	42.6	0.5	0.0

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative does not cross any streams that support federally listed or candidate fish species. However, the Applicant's Proposed Action Alternative crosses the Owyhee River, Bully Creek, Cottonwood Creek, and the Malheur River, which support redband trout. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in

increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

The Applicant's Proposed Action Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

The Applicant's Proposed Action Alternative crosses the Owyhee River, Bully Creek, Cottonwood Creek, and the Malheur River, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), the Applicant's Proposed Action Alternative is anticipated to result in approximately 1.1 miles of low, residual impacts on redband trout.

Protected Fish Habitats

The Applicant's Proposed Action Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this action are anticipated.

Variation S5-A1

Variation S5-A1 does not cross any streams that support special status fish species or protected fish habitats. No identifiable impacts from this variation are anticipated.

Federally Listed and Candidate Fish Species

As with Variation S5-A2, Variation S5-A1 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with Variation S5-A2, Variation S5-A1 does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with Variation S5-A2, Variation S5-A1 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S5-A2

Variation S5-A2 does not cross any streams that support special status fish species or protected fish habitats. No identifiable impacts from this variation are anticipated.

Federally Listed and Candidate Fish Species

As with Variation S5-A1, Variation S5-A2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

As with Variation S5-A1, Variation S5-A2 does not cross any streams that support sensitive fish species. No identifiable impacts from this variation are anticipated.

Protected Fish Habitats

As with Variation S5-A1, Variation S5-A2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S5-B1

Variation S5-B1 does not cross any streams that support federally listed or candidate fish species. However, Variation S5-B1 crosses the Owyhee River, which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variation S5-B2, Variation S5-B1 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S5-B1 crosses the Owyhee River, which supports redband trout. Vegetated riparian zones at this stream crossing is approximately 50 feet. Based on the impact criteria used in this analysis (Table 3-196), the Variation S5-B1 is anticipated to result in approximately 0.6 mile of low, residual impacts on redband trout. Variation S5-B1 is anticipated to result in approximately 0.4 mile of greater impacts on redband trout than Variation S5-B2.

Protected Fish Habitats

As with Variation S5-B2, Variation S5-B1 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S5-B2

Variation S5-B2 does not cross any streams that support federally listed or candidate fish species. However, Variation S5-B2 crosses the Owyhee River, which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variation S5-B1, Variation S5-B2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S5-B2 crosses the Owyhee River, which supports redband trout. Vegetated riparian zones at this stream crossing is approximately 50 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S5-B2 is anticipated to result in approximately 0.2 mile of low, residual impacts on redband trout. Variation S5-B2 is anticipated to result in approximately 0.4 mile of fewer impacts on redband trout than Variation S5-B1.

Protected Fish Habitats

As with Variation S5-B1, Variation S5-B2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Malheur S Alternative

The Malheur S Alternative does not cross any streams that support federally listed or candidate fish species. However, similar to the Applicant's Proposed Action Alternative, the Malheur S Alternative crosses the Owyhee River, Bully Creek, Cottonwood Creek, and the Malheur River, which support redband trout. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Malheur S Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

Similar to the Applicant's Proposed Action Alternative, the Malheur S Alternative crosses the Owyhee River, Bully Creek, Cottonwood Creek, and the Malheur River, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), the Malheur S Alternative is anticipated to result in approximately 0.5 mile of low, residual impacts on redband trout. The Malheur S Alternative is anticipated to result in approximately 0.6 mile of fewer impacts on redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Malheur S Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Malheur A Alternative

The Malheur A Alternative does not cross any streams that support federally listed or candidate fish species. However, similar to the Applicant's Proposed Action Alternative, the Malheur A Alternative crosses the Owyhee River, Bully Creek, Cottonwood Creek, and the Malheur River, which support redband trout. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with the Applicant's Proposed Action Alternative, the Malheur A Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this alternative are anticipated.

Sensitive Fish Species

Similar to the Applicant's Proposed Action Alternative, the Malheur A Alternative crosses the Owyhee River, Bully Creek, Cottonwood Creek, and the Malheur River, which support redband trout. Vegetated riparian zones at these streams vary from approximately 50 feet to 100 feet. Based on the impact criteria used in this analysis (Table 3-196), the Malheur A Alternative is anticipated to result in approximately 0.5 mile of low, residual impacts on redband trout. The Malheur A Alternative is anticipated to result in approximately 0.6 mile of fewer impacts on redband trout than the Applicant's Proposed Action Alternative.

Protected Fish Habitats

As with the Applicant's Proposed Action Alternative, the Malheur A Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this alternative are anticipated.

Conclusion

None of the alternative routes in Segment 5 cross streams that support ESA-listed fish, critical habitat, and/or EFH; however, all of the alternative routes in Segment 5 cross streams that support redband trout. Low residual impacts are anticipated where streams that support redband trout are crossed. The Applicant's Proposed Action Alternative is anticipated to result in greater residual impacts on fish

resources than the other alternative routes as a greater distance of streams that support redband trout are crossed.

SEGMENT 6—TREASURE VALLEY

The alternatives in Segment 6 cross numerous waterways with fish presence, construct new access roads, remove riparian vegetation, and control noxious weeds through herbicide use.

The number or locations of access road crossings will not be available until a route is selected for construction and final design and engineering is completed. However, the construction of new access roads and the upgrades of existing access roads can cause the loss of streamside vegetation, increased sedimentation or pollution runoff to waterways, potential blockage of fish passage, and loss of necessary habitat over the life of the B2H Project.

Waterways within Segment 6 do not support ESA-listed fish, designated critical habitat, and/or EFH; however, waterways within Segment 6 do support special status fish species. For perennial fish-bearing waterways within Segment 6, existing structures would be used when feasible; however, new or modified channel-spanning structures may be used where required. For seasonal/ephemeral streams, new or modified channel-spanning structures, existing fords, or existing fords that require minor modifications to stabilize (e.g., portable mats, minimal amount of coarse fill) would be used.

Also, short segments of new access roads that do not cross a waterway would be constructed within RCAs of waterways that support special status fish species.

The differences in impacts on fish resources between the alternatives and variations within Segment 6 are mainly related to the number of stream crossings and the extent of vegetation removal that would be required.

Table 3-220 presents the residual impacts on all alternative routes and route variations in Segment 6.

Table 3-220. Fish Resources Inventory Data and Residual Impacts for Segment 6—Treasure Valley

Alternative Route	Total Length (miles)	Inventory Data (miles crossed)					Residual Impacts (miles crossed)		
		Bull Trout Critical Habitat	Chinook Salmon Critical Habitat	Middle Columbia River Steelhead Critical Habitat	Snake River Basin Steelhead Critical Habitat	Redband Trout Occupied Streams	None	Low	Moderate
Applicant's Proposed Action	28.0	0.0	0.0	0.0	0.0	0.8	27.2	0.8	0.0
Variation S6-A1	*9.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*9.2*	*0.1*	*0.0*
Variation S6-A2	*8.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*8.8*	*0.1*	*0.0*
Variation S6-B1	*14.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.4*	*14*	*0.4*	*0.0*
Variation S6-B2	*14.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.4*	*13.7*	*0.4*	*0.0*

Applicant's Proposed Action Alternative

The Applicant's Proposed Action Alternative does not cross any streams that support federally listed or candidate fish species. However, the Applicant's Proposed Action Alternative crosses Succor Creek, Reynolds Creek, and Jump Creek, which support redband trout. These crossings would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

The Applicant's Proposed Action Alternative does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this action are anticipated.

Sensitive Fish Species

The Applicant's Proposed Action Alternative crosses Succor Creek, Reynolds Creek, and Jump Creek, which support redband trout. Vegetated riparian zones at these streams vary from approximately 100 feet to 200 feet. Based on the impact criteria used in this analysis (Table 3-196), the Applicant's Proposed Action Alternative is anticipated to result in approximately 0.8 of low, residual impacts on redband trout.

Protected Fish Habitats

The Applicant's Proposed Action Alternative does not cross any streams that support protected fish habitats. No identifiable impacts from this action are anticipated.

Variation S6-A1

Variation S6-A1 does not cross any streams that support federally listed or candidate fish species. However, Variation S6-A1 crosses Poison Creek, which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variation S6-A2, Variation S6-A1 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S6-A1 crosses Poison Creek, which supports redband trout. Vegetated riparian zones at this stream are approximately 100 feet to 300 feet. Based on the impact criteria used in this analysis

(Table 3-196), Variation S6-A1 is anticipated to result in approximately 0.1 mile of low residual impacts on redband trout. Variation S6-A1 is anticipated to result in similar impacts on redband trout as Variation S6-A2 except impacts will occur at different stream crossing locations.

Protected Fish Habitats

As with Variation S6-A2, Variation S6-A1 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S6-A2

Variation S6-A2 does not cross any streams that support federally listed or candidate fish species. However, Variation S6-A2 crosses Poison Creek, which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variation S6-A1, Variation S6-A2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S6-A2 crosses Poison Creek, which supports redband trout. Vegetated riparian zones at this stream are approximately 100 feet to 300 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S6-A2 is anticipated to result in approximately 0.1 mile of low residual impacts on redband trout. Variation S6-A2 is anticipated to result in similar impacts on redband trout as Variation S6-A1 except impacts will occur at different stream crossing locations.

Protected Fish Habitats

As with Variation S6-A1, Variation S6-A2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S6-B1

Variation S6-B1 does not cross any streams that support federally listed or candidate fish species. However, Variation S6-B1 crosses Jump Creek, which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variation S6-B2, Variation S6-B1 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S6-B1 crosses Jump Creek, which support redband trout. Vegetated riparian zones at this stream crossing are approximately 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S6-B1 is anticipated to result in approximately 0.4 mile of low residual impacts on redband trout. Variation S6-B1 is anticipated to result in similar impacts on redband trout as Variation S6-B2 except impacts will occur at different stream crossing locations.

Protected Fish Habitats

As with Variation S6-B2, Variation S6-B1 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Variation S6-B2

Variation S6-B2 does not cross any streams that support federally listed or candidate fish species. However, Variation S6-B2 crosses Jump Creek, which supports redband trout. This crossing would result in removal of tall vegetation that would decrease shading, potentially resulting in increased stream temperatures and sediment load. The types of potential effects on fish resources are described in more detail in Section 3.2.5.6. Design features of the B2H Project for environmental protection and selective mitigation measures that would minimize impacts on fish resources include spanning of riparian communities and water courses, using existing access roads, selective removal of vegetation, and others (refer to Table 3-201). Resource-specific consequences are discussed further below.

Federally Listed and Candidate Fish Species

As with Variation S6-B1, Variation S6-B2 does not cross any streams that support federally listed or candidate fish species. No identifiable impacts from this variation are anticipated.

Sensitive Fish Species

Variation S6-B2 crosses Jump Creek, which supports redband trout. Vegetated riparian zones at this stream crossing are approximately 100 feet. Based on the impact criteria used in this analysis (Table 3-196), Variation S6-B2 is anticipated to result in approximately 0.4 mile of low residual impacts on redband trout. Variation S6-B2 is anticipated to result in similar impacts on redband trout as Variation S6-B1 except impacts will occur at different stream crossing locations.

Protected Fish Habitats

As with Variation S6-B1, Variation S6-B2 does not cross any streams that support protected fish habitats. No identifiable impacts from this variation are anticipated.

Conclusion

The Applicant's Proposed Action Alternative does not cross streams that support ESA-listed fish, critical habitat, and/or EFH; however, it does cross streams that support redband trout. Low residual impacts

are anticipated where streams that support redband trout are crossed. For each variation option, the variations cross the same streams that support redband trout for the same distance, therefore residual impacts on fish resources are anticipated to be similar with any of the Applicant's Proposed Action Alternative route variation options.