3.2.8 CULTURAL RESOURCES

3.2.8.1 INTRODUCTION

CONSIDERATIONS FOR DEFINING CULTURAL RESOURCES

This section of the Draft EIS discusses the presence of cultural resources in the analysis area and the impacts that the Proposed Action and alternatives would have on those resources. The analysis area consists of the area of potential effects (APE), which is a geographic area or areas which may be directly or indirectly affected by the B2H Project. For cultural resources, effects could be the result of ground disturbances, visible or audible disturbances, or changes in public access, traffic patterns or land use. A distinction that should be understood at the outset of this presentation is the difference between the term “cultural resource” as it is employed in National Environmental Policy Act (NEPA) analysis and “historic property” as it is employed in Section 106 of the National Historic Preservation Act (NHPA) compliance. Historic properties are defined at 36 CFR Part 800.16(l)(1), the regulations implementing Section 106, as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior.” Historic properties include properties of “traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.” The requirement that a historic property be evaluated as eligible for listing in the National Register of Historic Places (NRHP) makes the field of consideration much more restrictive than in NEPA analysis. For the B2H Project, as well as other actions requiring NEPA analysis, the BLM has broadened its consideration of impacts to encompass all cultural resources, regardless of NRHP eligibility. BLM Manual 8100.03.F (BLM 2004a) states that “[c]ultural resources need not be determined eligible for the National Register of Historic Places (as in the National Historic Preservation Act) to receive consideration under the National Environmental Policy Act.” That said, where information on NRHP-listing or eligibility exists, it is issued to assist with assessments of significance and impact.

The classification of a “cultural resource” for purposes of the B2H EIS includes all buildings, sites, districts, structures, objects and landscapes that have been created by or are associated with humans and are considered to have historical or cultural value. The definition of what constitutes a “cultural resource” can vary between agencies and Indian tribes. For instance, some tribes prefer a definition that includes both the visual and spiritual elements of cultural practices. This may include cultural landscapes that possess natural resources and landforms important to tribes. These resources are commonly considered to be “traditional cultural properties” (TCPs). Hanes (1995) offers a broader definition of cultural resources as including “native species (plants and animals), inanimate materials, landforms, archaeological sites, ancestral grounds and other components of the physical environment…” This definition may more accurately approach the resources of concern to tribes, who consider the project area part of their traditional lands.

As defined in *National Register Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties*, a TCP is “(a place) that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identity of the

community" (Parker and King 1992). TCPs, as described in *Bulletin 38*, do not necessarily have to reflect the "products" or "work" or human beings, but can represent the location where significant traditional events, activities, or cultural observances have taken place. Although the purpose of *Bulletin 38* is to establish criteria for evaluation of such places for NRHP listing, the significance of TCPs is taken by many groups to exceed the limited analytical framework provided by the NRHP. Furthermore, the knowledge required to properly identify and evaluate the significance of this particular class of cultural resources makes them distinctive from other archaeological and built environment resources. As such, identification of TCPs has followed a separate, parallel process to the one used to identify other cultural resources in the project area. This process involves conducting ethnographic studies commissioned by the tribes and shared with the agency for planning purposes. Although the scope and nature of these studies are characterized in this chapter, specific information on the finding of these studies is considered confidential and is not distributed as public information.

This section also presents mitigation measures to be used to avoid, minimize, or compensate for impacts to cultural resources. As described in this document, mitigation under NEPA does not limit or set the outcome of consultation required under Section 106 of the NHPA and implementing regulations found at 36 CFR Part 800.

3.2.8.2 Regulatory Framework

Federal Legislation Applicable to Cultural Resources in Analysis Area

Under NEPA analysis, cultural resources are considered a subset of the "human environment," and are thus subject to study as part of the "affected environment" (40 CFR 1508.4). Furthermore, impacts to cultural resources must be evaluated and disclosed.

In addition to the disclosure requirements under NEPA, Section 106 of the NHPA (16 U.S.C. 470) requires that the federal agency permitting the undertaking must "take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register." Effect is defined in the implementing regulations of Section 106 (36 CFR 800.16(i)) as "alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." For projects where it has been determined that the project will result in an "adverse effect" to historic properties, Section 106 compliance is considered satisfied with the execution of a memorandum of agreement (MOA) or programmatic agreement (PA), a legally binding document that describes the lead federal agencies' (in this case, the BLM) process of identifying and evaluating impacts on historic properties, and the plans for resolving adverse effects, in accordance with 36 CFR 800.14(b) and 36 CFR 800.16(t).

For complex, or phased undertakings, such as transmission line projects, where effects on historic properties are similar and repetitive or are multistate or regional in scope or when effects cannot be fully determined before approval of an undertaking, the execution of a PA is often necessary to articulate the alternative measures that will be followed to ensure compliance with Section 106 of the NHPA. The BLM, in consultation with the Washington, Oregon and Idaho State Historic Preservation

Offices (SHPOs), the Confederated Tribes of the Umatilla Indian Reservation Tribal Historic Preservation Office (THPO), other tribes, and other consulting parties, is developing appropriate measures to resolve adverse effects to historic properties. The phased compliance approach will proceed in accordance with the B2H Project PA (Appendix G).

Other Federal Cultural Resources Legislation

In addition to NHPA and 36 CFR Part 800, there are multiple laws, regulations, and executive orders and memoranda that protect cultural resources, especially those of concern to tribes. Legal authorities pertaining to cultural resources for the B2H Project are listed below.

- **American Antiquities Act of 1906** (16 U.S.C. 432–433) authorizes federal land-managing agencies to grant permits for examination of ruins, the excavation of archaeological sites, and the gathering of objects of antiquity on federal land.
- **Religious Freedom Restoration Act** (RFRA; 42 U.S.C. 2000bb–41993), enacted in 1993 and amended in 2003, provides that without providing a compelling governmental interest, the United States government cannot substantially burden a person's exercise of religion, as provided for by the first amendment of the United States Constitution. RFRA is a significant law providing for protection of cultural resources, particularly traditional cultural places, particularly for tribes who visit or use these resources during religious practice.
- **American Indian Religious Freedom Act** (AIRFA; 42 U.S.C. 1996), enacted in 1978, requires federal agencies to protect and preserve the customs, ceremonies, and traditions of American Indian religions.
- **Archaeological Resources Protection Act** (ARPA; 16 U.S.C. 470aa–470ee), enacted in 1979, amended in 1988, provides felony-level penalties for the unauthorized excavation, removal, damage, alteration, or defacement, or the attempt to do so, to any archaeological resource, regardless of NRHP eligibility, more than 100 years old on public lands or tribal lands. It further prohibits the sale, purchase, exchange, transportation, receipt, or offering of any archaeological resource obtained from public lands or tribal lands in violation of any provision, rule, regulation, ordinance, or permit under the act or under any federal, state or local law (BLM 2004a). It establishes permit requirements and civil and criminal penalties and increases the penalty for stealing or vandalizing to $100,000 and up to five years in prison.
- **Native American Graves Protection and Repatriation Act** (NAGPRA; 25 U.S.C. 3001–3002), enacted in 1990, establishes additional requirements for ownership and control of Native American cultural items, human remains, and associated funerary objects to Native Americans. It also establishes requirements for the treatment of Native American human remains and cultural objects found on federal land. This act further provides for the protection, inventory, and repatriation of Native American human remains, objects of cultural patrimony, sacred objects, unassociated funerary objects, and associated funerary objects.
- **National Trails System Act of 1968** (as amended 2009) instructs federal agencies, such as BLM and NPS, to develop management plans to identify and protect designated National Trails, including National Historic Trails (NHTs), and their associated sites and resources (BLM 1986, 2012; NPS 1998). It is the responsibility of the BLM to protect and interpret trail resources that are under their jurisdiction (BLM 1986, 2012). Implementing those responsibilities includes, but

is not limited to, the following tasks: regular monitoring of the resource, keeping the NPS informed, defining boundaries, erecting and maintaining trail markers, providing and maintaining facilities, issuing and enforcing regulations, maintaining the scenic/historic integrity, avoiding destruction of segments, and mitigating the unavoidable impacts (BLM 1986).

- **EO 11593, Protection and Enhancement of the Cultural Environment**, issued in 1971, directs federal land management agencies to administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations; initiate measures necessary to direct their policies, plans, and programs in such a way that federally owned sites, structures, and objects of historical, architectural, or archaeological significance are preserved, restored, and maintained for the inspiration and benefit of the people; and, in consultation with the Advisory Council on Historic Preservation, institute procedures to ensure that federal plans and programs contribute to the preservation and enhancement of nonfederally owned sites, structures, and objects of historical, architectural, or archaeological significance.
- **EO 13007, Indian Sacred Sites**, issued in 1996, directs federal land-managing agencies to accommodate access to, and ceremonial use of, Native American sacred sites by native religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites.
- **EO 13175, Consultation and Coordination with Indian Tribal Governments**, issued in 2000, underscores the existing requirement for regular and meaningful government-to-government consultation between the federal government and tribal officials.

State Legislation Applicable to Cultural Resources

Oregon:

- Oregon Revised Statute (ORS) 358.905–955, Archaeological Sites and Objects
- ORS 390.235, Permits and Conditions for Excavation and Removal of Archaeological or Historic Material; Rules; Criminal Penalty and its associated Oregon Administrative Rules (OAR; 736–051-0080 to 0090)
- ORS Chapter 97.740 to 97.760, Indian Graves and Protected Objects

Idaho:

- Idaho Code Title 67, Chapter 41; Idaho Historical Society
- Idaho Code Title 27, Chapter 5, Sections 27-502 through 27-504: Protection of Graves
- Idaho Code Sections 9-337 through 9-350, the Idaho Public Records Law which stipulates the following records as exempt from disclosure:
    - Records, maps or other records identifying the location of archaeological or geophysical sites or endangered species, if not already known to the general public.
    - Archaeological and geologic records concerning exploratory drilling, logging, mining and other excavation, when such records are required to be filed by statute for the time provided by statute.

3.2.8.3 Issues Identified for Analysis

Project scoping with the public, tribes and agencies identified several specific key resources that could be impacted by the project. Those include:

- What will be the effects on places of cultural importance?
- What will the effects be on archaeological resources and historic properties?
- Can adverse effects on archaeological resources and historic properties be avoided?
- What will be the effects on first foods [foods traditionally gathered by Native American tribes]?

In addition, comments received during the scoping process indicated concerns about impacts to segments of the Oregon National Historic Trail, sites considered sacred to tribes associated with the Forced March of Paiute and Bannock peoples to Fort Simcoe on the Yakama Reservation, traditional Native American locations for gathering culturally significant plants, historic mining sites, and archaeological sites. Cultural resources specifically referenced in scoping are described below.

Oregon National Historic Trail

Designated an NHT in 1978, the Oregon NHT is an approximately 1,800 -mile-long network of trails, river crossings, and landmarks that were originally created by Native Americans and later refined by the early Euro-American explorers and fur trappers. Utilized by Euroamerican missionaries in the 1830s, in the 1840s the trail was intensively used by emigrants seeking to settle the fertile Willamette Valley. Many well-traveled segments of the trail have been converted to modern highways and railroad segments, including several segments of Interstate 84 (I-84) in Oregon and Idaho. Numerous markers have been erected along burial spots, emigrant camps, inscription spots, and areas containing visible wagon ruts within the states crossed by the trail. The Oregon Trail and/or associated trail features are present in all segments of the analysis area.

Characterization of segments of the NHT located within the analysis area for the B2H Project and analysis of impacts to the NHT are presented in this section as well as in Visual Resources (Section 3.2.7) and NHT (Section 3.2.9).

"Trail of Tears"

An estimated 550 to 650 Paiute and Bannock people were subjected to a forcible roundup to Fort Simcoe, in northwest Washington, during the winter of 1878-79.The precise location of their route is unknown. However, consultation with tribes indicates that portions of the trail are located within all segments of the analysis area. The relocation is considered by the Shoshone Paiute Tribes as a particularly significant event in their history, during which hundreds of men, women and infants died. Many bodies were left, unburied, along the Trail. The Trail is considered to be a spiritually significant property to the Shoshone Paiute Tribes, and project impacts continue to be evaluated through government-to-government consultation.

POISON CREEK STAGE STATION

The Poison Creek Stage Station is located in Segment 6 along the Proposed Action in Idaho. It contains a house, barn, two root cellars, a schoolhouse, a chicken coop, and an outhouse (NRHP form). This station was constructed in 1886 as a way station for the Jordan Valley-Caldwell stage line, and was listed in the NRHP in 1978.

3.2.8.4 METHODOLOGY

The area of potential effects for ground disturbances that could directly affect cultural resources in the project area is a 500-foot-wide corridor centered on the transmission line and towers. This corridor would accommodate the actual transmission line and towers. The APE has also been defined to accommodate a 200-foot-wide corridor along new and improved access roads and a 100-foot-wide corridor for existing unimproved access roads. The APE for staging areas, borrow areas, substations and other ancillary facilities is a 200-foot radius around the footprint of the facilities, and the APE for pulling and tensioning areas and geotechnical borings is a 250-foot radius around the site. The area of potential effects for indirect effects consists of a 10-mile-wide corridor centered on the project, adjusted to include the areas of land within this corridor from which the project would be visible. This expanse of corridor has also been established as the study area to examine any potential visual effects the project could have on sensitive cultural resources, such as traditional cultural properties, cultural landscapes, trails, standing architecture, or other cultural resources.

The cultural resources inventory conducted within the areas of potential effects for the B2H Project has been divided into two phases. Phase I has been completed for this Draft EIS, and Phase II will be completed for the Final EIS and will follow the provisions stipulated in the Section 106 project PA.

Phase I inventory consists of the following:

- A Class I records search, as set forth in the BLM Manual 8110 (BLM 2004b), consists of a compilation of existing information about known cultural resources assembled from a review of previous survey reports and previously recorded sites in the SHPO, THPO and agency databases and from the available literature. The parameters of the Class I records search included lands 2 miles on either side of centerline of the Proposed Action and all alternatives (four mile wide corridor.)
- A Class II sample pedestrian survey according to the BLM Manual 8100 guidance consists of "...statistically based surveys designed to characterize the probable density, diversity and distribution of cultural properties in an area and to answer appropriate research questions. A variety of methods may be used, singly or in combination, to improve statistical reliability, including quadrants selected randomly or systematically, transects, stratified samples, and phased approaches" (BLM 2004b). The parameters of the Class II survey included one mile sample segments of 250 feet on either side of centerline of the Proposed Action and all alternatives (500 foot corridor).

- A reconnaissance level survey (RLS) was completed within the expanded study area for indirect impacts. BLM Manual 8100 guidance defines an RLS as "…a focused or special-purpose information tool that is less systematic, less intensive, less complete, or otherwise does not meet Class III survey standards…an area surveyed only by reconnaissance methods cannot be considered to be "inventoried" and may be subject to resurvey for other purposes." The parameters of the RLS included above-ground resources located within five miles on either side of centerline of the Proposed Action and all alternatives.
- Ethnographic studies of the general project area to identify traditional cultural properties and characterize tribal concerns regarding cultural resources in the Project area.

Phase II will consist of the following:

- A Class III pedestrian survey will be conducted for the Agency Preferred Alternative as stipulated in the project PA. A Class III survey is a professionally conducted, thorough pedestrian survey that is intended to locate and record all cultural resources (BLM 2004b). The parameters of the Class III survey will include 100% of federal lands and accessible non-federal lands within the 500 foot corridor centered on the preferred alternative.
- An intensive level survey (ILS) will be conducted for aboveground resources identified in the RLS as requiring further study for assessment of indirect impacts.

The specific methods employed for collecting information on cultural resources during each of these phases are explained below.

Class I Records Search

To identify cultural resources within the study area, the IPC and their contractors conducted a Class I records search of a 4-mile-wide study corridor (two miles on either side of centerline) for the Proposed Action and each alternative. The records search for cultural resources on CTUIR lands consisted of two miles on both sides of the Proposed Action centerline only.

Data were gathered by official file records requests to the Oregon and Idaho SHPOs and the CTUIR THPO for sites and inventories located in any township, range, and section intersected by the 4-mile-wide study corridor. A portion of the study area encompasses the state of Washington, and the Washington SHPO and the USFW were also contacted to obtain records for that area. The records search focused on collecting information regarding previously recorded cultural resources within the study area, as well as identifying areas previously subject to pedestrian survey.

Additional data sources for the literature review included the U.S. Geological Survey (USGS) Mineral Resource Data System, GLO maps, and early state maps. USGS topographic maps and historic map sets were consulted to identify historic-era properties that may not have been previously recorded in the study area, as were state and local registers and the NRHP. Other sources consulted consist of the CTUIR Cultural Resources Protection Program, the Oregon Century Farms and Ranches Program, the Northwest Chapter and the Idaho Chapter of the Oregon-California Trails Association, the Oregon Historic Trails Advisory Council, and the Oregon Historic Sites Database. Sources consulted specific to

Idaho consist of the Archaeological Survey of Idaho database, Idaho Historic Sites Inventory database, and the Idaho Century Farms and Ranches Program.

Professional cultural resources inventories not only describe and document resources encountered, but provide recommendations of the resources' eligibility for listing in the NRHP. These recommendations are reviewed by the federal agency which, in consultation with SHPO and THPO, makes formal determinations of the resource's NRHP eligibility. These determinations, in turn, effect decision making on how the historic property will be managed by the agency. Information regarding NRHP eligibility for previously recorded cultural resources in Idaho reflect determinations made by the federal agency in consultation with the SHPO; it is unknown if the NRHP eligibility assessments provided for previously recorded resources in Oregon and Washington reflect recommendations or formal determinations reviewed by the SHPO.

Class II Fifteen Percent Sample Survey

Class II sample surveys of the Proposed Action and alternatives were conducted within a 500-foot-wide corridor (250 feet on both sides of centerline). Cultural resource investigations typically involve pedestrian field surveys that may locate new sites, structures, buildings, objects and districts and provide additional information on the types, densities, and precise locations of cultural resources within the area of analysis. The purpose of the 15 percent survey is to help to predict relative densities of cultural resources within the Proposed Action and alternatives to allow for an evaluation of potential effects to cultural resources for the Proposed Action and alternatives.

The sampling procedures employed random selection of sampling units. Inventory was conducted using 1-mile-long by 500-foot-wide survey blocks. The 1-mile length was used as an arbitrary measure, whereas the 500-foot width corresponds to the width of the comprehensive inventory that will be conducted of the direct APE of the Preferred Alternative. Following this procedure, all completed sample units will directly contribute to completion of the comprehensive inventory for the Agency Preferred Alternative.

Individual survey units were selected based on the following sampling strategy: First, for each proposed alternative and segment, 1-mile-long parcels were designated with a unique survey unit number (e.g., sampling units along a 50-mile-long segment were designated 1-50). A table of random numbers was then used to select specific units for inventory within an alternative. Representative units were selected to account for inventory of 15 percent of each alternative. To ensure adequate representation of each alternative, units were selected regardless of land ownership and included a mix of private, state, and federally managed lands. Because it was anticipated that access constraints would affect the ability to complete survey of units selected on private lands, and to ensure completion of a 15 percent sample, additional units were selected at random and held in reserve for use in case of denied access or other access issues. Following these procedures, information was collected to allow for assessment and comparison of potential cultural resources impact for the Proposed Action and alternatives.

In Oregon, the random sample covered 85 linear miles of the 554.37 miles of Proposed Action and alternatives (this number reflects current alternatives and those that have subsequently been dropped

from consideration). In Idaho, the survey area covered 5 linear miles of the 23.8 miles of the Proposed Action.

It is important to note that NRHP eligibility data associated with sites recorded during Class II survey are recommendations of eligibility that are provided by the archaeological surveyors. The NRHP eligibility of these sites is not considered confirmed until the agency has made determinations of eligibility in consultation with the OR SHPO, ID SHPO, land-holding agencies, affected tribes, and CTUIR THPO, as appropriate.

Reconnaissance Level Survey

The analysis area for the RLS to assess potential indirect impacts, primarily visual, to cultural resources was defined as a 10-mile-wide corridor, 5 miles from centerline or to the visual horizon—whichever was closer—for the Proposed Action and alternatives. Identification of the APE for indirect effects employed a GIS bare-earth viewshed analysis to determine whether a previously identified cultural resource could have a view of the project area and consequently be subject to an indirect adverse effect. This type of viewshed analysis is based on a digital elevation model (DEM) and therefore reflects visible areas of the landscape based on existing landforms, without consideration of vegetation or built environment. Because availability of data regarding existing vegetation and built environment is limited, the bare-earth analysis makes the best use of available GIS DEM data and also provides a “worst case” scenario for visibility.

Once the APE was defined, a literature review was employed to identify significant built environment resources (generally consisting of NRHP listed, eligible, or potentially eligible buildings, structures, sites and districts as well as archaeological sites with significant above-ground components) that could be visually impacted by the project. Surveyors subsequently drove publicly accessible rights-of-way to relocate and record previously recorded resources and to identify any previously unrecorded resources within the RLS APE. Cultural resources that were recorded were 45 years old or older at the time of the RLS. Resources that were found to be listed, eligible, or potentially eligible for listing in the NRHP and potentially visually impacted, were recommended to move forward for further evaluation and impact analysis through an ILS, which will occur in Phase II of the cultural resources inventory for the B2H Project.

Ethnographic Studies

The CTUIR and the Shoshone Paiute Tribes have conducted ethnographic studies to identify areas of tribal interest and TCPs within the B2H Project area and to assist the BLM in meeting its obligations under NEPA, NRHP, EO 13175, AIRFA, ARPA, and numerous other laws and EOs. The BLM treats all information gathered during ethnographic research as confidential, and as such, specific locations or descriptions of resources are not disclosed in the EIS.

The method for conducting the ethnographic studies includes background research and literature review, ethnographic interviews to determine contemporary and ongoing uses of culturally significant areas or sites. The CTUIR also involve desktop analysis and field studies to identify “first foods” of significance to the Tribe.

Class III Survey

A Class III (intensive pedestrian) survey will be completed for the Proposed Action so that cultural resources that may be directly or indirectly impacted can be identified and assessed. The Class III survey will occur after comments on the Draft EIS have been received and prior to issuance of the Final EIS.

Any additional survey required to complete a 100 percent inventory of the Proposed Action, as well as any necessary subsurface inventory or evaluation efforts, will be conducted during Phase II in accordance with the project PA (Appendix G) drafted for the project. The project PA also provides for a process of intensive Class III pedestrian survey for any additional elements (e.g., roads, staging areas) that are added to the project after the Record of Decision.

Intensive Level Survey

An ILS will be conducted for built environment resources within the indirect area of impacts. The ILS will focus on those resources identified in the RLS as requiring further study for assessment of indirect impact. The results of the ILS will be reported in the Final EIS.

3.2.8.5 Cultural Context

The following overview is presented to introduce the reader to the diverse geography of the project area, and the pattern of human activity visible on the landscape. The overview provides a general presentation of prehistoric chronologies of the Columbia Plateau and Great Basin regions, through information gathered by previous archaeological research. It also presents information on the historic period development of the area in terms of the important socio-economic themes that have shaped the landscape (e.g., transportation, mining, timber and logging, agriculture, and stock raising).

It is important to note that the distinction made between “prehistoric” and “historic” resources is an artificial one that is based, for the most part, on the source of data that informs upon each time period. The concept of “prehistory” is a term used in the field of archaeology, which must characterize human society and cultural patterns through material comparisons. Determining what constitutes the “historic period” differs from region to region, as the term “historic” simply marks the time at which written records become available. The murkiness of the prehistory concept becomes particularly evident when dealing with the period of time many researchers identify as the “protohistoric.” This is a time when Euro-Americans encountered and documented many Native American groups; however, these groups did not keep written records themselves, and, therefore, protohistoric records are often biased or unreliable accounts.

Ethnography is the descriptive study of living cultures by anthropologists and, in the United States, is often used to characterize the social and economic organization of Native American people living in a region prior to the arrival of Euro-American individuals and groups. Many tribes, including several tribes being consulted on the B2H Project, have indicated a concern with the artificial division between history and prehistory, citing that it characterizes traditional lifeways as “ahistoric” and fails to recognize the continuity of cultural practices that tribes engage in as living communities. Although the overview presented here does adopt the distinction between prehistoric and historic resources, the authors of the

EIS have chosen to begin this discussion with an ethnographic summary of the traditional lands of Native American groups living in the project area at the time of Euro-American contact. It is hoped that the structure of this presentation will facilitate an appreciation that the archaeology present in the project area is a manifestation of deeply rooted Native American cultural traditions that continue to be practiced today. Contemporary concerns of Native American tribes have been communicated to the BLM through government to government consultation and are discussed in various sections of the EIS, including Earth Resources (Section 3.2.1), Vegetation Resources (Section 3.2.3), Wildlife Resources (Section 3.2.4.), Land Use, Agriculture, Recreation and Transportation (Section 3.2.6), Socioeconomic and Environmental Justice (Section 3.2.11), and Public Health and Safety (Section 3.2.12).

The ethnographic and archaeological overviews presented follow the convention of distinguishing cultural patterns by ecological zone, as established through the work of noted anthropologist Julian Steward (1938), whose work documenting Native American tribes of the Columbia Plateau and Great Basin is considered foundational in the field of anthropology. However, as Steward himself noted, the boundaries of these two zones were not fixed; the highly mobile groups in the Great Basin and Snake River Plain resulted in a complex web of interaction and relationships that challenged Euro-American's efforts to document discrete tribes. As such, early attempts to characterize ethnic boundaries by language, diet, territorial range and/or political affiliation in historical accounts are conflicting. The alienation of many tribes from their traditional lands and the establishment of reservations by the United States government in the late nineteenth century further complicates the use of the Plateau and Great Basin as a conceptual framework for assigning traditional use of these lands to one or more contemporary tribes.

Ethnographic Overview of the Columbia Plateau

Ethnographic information on the Columbia Plateau has been summarized in a number of sources, including those by Ames et al. (1998), the CTUIR, Hanes (1995), Ruby and Brown (1972), Stern (1998), and Suphan (1974). In the Columbia Plateau region, the project traverses the traditional territories of the Western Columbia River Sahaptins; Umatilla, Cayuse, and Walla Walla tribes; and the Nez Perce Tribe (Figure 3-46). The ethnographic descriptions of these groups and their written history are summarized below.

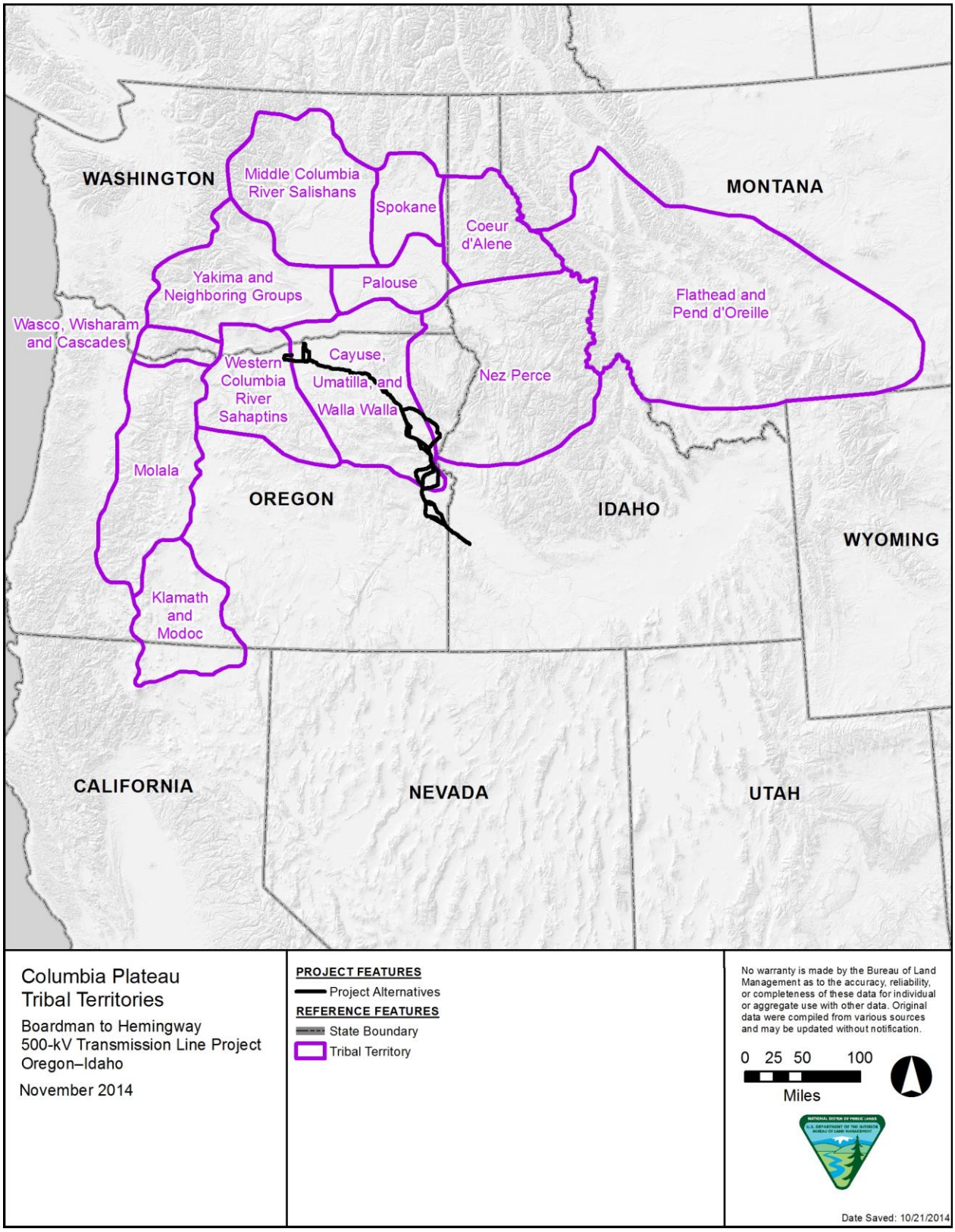

Figure 3-46. Diagrammatic Map of Traditional Tribal Territories of the Columbia Plateau (source: Walker 1998)

Western Columbia River Sahaptins

The village communities historically documented along the Columbia River and its tributaries from near The Dalles, Oregon, to Alder Creek, Washington, are characterized as comprising the Western Columbia River Sahaptins (Hunn 1990; Hunn and French 1998:378-379). These groups spoke the Columbia River dialect group of the Sahaptin language, as did the Umatilla, who resided to the east. The Yakama occupied territory to the north, whereas the Chinookan-speaking Wasco, Wishram, and Cascades resided to the west, though use of these areas overlapped (French and French 1998; Hunn 1990; Schuster 1998; Stern 1998).

Sahaptin villages consisted of politically autonomous groups. Village communities of Sahaptin-speakers were found along the Columbia River and its tributaries (Hunn and French 1998:378–379), though use of this area overlapped with neighboring groups, including the Nez Perce (cf. Hunn 1990; French and French 1998; Schuster 1998; Stern 1998). The traditional Sahaptin economy was based on the seasonal round; subsistence and settlement systems depended on the topography and availability of resources within an area. The Western Columbia River Sahaptins wintered in their villages at favorable fishing sites along the Columbia and its tributaries. Families spent much of the spring, summer, and fall in seasonal camps procuring food. This ecological adaptation provided an abundant resource base until smallpox epidemics of the late 1700s and subsequent arrival of Euro-American settlers in the mid-1800s severely disrupted traditional cultural patterns. Sahaptin-speaking communities were further fractured in the reservation era with the signing of the 1855 Middle Oregon Treaty and removal of the Wasco, Tenino and Northern Paiute peoples to the Warm Springs Reservation. Treaty boundaries arbitrarily divided traditional homelands, and social networks and many families were divided.

For thousands of years, the culture of Native Americans living on the Columbia Plateau has been intimately tied to the life cycle of salmon (Chatters and Pokotylo 1998:73). The timing of upstream migrations, locations of fishing sites, and the quantity and quality of salmon largely determined settlement patterns and seasonal mobility among Columbia Plateau peoples. During much of the year, Plateau peoples moved throughout their homeland in response to seasonal availability of foods and other subsistence resources (CTUIR n.d.). Co-utilization of resources by various tribes was common throughout the region, with no formal construct of resource or spatial ownership (Suphan 1974:74), although local bands might claim principal rights to prime fishing spots near their winter villages (Stern 1998:400).

Umatilla, Walla Walla, and Cayuse

The Umatilla People and Walla Walla are also Sahaptin-speaking tribes. The Umatilla were historically settled along both sides of the Columbia River in the vicinity of its confluence with the Umatilla River. The Walla Walla were generally located farther to the north, occupying lands along the Yakama, Walla Walla and Snake Rivers in present-day Washington. The Waiilatpuan-speaking Cayuse resided further to the south along the tributaries to the Umatilla and to the east of the Blue Mountains, where their territory overlapped with that of the Sahaptin-speaking Nez Perce (Walker 1998).

Situated at major river confluences, the Umatilla, Cayuse, and Walla Walla were ideally located to act as trade “middlemen” between people of the Plains and the tribes of the western valleys and Pacific

coast. Interaction, including trade and intermarriage, with Western Sahaptin people was frequent, as their territory was located downriver (Stern 1998:647). With the adoption of the horse as a major cultural focus, the Cayuse enjoyed a more expansive subsistence area which may have even ranged eastward into the Great Plains (Hanes 1995). Kinkaide et al. (1998:61) noted that the Cayuse language was no longer spoken by the early 1830s, due in part to a decline in population and extensive intermarriage with the Nez Perce and Umatilla.

The establishment of Fort Nez Perces, later renamed Fort Walla Walla, in 1818 along the lower Walla Walla River and the 1836 Whitman Mission disrupted established trade ties within the region and accelerated further loss of population through disease. The following decades would be tumultuous, marked by incidents of violence between Native American tribes and Euro-Americans. The Umatilla Indian Reservation was created by the Treaty with the Walla Walla, Cayuse and Umatilla in 1855, under which the Cayuse, Umatilla and Walla Walla ceded more than 6 million acres of their traditional territory in northeast Oregon and southeast Washington. Today the Umatilla Reservation is approximately 172,000 acres.

A majority of the B2H Project area is located within lands ceded to the U.S. government by the 1855 Treaty. The CTUIR have reserved explicit hunting, fishing, gathering, and pasturing rights in that treaty; the CTUIR actively work with the United States Government in natural resources planning efforts to protect their off-reservation treaty rights. (Phinney and Karson 2007).

Nez Perce

Before incursions by Euro-Americans, the Nez Perce occupied a vast territory, stretching from the Lochsa River in western Montana, to the eastern Blue Mountains, and south to the Weiser River and the headwaters of the South and Middle Forks of the Salmon River in central Idaho. Seasonal migrations, housing, food, storage, and basketry were similar to that of other southern Plateau groups. The Nez Perce homeland intersects the project area in the vicinity of Elgin and the southern Wallowas. The tribe ceded lands in present-day eastern Baker and Wallowa counties, east and north of the project area (Nez Perce Treaty of 1855).

The Nez Perce practiced a seasonal subsistence cycle. In the spring, women traveled to the lower valleys to dig root crops, while men traveled to the Snake and Columbia rivers to fish during the salmon runs. By mid-summer, groups moved to mountain areas to gather berries, fish in the streams, and hunt big game. With the adoption of the horse after A.D. 1700, some men would travel to the Montana Plains to hunt bison. By November, the groups returned to their traditional villages along the Snake, Clearwater, and Salmon Rivers.

Like the Umatilla and Walla Walla, the Nez Perce are also Sahaptin speakers. Bands of Nez Perce also participated in the Treaty of 1855, ceding large portions of their lands to the U.S. government in exchange for reserved lands. The discovery of gold on Nez Perce lands in 1860 spurred the U.S. decision to press for a renegotiation of this treaty in 1863 to reduce reserved lands to the approximately 1,000 square miles of what was subsequently deemed the Lapwai Reservation, just east of the Oregon and Idaho border. Many bands of Nez Perce, especially those who had relatives among the Umatilla,

refused to enter into this treaty; the band led by Chief Joseph, the elder remained in the Wallowa Valley. By 1877, the Nez Perce had been pushed out of the Wallowa Valley; displaced, and beleaguered by internal and external conflict; the Wallowa bands commenced a three-month long flight variously referred to as the Nez Perce War or Chief Joseph's War. This flight would eventually find them in Montana, where in October of 1878, Chief Joseph (the younger) would surrender to the U.S. Government (Ruby and Brown 1981). The Nez Perce captives would eventually be sent to Oklahoma, and would remain at the Ponca Agency in Indian Territory until 1885. After impassioned lobbying from Nez Perce leaders, including Yellow Bull and Chief Joseph, families of Nez Perce were allowed to return to the reservation at Lapwai. Families of the Joseph Band were resettled at Colville, where they became part of the Confederated Tribes of the Colville Reservation (Hanes 1995). Today, descendants of the Nez Perce live on the Colville, Lapwai and Umatilla Reservations.

Ethnography of the Northern Great Basin

In the northern Great Basin, the project traverses the traditional territories of at least three Native American groups. The Project area includes traditional lands of the Western Shoshone, Northern Shoshone-Bannock, and the Northern Paiute. Although the commonly held traditional boundary of the Western Shoshone is located just south of the Project area, interaction likely occurred among the Western Shoshone and the Northern Paiute, Bannock, and Northern Shoshone (Figure 3-47). These three groups spoke several mutually intelligible varieties of Central and Western Numic, a component of the Numic branch of the Uto-Aztecan language family. The Central Numic embraces three distinct languages: Panamint, Shoshone, and Comanche.

The timing of migration of the Numic or Shoshone people eastward across the Great Basin from southern California is greatly debated. The earliest definite evidence of Shoshone material culture remains comprise the Lemhi phase in Birch Creek Valley, which dates from the Early Historic period around A.D. 1805 to 1840 (Murphy and Murphy 1986). Questions remain regarding the cultural history of the area prior to occupation by the Shoshone in what is commonly conceived as the "historic period" Butler 1986:133). As mentioned earlier, some tribes reject the notion of "prehistoric" and "historic," preferring to discuss their history as a continuum. Regardless, evidence of Shoshone occupation marks the Upper Snake and Salmon River region as a subarea of the Great Basin culture area. The apparent continuity of aboriginal settlement and subsistence patterns through the Holocene was affected by the introduction of the horse in the mid1700s, which afforded Numic groups the enhanced the mobility for hunting far ranging bison herds (Steward 1938:201).

Ethnohistoric studies indicate that, following the introduction of the horse, aboriginal groups residing in the Snake River Plain were highly mobile, and ranged across not only the Great Basin and the Columbia River Plateau, but also onto the Great Plains.

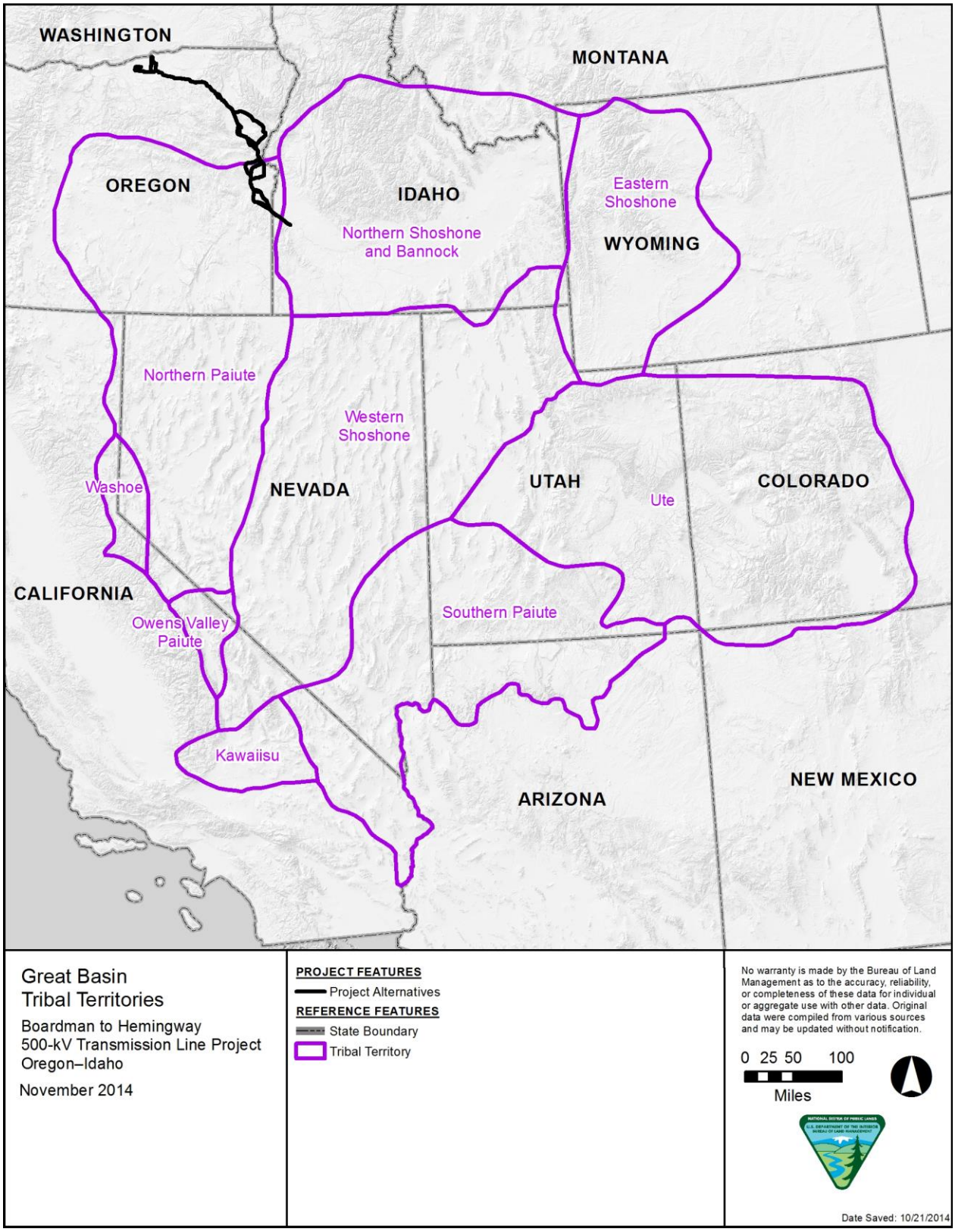

Figure 3-47. Diagrammatic Map of Tribal Territories of the Great Basin (source: d'Azevedo 1986)

Western Shoshone

Western Shoshone territory spans a vast area between the Blue Mountains or Cascade Mountains on the west, the Rocky Mountains on the east, north to the Salmon River Mountains, and South to the Great Basin (Thomas et al. 1986:264). As many as 48 separate subgroups of Shoshone peoples occupied the ancestral homelands across the Great Basin Province (Steward 1937, 1938). The northern boundary of the Western Shoshone territorial land is rather ambiguous and possibly extended north as far as the Snake and Salmon River drainages (Thomas et al. 1986:262).

Unlike the Shoshone to the east, the Western Shoshone people did not possess a mode of subsistence focused on the horse. Gathering of seasonal floral and faunal resources often required frequent residential and logistic moves, based on cyclic variations in rainfall and plant growth. The winter village was typically the larger of the seasonal camps and group efforts provided subsistence when seasonal plants were unavailable.

Northern Shoshone and Bannock

At the time of Euro-American arrival in the mid nineteenth century, much of Idaho was home to the Northern Shoshone and Bannock tribes. The Northern Shoshone and Bannock occupied the area encompassing the Snake River Plain ranging from the Nevada border to the south, the Wyoming border to the east, the Oregon border to the west, and the Salmon River to the north (Murphy and Murphy 1986:287). Walker (1978:89) notes that Shoshone and Bannock territory extended across most of southern Idaho into western Wyoming, Nevada, and Utah.

Hanes (1995) notes that the Northern Shoshone are often referred to as the “Snake” Indians in historic accounts, based upon their close association with the lands and resources of the Snake River. The ethnographic territory of the Northern Shoshone, who shared much the same material culture and social organization with the Northern Paiute, extended farther south through most of Nevada, and north into northwestern Utah and eastern Idaho (Murphy and Murphy 1986:288). In southwestern Idaho, Northern Shoshone populations were centered on the Boise, Weiser, and Payette River drainages (Murphy and Murphy 1986:288). Other Shoshone groups practicing a more sedentary fishing economy were settled in the Boise and Bruneau River valleys. Still other bands of Shoshone, identified as “Sheepeater” or “Lemhi” in historic accounts, focused subsistence on hunting and gathering of mountain resources.

The Bannock were historically associated with the Northern Shoshone, and shared many cultural similarities. However, the Bannock possessed a different dialect from Shoshone, and possessed a focus upon the horse as a key element of their subsistence and culture. The use of horses in the mid-1700s (Steward 1938) allowed for the expansion of hunting territories as far north as Canada and east into Montana and Wyoming.

The Fort Bridger Treaty of 1868 settled families of Shoshone and Bannock on the Fort Hall Reservation. In exchange for yielding their traditional homelands, the Shoshone and Bannock reserved, through Treaty, certain rights outside of their reservation boundaries, including hunting, fishing, gathering and grazing. In 1907, additional families were relocated from the Lemhi Reservation after it

was disbanded (Hanes 1995). Some Shoshone and Bannock families who had lived along the Owyhee River also settled on the Duck Valley Reservation, established by Executive Order in 1877 near the border of Idaho and Nevada (Shoshone Paiute Tribes 2009). They were later joined by groups of Paiute from the Weiser area, and eventually Paiute from southeast Oregon and Idaho, and as far north as the Yakama Reservation. The tribes comprising the Shoshone Paiute Tribes of the Duck Valley Indian Reservation did not sign the Fort Bridger Treaty and claim aboriginal title to lands in the project area.

Northern Paiute

The people known today as Northern Paiute are descendants of culturally distinct groups sharing a common language. At the time of Euro-American contact, the Northern Paiute ranged from southeastern Oregon east into southwestern Idaho and northwestern Nevada, encompassing much of the Owyhee Uplands. The Northern Paiute represent the northern extent of the Great Basin cultural complex. However, in the north, this complex was highly influenced by long-standing traditions of travel, trade, intermarriage, and co-utilization of resources with Plateau peoples living in the Blue Mountains and the Owyhee Uplands.

Some Northern Paiute bands in eastern Oregon and along the Snake River plain obtained the horse around 1750 A.D. They, along with the Northern Shoshone and Bannock, traveled widely through the Snake River plain and beyond. However, other bands of Northern Paiute did not adopt the horse complex, and focused instead on hunting and gathering resources. The gathering of camas root, in particular, reflected an important aspect of Paiute identity, and loss of access to the culturally significant and economically vital Camas Prairie of southwestern Idaho has been ascribed as a factor contributing to the 1878 Bannock War, which ultimately resulted in the “forced march” of approximately 550Paiute people from Fort Harney 350 miles north to Fort Simcoe, Washington on the Yakama Reservation (Ruby and Brown 1981). Circumstances of the “Forced March” are paraphrased in the accounts of Paiute chronicler Sarah Winnemucca Hopkins:

> They were poorly clad. Children froze to death, and mothers died during childbirth along the way. The Indians were not even allowed to bury their dead. On February 2, 1879, 543 Paiutes stumbled into the Simcoe Agency, where they were herded into cold sheds, “like so many horses and cattle.” (Ruby and Brown 1981:255)

Although historical documentation from Winnemucca Hopkins and Indian Agent W.V. Rinehart indicates that the route of the “Forced March” would have followed a south-north trajectory, government-to-government consultation with the Shoshone Paiute Tribes suggests that travel may have occurred from east to west within the B2H Project area in roughly the same corridor as the Oregon Trail.

Cultural resources that may be associated with American Indian use of the land encompass TCPs (which include, but are not limited to, viewsheds, mountains and other landforms, and plant gathering locations), rock alignments and cairns, trails- such as the abovementioned “Trail of Tears”, burials and locations of deceased people, camps, and petroglyphs.

PREHISTORIC RESOURCE OVERVIEW

The analysis area encompasses portions of the Columbia Plateau and Great Basin cultural areas, each representing expansive geographic locations where indigenous peoples shared broadly similar social, subsistence, and material culture (Lohse and Sprague 1998). The Columbia Plateau culture area includes all of the area drained by the Columbia and Fraser rivers, with the exception of that portion of the Snake River that drains the northern Great Basin. The Great Basin culture area, based on shared language, technological similarities, and cultural attributes, is considerably larger, including all of Nevada and Utah, southeastern and south-central Oregon, southern and central Idaho, and the western portions of Wyoming and Colorado (d'Azevedo 1986:8). A comprehensive culture history of the analysis area can be found in Andrefsky (2004), Burtchard (1998), Jennings (1986), Leonhardy and Rice (1970), and Lohse and Sprage (1998). The discussion below provides a summary of culture chronologies for each region, as informed by previous archaeological research of the area.

COLUMBIA PLATEAU

Various culture chronologies have been proposed for the Columbia Plateau and its various subregions and are summarized in Figure 3-48. This overview is intended only as a general outline and is largely based on Galm et al. (1981), Ames et al. (1998), and Andrefsky (2004)—all of which are founded on the initial and seminal culture histories of the region by Daugherty (1956), Cressman et al. (1960), Butler (1961) and Leonhardy and Rice (1970). While subsequent cultural-historical and cultural-ecological models have been conducted within and surrounding the project area—Reid (1988), Burtchard (1998), Dumond and Minor (1983) and Davis (2001) among others—all largely support or refine the initial human temporal-spatial record of the Southern Columbia Plateau region of Oregon.

Leonhardy and Rice's (1970) chronology, based upon the collections from several large, well-documented archaeological sites, employed changes in tool assemblages and morphology to define six phases of cultural chronology on the Columbia Plateau between approximately 10,000 Before Present (BP) and around A.D. 1730 in the Lower Snake River region of southeastern Washington. Dumond and Minor (1983) proposed a chronology for north-central Oregon based on the Wildcat Canyon site (35GM09) and sites in central Oregon.

Importantly, the southern Columbia Plateau is in close proximity to the Northern Great Basin culture area, and multiple researchers have suggested that a combination of both culture areas is commonly observed—particularly during the Late Prehistoric period (Cressman 1986; Ames et al. 1998). As such, archaeological assemblages recovered within the Southern Columbia Plateau commonly include cultural elements from both regions. For example, Reid (1988) developed a cultural-historical model for the Blue Mountain physiographic province in northeastern Oregon and cited the common occurrence of Elko points as an indicator of increased influence of Great Basin culture in the Southern Columbia Plateau.

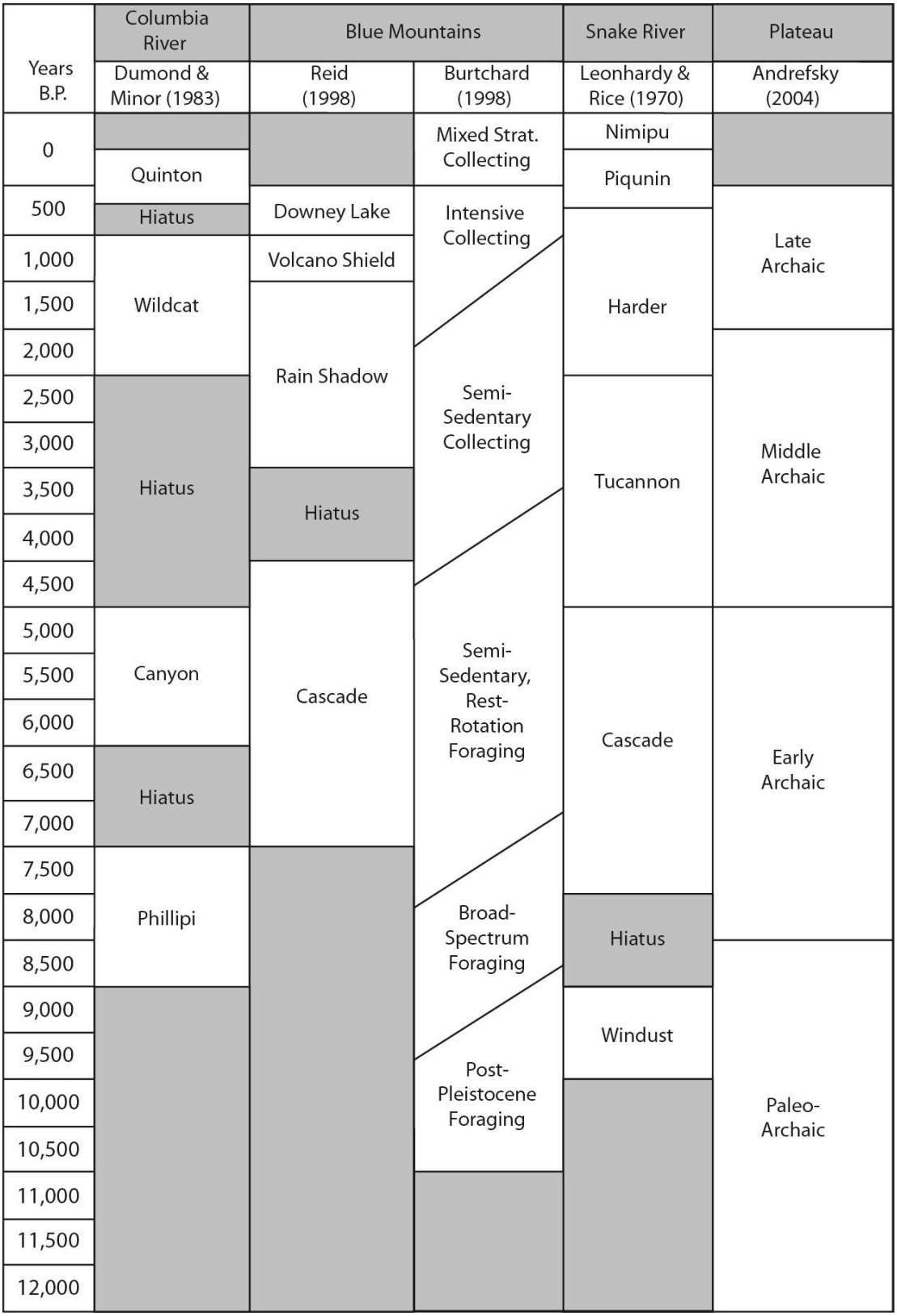

Figure 3-48. Cultural Chronologies for the Southern Columbia Plateau

Andrefsky (2004) provides a useful synthesis of several chronologies to achieve a simplified four-phase sequence for the Plateau, which includes the Paleoarchaic (pre-12,000 to 8500 BP), the Early Archaic (8500 to 5000 BP), the Middle Archaic (5,000 to 2,000 BP), and the Late Archaic (2000 to 500 BP). Figure 3-48indicates which regional phases discussed above correspond to Andrefsky's chronological periods. This temporally structured model allows for more effective comparison between the archaeological chronology of the Columbia Plateau and Jennings' chronology for the Great Basin (Jennings 1986:115), and is used here.

Columbia Plateau Paleoarchaic Period

The Paleoarchaic period dates from sometime prior to 12,000 and continues to 8250 BP (Ames et al. 1998; Andrefsky 2004). This period represents the earliest archaeological evidence of human occupation in the Southern Columbia Plateau. As late as Ames et al.'s (1998) cultural-historical model, this period has traditionally been divided into Period 1A—referring to Clovis, or the Western Fluted Point Tradition (WFPT)— and Period 1B—referring to Post-Clovis, or the Western Stemmed Point Tradition (WSPT). However, since the published culture-history by Ames et al. (1998), subsequent research conducted at numerous sites throughout the Plateau region and larger Pacific Northwest area has served to largely dispel a Clovis-first explanation for the earliest human occupation for the region (Davis 2001; Davis et al. 2011; Jenkins et al. 2012). Instead, the WSPT—correlating to Ames et al.'s (1998) Period 1B and Andrefsky's (2004) Paleoarchaic period- represents the earliest documented human groups in the Columbia Plateau. While debate continues to surround the temporal order of these two significantly different techno-complexes, they do temporally overlap during the terminal Pleistocene in the Pacific Northwest and Great Basin. This has led some researchers to consider an early co-tradition occupation of the region most likely consisting of two distinct ethno-linguistic cultures with different technological organization (Bryan 1988; Davis et al. 2011).

Western Stemmed Point Tradition sites are more common within the Columbia Plateau and numerous intact deposits containing WSPT assemblages—Lind Coulee, Marmes Rockshelter, Cooper's Ferry and Hatwai among others—have been excavated. Hunter-gatherer groups associated with the Western Stemmed Point Tradition are described as following a broad-spectrum and flexible adaptation to the Pacific Northwest's mosaic environments using a diverse and generalized lithic technological organization (Ames et al. 1998; Bryan 1980 and 1988). Western Stemmed Point Tradition artifact assemblages commonly include formally modified flakes and blades—including unifaces, gravers and burins—grooved bolas, eyed-bone needles, bone awls, beads, antler wedges, small milling stones, and the adaptation of a dart point and atlatl technology (Ames et al. 1998). These dart point types include among others Windust (shouldered and stemmed lanceolate points) and Cascade (unstemmed, foliate or laurel-leaf shaped points) (Ames et al. 1998). Western Stemmed Point Tradition sites are often located along the Snake River and its tributaries, the Lower Salmon River in western Idaho, as well as the surrounding plateaus and mountainous uplands, including Pilcher Creek in the Blue Mountains (Brauner 1985). Recent excavations at Paisley Caves in southeastern Oregon resulted in the recovery of a small Western Stemmed Point Tradition lithic assemblage associated with an age estimate of 11,340 B.P. (Jenkins et al. 2012). The Cooper's Ferry site in western Idaho includes an extensive WSPT component with potential occupation beginning around 11,370 B.P. (Davis 2001).

The archaeological record from the WFPT is sparse, and generally viewed as indicative of small, highly mobile groups which focused on exploiting a variety of resources. Artifacts associated with WFPT assemblages include formalized bone tools, large bifaces, unifacial tools, and the hallmark fluted bifacial projectile point (i.e., Clovis) that were likely used as spear points. WFPT surface finds are present throughout the region. However, intact WFPT deposits have only been identified at the Richey-Roberts Clovis Cache near Wenatchee, Washington. The artifact assemblage from this site is extensive and specialized, likely reflecting ceremonial activities associated with intentional human interment (Ames et al. 1998). While the Richey-Roberts Clovis Cache is a buried WFPT component, absolute age assessments failed to securely date the site (Mehringer and Foit 1990). The Dietz Site in southern Oregon is an extensive WFPT lithic surface assemblage (Willig 1988; Pinson 2011). However, diagnostic WSPT lithic artifacts are also present (Willig 1988).

Columbia Plateau Archaic Period

The Archaic period in the Columbia Plateau contains three subdivisions: Early, Middle, and Late. The overall Archaic period is generally characterized by substantial changes in subsistence and material culture. The Late Pleistocene-Early Holocene transition in the Pacific Northwest and Northern Great Basin is marked by increasingly warmer temperatures and dry conditions following the retreat of continental glaciers. Resulting shifts in flora and fauna populations correspond with noticeable changes in the Columbia Plateau and Northern Great Basin archaeological records (Grayson 1993; Chatters 1998). These transitions in human behavioral patterns—including cultural innovation and technological organization—are apparent in changes observed in the Early, Middle, and Late Archaic material records.

Columbia Plateau Early Archaic Sub-Period

The Early Archaic sub-period of the Columbia Plateau dates from 8250 to 5000 BP. Projectile point size and configuration indicate substantial reliance on hunting mammals. However, exploitation of fish and root crops appears to increase over the period, as evidenced by occasional discoveries of fishing tackle (Ames et al. 1998), pounding stones, and manos (Andrefsky 2004) at archaeological sites dating to this sub-period. The presence of nonlocal obsidian at Early Archaic sites suggests an increase in widespread mobility and/or development of trade routes (Salo 1985).

Early Archaic sites are found in a variety of geographical settings and include an increased diversity in site function and site composition designating shifting regional settlement and subsistence patterns during this period. Lithic technological organization, group mobility, residential patterns, and diet breadth correlate to the newly established Holocene ecosystems within the region. Lithic artifacts recovered at these sites typically include foliate or leaf-shaped (Cascade) projectile points; tabular and keeled end scrapers; formal and non-formal modified flakes and macroblades; and cobble/pebble tools including groundstone. Groups during this period practiced a generalized subsistence economy with a broad range of diet that included hunting of small and large game, gathering of edible plants, and procurement of riverine resources such as shellfish (mussels), salmon and steelhead. Burials recovered from archaeological sites dating to this period were flexed and extended.

Columbia Plateau Middle Archaic Sub-Period

The initial emergence of semi-subterranean pithouses occurs during the Middle Archaic (5000 to 2000 BP) and is suggestive of a region-wide shift towards a semi-sedentary pattern with a marked decrease in residential mobility (Prentiss et al. 2006; Andrefsky 2004; Chatters 2004). The transition from Early to Middle Archaic on the Plateau saw projectile point morphology and design transition towards the production of relatively smaller-sized projectile points, presumably to be used as dart points (Northern Side Notched, Cold Springs, and Bitterroot) and delivered with spear and atlatl. Cascade type projectile points continue in the early portion of the Middle Archaic although there is a noticeable decrease in the frequency of projectile points from this period in the archaeological record (Ames et al. 1998).

Potential influence—or some form of cultural transmission—originating from the Northern Great Basin region into the Southern Columbia Plateau region occurs toward the later period of the Middle Archaic. Large, side-notched points exhibiting low notches at the base, expanding stems, and short barbs are similar to those attributed to the Great Basin Elko series. Additionally, projectile points with pronounced shoulders and contracting stems are similar in morphology to the Pinto type projectile point of the Great Basin (Lohse 1995).

The Middle Archaic period is additionally marked by an increasing reliance on seasonal gathering and processing of plants and the initial establishment of a surplus food economy. Storage pit features are more common at archeological sites during this time as well as an increase in the diversity—in terms of frequency, type, and, more particularly, size—of grinding and milling stones (e.g. hopper mortar bases, pestles, and anvils) used for seed, plant and fish processing (Lohse and Sammons-Lohse 1986). Salmon and shellfish exploitation also seem to have gained in importance with the establishment of seasonal fisheries signaling a central focus on riverine resources as part of an annual round.

Columbia Plateau Late Archaic Sub-Period

The Late Archaic sub-period of the Southern Columbia Plateau dates from 2000 to 500 BP. And includes the late portion of the Tucannon phase, as well as the Harder, Piquinin, and Numipu phases (Leohnardy and Rice 1970; Ames et al. 1998). This period is markedly distinct from any previous cultural periods as is evidenced by the extensive use of pit-houses and a dramatic shift in human land use patterns throughout the Columbia Plateau and Northern Great Basin regions. Archaeological evidence from this period is indicative of long term, semi-permanent residential sites or villages, special use camps, an ever-increasing reliance on fishing—specifically the harvesting and storage of salmon—and the exploitation and processing of camas. During the Late Archaic, increased reliance on seasonally varying resources—specifically salmon and camas—resulted in the establishment of large, long-term canyon and river terrace residential camps or villages for use in winter and spring and smaller, task-specific upland camps used for summer and fall foraging. This pattern of land use is commonly referred to in archaeological literature as the “Winter Village Pattern” (Endacott 1992; Ames et al. 1998; Andrefsky 2004; Chatters 2004).

The Late Archaic is also characterized by the appearance of small Corner-notched and basal-notched points by approximately 2400 BP, signaling the advent of bow and arrow technology (Andrefsky 2004). The earlier subphase is denoted by camp sites, and the later subphase by pit-house villages. The early

subphase artifact assemblage is characterized by large basal-notched and Corner-notched projectile point types including the Snake River Corner-notched point. The points become smaller and more finely made in the later subphase. The artifact assemblages for both are marked by small end scrapers, a distinctive concave bit scraper, lanceolate and pentagon-shaped knives, cobble implements, pounding stones, pestles, hopper mortar bases, and net sinkers. Large and small game was hunted, including bison and mountain sheep, and salmon fishing was important. Pit house settlements become well-established during the phase along with an increased reliance on fishing.

Domestic architecture during the Late Archaic transitioned from pit houses to the construction of longhouses. Fishing net weights are increasingly common at sites dating to this period, suggesting a refinement in net making and the increasing reliance on anadromous fishing. The bow and arrow, basketry, and a fiber and wood industry are also introduced and become widespread during the Late Archaic period. A surplus resource economy is suggested by the common occurrence of storage pit features which contain the remains of salmon. Burials identified in the Late Archaic contexts are single flexed internments (Lohse 1995).

Projectile points known from the Middle Archaic period continue to occur in Late Archaic period assemblages including Hatwai-eared, Rabbit Island Stemmed-like, and larger side-notched types (Ames et al. 1998). Evidence for the culturally transitional nature of this region is supported by increased occurrences of similar Northern Great Basin types—Elko-Eared and Elko Side-Notched types (Ames et al. 1998; Reid 1998). These larger forms are gradually—but eventually—replaced by smaller corner- and basal-notched forms (Ames et al. 1998)—as well as Desert Side-notched-like points (Aikens 1993)—likely used with bow and arrow technology around 3,000 cal B.P. (Chatters 2004). Arrow-like point types tend to dominate the most recent sites of the Late Archaic period and continued to be used into the period of Euro-American contact. However, Ames et al. (2010) suggest these small projectile points may have been in use as early as 4,400 B.P., where they would have co-existed with atlatl technology (i.e., dart points).

Columbia Plateau Late Prehistoric Period

The Late Prehistoric Period (post-A.D. 1450) on the Columbia Plateau is characterized by Leonhardy and Rice (1970) as the Nimipu (A.D. 1700 to historic contact) and Piqunin (A.D. 1350 to 1700) phases on the Lower Snake River. The Piqunin Phase was developed based on the need for a separate designation for a late archaeological component at the Wexpusnime housepit settlement (45GA61) in southeastern Washington. The diagnostic artifacts included variable forms of small basal-notched, Corner-notched, and Side-notched projectile points.

Other apparent cultural and material transitions during this time include the increased presence of varyng sized pithouses, an increase in larger settlements and villages, the advent of mat lodges, the A.D. 500, an intensive exploitation of camas and other roots, ubiquitous practice of fishing and net use, prevalent use of storage facilities including storage pits and caves, intensive exploitation of salmon, and evidence of food propagation. Basketry, fiber, and wood artifacts are also present, as are small projectile points suggesting an increase in the use of the bow and arrow. Sometime after 1500 B.P.,

burial practices also transition from the Western Idaho Burial Complex to formal cemeteries associated with pit-house villages.

The introduction of the horse from Euro-American explorers and settlers is typically invoked as ending the Late Prehistoric period. By the time of contact with Euro-American cultures in the early 1700s, the historically documented groups still present today were living in Northeast Oregon, including the Cayuse, Umatilla, Walla Walla, Nez Perce and Paiute.

Northern Great Basin

The Proposed Action traverses the northeastern corner of the Great Basin culture area, an expansive region encompassing some 400,000 square miles of western North America between the Sierra Nevada and the Rocky Mountains (d'Azevedo 1986). Data produced by several researchers has largely defined the culture history of this area. The four-phase chronology presented by Jennings (1986) is the most commonly cited description of Great Basin cultural history. This chronology uses general prehistoric periods to define the cultural sequence of the Great Basin, providing a larger framework that incorporates data from each subarea within the basin. The four periods include: Pre-Archaic (Pre-9000 BP), Early Archaic (9000 to 3500 BP), Middle Archaic (3500 to 750 BP), and Late Archaic (750 BP to historic contact).

Jennings' definitional approach for the northern Great Basin overlaps with that proposed by Andrefsky et al. (2003) for the Columbia Plateau. Andrefsky and colleagues (2003), however, point out the inadequacies of a Plateau-based chronology for the northern Great Basin, in that some characteristics of Great Basin culture (for example, pottery production, dwelling types and materials, and some lithic technologies) are not hallmark Plateau traits. Moreover, much of the data for the Jennings' chronology come from sites farther to the east with presumably more Plains influence. Meatte's (1989) approach to pre-contact chronology in the project region is based on three premises: a hydrologically distinct drainage that includes the Payette, Weiser, Owyhee, Malheur, Boise, Bruneau, and Malad rivers; the pre-contact existence of anadromous fishery; and a purported tendency for cultural groups to define their territories by natural drainage patterns. Dating in Meatte's chronology is based primarily on obsidian hydration, C14 analysis, and evidence of food processing and storage rather than the stylistic changes in projectile points that define phases in other chronologies. Meatte's review of more than 100 sites resulted in three overarching archaeological sequences in his western Snake River Basin chronology: Broad Spectrum Foragers (11,500 to 4200 BP), Semi-Sedentary Foragers (4200 to 250 BP), and Equestrian Foragers (250 to 100 BP).

The best evidence for early occupation of the western Snake Basin is the presence of an extensive cache of Clovis points discovered at Camas Prairie. Meatte places the Broad Spectrum Forager phase within this very early time span based on the recovery of a Clovis Point south of Marsing, Idaho (within 2 miles of the southern terminus of the project). This phase was characterized by mobile groups employing simple tools and exploiting a variety of resources over a large geographic area. Meatte establishes a diversification in projectile point morphology over the course of this long epoch, beginning with Clovis and progressing through Folsom, Windust, Haskett, Cascade, and Northern Side-Notch

(Bedwell 1973; Musil 2004). The subsistence economy associated with this technology is assumed to also be similar: highly mobile and centered on big game hunting.

The Fort Rock Basin, in Lake County to the west of the project area, was the subject of intensive study by the University of Oregon Archaeological Field School. This research established the Fort Rock Basin cultural chronology, which is specific to the northern Great Basin in Oregon. The Fort Rock Basin chronology was developed primarily based on work conducted at Fort Rock Cave (Cressman 1942; Cressman and Williams 1940), Paisley Caves (Bedwell 1970, 1973; Bedwell and Cressman 1971; Cressman 1942; Cressman and Williams 1940), Cougar Mountain Cave (Cowles 1960; Layton 1972a, 1972b), and the Connley Caves (Bedwell 1970, 1973; Cressman 1986). Cressman's work at Fork Rock Cave and Paisley Cave (Cressman 1942; Cressman and Williams 1940) established the Early Holocene occupation of the region, and Bedwell (1970, 1973) drew upon this research with more intensive investigations. Other south-central Oregon sites, such as the Shepherd Site (Musil 1984, 2004), Dietz Site (Fagan 1983, 1984a, 1984b), and Tucker Site also contributed to development of the regional cultural sequence. Archaeological investigations in the southeastern Oregon area also included work at Catlow and Roaring Springs Caves (Cressman et al. 1940; Cressman 1942) and Dirty Shame Rockshelter (Aikens et al. 1977).

The research generated from these excavations resulted in a comprehensive overview of the basin's culture history and ecology (Aikens and Jenkins 1994; Jenkins et al. 2004). Aikens and Jenkins' overview establishes that culture change in the northern Great Basin was molded to a significant degree by climatic and ecological events at the regional and subregional levels. From the perspective of Fort Rock Basin, the development of a cultural chronological sequence was tied to intense climatic events that affected the human ecology of the region. Such events included unusually hot and cold thermal regimes, flooded marshes, and extended periods of drought. These climatic events prompted cultural responses and patterned lifeways that have been defined in the archaeological record in five time periods: the Paisley Period, Fort Rock Period, Lunette Lake Period, Bergen Period, and Late Holocene Period (Jenkins et al. 2004). Figure 3-49 provides a comparison of the various northern Great Basin chronologies. The culture history provided below for the B2H project area is based on the previous research summarized above, as well as research conducted at archaeological sites located near the project area.

Northern Great Basin Pre-Archaic Period

The Pre-Archaic Period (referred to as the Paleoarchaic Period in the Columbia Plateau) dates from 14,500 to 9500BP, spanning the Late Pleistocene and Early Holocene. It includes the Paisley Period and Fort Rock Periods of the Fort Rock Basin chronology. The period is typically associated with the hunting of now-extinct megafauna, including proboscideans and certain species of bison, among other large game species that included camel, horse, mountain sheep, elk, and deer. In the Snake River Plain, the Pre-Archaic Period is subdivided based on changes in distinctive spear point technology and associated with direct or relative dating of sites. These sub-periods include the Pre-Clovis (prior to 12,000 BP), Clovis (12,000 to 11,000 BP), Folsom (11,000 to 10,600 BP), and Plano (10,600 to 7800 BP) periods (Plew 2008:23).Characteristics of these sub-periods are detailed in the sections that follow below.

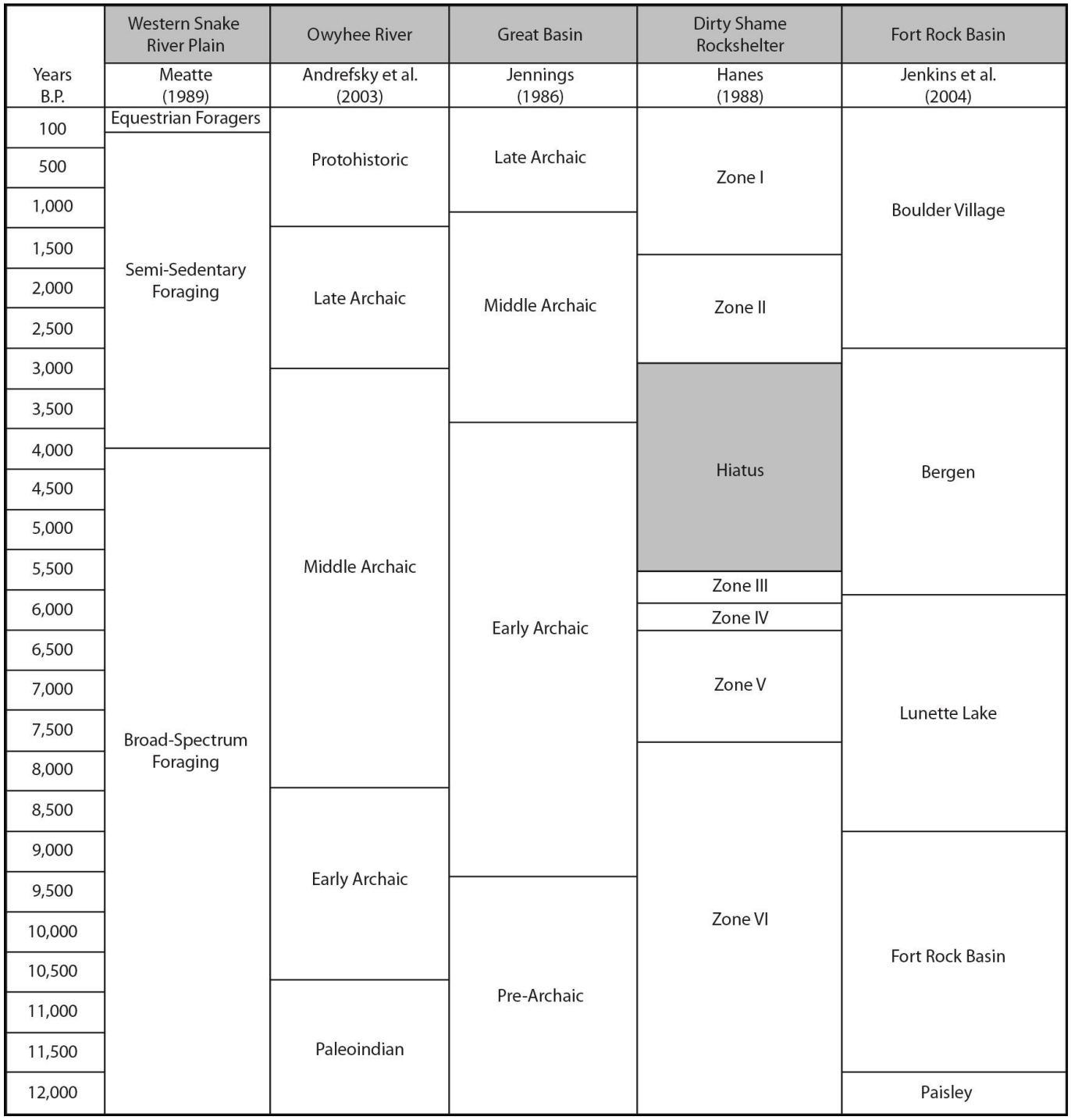

Figure 3-49. Comparison of Cultural Chronologies for the Northern Great Basin

Northern Great Basin Pre-Clovis Sub-Period

A Pre-Clovis sub-period (prior to 12,000 BP) has recently become accepted for the New World, though data is currently scarce and a comprehensive picture of cultures dating to this time period has yet to emerge. (Adovasio and Page 2003; Dillehay 1989, 2000; Yohe and Woods 2002).The timeframe is included in the Paisley Period and the early phase of the Fort Rock Period of the Fort Rock Basin

chronology. Two well-known sites dating to this period are the Paisley Caves (Jenkins et al. 2012), located 300 miles west of the project in the Fort Rock Basin area, and Wilson Butte Cave (Gruhn 1961a, 2006), located approximately 150 miles southeast of the project in south-central Idaho near Dietrich. Connley Caves, where the later WSPT was first recognized, also includes a Paisley Caves Period component (Aikens et al. 2011:63–65). Work by the University of Oregon at Paisley Caves provides some of the earliest direct evidence of a Pre-Clovis presence in Oregon, including human coprolites dated to 14,500 cal. BP and faunal remains dated to 16,190 cal. BP., and faunal remains from extinct species. (Aikens et al. 2011:51; Jenkins et al. 2012). Analyses of the coprolites showed that the site occupants ate a variety of plants, bison, fox, and sage-grouse, while residue analysis on one of the handstones identified horse protein. At least 15 radiocarbon and obsidian hydration dates are attributed to the Pre-Clovis sub-period (Aikens et al. 2011:53, Figure 2.13). Importantly, a small WSPT lithic assemblage including stemmed projectile points was recovered from a cultural deposit with a chronometric age estimate dating from 11,070 to 11,340 B.P.

Northern Great Basin Clovis Sub-Period

The Clovis sub-period dates from 12,000 to 11,000 BP and is encompassed by the Fort Rock Period of the Fort Rock Basin chronology. During this sub-period, climatic conditions became generally drier and warmer. A vast system of Pleistocene pluvial lakes that developed in western North America during the late Pleistocene turned seasonal as water tables gradually dropped. Clovis inhabitants of the area existed in small mobile bands, hunting mammoth and other now-extinct Pleistocene fauna, and many smaller species in riverine and lacustrine environments. Clovis toolkits are diverse and consistently exhibit high quality lithic materials procured from distant sources. The archaeological hallmark of the Clovis period is the Clovis projectile point—a large, lanceolate-shaped projectile point with a bifacial basal flute (Justice 2002:67; Yohe and Woods 2002). Although relatively rare in the Snake River Plain, several Clovis-age archaeological sites have been documented, including Jaguar Cave (Plew 2008:34), the Simon Site (Butler 1986a:128; Plew 2008:35), the Wilson Butte Cave (Gruhn 1961a), Kelvin's Cave (Meatte et al. 1988), the Buhl burial site (Green et al. 1998), and Diversion Dam Cave (Plew 2008: 34–40; Rodgers and Yohe 2006), all located in Idaho. Several Clovis-age occupations have been identified in the central and southeastern part of Oregon, including the Dietz Site, Paisley Caves, Sage Hen Gap, Sheep Mountain Clovis Site, and Connley Caves (Aikens et al. 2011). The Dietz Site, located in the Alkali Basin of southeastern Oregon, provides a definitive Clovis occupation based on diagnostic artifacts. The site is represented by a wide lithic surface scatter along the shoreline of a pluvial lake. Many of the tools were fluted Clovis points and concentrations of debitage included flute flakes and broken bifaces. Other tools include Western Stemmed projectile points, biface blanks, knives, preforms, scrapers, gravers, flake tools, hammerstones, and abraders.

The Western Pluvial Lake Tradition (about 13,000 to 8,500 cal. BP) also occurred during this period. The tradition was first proposed by Stephen F. Bedwell in 1970 and is based on his findings at the Connley Caves site in Fort Rock Basin; the adaption focused on lakeside settlement with distinctive stemmed (and non-fluted) Late Pleistocene and Early Holocene lithic technologies. Subsistence practices focused on marshland resources, but also included a variety of terrestrial mammals as well (Jenkins et al. 2004:6, 11). Some researchers view the adaptation as a bridge between the more highly

mobile Paleoindian big game hunters of the Pre-Clovis/Clovis Periods and later periods (Pinson 2004:53). Stone tools typical of the tradition include Western Stemmed, Windust, lanceolate, and foliate projectile points, as well as crescents, large scrapers, bifaces, gravers, choppers, cobblestone tools, manos, and bone awls. It should be noted that evidence of the tradition is inconsistent in Fort Rock Basin (Jenkins et al. 2004:11–16).

Northern Great Basin Folsom Sub-Period

The subsequent Folsom sub-period dates from 11,000 to 10,600 BP and is also encompassed by the Fort Rock Period of the Fort Rock Basin chronology. Climatic shifts that began in the Clovis sub-period continued during this time, resulting in overall warming and more pronounced seasonality. Compared to modern conditions, temperatures were generally cooler, but began to approach modern patterns by the end of the sub-period. The process of Pleistocene megafaunal extinctions that began during the Clovis sub-period was largely complete by the end of the Folsom sub-period. Widespread changes in vegetation communities between 10,000 and 8,000 years ago are inferred to have contributed to the extinction of species of mammoth and mastodon, camel, and horse. While the overall diversity of mammalian species was reduced, the ranges of certain grassland-adapted species, such as bison, elk, moose, deer, and antelope, expanded (Yohe and Woods 2002). Folsom-age demographics were like those of the Clovis sub-period, with small bands of hunter-gatherers exploiting well-watered areas in an increasingly arid environment. Folsom sites are often associated with small-scale kills (up to 25 animals) of a now extinct form of bison, but an array of smaller mammal species were exploited as well. Folsom toolkits are highly diverse and display a range of both formal and expedient forms and, like Clovis, show a preference for high-quality lithic materials from widely distributed sources. Folsom projectile points are similar in form to Clovis points, but are generally smaller with fluting that extends along nearly the entire length of the blade.

The Folsom sub-period is represented in the Snake River Plain by widespread surface finds (Butler 1972, 1978; Dort and Miller 1977; Guilday 1967; S. Miller 1982; Ore 1968) and several buried contexts (Aikens et al. 2011). A Folsom point dating to 10,920 ± 150 BP associated with the remains of mammoth, camel, and an extinct form of bison was recovered at the Wasden site approximately 300 miles east of the project in the eastern Snake River Plain of Idaho. In Oregon, several have a recorded Folsom sub-period component, including Connley Caves, Paisley Caves, Paulina Lake, and the series of sites known as the Buffalo Flat Bunny Pits sites (Aikens et al. 2011). The Folsom Period/Fort Rock Period deposit at Connley Caves is stratigraphically bound by an earlier Pre-Clovis/Paisley Period and a later Plano/Lunette Lake Period deposit. The Folsom sub-period deposit produced a radiocarbon date of 10,940 cal. BP. The assemblage suggests that the site was used as a long-term winter base camp for big game hunting during the Folsom sub-period, and later as a short-term hunting and collecting campsite during the Lunette Lake Period (Aikens et al. 2011:64–65).

Northern Great Basin Plano Sub-Period

The Plano sub-period, dating to between 10,600 and 7800 BP includes the termination of the Fort Rock Period and most of the Pre-Mazama Lunette Lake Period of the Fort Rock Basin chronology. By this time, the Snake River Plain had evolved into a land of semi-arid to arid, shortgrass prairie with

deciduous woodlands located along principal streams. Bison continued to diminish in size, but increased in absolute numbers and roamed an expanded range as grasslands proliferated. Human occupants responded to Plano environmental conditions by becoming highly specialized bison hunters and developing communal hunting techniques that, at times, resulted in the killing of 200 or more animals in a single event.

The Plano sub-period is characterized by a series of temporally and geographically overlapping projectile point traditions. Morphological variability is apparent in Plano assemblages, but points continued to be generally large and well made, often from high-quality nonlocal materials, an observation which further suggests that groups were increasing their geographic range. Lithic assemblages appear as an outgrowth of Folsom industries, but with greater morphological and perhaps functional variability. The Plano sub-period is well represented on the Snake River Plain by surface and subsurface finds consisting of a variety of unfluted lanceolate projectile points. . Plano sub-period artifacts have been found in the northern Great Basin including at Agate Basin (Miller 1977), Haskett (Butler 1965), Wasden (Butler 1965, 1986a; Strawn 1965; Davis et al. 1965), Wilson Butte Cave (Gruhn 1961a:118–119), American Falls (Butler 1965; Strawn 1965; Davis et al. 1965), Redfish Overhang (Sargeant 1973), Scottsbluff, Eden, Angustora, and Plainview (Gruhn 1961a, 1961b). In Oregon, Fort Rock Cave, Paisley Caves, Connley Caves, Cougar Mountain Cave, Paulina Lake, the Buffalo Flat Bunny Pits sites, and the Locality III site all include Plano sub-period components (Aikens et al. 2011). These sites are typically associated with the hunting of bison (Butler 1978, 1986b) and mountain sheep (Swanson 1972).

The Hetrick site in southwest Idaho consists of a multi-component habitation site near the confluence of the Weiser and Snake rivers and contains four distinct cultural levels with a broad spectrum subsistence strategy dating from 11,000 BP to 300 BP (Rudolph 1995). Artifacts include flake stone tools, groundstone, and bone. Faunal remains at the site include more than 78 taxa including deer, elk, bison, rabbit, bird, sheep, amphibians, reptiles, fish, and shellfish. Salmonid fish remains are also present and represent some of the earliest known use of such fishes in the region (Rudolph 1995:8). Diagnostic artifacts include Windust (Early Archaic), Rosegate, Desert Side-Notched, and Cottonwood Triangular (Late Archaic) (Plew 2008:61).

The Dirty Shame Rockshelter provides the most comprehensive record of Burtchard's (1998) Broad Spectrum Forager period during the Plano sub-period (Aikens et al. 1977). Excavations have provided numerous dates for the site, ranging between 10,800 and 400 cal. BP (Aikens et al. 2011:105). A diverse array of lithics, bone, and perishable materials was excavated from this deeply stratified streamside site; this evidence suggests that initial occupation at the site occurred by 9500 BP. Big game hunting is evident in the remains of mountain sheep and mule deer. Projectile point types include Windust, Northern Side-notched, Humboldt, and Elko series points. By 7,500 BP, groundstone metates are present, suggesting an increase in the use of plant resources. By 6,800 BP, grass-lined storage pits are also present at the site. Interestingly, there is a pronounced absence of human activity at this site between about 6,700 and 2,900 cal. BP, an extended period of arid conditions occurring during the Archaic Period/Bergen Period (Aikens et al. 2011:105).

Northern Great Basin Archaic Period

The Archaic Period in the Great Basin dates from 9,500 BP to historic contact and, similar to the Columbia Plateau, is subdivided into Early, Middle, and Late Archaic sub-periods (Simms 2008:62–63). It correlates to the end of the Pre-Mazama Lunette Period (Jenkins et al. 2004), the entirety of the Post-Mazama Lunette and the Bergen Periods (Jenkins et al. 2004), and the beginnings of the Late Holocene. The Early Archaic (9,500 to 4,000 BP) is broadly associated with the Altithermal climatic event, an approximately 4,000-year-long period of relatively hot and arid conditions over the western U.S. (Barnosky et al. 1987; Davis et al. 1986; Dort 1968; Plew 2008:47; Swanson 1972). During this time, conditions on the Snake River Plain became warmer and drier, resulting in changes in subsistence strategies. The area surrounding the Snake River corridor at the southern end of the project area experienced geological changes as a result of climate shifts with frequent rock falls and mud slides. This, in conjunction with subsequent displaced sediment loads, made the area generally unstable to live in until after the Altithermal event (Bently 1983). Like the Pre-Archaic occupants of the Snake River Plain, the Archaic inhabitants appear to have depended on large game as a principal food resource (Butler 1986a; Swanson 1972); however, stone tool technology continued to evolve toward stemmed and notched projectile point styles indicative of increasing focus on hunting small game.

Northern Great Basin Early Archaic Sub-Period

The Early Archaic in the Great Basin dates from 9,500 BP to 4,000 BP and is encompassed by the Lunette Lake Period of the Fort Rock Basin chronology. It marks the transition from Plano to Archaic technology and represents substantial changes in subsistence and material culture (Plew 2008:48). The climate during the Middle Holocene experienced more extreme variability with cooler and warmer periods than that of present day; torrential storms likely occurred during the summer months (Simms 2008:77). Pluvial lakes experienced wide ranging fluctuations in depths and shorelines while piñon pine, juniper, and hybrid scrub oak began to expand across the Great Basin, soon to be followed by the establishment of modern flora and fauna.

Hunting technology during this time is characterized by the manufacture of lanceolate and large corner-notched projectile points developed for use with the atlatl. Early Archaic point styles are commonly referred to as Northern Side-notched (Bitterroot) and stemmed-indented base Pinto series points. These point types have been discovered at the Wasden site (Dort and Miller 1977), Wilson Butte Cave (Gruhn 1961a), and more recently at the Idaho National Engineering and Environmental (INEEL) complex in the high desert of eastern Idaho (Reed et al. 1986; Ringe 1995).

Other Early Archaic sites found on the Snake River Plain include the Bison and Veratic rockshelters in the Birch Creek region (Swanson 1972); Weston Canyon (S. Miller 1972) in the eastern Snake River Plain; the Rock Creek site (Green 1972) south of Twin Falls in the central Snake River Plain; Bachman Cave (Metzler 1978) near Oreana; the Braden Burial Site (Butler 1980; Harten 1980) and the Hetrick site (Rudolph 1995) near Weiser, Idaho. Notable Early Archaic sites in Oregon include the Locality III Site, Birch Creek Site, the Bowling Dune, Nightfire Island, and Malheur Lake (Aikens et al. 2011).

Although not specifically attributed to Oregon, the Western Idaho Archaic Burial Complex, dated to about 6,000 to 4,000 BP (Pavesic 1983, 2000), has been documented in the Snake River Plain in

western Idaho and likely influenced behaviors in adjacent areas. This burial pattern includes interments separate from habitations along high sandy knolls overlooking streams, evidence of ritual treatment of the dead, and distinctive special use artifacts. Burial goods often include large bifaces, including the distinctive "Turkey Tail" style projectile point, obsidian preforms, and red ochre (Butler 1980; Harten 1980; Plew 2008:). One discovery of volcanic tuff pipes included in the burial assemblage has also been documented (Pavesic 2000). Sites with similar burials have been found in the Blue Mountains and in the area of the Stockoff Quarry in northeast Oregon, but researchers have not explicitly associated these sites with the Burial Complex.

Northern Great Basin Middle Archaic Sub-Period

The Middle Archaic sub-period dates from 4,000 to 1,250 BP in the Great Basin and encompasses much of the Fort Rock Basin chronology's Bergen Period and the beginning of the Boulder Village Period. Climatic conditions during this time are believed to have become more mesic, with wetter and cooler conditions prevailing. Conditions were similar to those of the present and essentially modern flora and fauna characterized the area, as evidenced in archaeological assemblages dating to this time period. The climate does not appear to have been static, however. Geomorphic evidence indicates that episodes of sand dune activation and dormancy occurred throughout the Middle Archaic and well into the Late Archaic, suggesting that fluctuations in moisture occurred. Both open and sheltered sites are present in riverine, foothill, and upland settings (Plew 2008:67), and certain localities appear to have been occupied repeatedly by small hunter-gatherer bands. Many Middle Archaic sites are overlain by substantial Late Archaic deposits, and, in some cases, Late Pre-Contact deposits.

The hunting technology of the Middle Archaic is characterized by increased variability in projectile point styles that include large side-notched, Humboldt series concave-base points, Elko series points, Pinto series points, and Eastgate series points. Evidence from the Givens Hot Springs area in southwestern Idaho, near the southern end of the project, indicates that large semi-subterranean houses were being built by about 4,300 BP (T.J. Green 1982). Butler (1978) has noted the appearance of earth ovens during the early part of the Middle Archaic in the Snake River Plain. Hunter-gatherer subsistence and settlement strategies continued throughout the later Middle Archaic (Gruhn 1961a; Swanson 1972; Swanson et al. 1964), but by 3,000 BP the archaeological record shows a decrease in projectile point neck widths among artifact assemblages. This may suggest an earlier introduction of the bow and arrow than in other regions (Franzen 1981), or it may merely reflect the use of smaller dart shafts.

Significant Middle Archaic sites include Bobcat Cave (Henrikson 1996, 2003, 2005) and the Wasden Site (Butler 1978) in the eastern Snake River Plain; Rock Creek (Green 1972) and Wilson Butte (Miller 1972) in the central Snake River Plain; and Givens Hot Springs (Green 1993) and Dry Creek (Webster 1978) in the western Snake River Plain. The Map Rock Petroglyphs Historic District, within the Givens Hot Springs area, contains 20 etched volcanic boulders containing numerous different designs (Davis and Swanson n.d.).

Northern Great Basin Late Archaic Sub-Period

The Late Archaic sub-period in the Great Basin dates from 1,250 BP to historic contact and is encompassed by the Boulder Village Period of the Fort Rock Basin chronology. This sub-period is

characterized by changes in material culture that include the proliferation of the bow and arrow and adoption of ceramic technology (Plew 2008). The climate during the Late Archaic experienced a return to Pleistocene-like conditions, but with modern flora and fauna. The winter months were wetter and the summers cloudier and cooler, allowing for expansion of glaciers along Great Basin mountain ranges. The Great Salt Lake and Pyramid Lake rose due to the lack of evaporation and decreasing temperatures. Wetlands developed in the high desert regions (Simms 2008). Small corner- and side-notched projectile points in the form of Desert Side-notched and Rosegate points replaced the large side-notched and Humboldt concave-base points of the Middle Archaic period. Hunting was still the primary means of subsistence, but strategies changed to incorporate buffalo jumps, game drives, and a heavier reliance on smaller game and fish to support the needs of growing populations. The population of the Snake River Plain expanded during this time of economic diversity and several settlement-subsistence systems developed. Gould and Plew (1988) describe diversifying economic strategies that eventually resulted in some groups refining their subsistence practices and focusing on a single resource, such as salmon fishing.

The archaeological evidence of fish caches and bison jumps for bulk food procurement, accompanied by the employment of diverse subsistence practices focusing on specific resources, suggests that people were becoming more sedentary during the Late Archaic. In addition to the changes in material culture and lithic technology, rock art in the form of petroglyphs and pictographs executed in a Shoshone style appears along the Snake River, possibly marking hunting and shamanistic sites (Plew 2008).

A few sites from this short 1,000-year time period have been identified in Oregon, including the Warner Valley sites, Indian Grade Spring, and the North Ontario Interchange sites. The North Ontario Interchange sites are the closest to the B2H Project area and located at the confluence of the Snake and Malheur rivers near the southern end of the project. These two sites provide evidence that spawning Chinook salmon and fresh water mussels were collected and roasted there sometime between about 3,100 and 2,600 cal. BP, with minor subsequent visits occurring as late as 1,530 cal. BP. Other artifacts present in the assemblage included obsidian bifaces, a small amount of groundstone, hammerstones, shell and bone beads, and debitage. Projectile points at the sites are almost exclusively limited to obsidian Elko points. Obsidian sourcing studies indicate the tool materials came from several distant sources including Gregory Creek to the west, Coyote Wells to the southwest, Timber Butte to the east, and Nevada to the south (Aikens et al. 2011).

Northern Great Basin Late Pre-Contact Period

The Late Pre-contact period can be represented by the end of Jennings' (1986) Late Archaic Period. It is attributed to the time period between 2,000 and 650 BP in the northern Great Basin and is also encompassed by the Boulder Village Period of the Fort Rock Basin chronology. The time period is characterized by the increased production of bow and arrow type projectile points, bulk food procurement, expansive material trade, and continued development of ceramic technology. This period was characterized by gradual warming until 1,050 BP when the speed of such warming increased, accompanied by summer rainfall. Beginning in 950 BP, decades of severe drought occurred which were subsequently followed by abundant precipitation (Simms 2008:77).

Two distinctive sets of cultural manifestations have generally been identified during the Late Pre-contact Period: the Fremont and the Numic or Shoshone. Although readily identified in the eastern Great Basin, there is no evidence of the Fremont tradition in Oregon. The “Numic Expansion” witnessed the movement of Western Shoshone and Southern Paiute groups into most of the Great Basin during the Late Pre-contact Period. Numic peoples spread eastward from a homeland in the southwestern Great Basin, either from Death Valley (Lamb 1958) or Owens Valley (Bettinger and Baumhoff 1982). While there is little doubt that this spread occurred, its nature and timing are debated.

The introduction of ceramics associated with historically known Shoshone speakers and small notched projectile points, such as the Rose Spring, Eastgate, and Desert Side-Notched point types, marks the beginning of the Late Pre-contact period (Aikens et al. 2011:47). Hunter-gatherer subsistence strategies continued to be practiced during this time, but the increased number of sites in the archaeological record suggests that population density as well as the degree of sedentism continued to increase (Franzen 1981:225).Lithic technology of the Late Pre-contact period shifted from the production of dart-style points made from quarried materials to arrow -style points and other flake stone tools made from locally available raw material. Plant processing became more abundant and widespread.

Numerous Late Pre-Contact Period sites have been identified in Oregon, including Boulder Village, Drews Valley, Mortar Riddle, McCoy Creek, Lost Dune, Laurie’s Site, Broken Arrow, Indian Grade Spring, the Knoll Site, and Hines (Aikens et al. 2011). The McCoy Creek site is one of sites closer to the project, located near Malheur Lake. Excavations at the site have identified overlapping house floors, a complex of two hearths, two storage pits, and concentrations of groundstone. Radiocarbon dates place the site between 1850 and 950 cal. BP, squarely within the Late Pre-Contact Period. A later date of 540 cal. BP from a separate house floor indicates that the site continued to be occupied during the Historic Period. Elko and Gatecliff points are associated with the earlier occupation, while a wider variety including Desert Side-Notched, Cottonwood Triangular, and small pin-stem corner-notched points similar to those found in the Columbia Plateau are associated with the later occupation. The faunal assemblage indicates site occupants made use of all nearby major habitats including marsh, lake, stream, and upland environs. The earlier occupation strongly focused on fish and fur-bearing mammals while the later occupation focused on large game, a pattern which reflects the environmental changes experienced during this time period (Aikens et al. 2011).

Sites that are associated with prehistoric use of the land in the project area include lithic scatters, camps and habitation areas, quarries, petroglyphs, rock alignments, and cairns.

Historic-Period Overview

Early Historic Contact with American Indian Tribes

In the first decade of the nineteenth century, members of the Corps of Discovery, led by Captain Meriwether Lewis and Second Lieutenant William Clark, were the first Euro-Americans to document navigation of the northwest region by traveling up the Missouri and Columbia rivers (Walker and

Sprague 1998). When word of the region's resources spread, trappers and traders quickly organized to exploit them.

The fur trade followed closely on the heels of the early explorers, with the Hudson's Bay Company and Northwest Fur Companies vying for territory and otter and beaver pelts (Walker and Sprague 1998:142). Native people traded beaver pelts for domestic goods, weapons, and ammunition (Stern 1998:412). By the mid-1840s, overtrapping eliminated the beaver from much of its range in the Plateau and Great Basin causing trappers to gradually leave the country (Beal and Wells 1959).

Early interactions between native peoples and Euro-American travelers were peaceful, although strained. The rapid influx of emigrants in the mid-nineteenth century and the associated depletion of natural resources brought about strife between the Euro-Americans and the American Indians. Game and wood resources were becoming depleted as American Indians were forced to share resources with Euro-Americans migrating westward. Competition for fuel and fodder and damage to the grasslands and water sources from thousands of wagon wheels threatened traditional American Indian lifeways and led to growing dissatisfaction and mistrust among the American Indian tribes, resulting in armed skirmishes and livestock theft (Ruby and Brown 1972:179). Subsequently, hostilities between American Indians and new emigrants increased as a number of altercations, led by both American Indians and United States military cavalry, occurred (Sudweeks 1941). Hostilities between the Indians and the Euro-American emigrants ran high in the 1850s, in part stemming from conflicts resulting in the deaths of 11 missionaries at the Whitman mission near Walla Walla in 1847 (Walker and Sprague 1998:144-146). Five Cayuse were eventually tried, convicted, and hanged for the murders, which subsequently ignited the Cayuse War of 1848. The war continued with sporadic fighting into the 1850s as native peoples in the Columbia Plateau increasingly were displaced from their homes under constant pressure from settlers and speculators (Walker and Sprague 1998).

Concurrent with unauthorized settlement, or "squatting," by Euro-Americans, agents of the U.S. government formally surveyed Indian lands for division and sale to immigrants and miners. Oregon Superintendent for Indian Affairs Joel Palmer formulated plans to relocate tribes to reservations and Washington Territory governor Isaac Stevens, accompanied by a military entourage, met with Plateau tribes in 1855 to negotiate treaties. The Walla Walla, Umatilla, and Cayuse tribes ceded 6.4 million acres to the United States, but they reserved rights for fishing, hunting, gathering foods and medicines, and pasturing livestock. 510,000 acres were set aside as lands of the Confederated Tribes of the Umatilla Indian Reservation. The Yakama and Nez Perce Indian reservations were created at this time as well (Ruby and Brown 1972:189-204).

On July 1, 1868, the Bannocks and Paiute also signed a treaty, providing for resettlement on reservation lands (Michno 2003). The Bannock War of 1878 erupted when settlers living near Camas Prairie in south-central Idaho allowed their livestock to root up the wet camas meadows, a chief source of subsistence for the tribes. Bannocks and Paiutes, furious at the destruction of an important food source, began threatening settlers. Government troops were again mobilized out of Fort Boise, pursuing the Indians through southern Idaho and southeastern Oregon (Michno 2003).

Essentially all of the project area in southwestern Idaho and northeastern Oregon was contested land during the turmoil of the 1860s, 1870s, and 1880s. Because of increasing hostilities between Indians and settlers, the U.S. government ordered that all Indians in surrounding regions were to be rounded up and held forcibly. Over the winter of 1878–1879 approximately 550 to 650 Paiutes were ordered to walk under armed guard to Fort Simcoe, Washington, on the Yakama Reservation and Fort Vancouver in Washington. Many did not survive this experience (Michno 2003; Ruby and Brown 1981). While both Paiute chronicler Sarah Winnemucca Hopkins and U.S. Indian Agent W.V. Rinehart indicate that the general route taken by the captives trended north-south from Fort Harney to Fort Simcoe, government-to-government consultation with the Shoshone Paiute Tribes indicates that the route roughly followed the east-west geography of the Oregon Trail, traversing the B2H Project area. Although formal studies to identify segments of trail associated with this event have not been undertaken, the possibility that previously identified and unidentified trail segments are located in the B2H Project area should not be discounted. The legacy of what is often referred to as the “Forced March” and the “Paiute Trail of Tears” is still remembered by the Paiute who consider lands of the project area sacred to their culture.

Cultural resources that could be encountered along the Proposed Action and alternatives that reflect this early period of Native American and Euro-American contact include trapping and hunting camps, Native American habitation sites, hunting sites, artifact scatters and rock alignments, early homesteads, school houses, marked and unmarked graves, military forts, and Indian and emigrant trails.

Transportation

Roads and Trails

Indian Trails

Before Euro-American westward immigration, American Indians had established networks of trails to facilitate trade relationships and regional travel. Commodities such as marine shells, obsidian, camas, and salmon were carried many miles from their origins. Interregional exchange of goods bearing common social and ceremonial value was well organized throughout the continent (Swagerty 1986). Indian trails had a pronounced impact on the early European American history area. Native guides led explorers along them, traders built their posts beside them, and battles were fought near them. Some emigrant trails developed from Indian trails, although wagon traffic sometimes necessitated modifications to the routes (Blakeslee 1988). The route that became the Oregon NHT was to a significant degree, comprised of segments of hunting and migration trails actively used by Indians well into the nineteenth century.

Emigrant Trails

Early explorers devised routes that incorporated segments of early Indian trails accessible by wagon. In 1812, fur traders made an arduous 10-month journey from Fort Astoria, Oregon, to St. Louis, Missouri, along existing Indian trails and natural travel corridors, much of what would become the Oregon NHT (Dary 2005). Later groups of traders and trappers found an alternative route through South Pass, Wyoming that later made it possible for wagons to travel the trail (BLM 1986). Numerous wagon roads are depicted on historic maps and cross the Proposed Action and alternatives in multiple locations.

Several named roads that were likely based on early trails and wagon roads cross the Proposed Action and alternatives include: the Butler Creek Trail, Highway 95, Ontario to Burns Freight Road, Road from Baker City to Sparta, Road to Silver City, Uniontown Road, Quartz Mill Road, Sparta Road, Road from Walla Walla to Boise, and the Road from Baker to Boise all cross the Proposed Action; the Auburn to Burnt River Road crosses the Flagstaff Alternative; the Road from Baker to Boise and the Rye Valley Road cross the Burnt Mountain Alternative, the Road from Watson to Nyssa and the Road from Watson to Vale cross both the Malheur A and Malheur S alternatives; and the Union to Sparta Road crosses the Timber Canyon Alternative. The Indian Service Road was constructed in 1861-1862 in an effort to avoid travel on the Oregon NHT within the newly created Indian reservation (Miller 1996; Tucker n.d., Pilot Rock Emigrant Road). As there was no planned maintenance of this road, it fell into disrepair.

Several roads and trails are of special significance to the history of the area and are either listed or have been determined eligible for listing in the NRHP. Additionally, the Poison Creek Stage Station is located in the analysis area of the Proposed Action in Idaho. The Station contains a house, barn, two root cellars, a schoolhouse, chicken coop, and an outhouse (source: NRHP form, 1978.) This property was constructed in 1886 as a way station for the Jordan Valley-Caldwell stage line and was listed in the NRHP in 1978.

Oregon National Historic Trail (NHT)

The web of pathways that became known as the Oregon NHT was actually a network of trail segments, river crossings, and landmarks that stretched across 1,800 miles of territory and linked the western frontier to the settled lands of the east. Many components of this historic trail have been congressionally designated as NHTs and are part of the National Trails System. Interconnecting with these transcontinental trails are regional and local historic stage and freight roads. Portions of the Oregon National Historic Trail cross the Proposed Action and the Burnt River Mountain, the Flagstaff, Glass Hill, Horn Butte, Longhorn, Timber Canyon, Tub Mountain South alternatives.

The principal route of migration westerly across southern Idaho to Oregon was via the Oregon NHT. It was originally established by Indians and only later refined by the early Euro-American explorers and fur trappers including members of the Astor expedition of 1811 to 1812 and John C. Frémont in 1843. The first wave of migration came during the 1830s as Protestant missionaries journeyed west to convert the native populations (Hutchinson and Jones 1993). The first true emigrant wagon train arrived in southeastern Idaho in 1841 and was conducted by the Bidwell-Bartleson party. Thirty-four members of the Bidwell-Bartleson party continued west accompanying missionaries along what would eventually become the Oregon NHT. Shortly after the Bidwell-Bartleson party, Captain John C. Frémont explored the region during his travels as part of a federal expedition and published accounts that became the trail guides for subsequent emigrants along the Oregon NHT (Hutchinson and Jones 1993). By the mid-1840s, the Oregon NHT became a major, nationally recognized thoroughfare for emigrants making their way west.

Portions of the Oregon NHT continued to be used into the late 1890s, but the trail saw a decline once the transcontinental railroad—which provided faster, safer, and, usually, cheaper travel east and west—was completed in 1869. Many well-traveled segments of the Oregon Trail were converted to modern

highways and railroad segments, including several segments of Interstate 84 (I-84) in Idaho and Oregon. Numerous markers and memorials have been erected at burial sites, springs, emigrant camps, and inscription sites along these segments. Several segments have been given discrete names, such as the California Gulch/Blue Mountain, Whiskey Creek, White Swan, Virtue Flat, Straw Ranch 1 and 2, Swayze Creek, Birch Creek, Tub Mountain, and Alkali Springs segments.

Segments of the Oregon Trail are located within the analysis area for the Proposed Action Corridor, as well as the Burn River Mountain Alternative, the Longview Variation, The Flagstaff Alternative, Glass Hill Alternative, Horn Butte Alternative, and Longhorn Alternative.

Meek Cutoff

The Meek Cutoff, which was blazed as another alternate route of the Oregon NHT in 1845, headed directly west from the Oregon NHT's junction with the Malheur River. The Meek Cutoff crosses the Proposed Action once. Stephen Meek, accompanied by 750–1,000 emigrants, approximately 200 wagons, and heads of livestock, set out across the Malheur River convinced that they could connect a route through central Oregon, over the Cascades, and into the Willamette Valley. Meek led the wagon train along the rocky banks of the Malheur River, then up and over steep rocky bluffs. The oxen-driven wagons and travel-weary emigrants experienced a difficult time along the route (Beckham 1991).

Water and forage for draft animals became scare along the journey and many of the emigrants felt that Meek had misled them and were desperate to head upriver along the Deschutes River toward The Dalles, while others desired a more direct route over the Cascade Mountains. The wagon train split just south of the Maury Mountains, near Lost Hollow, with one group travelling northwest toward the Deschutes River, while another group travelled north toward the Columbia River. After 10 days apart, the two groups arrived separately at Sagebrush Springs. It took two weeks to move all of the wagons, livestock, and 200 families across the Deschutes River with the assistance of local Indians. Meek and the remaining emigrants reached The Dalles having lost at least 23 members to disease and hunger along the way. Segments of the Meek Cutoff are located in the analysis area for the Malheur S Alternative of Segment 5 of the B2H Project.

Goodale's Cutoff

The Goodale's Cutoff to the Oregon Trail had its origins as a migration route used by Shoshone peoples and was popularized as an alternate route of the Oregon Trail by John Jeffrey, a river ferry operator, as early as 1852 (NPS n.d.). This cutoff trail left the main Oregon Trail at Fort Hall, Idaho proceeding northwest to the landmark Big Southern Butte and then reaching as far north as modern-day Arco, before turning southwest through what is now Craters of the Moon National Monument and proceeding west through the Camas Prairie and intersecting the Main Oregon Trail Route south of Boise (NPS n.d.). Widespread EuroAmerican immigration on the trail dates to 1862 when a party of over 1,000 emigrants hired guide Tim Goodale to lead them on the passage From Fort Hall to Fort Boise. As hostilities increased between Shoshone and Bannock peoples and the emigrants along the main Oregon Trail, larger numbers of people began to use Goodale's alternate route (Dary 2004). The discovery of Gold in the Boise Basin further contributed to the increase of EuroAmerican use of this route (NRHP nomination 1972).

A northern alternate of Goodale's Cutoff continued from Boise north to the Brownlee Ferry crossing of the Snake River in Hells Canyon (McGill 2006a). The road out of the canyon has been described as a "zigzag road" which traversed the steep incline of the river bank leading to Pine, Oregon (McGill 2006). The trail then followed a westward alignment to Richland, Oregon and crossed the Powder River following a southern alignment to Ruckles Creek and continued along the creek to Flagstaff Hill (McGill 2006a). This alternative was purportedly used by prospectors, including prospector George Grimes, who used the route to traverse between the Boise Basin mines and Walla Walla (Wells 1972).

Two segments of the Goodale's Cutoff are located in the analysis area for the Timber Canyon Alternative in Segment 3 of the B2H Project.

Dalles Military Wagon Road

After the regional discovery of gold in 1861, the road from The Dalles to Canyon City became a major transportation route and was used to haul people and supplies to the gold fields. A parallel road, using much the same route as The Dalles to Canyon City Road, was surveyed between 1864 and 1867 by Major Enoch Steen (Preston 1972). In 1869, it was designated the Dalles Military Road, which continued east from Canyon City to Idaho, linking The Dalles to Fort Boise, crossing the Oregon NHT near Malheur River, south of Farewell Bend. The Dalles Military Wagon Road crosses the Proposed Action, the Tub Mountain South Alternative, and the Willow Creek Alternative.

The Lewis and Clark National Historic Trail (NHT)

Although not an emigrant trail, the Lewis and Clark NHT is located in the analysis area for the Longhorn and Longhorn Variation Alternatives in Segment 1 of the B2H Project, and is studied as a cultural resource. The almost 3,700 mile long Lewis and Clark NHT commemorates the route taken by the Corps of Discovery in 1803-1806 and largely follows the Missouri and Columbia Rivers. The portion of the NHT in the analysis area is located immediately across the Oregon-Washington border on the northern side of the Columbia River.

Railroads

In 1879, Henry Villard became a major force in Oregon railroading when he purchased the Oregon Steam Navigation Company and the Oregon Steamship Company, merged them with his interests in the Oregon and California Railroad and created the Oregon Railway and Navigation Company (OR&N). In that year, the Union Pacific and Henry Villard agreed to connect the rails of the OR&N with those of the Union Pacific transcontinental mainline at Granger, Wyoming, in order to create a direct line to the Pacific coast. In 1881, Union Pacific incorporated the Oregon Short Line (OSL), to develop a connecting line between Granger, Wyoming, and the Baker City, Oregon are where the OR&N was extending its own line. The OR&N reached Pendleton, Oregon, on August 31, 1882, and Baker City, Oregon, in August 1884. The final spike connecting the two railroads was driven at Huntington, Oregon, on November 25, 1884. The OSL acquired control of the OR&N in 1887, and with that the Union Pacific had a through route to the Pacific Ocean. The OR&N lines were leased to Union Pacific's OSL from 1887 until Union Pacific purchased OR&N in 1889 (Deumling 1972).

In 1893, following a national economic panic, the Union Pacific was forced into bankruptcy along with its subsidiary railroad companies. The OR&N was taken into receivership at this time. In 1896, a new Oregon Railroad and Navigation Company was incorporated to take over operation of the OR&N. The Union Pacific, under new management after the financial disaster of 1893, was left with a transcontinental railroad that ended at the Great Salt Lake, where it connected with other railroads. The OSL emerged from the bankruptcy in 1897 as an independent company until it was again leased by the Union Pacific in 1899 (Robertson 1995:219). By 1900, the new Oregon Railroad & Navigation Company became a subsidiary of the Union Pacific (Laubaugh 2012).

In the early 1900s, the Union Pacific constructed new lines in places, and gained additional operating agreements. By January 1910, its service had expanded to include Seattle. It was during this period that the company was incorporated as the Oregon-Washington Railroad & Navigation Company. In December of that year, the OWR&N acquired all the assets, liabilities, and operations of the smaller companies (Laubaugh 2012).

Construction of a branch line from Ontario to Burns, Oregon, had been started in 1913 and finally completed by 1925. From the 1930s through the 1960s, the railroad's main line was rebuilt to accommodate the various river dam projects constructed on the Snake and Columbia rivers. Overtime, the OWR&N name fell into disuse as most people identified the railways with the Union Pacific company largely due to the diesel locomotives being labeled and painted with the Union Pacific colors and emblems (Laubaugh 2012).

Logging Railroads

On June 30, 1890, the independent Sumpter Valley Railroad was incorporated in Oregon by David Eccles and four other partners to haul logs to a new sawmill being built for the Oregon Lumber Company in South Baker City. Work began immediately to lay track from South Baker to the timberlands along Sumpter Valley. By March 1892, the railroad reached the stage stop of McEwen 22 miles west of Baker City. The railroad began at once offering passenger and freight service to McEwen in addition to hauling logs to the Oregon Lumber Company mill (Robertson 1995:146–147).

By the 1920s, the railroad began losing passenger and freight business to automobiles and trucks. This decline eventually resulted in the abandoning of 20 miles of main line between Prairie City and Bates in 1933. Scheduled passenger service was discontinued entirely in 1937, though mail and occasionally passengers continued to be carried in the cabooses of freight trains until the railroad ceased operation completely. Finally in 1947, the railroad ceased all operations except for 1.5 miles of dual-gauge track at the Oregon Lumber Company yard in South Baker (Robertson 1995:146–147). A diesel switch engine operated at the lumber yard until December 1961 when the last tracks were razed. During its 57-year history from 1890 to 1947, the Sumpter Valley Railway was a vital part of the Eastern Oregon region it served and was one of the longest used narrow gauge railroads in the western United States.

The Mount Emily Lumber Company, founded in 1924, constructed some 40 miles of railroad line in the La Grande area, connecting to the Union Pacific mainline 8 miles west of town. The company largely switched from rail logging to truck logging in 1930, but the Mount Emily mainline continued in use until 1955 (Taubeneck 2000).

A segment of the Oregon Railroad and Navigation Company (OR&N) Railroad, the Mount Emily Railroad, and several unnamed railroad grades cross the Proposed Action. The Mount Emily railroad and unnamed railroad grades cross the Glass Hill Alternative, a segment of the OR&N is within the Horn Butte Alternative corridor, as well as the Longhorn Alternative, and unnamed railroad grades cross the Longhorn Alternative and the Longhorn Variation. Railroad related properties that could be located within the project area include bridges, including small-scale culverts, tunnels, line segments, and abandoned railroad beds, among others.

Energy Exploration/Resource Extraction

Mining

Gold Mining

Idaho Operations

The majority of gold mining operations in Idaho's Owyhee County were located in the Silver City mining district in the northwestern part of the county, with placer mining operations conducted along the Snake River. The Silver City mining district included the De Lamar, Flint, and Florida Mountain-War Eagle Mountain camps in northwestern Owyhee County. Between 1863 and 1865, more than 250 mines operated in the district. By the time the rich oxidized ore deposits were nearly exhausted in the early 1870s, the district had produced $12.5 million in gold and silver (Koschmann and Bergendahl 1968; Piper and Laney 1926).

The second wave of mining in the Silver City area began following gold discoveries at the Black Jack mine on Florida Mountain and the De Lamar mine at Wagontown in 1889. This second boom proved to be larger in scale than the first and by 1914 the district had produced $23 million in precious metals before the ore resources were exhausted (Koschmann and Bergendahl 1968; Piper and Laney 1926). Currently, no major mines are operating in the district.

Oregon Operations

Approximately three-fourths of Oregon’s gold production centered on the Blue Mountains in a region referred to as the “Gold Belt of the Blue Mountains” (Brooks and Ramp 1968:41). The belt, approximately 50 miles (80 kilometers [km]) wide by 100 miles (160 km) long, extends from the John Day River in the west to the Snake River in the east. Of particular relevance to the project, because of their proximity, are the Baker, Lower Burnt Valley, Mormon Basin, Sparta, and Virtue mining districts.

The Baker District, located about 6 miles northwest of Baker City, produced over 37,000 ounces of gold, half of which came from placer mines (Oregon Gold 2012a). Spurred on by the initial gold discovery on Griffin’s Gulch in 1861, beginning in 1862 prospectors roamed the Powder and Burnt River areas, finding gold in a great many creeks and gulches (Gilluly et al. 1933:24; Hiatt 1893:33). The Dale Mine, located southwest of Baker City, produced free-milling gold. Placer mines were established at the southern end of Elkhorn Ridge, as well as west of Baker, Salmon, and Marble creeks. Lode mining produced gold in the upper Washington Gulch area and the McCord Gulch area (Gilluly et al. 1933:81-83). Another prosperous mining region in Baker County was the Poorman-Balm Creek mines

of the Mother Lode mining group which were located at the confluence of Slide Creek and Balm Creek approximately 20 miles northeast of Baker City and 6 miles from the town of Keating (Allen 2005).

The Lower Burnt Valley District, which includes the former Gold Hill District (Gilluly et al. 1933:54), encompasses the Weatherby, Gold Hill, Durkee, Chicken Creek, and Pleasant Valley areas, is located along the Burnt River in southern Baker County. Placer mines in this district were worked in the early 1860s, followed by lode mines in the 1880s. Gold was readily available in Burnt River tributary streams and gulches, with Shirttail Creek an especially rich source. The neighboring Weatherby area, about 10 miles southeast of Durkee, contained important placer and lodes mines, particularly along Chicken and Sisley creeks (Eastern Oregon Mining Association 2012a).

The Mormon Basin (Dixie Creek, Rye Valley, and Malheur) District lies in southern Baker County and northern Malheur County. Placer deposits were first discovered in Malheur in the Mormon Basin in 1862 (Malheur County Historical Society 1988). Placers were mined as early as 1863 in the Rye Valley area and were credited with a production of $1 million of gold (Eastern Oregon Mining Association 2012a). Rainbow Mine, discovered in 1901, was the largest gold producer, and from 1913 to 1915, it was the most productive lode mine in the state (Gilluly et al. 1933). The district was most active before 1915, with production dwindling between 1915 and 1949, after which mining production fell idle.

The Sparta District lies roughly 27 miles east-northeast of Baker City, from the southern foothills of the Wallowa Range following drainages along the Powder River. Placers were worked early in the 1860s and, after 1873, were supplied with water by the Sparta Ditch. The Sparta District was also extensively mined for lode deposits, especially around Eagle Creek (Gilluly et al. 1933). The district declined rapidly after 1892 and it was idle from 1952 through 1959. Total production from the district through 1959 was 35,200 ounces of lode gold and 7,700 ounces of placer gold (Eastern Oregon Mining Association 2012a).

The Virtue District, located about four miles east of Baker City, was the scene of intensive placer and lode mining. The Union or Rockafellow Mine was established in 1862 and then sold to Col. J. Ruckel in 1864. Needing a reliable water source to process his ore, Ruckel built a 10-stamp ore-processing mill on the Powder River at the site of what would become Baker City (Jacoby 2007). Baker City grew rapidly and a formal townsite was laid out in 1865. Also referred to as the "Queen City of the Mines," the settlement became a commercial and financial center for the surrounding mining districts (Potter 1995:95). Ruckel sold his mining claim to James W. Virtue and A.H. Brown in 1868, which gave rise to not the area's current name and the Virtue Mine. Located at the southern end of Virtue Flat, this lode mine, which was worked into the 1920s, was one of the largest producers in Oregon yielding some $2.2 million of gold. Other important mines included the Brazos, Carroll B., Chicago-Virtue, Cliff, Flagstaff, Koehler, Norwood, and White Swan (Eastern Oregon Mining Association 2012a; Gilluly et al. 1933: 73). Many prospect adits and pits scattered across the district attest to the intensity of mining in the area. Total gold production within the Virtue District through 1959 was 126,000 ounces of lode and placer gold (Eastern Oregon Mining Association 2012a).

Even though it was against the law to stake their own claims, Chinese immigrants purchased and re-worked abandoned claims from Euro-American miners. The remains of "Chinese Walls," hand-stacked

as workers progressed along the placers, are found in the local Baker County area (Wegars 1995). Mining by Chinese emigrants also ceased once the ore resources in the region were completely exhausted.

Non-Gold Bearing Mining

Although gold was the principal mineral mined in eastern Oregon and southeastern Idaho during the nineteenth and twentieth centuries, other non-gold bearing mineral commodities were also prospected within Baker and Malheur counties. Most non-gold bearing minerals were first quarried during the early twentieth century. Unlike gold-bearing mining in the region, however, heightened activities continued in some areas during and after the World War II period. Minerals prospected in the Baker and Malheur county area included limestone, granite, coal, manganese, uranium, calcite, pumice, and asbestos. Of these minerals, limestone proved to be the most economically significant.

The Marble Creek area of Baker County was mined for limestone, beginning with a patented claim in 1893 to the Monarch Marble Mine. From 1892 to 1900, some 6,000 tons of limestone from this mine were squared and burned for use in the Baker area. Activity ceased after 1900, with exploration work resuming in 1948 through the Marble Creek Limestone quarry (Wagner 1949). Work continued until 1963, when the Marble Creek quarry was closed and the neighboring Baboon Creek limestone quarry was developed and operated by the Chemical Line Company. The Baboon Creek quarry operated from 1958 to 1971 when the plant and quarries closed (The Record-Courier 1995).

In 1907, a lime kiln operated in the vicinity of Lime, Oregon (Prescott 1937) and in 1916 the Acme Cement Plaster Company built a plant at Lime to produce plaster. In November 1923, the Sun Portland Cement Company built a cement plant in Lime to serve western Idaho, eastern Oregon, and southwestern Washington (McCaslin 1965). Because of overlapping stockholders, the “Sun” company and the “Oregon” Portland Cement Company merged in September 1926, becoming the Oregon Portland Cement Company (McCaslin 1965). By the 1960s, the Lime facility produced 1,200,000 barrels of cement year. As the nearby limestone deposits were depleted, limestone was brought from the Nelson area, near Durkee, Oregon. A new plant was built at Nelson in 1979 and the facility at Lime was closed in 1980. The ruins of the limestone plant are still present today. The Western Lime Quarry, located 3.5 miles southeast of Durkee, in the Burnt River Canyon, consisted of 24 placer claims (Prescott 1937).

No mines are located within the 500-foot-wide corridor centered on the Proposed Action and alternatives. However, the Rachel, Cliff, Cyclone, Flagstaff Hill, and Grey Eagle mines are located within the 4-mile-wide corridor centered on the Flagstaff Alternative, and the Rachel, Cliff, Columbia, Con-Virginia, Cyclone, Emma, Flagstaff Hill, Grey Eagle, Hidden Treasure, St. Paul, and Virtue Flat mines are located within the 4-mile-wide corridor centered on the Proposed Action. The Lode Mine is located within the larger 10-mile-wide corridor along the Timber Canyon Alternative. The Baker City Historic District, an NRHP listed historic district comprised of both commercial and residential properties associated with regional mining operations, is located within the 10-mile-wide study corridor for indirect impacts along the Flagstaff Alternative. Approximately half the buildings were built between 1870 and 1915. One of the more notable structures is the Baker City Tower, which began as the Baker

Community Hotel in 1929. It remains the tallest structure in Baker City and is an excellent example of Art Deco architecture (Engeman 2005). The Baker City Historic District was listed in the NRHP in 1978.

The NRHP-listed Bernard's Ferry is also located in the analysis area for the Proposed Action for the B2H Project. Established in 1882 by J.C. Bernard, the ferry provided an important transportation linkage between the communities of Nampa and Caldwell and the mines at Silver City. It was in operation until 1920, when establishment of a bridge at Walter's Ferry obviated the need for river transportation. The remaining barn and associated structures were listed in the NRHP in 1978 (NRHP form 1978). The will be further analyzed through the ILS.

Although remnants of the "Chinese Walls" associated with the work of Chinese miners in eastern Oregon have not been identified within the analysis area for the B2H Project, RLS of the 10-mile-wide study corridor for indirect impacts has indicated the presence of a "Chinese House" in proximity to the Proposed Action. Additional types of mining related properties that could be located within the project area include claim markers, prospect pits, cairns, quarries, tunnels, camps, smelters, building foundations, railroads, and roads, among others.

Timber and Logging

Early settlers in eastern Oregon initially participated in logging to construct and maintain their farms and ranching practices; roads would also be constructed to transport felled timber to their properties (Tucker 1940:70). The earliest commercial timber harvesting efforts primarily supplied the mining industry. Into the latter part of the nineteenth century, timber began to be produced for local and increasingly regional consumption. However, with the construction of the OSL Railroad line in the 1880s, the industry gained access to national lumber markets and logging became an important economic driver for the region (Powell 2008a).

The timber industry experienced a downturn and financial stresses during the Great Depression, as the overall national decrease in development projects correspondingly decreased demand. However, with the onset of World War II, foreign and domestic demand increased and continued to do so well into the 1950s when the practice of second-growth timber harvesting began. The timber industry continued to play a major role in Oregon's economy during the second half of the twentieth century, and by 1960, represented one-fifth of the nation's domestic lumber supply (Andrews and Kutara 2005:1).

During the latter part of the twentieth century, mills became more permanent and lumber companies began to acquire their own land. The Oregon Lumber Company in Baker City, the Grande Ronde Lumber Company in La Grande, the Baker White Pine Lumber Company of Sumpter and Baker City, and the East Oregon Lumber Company in Enterprise are just several of the larger mills that developed in the region (Powell 2008a). Only recently has the industry experienced an extended decline in production and profit (Andrews and Kutara 2005:1, 7; Powell 2008a:2, 3).

Some of the historic mill locations within or near the project include mills at Dry Gulch, Government Springs, and the Grande Ronde River (Tucker 1940:77–79).Properties associated with timber and logging in the B2H project area could include temporary camp and work sites, railroad grades, splash

dams, and spring board notch trees. Historic roads, such as the Quartz Mill Road on the Proposed Action, were used to transport wood and cut lumber.

Homesteading, Irrigation, and Agricultural Settlement

Idaho was largely settled by emigrants from other parts of the West who sought their fortune in gold or land. In reality, many of them ended up making a living as farmers or storekeepers during the Gold Rush years and stayed on to raise livestock and crops. Few people were initially drawn to Idaho for its land, much of which, especially on the Snake River Plain, appeared sterile and uninviting (Schwantes 1991:96). Once the Gold Rush went bust, many stayed and realized that crops would grow well on the sage-covered flats of the Snake River Plain, if water were available. The early twentieth century introduction of large-scale irrigation soon made it possible to settle and farm this area (Schwantes 1991:96-97).

However, ranching and agriculture have played a major role in the economic development of the Pacific Northwest and continue to do so today. The natural resources of eastern Oregon in particular lend themselves to these productive industries. The ongoing improvements of irrigation canals and dam construction in the early 1900s precipitated further economic development and settlement. Soon after, native vegetation began being replaced by irrigated croplands of grains, sugar beets, potatoes, and alfalfa, which resulted in a disruption of the natural hydrologic system (Franzen 1981:228). Federal construction, canal, and dam projects through the Civilian Conservation Corps and Work Projects Administration during the 1930s Depression era enabled the unemployed to find work and helped establish larger-scale irrigation in the agricultural regions of Idaho and Oregon. Many of the currently in-use canal headgates were constructed during this time.

Based partly on the mass development of agricultural lands during the early twentieth century and as a response to the environmental disturbances caused by overgrazing and deforestation, public lands in western Idaho and eastern Oregon were set aside. This resulted in land management by federal agencies such as the BLM and U.S. Department of Agriculture Forest Service (USFS; Franzen 1981:229). Though the economy has been affected by periodic droughts and depressions throughout the twentieth century, to date, western Idaho and southeastern Oregon retain their agricultural economy; sugar beets, potatoes, dairy farms, wood product processing plants, and feedlots continue to contribute to regional development.

Homesteading

While squatters on public lands gained the authority to purchase tracts of land of up to 160 acres from the federal government through the Preemption Act of 1841, it was the Homestead Act of 1862 that dramatically drove new settlement in the west and, more specifically to this discussion, in eastern Oregon. The Homestead Act provided a 160-acre tract of land to any U.S. citizen, or intended citizen, who had never borne arms against the U.S. government, provided that the claimant lived on the land for 5 years and improved it by building a 12-foot by 14-foot dwelling and commenced cultivation of crops. After the 5-year period, the homesteader could file for a deed of title by submitting proof of

residency and land improvements and paying a nominal registration fee to the local land office. This system allowed citizens access to land without any upfront land purchase costs.

Following the Homestead Act, Congress passed the Timber Culture Act in March 1873 that authorized the grant of an additional 160 acres to a homesteader who agreed to plant trees on 40 acres of the allotted land and cultivate them for 10 years. The legislation allowed for land speculators to consolidate large landholdings. Subsequent amendments of the Act reduced the number of acres of tree planting to 10. The purpose of the act was to establish groves of trees in the hope that they would create a more humid climate that would provide better agricultural land, thus bringing more rainfall to the drought-stricken prairie. Additionally, the Act would provide a source of material for fencing, fuel, and building for newly arriving and existing settlers, and also provide another method by which additional land could be acquired by residents, often doubling the amount of land they could receive.

The Desert Land Act was passed by the U.S. Congress on March 3, 1877 and was intended to encourage and promote the economic development of the arid and semiarid public lands of the western states (BLM 2009). The act offered 640-acre tracts of land to an adult married couple who would pay $1.25 an acre and promise to develop and irrigate the land within 3 years; a single man would receive 320 acres for the same price. The conditions required that the applicant be a naturalized citizen, head of household, or male over the age of 21 who had never been an enemy or aided an enemy of the United States. At the time the claim was placed, the claimant was required to pay 25 cents per acre, with the remaining balance due within 2 years. Unlike the Homestead Act, the Desert Land Act did not include a requirement to construct a residence, but it did stipulate that title would only be transferred after 3 years if irrigation development was completed within that time.

In 1909, Congress passed the Enlarged Homestead Act, which raised the amount of land deeded to each homesteader from 160 to 320 acres (Gates 1968). The Act also stipulated that only nonmineral, nonirrigable, and nonmerchantable timber land could be acquired provided that at least 1/8 of the land be continuously cultivated for agricultural crops, with 5 years to make all necessary improvements. In 1912, Congress decided that 5 years was too long for the residential and agricultural requirement and passed the Three-Year Homestead Act (Meinig 1955).

Irrigation

Farming became the way of life in arid northeastern Oregon during the late 1800s, but the lack of adequate irrigation soon reduced agricultural productivity. Old mining ditches were put back to work to provide water for orchards, hayfields, row crops, and dairy cows (Braswell 1986). However, this opportunistic use of the old mining ditches faded as a more formal system of irrigation ditches developed. Vale area farmers even diverted part of the Malheur River in the 1880s with varying success to provide more water to the area's agricultural fields (Oregon Historical Society 2012c).

The Carey Act of 1894 allowed for private companies in the United States to construct irrigation systems in the western semi-arid states and profit from the sales of water. The Carey Act was enacted into law by Congress on August 18, 1894, and was intended to dispose of arid public land. The Act, managed by the U.S. General Land Office (GLO) under the supervision of the federal government, provided as much as one million acres of land for each western state, which was then regulated by

each state, which determined who qualified as potential claimants and investors. In most of the western states, claimants had to pay an entry fee, plus a small amount for the land, and meet several guidelines. The Act was particularly successful in Idaho and Wyoming. In 1908 Idaho received an additional two million acres and Wyoming received an additional one million acres of land to develop under the Carey Act. Today, approximately 60 percent of the Carey Act lands irrigated in the U.S. are in Idaho. Examples of projects that benefitted from the Carey Act in Idaho include the Boise and Twin Falls projects (Pisani 2002).

Congressional passage of the Newlands Reclamation Act in 1902 heightened expectations that federal monies would be available to develop irrigation projects in Oregon's arid desert region. Toward this end, the U.S. Reclamation Service conducted a series of survey and investigations of the Malheur, Willow Creek, and Owyhee areas in eastern Oregon and the Umatilla area in the northeast (Oregon Historical Society 2012b). Within the Umatilla region, the federal government quickly funded the Hermiston Irrigation Project, a large-scale development to divert water from the Umatilla River to agricultural fields in northern Umatilla County. The project focused on construction of a 26-mile-long canal system that carried water to the 100-foot-high Cold Springs Dam, built between 1906 and 1908 on the Umatilla River. Below the dam, the water was dispersed to croplands through a series of pipes and canals. Local interest in water development continued to grow and in 1953, McNary Dam was completed on the Columbia River at Umatilla Rapids to serve both irrigation and navigation needs for this growing region.

In the late 1920s, the Reclamation Service initiated the Vale-Owyhee engineering project, part of the larger reclamation enterprises being developed along the Snake River. The project included construction of 417-foot-high Owyhee Dam (the highest dam west of the Mississippi at the time), a 3.5-mile-long diversion tunnel, 5 miles of additional tunnel, a 2.5-mile-long steel siphon, and 200 miles of canal (Oregon Historical Society 2012b). The dam, completed in 1932, began delivering water to farmers in 1935. By 1965, the Owyhee Project irrigated more than 111,000 acres and, in the 1970s, the value of crops irrigated with Owyhee water peaked at $50 million (Stene 1996).

The Owyhee Historic District was listed on the NRHP in 2010. The property is located within the study area for indirect effects for Segment 5, specifically the Malheur A and S Alternatives and adjacent portions of the Proposed Action, and will be further analyzed through the ILS. The Bureau of Reclamation constructed the McKay Dam, between 1923 and 1927 supply water to the Stanfield and Westland Irrigation Districts (BOR 2012). This earthfill structure is 165 feet high; it was modified in 1978–1979 to increase capacity and was instrumental in furthering the agriculture capabilities of the area.

Other cultural resources related to the context of irrigation that may be found in the B2H analysis area include ditches, dams, spillways, siphons, canals, headgates, historic fields, orchards, and homesteads, among others.

Ranching

The ranching industry provided several basic staples including beef, mutton and lamb, pork, chicken, milk, and cheese. Cattle and horses also provided the necessary power for plowing agricultural fields,

pulling wagons and other machinery, and leather for clothing and other purposes. It has been postulated that Shoshone Indians brought the earliest horses to the northwest from Spanish Missions in northern New Mexico in the 1700s (Galbraith and Anderson 1991:213). Regardless of origin, ranchers and farmers who arrived in the region in the nineteenth century found domesticated horses necessary for conducting daily activities. Cattle were first introduced to the region at Neah Bay Washington, in 1792 and by the early nineteenth century, had spread into eastern Washington (Galbraith and Anderson 1991:213). Later, numerous herds of cattle and sheep were driven north from California and west from the Great Plains into the Willamette Valley and east of the Cascades. The practice of driving cattle over long distances ended in the 1880s with the creation of the Northern Pacific Railroad, the Utah and Northern Railroad, and the Oregon Short Line, which allowed for shipping cattle by rail. Cattle and sheep ranching expanded into and developed more fully in eastern Oregon during the 1850s and 1860s when miners moved into the Columbia Basin. For the most part, ranchers sold their meat and milk locally, but this changed in the 1870s when they were forced to look beyond the Pacific Northwest to compensate for the overpopulated industry in the region. In addition to supplying areas to the east with basic goods, the cattle were also used to create base herds in the Rocky Mountains (Galbraith and Anderson 1971:8-9).

Open range ranching on lands surrounding an established headquarters was the accepted practice until the 1890s when, after a series of severe winters, ranchers finally accepted that shelter and feed during the winter were necessary for a successful operation. Large-scale changes in land management, however, ultimately put an end to the practice of open range ranching. Following enactment of the Homestead Act, land began to be fenced off and property lines delineated; this prevented free movement of herds and limited travel along established sheep and cattle drive routes. In 1897, the federal government further limited open range with the creation of forest reserves to protect damaged range lands; a limited number of grazing leases were available to ranchers, which drastically reduced their access to public lands (Galbraith and Anderson 1971).

The first Basque populations arrived in this region during the late 1880s, with many settling in the southeastern corner of the state near Jordan Valley, Steens Mountain, and Ontario as well as the Boise and Nampa areas in Idaho. Known also as Amerikanuak (American Basques), most were sheepherders or livestock men who had immigrated from South America and had followed mining booms from California to Nevada and into Oregon and Idaho (Compean n.d.). Still others migrated directly from their homelands in the Pyrenees Mountains between France and Spain (Douglass and Bilbao 1975; Etulain 1991). The Basque migration to the United States peaked between 1900 and 1920 and had a direct impact on the economic, political, and cultural conditions of the American West, as well as to the growth of the sheep industry in the Pacific Northwest. Estimates of Basque in southeastern Oregon indicate that Basques probably made up more than half of the 1,000 to 2,000 residents of the region and may have represented nearly 90 percent of the area's sheep herders (Etulain 1991).

Immigration restrictions enacted in 1922 capped the allowable quotas for Spanish and French immigrants thereby drastically reducing Basque immigration (Compean n.d.). The new immigration restrictions compounded the economic hard times experienced by Basque families due to the Great Depression and the passing of the 1934 Taylor Grazing Act. The Act's restriction of grazing allotments on public lands

forced the Basques to reduce the size of sheep herds, which directly impacted their income. The local sheep industry was also affected by overseas competition and the diminished demand for wool.

In the postwar era, Congress passed laws to encourage immigration by sheepherders which led to a new wave of Basque immigrants settling in Idaho and Oregon (Compean n.d.) Besides working as herders or at other ranch jobs, some Basque men secured work as miners or as laborers on irrigated farms. Several Basques also owned their own ranches, opened boarding houses, or sought success in other business 15,000 people living in Boise, Idaho that are of Basque decent are a clear indicator of the large impact they had upon the development of the region (O'Connor 2012).

Evidence of Greek sheepherders is also prevalent in the area. Historical sites on Lookout Mountain contain dendroglyphs; histories of the area indicate that these could be attributed to Greek families (Oman 1999). Cairns at sites in this area could be ascribed to the Greek sheepherders. Anecdotal histories also indicate a Greek presence among the sheepherders (Kirby 1989).

Many unnamed homesteads, cabins and roads are depicted on historic maps throughout the project area. In areas that are not known to have been actively involved in the timber or mining industries, these properties have been frequently associated with ranching. Reconnaissance level data indicates that the remains of possible ranching complexes, including resource types such as fences, corrals, chutes, buildings, windmills, and troughs are located within the 10-mile-wide corridor for indirect impacts along the Proposed Action, Longhorn Variation, Proposed 138/69-kV Rebuild, and Timber Canyon Alternatives.

3.2.8.6 Affected Environment

Cultural Resources Inventory Summary

Cultural Resources Identified through Class I, Class II, and Reconnaissance Level Survey of the B2H Analysis Area

A Class I records search examined a 4-mile-wide corridor centered on the Proposed Action and alternatives. Based on review of this information, a random sample within a 500-foot-wide corridor centered on the Proposed Action and alternatives was subject to a Class II pedestrian survey. Approximately 4,218 acres of the analysis area was surveyed in Oregon. The survey areas were located on both privately and federally owned land within Morrow, Umatilla, Union, Baker, and Malheur counties. In Idaho, an additional 303 acres of privately and federally owned land were surveyed within Owyhee County. The RLS was conducted for those visible lands within a 10-mile-wide corridor that included 5 miles on both sides of the Proposed Action and alternatives. The RLS identified above-ground resources that could be within the 10-mile-wide corridor. These consist of buildings and districts, archaeological sites with aboveground components, eligible and unevaluated irrigation features, railroads, and trails–including several segments of the Oregon NHT.

Cultural resources identified through Class I and Class II survey efforts as well as the RLS are presented in tables below. Resources are characterized by their recommended or determined NRHP-eligibility (properties listed in the NRHP and eligible for listing /properties ineligible for listing

/unevaluated properties), and further broken down by general resource type: prehistoric, historic, multicomponent (having evidence of both prehistoric and historic activity) or unknown. Cultural resources categorized as “unknown” are usually those for which incomplete records were found, and consequently could not be assigned to a particular time period. It is important to note that no determinations of eligibility have been formally made for cultural resources recorded during the Class II survey performed for the B2H Project. The NRHP-eligible properties presented in this section have been determined eligible in conjunction with previous undertakings and/or planning efforts.

Table 3-219 through Table 3-244 summarize the identified cultural resources and NRHP-eligible properties in the analysis area pertaining to each of the six segments of the project area and the Proposed Action and alternatives within each one. These tables also present the number of identified cultural resources within the analysis area of the corresponding segment of the Proposed Action. There are no alternatives identified for the portion of the Proposed Action in Idaho (segment 6). Note that historic districts are presented as a single resource in these tables, and their contributing properties are not included in the counts. Note that segments of NHT identified through RLS are also included in the counts; detailed recordation of these segments will occur through ILS prior to publication of the FEIS and Class III survey prior to project construction. Places important to Native Americans are located throughout the B2H Project area, but the precise locations of these places has not been disclosed for publication in the DEIS.

Table 3-219. Cultural Resources Located in Analysis Area of the Proposed Action

Resource Types	Number of Resources for the Proposed Action Oregon	Number of Resources for the Proposed Action Idaho
Unknown	3	4
Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	92	20
Ineligible sites	186	20
Task-specific sites	27	11
Quarries	11	4
Utility lines	1	1
Unnamed roads/ditches	6	0
Roads /railroads/canals	35	5
Large habitations, precontact	1	0
Mining complex	17	2
Historic buildings/structures with integrity	234	7
Rock shelters	16	12
Rock cairns/alignments	52	5
Petroglyphs/pictographs	5	2
NRHP-listed sites/historic districts	31	2
Burials/cemeteries	13	3
Total	**730**	**98**

Table 3-220. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Proposed Action

Name	State	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				Total
		Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	
Proposed Action	Oregon	8	208	3	2	15	165	1	5	95	138	10	80	730
Proposed Action	Idaho	4	7	0	0	7	11	2	0	46	13	4	4	98

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Segment 1—Morrow-Umatilla

Segment 1 encompasses a portion of the Proposed Action and three alternatives: the Horn Butte, Longhorn Variation, and Longhorn alternatives, all three of which are clustered in the western extent of the segment. This segment is characterized by several important historic period cultural resources, including multiple segments of the Oregon NHT, a segment of the Oregon Railway and Navigation Company Railroad, the Cecil Survey District, the Willow Creek Campground, the Naval Weapons System Training Facility, and numerous historic cemeteries, houses, and other structures, especially in and near Pilot Rock, Boardman, and Cecil. A number of historic trails, wagon roads, homesteads, farmsteads, agricultural fields, and water-conveyance features (canals, ditches) also are present along Segment 1. Overall, the types of historic resources in this segment reflect historic period agriculture activities and railroad development. Recorded prehistoric sites consist of lithic scatters and open camps. . Resources recorded in the study areas of each of the three alternatives and the Proposed Action are described below.

Horn Butte Alternative

The Horn Butte Alternative analysis area contains 11 known cultural resources including segments of trails and other historic resources. The segment of the Proposed Action adjacent to the Horne Butte Alternative contains 19 known cultural resources. Both the Proposed Action and alternatives encompass a segment of the Oregon NHT, the Oregon Railway and Navigation Company Railroad, the Cecil General Store, several historic cemeteries, a historic farmstead, and a historic homestead. The Oregon NHT runs parallel to and slightly north of the Horn Butte Alternative alignment and proposed action where the route follows an east-west trajectory, and intersects the centerline of both the proposed and alternative near the juncture where the route shifts from an east-west to north-south trajectory. Few prehistoric resources have been recorded near the Horn Butte Alternative and Proposed Action analysis areas; these resources consist of a small number of unevaluated camps and lithic scatters.

Table 3-221. Cultural Resources Located in Analysis Area of the Horne Butte Alternative

Resource Types	Proposed Action Compared to Horn Butte Alternative	Horne Butte Alternative
Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	3	0
Ineligible sites	1	1
Task-specific sites	4	2
Roads /railroads/canals	1	1
Historic buildings/structures with integrity	3	2
NRHP-listed sites/historic districts	5	4
Burials/cemeteries	2	1
Total	**19**	**11**

Table 3-222. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Horn Butte Alternative

	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				
Route Name	**Pre**	**Hist**	**MC**	**Unk**	**Pre**	**Hist**	**MC**	**Unk**	**Pre**	**Hist**	**MC**	**Unk**	**Total**
Proposed Action Compared to Horn Butte Alternative	0	4	0	0	0	1	0	0	6	8	0	0	19
Horn Butte Alternative	0	5	0	0	0	1	0	0	1	4	0	0	11

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Longhorn Variation

The Longhorn Variation analysis area contains 58 known cultural resources. Many of these are historic age buildings and structures, including the Boardman Fire Station, Riverside High School, and a Naval Weapons System Training Facility. Historic cemeteries are also present, including the Riverview Cemetery and an emigrant cemetery. Linear historic resources include the Oregon Railway and Navigation Company Railroad and the West Extension Irrigation Canal. Segments of trails are also present, including a segment of the Oregon NHT and Lewis and Clark NHT. The Oregon NHT runs perpendicular to the Longhorn Variation alignment and crosses its centerline near its southern terminus; The NRHP-listed Wells Spring segment of the Oregon NHT begins immediately west of the alignment. The Lewis and Clark NHT runs perpendicular to, but several miles north of, the Longhorn Variation alignment in southern Washington; it only slightly overlaps the northernmost extent of the analysis area. Three sites with both historic and prehistoric components and two prehistoric sites also were recorded in the indirect APE, including middens, camps, and lithic scatters. The segment of the Proposed Action corresponding to the Longhorn Variation Alternative contains substantially fewer recorded cultural resources (11), including several of the same linear resources that are present along

the alternative. The Oregon NHT mostly runs parallel to the Proposed Action in this area and intersects its centerline where its alignment shifts from an east-west to north-south trajectory.

Table 3-223. Cultural Resources Located in Analysis Area of the Longhorn Variation Alternative

Resource Types	Proposed Action Compared to Longhorn Variation	Longhorn Variation
Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	4	2
Ineligible sites	1	22
Task-specific sites	4	4
Utility lines	0	1
Unnamed roads/ditches	0	1
Roads /railroads/canals	1	5
Historic buildings/structures with integrity	4	18
NRHP-listed sites/historic districts	2	5
Burials/cemeteries	2	1
Total	**18**	**59**

Table 3-224. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Longhorn Variation Alternative

	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				
Route Name	**Pre**	**Hist**	**MC**	**Unk**	**Pre**	**Hist**	**MC**	**Unk**	**Pre**	**Hist**	**MC**	**Unk**	**Total**
Proposed Action Compared to Longhorn Variation	0	3	0	0	0	1	0	0	6	8	0	0	18
Longhorn Variation	0	20	0	0	0	22	0	0	2	12	3	0	59

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Longhorn Alternative

The Longhorn Alternative analysis area contains 49 known cultural resources. Many of these are historic age buildings and structures, such as the Oregon Railway, Navigation Company Railroad and Riverside High School, and various houses and other buildings in Boardman. Segments of trails are also present, including a segment of the Oregon NHT and Lewis and Clark NHT. The Oregon NHT runs perpendicular to the Longhorn Alternative and crosses its centerline near its southern terminus. The Lewis and Clark NHT runs perpendicular to, but several miles north of, the Longhorn Alternative; it only slightly overlaps the northernmost extent of the analysis area. The Longhorn Alternative analysis area also contains multiple historic cemeteries and roads. Multicomponent and prehistoric resources are also present within the indirect APE, including archaeological sites in proximity to the Columbia River.

These sites include camps, middens, residential areas, and lithic scatters. The corresponding segment of the Proposed Action contains substantially fewer known cultural resources (17), including several of the same linear historic period resources recorded along the alternative. The Oregon NHT generally runs parallel to the Proposed Action in this area and intersects its centerline where its alignment shifts from an east-west to north-south trajectory.

Table 3-225. Cultural Resources Located in Analysis Area of the Longhorn Alternative

Resource Types	Proposed Action Compared to Longhorn Alternative	Longhorn Alternative
Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	3	2
Ineligible sites	1	20
Task-specific sites	3	4
Utility lines	0	1
Unnamed roads/ditches	0	1
Roads /railroads/canals	1	3
Historic buildings/structures with integrity	5	16
NRHP-listed sites/historic districts	2	3
Burials/cemeteries	2	0
Total	**17**	**50**

Table 3-226. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Longhorn Alternative

	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				
Route Name	**Pre**	**Hist**	**MC**	**Unk**	**Pre**	**Hist**	**MC**	**Unk**	**Pre**	**Hist**	**MC**	**Unk**	**Total**
Proposed Action Compared to Longhorn Alternative	0	3	0	0	0	1	0	0	6	7	0	0	17
Longhorn Alternative	1	16	0	0	0	18	2	0	2	8	3	0	50

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Segment 2—Blue Mountains

Segment 2 encompasses a portion of the Proposed Action and one alternative, the Glass Hill Alternative, which is located in the approximate midpoint of the segment. Significant cultural resources located along Segment 2 include several segments of the Oregon NHT, and the NRHP-listed La Grande Commercial Historic District (LGCHD). Additional historic period resources in Segment 2 include roads, homesteads, railroad segments, camps and, various structures associated with La Grande and North Powder. Prehistoric resources consist of lithic scatters, open camps, and a small

number of rock alignments. Cultural resources recorded in the analysis area for the Glass Hill Alternative and the Proposed Action are described below.

Glass Hill Alternative

The Glass Hill Alternative analysis area contains 32 known cultural resources. Some of these are historic age buildings and structures, including railroad grades and historic era buildings associated with the nearby community of La Grande. Multiple trail segments are present, including Whiskey Creek Segment of the Oregon NHT and several trail markers. The Oregon NHT follows a roughly parallel trajectory to the north and east of both the Glass Hill Alternative and Proposed Action in this analysis area, but it does not cross either of their centerlines. A small number of prehistoric flaked stone scatters are present as well. The adjacent portion of the Proposed Action encompasses part of the LGCHD. The Proposed Action's proximity to the town of La Grande accounts for the high frequency of resources, which include numerous historic buildings outside of the LGCHD and associated linear resources (roads, railroads). Few prehistoric resources have been recorded in either the Proposed Action or the Glass Hill Alternative analysis areas.

Table 3-227. Cultural Resources Located in Analysis Area of the Glass Hill Alternative

Resource Types	Proposed Action Compared to Glass Hill Alternative	Glass Hill Alternative
Unknown	4	4
Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	4	4
Ineligible sites	52	9
Task-specific sites	1	1
Unnamed roads/ditches	2	2
Roads /railroads/canals	1	2
Large habitations, precontact	1	1
Historic buildings/structures with integrity	28	4
Rock cairns/alignments	2	2
NRHP-listed sites/historic districts	2	3
Total	**97**	**32**

Table 3-228. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Glass Hill Alternative

Route Name	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				Total
	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	
Proposed Action Compared to Glass Hill Alternative	0	27	0	0	1	50	1	0	3	10	1	4	97
Glass Hill Alternative	0	6	0	0	1	7	1	0	4	8	1	4	32

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Segment 3—Baker Valley

Segment 3 encompasses a portion of the Proposed Action and three alternatives: the Timber Canyon, Flagstaff, and Burnt River Mountain Alternatives. Key historic period resources in this Segment 3 include the Oregon NHT and other trail segments, the Virtue Flat Mining area, and numerous buildings and other resources located in and near Baker City, Huntington, Durkee, Weatherby, and Sparta. The NRHP-listed Baker City Historic District (BCHD) is also present within Segment 3, along with numerous historic roads, homesteads, fields, and mining- and logging-related features. Prehistoric resources, especially lithic scatters and mining areas/quarries are numerous in Segment 3. Numerous cultural resources possibly significant to Native American tribes are also present, such as petroglyph panels, a dendroglyph/arborglyph, and numerous cairns, rock alignments, and other arranged-rock features. Several rockshelters also have been recorded in the Baker Valley. Overall, the Segment 3 area appears to have been an important area for both prehistoric and historic settlement and land use, especially mining/quarrying activities. Cultural resources recorded in the analysis areas of each of the three alternatives and the Proposed Action are described below.

Timber Canyon Alternative

The Timber Canyon Alternative analysis area contains 257 known cultural resources. Numerous cairns and rock alignments, both historic and prehistoric in age, are present, as are two segments of the Goodale's Cutoff Trail, prehistoric rockshelters, and arranged-rock features. The Oregon NHT follows a roughly parallel route located far to the west of the Timber Canyon Alternative, but it intersects its centerline at its southern terminus where it rejoins the Proposed Action. The Goodale's Cutoff Trail runs perpendicular to and crosses the Timber Canyon Alternative alignment. The segment of the Proposed Action corresponding to the Timber Canyon Alternative contains 107 known resources, including a number of historic mines and ranching complexes, the Virtue Flat segment of the Oregon Trail, several Oregon NHT monuments, historic buildings and structures (mostly associated with the town of North Powder), and numerous prehistoric cairns, rock alignments, a petroglyph, and several quarry sites. The Oregon NHT runs parallel to, and several miles west of the Proposed Action in this analysis area; the Virtue Flat segment of the NHT intersects the Timber Canyon Alternative in the area east of Baker City.

Table 3-229. Cultural Resources Located in Analysis Area of the Timber Canyon Alternative

Resource Types	Proposed Action Compared to Timber Canyon Alternative	Timber Canyon Alternative
Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	9	58
Ineligible sites	16	21
Task-specific sites	4	16
Quarries	4	5
Utility lines	0	1
Unnamed roads/ditches	0	5
Roads /railroads/canals	10	19

Resource Types	Proposed Action Compared to Timber Canyon Alternative	Timber Canyon Alternative
Mining complex	15	37
Historic buildings/structures with integrity	28	50
Rock shelters	1	8
Rock cairns/alignments	13	33
Petroglyphs/pictographs	1	0
NRHP-listed sites/historic districts	0	3
Burials/cemeteries	0	1
Total	**107**	**257**

Table 3-230. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Timber Canyon Alternative

Route Name	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				Total
	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	
Proposed Action Compared to Timber Canyon Alternative	1	26	0	1	2	9	0	5	12	35	0	16	107
Timber Canyon Alternative	26	29	2	4	4	12	0	5	34	94	11	36	257

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Flagstaff Alternative

The Flagstaff Alternative analysis area contains 188 known cultural resources. Most are historic age buildings, mines, and structures, with segments of trails; prehistoric artifact scatters and rock alignments are also present. This alternative encompasses many historic period resources associated with the town of Baker City, including the Baker City Historic District (BCHD). The corresponding segment of the Proposed Action contains substantially fewer known resources (41), comprised of mostly historic period mines, roads, and trails. Few prehistoric sites were recorded along both the Proposed Action and alternatives, mainly representing rock alignments and lithic scatters. One rockshelter was recorded in the analysis area of the Proposed Action. The Virtue Flat segment of the Oregon NHT is present within the analysis area of both the Proposed Action and the Flagstaff Alternative and crosses both of their centerlines slightly north and east of Baker City.

Table 3-231. Cultural Resources Located in Analysis Area of the Flagstaff Alternative

Resource Types	Proposed Action Compared to Flagstaff Alternative	Flagstaff Alternative
Unknown	0	2
Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	5	6
Ineligible sites	3	37
Task-specific sites	1	1
Roads /railroads/canals	6	5
Mining complex	13	6
Historic buildings/structures with integrity	2	119
Rock shelters	1	0
Rock cairns/alignments	3	4
NRHP-listed sites/historic districts	7	8
Total	**41**	**188**

Table 3-232. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Flagstaff Alternative

	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				
Route Name	**Pre**	**Hist**	**MC**	**Unk**	**Pre**	**Hist**	**MC**	**Unk**	**Pre**	**Hist**	**MC**	**Unk**	**Total**
Proposed Action Compared to Flagstaff Alternative, including 230-kV rebuild	0	9	0	0	1	2	0	0	6	21	0	2	41
Flagstaff Alternative, including 230-kV rebuild	0	121	0	0	1	36	0	0	8	20	0	2	188

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Burnt River Mountain Alternative

The Burnt River Mountain Alternative analysis area contains 50 known cultural resources. Historic age roads, mines, and structures, and segments of trails are present in the analysis area, as are prehistoric lithic scatters, quarry sites, and rock cairns. Key historic resources include a segment of the Oregon NHT, the Rattlesnake Springs landmark of the Oregon NHT, and a number of historic-aged residential, commercial and governmental buildings. The analysis area of the corresponding segment of the Proposed Action contains slightly fewer resources (40), including many of the same historic period buildings and structures. A similar range of prehistoric sites was also recorded in the Proposed Action analysis area, including cairns, quarry sites, and lithic scatters. The segment of the Oregon NHT present in the Burnt River Mountain Alternative analysis area is also present in the Proposed Action analysis area. It runs parallel to, and in between, the Burnt River Mountain Alternative and Proposed

Action and intersects both of their centerlines near the northern and southern termini of the Burnt River Mountain Alternative.

Table 3-233. Cultural Resources Located in Analysis Area of the Burnt River Mountain Alternative

Resource Types	Proposed Action Compared to Burnt River Mountain Alternative	Burnt River Mountain Alternative
Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	2	9
Ineligible sites	5	4
Task-specific sites	2	2
Quarries	4	4
Unnamed roads/ditches	0	2
Roads /railroads/canals	5	4
Mining complex	1	3
Historic buildings/structures with integrity	14	13
Rock cairns/alignments	3	3
Petroglyphs/pictographs	1	1
NRHP-listed sites/historic districts	3	5
Total	**40**	**50**

Table 3-234. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Burnt River Mountain Alternative

	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				
Route Name	**Pre**	**Hist**	**MC**	**Unk**	**Pre**	**Hist**	**MC**	**Unk**	**Pre**	**Hist**	**MC**	**Unk**	**Total**
Proposed Action Compared to Burnt River Mountain Alternative	1	6	0	0	1	4	0	0	4	18	0	6	40
Burnt River Mountain Alternative	1	7	0	0	1	3	0	0	14	18	0	6	50

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Segment 4—Brogan Area

Segment 4 encompasses a portion of the Proposed Action along with two alternatives, the Willow Creek and Tub Mountain South alternatives. Several portions of the Oregon NHT are present in Segment 4, along with the historically significant Vale Irrigation District, Farewell Bend State Park, and Huntington Survey District (HSD), where many of the historic structures and landscape features in Segment 4 are concentrated. This segment also encompasses numerous historic roads, homesteads, water-conveyance features, and historic period refuse dumps. A number of emigrant graves are also

present. Prehistoric resources slightly outnumber historic period features in Segment 4 and include numerous lithic scatters, rock alignments, and mining/quarrying loci. A small number of prehistoric rockshelters, open camps, and rock art panels (including the Holtz Pictographs) also were recorded. As with Segment 3, prehistoric occupants appear to have been drawn to the Brogan Area to exploit opportunities for mining/quarrying raw lithic materials. The cultural resources located in the analysis areas within the Willow Creek and Tub Mountain South alternatives and the Proposed Action are described below.

Willow Creek Alternative

The Willow Creek Alternative analysis area contains 95 known cultural resources, many of which are prehistoric rock alignments, artifact scatters, rock art sites, cairns, quarries, a rockshelter, and numerous sites with stacked and arranged rock features. Historic age roads, mines, and structures are also present. The corresponding segment of the Proposed Action includes 72 known cultural resources, most of which are also prehistoric sites with a similar range of features. Both the Proposed Action and alternatives have analysis areas that incorporate historic buildings and structures in the Town of Huntington, a segment of the Oregon NHT, and the Holtz Pictograph site. At the northernmost extent of the Willow Creek Alternative analysis area, the Oregon NHT is located within a mile to the east of the centerlines for both the alternative and Proposed Action.

Table 3-235. Cultural Resources Located in Analysis Area of the Willow Creek Alternative

Resource Types	Proposed Action Compared to Willow Creek Alternative	Willow Creek Alternative
Unknown	1	0
Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	31	37
Ineligible sites	9	6
Task-specific sites	1	0
Quarries	2	2
Unnamed roads/ditches	0	
Roads /railroads/canals	2	3
Historic buildings/structures with integrity	19	19
Rock shelters	0	1
Rock cairns/alignments	19	25
Petroglyphs/pictographs	1	1
NRHP-listed sites/historic districts	3	4
Burials/cemeteries	1	2
Total	**88**	**100**

Table 3-236. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Willow Creek Alternative

Route Name	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				Total
	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	
Proposed Action Compared to Willow Creek Alternative	4	15	1	0	8	1	0	0	28	10	3	18	88
Willow Creek Alternative	2	4	1	0	6	0	0	0	51	13	5	18	100

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Tub Mountain South Alternative

The Tub Mountain South Alternative analysis area contains 119 known cultural resources, most of which are prehistoric rock features and artifact scatters, including cairns, rock alignments, quarries, and the Ali-Alk rock shelter. Historic age roads, mines, canals, and structures are also present. The analysis area of the corresponding segment of the Proposed Action contains slightly fewer cultural resources (94), but many of the same linear features are present. The Proposed Action analysis area encompasses a similar range of prehistoric and historic resources as that of the alternative. The analysis areas of the Proposed Action and alternative both possess historic buildings and structures in the Town of Huntington, a segment of the Oregon NHT, and the Holtz Pictograph site. The Oregon NHT intersects the centerline of the Tub Mountain South Alternative in two locations near its southern and northern termini. It does not intersect the Proposed Action centerline within this analysis area.

Table 3-237. Cultural Resources Located in Analysis Area of the Tub Mountain South Alternative

Resource Types	Proposed Action Compared to Tub Mountain South Alternative	Tub Mountain South Alternative
Unknown	0	1
Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	42	38
Ineligible sites	11	9
Task-specific sites	1	4
Quarries	2	9
Unnamed roads/ditches	0	2
Roads /railroads/canals	3	8
Historic buildings/structures with integrity	9	14
Rock shelters	0	3
Rock cairns/alignments	19	20
Petroglyphs/pictographs	1	0
NRHP-listed sites/historic districts	5	10
Burials/cemeteries	1	1
Total	**94**	**119**

Table 3-238. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Tub Mountain South Alternative

Route Name	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				Total
	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	
Proposed Action Compared to Tub Mountain South Alternative	4	12	1	0	9	2	0	0	35	10	3	18	94
Tub Mountain South Alternative	7	6	3	1	0	1	0	0	52	27	4	18	119

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Segment 5—Malheur

Segment 5 encompasses a portion of the Proposed Action along with three alternatives: the Malheur A, Malheur S, and Double Mountain Alternatives. The resources in this segment include historic roads, homesteads, dams, and water-conveyance features as well as numerous prehistoric lithic scatters, mining/quarrying loci, and rock alignments. Several prehistoric rockshelters and open camps also were recorded in this area. The Malheur Segment also encompasses the NRHP-listed Owyhee Dam Historic District (ODHD) and various canals, ditches, and other components of the Owyhee Irrigation project. Heavily disturbed (and ineligible) segments of Meek Cutoff Trail and the Dalles Military Wagon Road are also present. Overall, the historic period resources along Segment 5 are largely associated with water-control and conveyance; prehistoric resources are mostly associated with procurement and processing of lithic raw materials. The cultural resources recorded in the analysis areas of each of the three alternatives and the Proposed Action are described below.

Malheur A Alternative

The Malheur A Alternative analysis area contains 91 known cultural resources, many of which are prehistoric rock alignments, lithic scatters and camps, as well as two rockshelters. Historic age roads, mines, and structures are also present, and historic irrigation features are prevalent. The analysis area of the alternative also contains a portion of the NRHP-listed Owyhee Dam Historic District, which is not present in the analysis area of the Proposed Action. Other historic-era cultural resources in the Malheur A Alternative analysis area include an abandoned segment of the Union Pacific Railroad, a segment of the Meek Cutoff Trail, and the Vale Irrigation Project Canal. The corresponding segment of the Proposed Action contains 29 known resources in its analysis area, including a number of historic canals, irrigation ditches, and roads. A small number of lithic scatters and a rock alignment have also been recorded in the analysis area for the Proposed Action.

Table 3-239. Cultural Resources Located in Analysis Area of the Malheur A Alternative

Resource Types	Proposed Action Compared to Malheur A Alternative	Malheur A Alternative
Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	11	33
Ineligible sites	4	15
Task-specific sites	3	5
Unnamed roads/ditches	1	2
Roads /railroads/canals	7	7
Mining complex	0	3
Historic buildings/structures with integrity	2	18
Rock shelters	0	3
Rock cairns/alignments	1	1
NRHP-listed sites/historic districts	0	4
Total	**29**	**91**

Table 3-240. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Malheur A Alternative

Route Name	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				Total
	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	
Proposed Action Compared to Malheur A Alternative	0	1	0	0	1	3	0	0	12	10	2	0	29
Malheur A Alternative	1	21	0	2	1	14	0	0	36	9	6	1	91

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Malheur S Alternative

The Malheur S Alternative analysis area contains 97 known cultural resources, many of which are prehistoric rock alignments or artifact scatters. Historic age roads, mines, and structures are also present, and historic irrigation features are prevalent. Key historic resources include an abandoned segment of the Union Pacific Railroad, a segment of the Meek Cutoff Trail, and the Vale Irrigation Project Canal. The Meek Cutoff Trail follows a roughly perpendicular trajectory to the east and west of the Malheur S Alternative in the analysis area, but it does not cross its centerline. The resources situated along the corresponding segment of the Proposed Action are the same as those described for the segment of the Proposed Action in the Malheur A Alternative analysis area. The centerline of the Proposed Action intersects with the trail to the north of the U.S. Route 26 (also known as the Central Oregon Highway) near the northern end of the segment.

Table 3-241. Cultural Resources Located in Analysis Area of the Proposed Action

Resource Types	Proposed Action Compared to Malheur S Alternative	Malheur S Alternative
Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	12	34
Ineligible sites	4	15
Task-specific sites	3	7
Unnamed roads/ditches	0	1
Roads /railroads/canals	6	9
Mining complex	0	3
Historic buildings/structures with integrity	2	20
Rock shelters	0	4
Rock cairns/alignments	1	1
NRHP-listed sites/historic districts	2	3
Total	**30**	**97**

Table 3-242. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Malheur S Alternative

Route Name	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				Total
	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	
Proposed Action Compared to Malheur S Alternative	0	2	0	0	1	3	0	0	11	9	2	2	30
Malheur S Alternative	1	21	0	2	1	14	0	0	39	12	6	1	97

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Double Mountain Alternative

The analysis area for the Double Mountain Alternative contains only two known cultural resources: a historic and a multicomponent trash scatter. The Double Mountain Alternative does not contain any known cultural resources.

Table 3-243. Cultural Resources Located in Analysis Area of the Double Mountain Alternative

Resource Types	Proposed Action Compared to Double Mountain Alternative	Double Mountain Alternative
Ineligible sites	0	1
Historic buildings/structures with integrity	0	1
Total	**0**	**2**

Table 3-244. NRHP Eligibility of Cultural Resources Located in Analysis Area of the Double Mountain Alternative

Route Name	NRHP-Eligible Sites				Not-Eligible Sites				Unevaluated Sites				Total
	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	Pre	Hist	MC	Unk	
Proposed Action Compared to Double Mountain Alternative	0	0	0	0	0	0	0	0	0	0	0	0	0
Double Mountain Alternative	0	0	0	0	0	1	0	0	0	0	1	0	2

Table Source: Data from Class I, Class II, and reconnaissance level surveys.

Table Abbreviations: NRHP = National Register of Historic Places; Pre = prehistoric; Hist = historic; MC = multicomponent; Unk = unknown.

Segment 6—Treasure Valley

Segment 6 includes the Proposed Action. This resources located in the analysis area are summarized above in Table 3-219. The Proposed Action includes two NRHP-listed historic period properties, the Poison Creek Stage Station and Bernard's Ferry. An intact segment of the Oregon NHT (South Alternate) is also present, along with the Wilson Cemetery and numerous historic period roads, canals, ditches, mining claims, and scattered buildings. Prehistoric resources are frequent and include several prominent petroglyph locations, notably the NRHP-listed Map Rock Petroglyphs Historic District and Givens Hot Springs area. Prehistoric lithic scatters and open camps are prevalent, and rockshelters are particularly frequent in comparison with the other segments.

Tribal Issues

As discussed previously, ethnographic studies have been undertaken by the CTUIR and Shoshone Paiute Tribes to assist with the identification of traditional cultural properties and other resources of concern to tribal members. The CTUIR study also conducted a sample inventory for the presence of First Foods, traditional plant resources considered culturally significant to Tribe within the B2H Project area. Neither the Shoshone Paiute Tribes nor CTUIR have disclosed the location of TCPs or other resources for publication in the Draft EIS, although CTUIR has identified at least 45 known NRHP-eligible TCPs in or near the project area that could be affected by the Proposed Action. CTUIR has further indicated the existence of a cultural landscape used for procurement of First Food resources that extends over a large portion of the Proposed Action analysis area from the project's intersection with McKay Creek, west of the Blue Mountains to Clover Creek, northeast of the community of North Powder, Oregon.

Consulting tribes have also indicated concern with Project impacts to the broader cultural landscape which includes certain classes of resources that are considered culturally significant, including: trade sites; village and settlement sites; trails; treaty sites; natural springs; rock image sites; rock structures and buttes; caves and rockshelters; hunting, gathering and fishing locations; battle sites; burial sites; First Food collection areas; sites associated with ceremonies and legends, and monumental features such as rock formations. Impacts to segments of the Shoshone Paiute Trail of Tears is also a paramount concern for the Shoshone Paiute Tribes. The Trail is considered to be a spiritually

significant property to Tribe, and project impacts continue to be evaluated through government-to-government consultation.

3.2.8.7 Environmental Consequences

Data Considerations

The data used for analysis reflects the most current cultural resources information collected for the B2H Project. As described earlier, these data consist of a Class I overview of records on cultural resources for a 4-mile-wide corridor centered on the Proposed Action and each alternative; ethnographic studies of the project area; an RLS for a 10-mile-wide corridor encompassing lands from which the project would be visible; and 15 percent sample pedestrian surveys of a 500-foot-wide corridor for the Proposed Action and all alternatives.

The Class I and Class II data are augmented by the data collected through the RLS, which aimed to further document the presence of aboveground cultural resources that may be indirectly (e.g., visually) impacted by the construction of the project. The ethnographic data collected through study and consultation with Native American tribes is presented in the Draft EIS at the project level and will be used by the agency during impact analysis to evaluate specific resources or classes of resources that should be considered in the agency's decision.

Additional data will be collected as NEPA analysis progresses. Class III pedestrian survey will occur to provide for comprehensive identification of cultural resources for the Agency Preferred Alternative and will be summarized in the Final EIS. Cultural resources identified in the RLS as requiring additional evaluation and assessment will be completed during the ILS, and the results will be summarized in the Final EIS.

Determinations of Effect under Section 106 of the NHPA

Pursuant to Section 106 of the NHPA, project effects upon all historic properties located with the defined APE will be determined by the agency, in consultation with SHPOs, tribes, and parties to the abovementioned project PA, in compliance with Section 106 of the NHPA. Adverse effects are found when the defined undertaking alters—either directly or indirectly—the characteristics that qualify the property for inclusion in the NRHP in a manner that would diminish the property's integrity (CEQ and ACHP 2013). Where effects are determined to be adverse, the agency shall consult with the SHPO/THPO, consulting parties including Indian Tribes to develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize, or mitigate adverse effects on historic properties. The application of avoidance, minimization and mitigation measures will be guided by the provisions of the project PA.

Analysis of Impact under NEPA

As described earlier, analysis of cultural resource impacts under the NEPA process will not be limited to an examination of effect as applied to the narrower category of "historic properties" defined by the Section 106 process. Impacts under NEPA are examined in terms of whether the Proposed Action

would "significantly affect the quality of the human environment." Impacts are analyzed based on an assessment of context, defined here as the affected cultural resource; and intensity, construed here as the severity, or magnitude, of the effect (40 CFR 1508.27). Although NEPA impact analysis is not limited to examination of effect to NRHP-eligible properties, information on NRHP eligibility has been included in the analysis as a proxy for resource significance and to assist with an approximation of the magnitude of an effect.

Type and Level of Impact

The construction, operation and maintenance of the B2H Project could potentially result in both direct and indirect effects to cultural resources. These impacts may be classified as:

- *Direct,* involving physical impact to the resource through ground disturbance associated with construction activities. Resources directly impacted by the project will be located within the 500 foot corridor for direct impacts.
- *Indirect,* involving physical impact to the resource that may be further removed in time as a by-product of increased access to the right-of-way and future operation and maintenance activity. Resources indirectly impacted by the project as a by-product of increased access will be located within the 500 foot corridor for direct impacts. Very few of these resources should be located outside of the 500 foot corridor.
- *Indirect,* involving visual, auditory and atmospheric impact to the resource as a by-product of construction and operation of the project. Resources indirectly impacted by the project as a function of visual, auditory and atmospheric effects may be located within the 500-foot-wide corridor for direct impacts; however, these resources may also be located outside this corridor. For example, resources—such as historic trails—for which setting contributes to character, may be indirectly impacted if they are located within the viewshed of the project.

At the time of this writing, evaluation of indirect impacts to resources identified in the RLS as requiring further analysis has not occurred. Analysis of indirect impacts will occur following the process outlined in the Visual Assessment of Historic Properties workplan, which will be appended to the project PA. Direct impacts to most of the resources located in the 500-foot-wide corridor can be avoided through micrositing of project elements, such as towers, tie downs, roads, and substation structures. However, it is important to note that avoidance of direct impacts through micrositing and monitoring of construction activities will not account for indirect impacts that may result from increased access and future operation and maintenance of the project. The resolution of both direct and indirect impacts is addressed in the project PA that shall be executed for the B2H Project prior to the Record of Decision, as well as the Historic Properties Management Plan (HPMP) that will be produced prior to issuance of a Notice to Proceed.

Effects Analysis Methodology

In order to evaluate the cultural resources impacts of an alternative when compared to the segment of Proposed Action for which the alternative would replace, a methodology was developed to calculate an index of potential impact. The intent behind generating a single index value for the Proposed Action and alternatives was to find a comparative means of evaluating an impact in terms of both the *quantity* of

cultural resources and the *sensitivity* of the resources in terms of resource type; and in the case of RLS and Class I cultural resources data, *distance* from the Project centerline. The variable of sensitivity, as discussed below, assumes that certain resources are either rarer than others, have strong cultural values to tribes and other ethnic groups, are more difficult to avoid, or for which adverse effects are more difficult to mitigate. The latter variable of distance assumes that the likelihood of impacts to cultural resources would generally decrease as a function of distance of the resource from the transmission line and facilities.

The data for these calculations come from three data sources: the Class II survey, which encompassed randomly selected 1-mile long, 500 foot wide survey segments that together comprise a 15 percent sample of both the Proposed Action and alternatives; the RLS, which consisted of a records search and "windshield survey" of cultural resources located within a 10-mile-wide corridor of the Proposed Action and alternatives that could potentially be visually impacted by the project; and the Class I data, which consisted of a review of existing reports and records to obtain locations and attribute information for previously recorded sites within 2 miles on either side of the centerline for the Proposed Action and alternatives. The RLS and Class I data were combined for the index calculation. However, as the Class II data collection involved systematic data collection of randomly generated one-mile segments for Proposed Action and alternatives, these data were analyzed separately. The differences in how the Class II data was collected do not allow for direct comparison with the data from the RLS and Class I records searches.

The Potential Impact indexes for the Class II and RLS/Class I datasets were calculated based on several key variables. The first variable accounts for the actual frequency (count) of cultural resources documented along the Proposed Action and alternatives. The route segments varied in length and, therefore, encompassed survey areas of varying size. For the Class II survey in particular, the Proposed Action and alternatives often encompassed different numbers of one-mile survey segments. Consequently, the frequencies of cultural resources among the various alternatives are largely a function of the varying amount of acreage that they encompassed. To standardize the frequency values, therefore, the raw counts of cultural resources were divided by the total survey acreage, which resulted in a value representing the number of recorded cultural resources per acre.

The second key variable examined gauges the "sensitivity" level of the cultural resources identified in each segment and alternative. Five ranked sensitivity categories were applied to the types of properties identified through Class I records search, Class II survey, and RLS: low, low-moderate, moderate, moderate-high, and high (Table 3-245). Discrimination as to which category a certain property type would fall into was judgmental, based largely on whether or not the resource had been listed in the NRHP or was part of an NHT designation, and BLM cultural resources' staff's knowledge of the prevalence of the resource. For example, resources graded as highly sensitive include NRHP-listed properties and resources which may represent TCPs; lower-sensitive resources included archaeological sites and small lithic scatters that have previously been determined ineligible for listing in the NRHP.

Table 3-245. Sensitivity Values and Weightings

Sensitivity	Resource Types	Weighting
Low	Lithic scatter/historic debris scatter with which cannot be assigned a specific age based on artifacts or features	1
Low	Ineligible sites	
Low	Isolated features like prospect pits	
Low-moderate	Task-specific sites	2
Low-moderate	Quarries	
Low-moderate	Historic locations lacking structures	
Low-moderate	Utility lines	
Low-moderate	Unnamed roads/ditches	
Moderate	Roads /railroads/canals	3
Moderate	Historic trails lacking integrity of physical features or trail segments deemed noncontributing	
Moderate	Large habitations, precontact	
Moderate	Mining complex	
Moderate	Historic buildings/structures with integrity	
Moderate-high	Rock shelters	4
Moderate-high	Cultural landscapes with integrity	
Moderate-high	Rock cairns/alignments	
Moderate-high	Petroglyphs/pictographs	
High	NRHP-listed sites/historic districts	5
High	TCPs/properties of traditional religious and cultural significance	
High	Paleoindian sites	
High	Burials/cemeteries	

Table Abbreviations: NRHP = National Register of Historic Places; TCP = traditional cultural property.

These sensitivity categories were assigned numeric values (weightings) from 1 to 5, which were used as multipliers, so that resources judged more “sensitive” would generate higher scores than those judged less-sensitive. For multicomponent archaeological sites, sensitivity values were assigned based on the highest-scoring component; for example, a site containing a lithic scatter and rock cairns would be coded as moderate-high sensitivity based on the presence of the cairns, which are considered a highly sensitive cultural resource type. This analysis focused on segments of the B2H Project that possessed an alternative for the Proposed Action; as there are not alternatives for the segment of the Proposed Action in Idaho, a Potential Impact index has not been developed for this area of the Proposed Action.

A higher Potential Impact Index score for an alternative or segment of corresponding Proposed Action indicates higher potential for cultural resources impacts. These index values should not be construed as proxies for site significance but are a tool to facilitate comparison of the Proposed Action and alternatives. Government to government consultation with tribes and consultation with Parties to

Section 106 will be considered in the agency's analysis and decision making with regards to cultural resources.

Analysis of Impacts Common to the Proposed Action and Alternatives

Specific Impacts Related to Construction, Operations, and Maintenance

Construction of the transmission line and its ancillary facilities could directly impact existing cultural resources. Construction or other ground-disturbing activities could directly or indirectly impact previously unidentified cultural resources, especially buried resources. Such impacts are likely to be adverse. Increased use of existing and new access roads may encourage unauthorized site access, artifact collection, and vandalism. Vibrations from construction equipment and construction activities (such as blasting or drilling) may impact cultural resources, especially historic period resources with standing architecture or prehistoric rockshelters. Impacts on the setting and feeling of cultural resources may be introduced through the addition of the project's structural elements to the landscape. Construction of transmission line towers may introduce an indirect (visual) impact upon existing cultural resources, especially historic trails. Because of the existence of the Oregon NHT and trails under study for NHT designation in the project area, an analysis of impacts to these important resources is addressed separately in Section 3.2.9.

Once the transmission line has been constructed, the presence of large transmission towers may introduce long-term impacts to the setting of certain cultural resources particularly sensitive to changes in the visual field, including historic trails, traditional cultural properties, and cultural landscapes.

Cultural resources that are within the analysis area may be directly affected by use and improvement of access roads, and construction of pads for new transmission line structures and facilities.

Indirect effects could consist of increased off-road traffic, and therefore easier access to cultural resources, that could result in vandalism or inadvertent adverse effects. Auditory impacts may consist of transmission line "buzzing" or "humming" that could detract from the remote sense of feeling contributing to the character of certain cultural resources, such as historic trails, traditional cultural properties, and cultural landscapes.

Periodic access to the transmission line right-of-way is required to maintain its operating function. Thus, access roads would be kept open, at least at a two-track level, which increases the potential for vandalism and illicit artifact collection. Continued use of access roads for maintenance may also promote erosion, which could impact cultural resources located along the margins of roads. Other maintenance activities, such as vegetation removal, bear the potential to create ground disturbance, which may in turn, impact both previously identified and unidentified resources.

Some Native American tribes express concerns that construction, operation, and maintenance activities will reduce the number of plant and animal species considered sacred to them and will restrict tribal-member access to sacred areas. Tribes are also concerned that construction, operation, and

maintenance activities will impair ceremonial use of sacred sites by tribal members through the following:

- Alteration of the broader site context; spiritual abandonment of the sacred sites
- Disruption of the visual qualities of the landscape
- Physical desecration of sites, objects and materials
- Distraction of ceremonial participants
- Interference of electrical energy with the spiritual environment
- Loss of ceremonial objects, materials, and medicines
- Increased accessibility of the project area by people who are not Native American
- Eventual site abandonment by spiritual practitioners

Analysis of Impact for No Action Alternative

Under the No Action Alternative, no direct or indirect project impacts to identified cultural resources would occur. Other effects due to continued access, recreation, looting of archaeological sites, and similar actions would continue at the current rate, and would be the responsibility of the land managing agency. The No Action Alternative states that the agencies would not issue a permit for the construction or operations of the project on federally managed lands. No impacts would occur to cultural resources identified in this EIS.

Comparative Analysis of Impacts of Proposed Action and Alternatives

For the Class II and RLS/Class I dataset, the following calculation was used to generate a Potential Impact Index that takes into account resource per acre data and cultural resources sensitivity for the Proposed Action or alternatives:

- Count of “low” sensitivity cultural resources/ survey acreage +
- Count of “low-moderate” sensitivity cultural resources x 2 / survey acreage +
- Count of “moderate” sensitivity cultural resources x 3 / survey acreage+
- Count of “moderate-high” sensitivity cultural resources x 4 / survey acreage+
- Count of “high” sensitivity cultural resources x 5 / survey acreage

Class II survey acreage was calculated based on the number of 1-mile survey segments within the Proposed Action and alternatives, which ranged from zero to 11. Each 1-mile survey segment encompassed an estimated area of 60.6 acres (500 x 5,280 feet [1 mile] = 2,640,000 square feet = 60.6 acres). The acreage thus was calculated as the number of 1-mile survey segments in a route segment times 60.6 acres. In order to avoid very small density values (i.e., values in the hundredth or thousandth decimal point of a resource per acre), the density values were multiplied by 100, resulting in counts of cultural resources per 100 acres within the survey segments. The RLS/Class I survey acreage was calculated in GIS.

As the combined RLS/Class I data spanned the entire analysis area (10-mile-wide corridor centered on the Proposed Action and alternatives' centerlines), a third variable of distance was used to calculate the Potential Impact Index value for this data. For these data, the distance was divided into three zones: 0–250 feet of centerline; 250–750 feet of centerline, and 750 feet–5 miles of centerline. For the RLS/Class I data, distance from centerline data serves as a proxy for evaluating the visual impact of the proposed undertaking on cultural resources, with the assumption that resources located closer to the transmission-line towers will be subjected to a more intense and sustained visual impact than those located at a greater distance. To accommodate this assumption that distance is a proxy for the intensity of visual impact, distance zones were coded with ordinal values of 1–3, with a value of 3 for resources located closer to the centerline in the 0-250-foot zone; 2 for resources in the 250-750-foot zone; and 1 for resources in the 750-foot-5 miles of centerline; these values functioned as multipliers for calculating the Potential Impact Index. For example, a highly sensitive resource located within 0–250 feet of the centerline would generate a Potential Impact Index of 15 (sensitivity value of 5 times a distance value of 3), and a low sensitivity resource located within 250–750 feet of the center line would generate a value Potential Impact Index of 2 (sensitivity value of 1 times a distance value of 2).

For the RLS/Class I data, therefore, the Potential Impact Index calculation is as follows:

- (Count of cultural resources/ survey acreage within 0–250 feet x sensitivity multiplier) x 3 +
- (Count of cultural resources/ survey acreage within 250–750 feet x sensitivity multiplier) x 2 +
- (Count of cultural resources/ survey acreage within 750 feet–5 miles x sensitivity multiplier)

The Potential Impact index scores, rounded to the nearest whole number, for the proposed and alternative routes are listed in Table 3-246. To interpret the Potential Impact Index scores, the range of data was categorized into four groups—low, medium, high, and very high—based on the distribution of the combined Class II and RLS/Class I Potential Impact scores. The range of scores for the two indexes is roughly similar, which allows them to be added together without biasing one class of data (RLS/Class I vs. Class II) over the other.

The random sample of segments for the 15 percent Class II sample survey prohibits comparison of certain alternatives with the corresponding segment of the Proposed Action. Because of the absence of surveyed segments for the Longhorn Variation and Flagstaff Alternatives and in the segment of the Proposed Action that would be compared to the Glass Hill Alternative indexes cannot be generated to compare the alternative with the Proposed Action in these three analysis areas. The alternatives would have no Class II index score, and as such, would have a lower Impact Score as a function of the lack of pedestrian survey data. These three are evaluated separately below. The distribution of the data into three clusters facilitated the creation of four categories of overall potential impact.

Table 3-246. Potential Impact Scores from the Class II and Reconnaissance Level Survey/Class I Data

Segment and Alternative	Class II Potential Impact Index	RLS and Class I Potential Impact Index	Combined Potential Impact Index	Potential Impact Assessment
Segment 1−Morrow-Umatilla				
Horn Butte Alternative	0	1	1	Low
Proposed Action Compared to Horn Butte	0	0	0	Low
Longhorn Variation Alternative	NS	2	–	Medium*
Proposed Action Compared to Longhorn Variation	0	0	–	Low*
Longhorn Alternative	3	6	9	High
Proposed Action Compared to Longhorn	0	1	1	Low
Segment 2−Blue Mountains				
Glass Hill Alternative	3	3	–	Medium*
Proposed Action Compared to Glass Hill	NS	3	–	Medium*
Segment 3−Baker Valley				
Timber Canyon Alternative	1	3	4	Medium
Proposed Action Compared to Timber Canyon	2	3	5	High
Flagstaff Alternative	NS	5	–	High*
Proposed Action Compared to Flagstaff	0	4	–	High*
Burnt River Mountain Alternative	2	4	6	High
Proposed Action Compared to Burnt River Mountain	10	6	16	Very High
Segment 4−Brogan Area				
Willow Creek Alternative	0	2	2	Medium
Proposed Action Compared to Willow Creek	1	2	3	Medium
Tub Mountain South Alternative	4	2	6	High
Proposed Action Compared to Tub Mountain South	1	2	3	Medium
Segment 5−Malheur				
Malheur A Alternative	1	1	2	Medium
Proposed Action Compared to Malheur A	1	2	3	Medium
Malheur S Alternative	2	2	4	Medium
Proposed Action Compared to Malheur S	2	1	3	Medium
Double Mountain Alternative	0	0	0	Low
Proposed Action Compared to Double Mountain	0	0	0	Low
Segment 6−Treasure Valley				
	3	**6**	**9**	**High**

Table Abbreviations: RLS = reconnaissance level survey; NS = No 15 percent Class II survey segments were included along route.

Table Note: Asterisk (*) indicates that the potential impact assessment for those alternatives is based on distribution of RLS/Class I index scores only (see text). Index scores could not be combined for those alternatives because no Class II survey was conducted along either the Proposed Action or alternative route.

Segment 1—Morrow-Umatilla

The results and implications of the Potential Impact Index study are discussed below for the three alternatives and corresponding portions of the Proposed Action located in Segment 1.

Horn Butte Alternative

Both the Horn Butte Alternative and the corresponding segment of Proposed Action are considered areas of potentially low-impact for cultural resources. Relatively few cultural resources were recorded in the analysis area for both the Proposed Action and alternative during the Class I and RLS-level investigations, and no cultural resources were recorded in the two 1-mile segments inventoried for both the Proposed Action and alternative during the Class II survey.

Longhorn Variation

The Class II sample survey did not include any segments in the Longhorn Variation Alternative. Therefore, the Potential Impact assessment is based solely on the RLS/Class I calculated Potential Impact indices, which suggest that the Longhorn Variation Alternative may have slightly higher potential impacts to cultural resources than the corresponding segment of the Proposed Action. This difference is mostly attributable to the higher number of cultural resources previously recorded within the Longhorn Variation Alternative analysis area. Overall, the Longhorn Variation Alternative possesses a medium Potential Impact Index score, while the corresponding segment of Proposed Action possesses a low Potential Impact Index score.

Longhorn Alternative

A pronounced difference in Potential Impact Index results is evident between the corresponding segment of the Proposed Action and Longhorn Alternative, where the combined index scores calculated for the Longhorn Alternative (9) is substantially higher than that calculated for the corresponding segment of the Proposed Action (1). This difference is in part attributable to the presence of a segment of the Oregon NHT—a highly sensitive resource—within 500 feet of the Longhorn Alternative centerline. In addition, a total of 62 resources were recorded in the analysis area for the Longhorn Alternative, as compared to only nine along the corresponding segment of Proposed Action. Overall, the Longhorn Alternative is considered to have a high potential for impacts to cultural resources; the Proposed Action segment is considered to have low potential for cultural resources impacts.

It is important to note that a TCP has been disclosed as existing within the analysis area for the Proposed Action in the Morrow-Umatilla County segment. The TCP, a First Foods gathering area, extends over a large portion of the Proposed Action analysis area from the project's intersection with McKay Creek, west of the Blue Mountains to Clover Creek, northeast of the community of North Powder, Oregon.

Segment 2—Blue Mountains

The results and implications of the Potential Impact Index study are discussed below for the Glass Hill Alternative and adjacent portion of the Proposed Action in Segment 2.

Glass Hill Alternative

The Class II sample survey did not include any segments in segment of the Proposed Action that would be compared to the Glass Hill Alternative, and thus the Potential Impact Index comparative assessment is based solely on the RLS/Class I calculated Potential Impact Index. The Glass Hill Alternative and corresponding segment of the Proposed Action have similar index scores and have a medium potential for cultural resources impacts. The medium-level impact score for the Glass Hill Alternative is mainly attributed to the relatively high frequency of cultural resources recorded within the 750 foot-5 mile distance zone.

Segment 3—Baker Valley

The results and implications of the Potential Impact Index study are discussed separately below for three alternatives and corresponding portions of the Proposed Action in Segment 3.

Timber Canyon Alternative

The Timber Canyon Alternative possesses a medium Potential Impact Index, as compared to the high Potential Impact Index calculated for the corresponding segment of the Proposed Action. The higher Potential Impact score for the Proposed Action is based upon the presence of a segment of the high-sensitivity Oregon NHT within 250 feet of centerline.

Flagstaff Alternative

The Class II sample survey did not include any segments in the Flagstaff Alternative, and thus the Potential Impact assessment is based solely on the RLS/Class I calculated scores. The Flagstaff Alternative and corresponding segment of the Proposed Action are both considered to have a high potential to impact cultural resources. These high Potential Impact scores can be attributed to the presence of the Virtue Flat segment of the Oregon NHT within both the 0-250 and 250-750-foot distance zones of both routes. Most of the cultural resources recorded along both of these routes are located in the 750-foot-5 mile distance zone.

Burnt River Mountain Alternative

The Potential Impact Index for the Burnt River Mountain Alternative indicates a high potential for impacts to cultural resources; the score for the corresponding segment of Proposed Action indicates a very high potential for impacts. The high scores for these two routes are largely based on the presence of the Oregon NHT, several archaeological sites possessing human remains, and a historic church in the analysis area. Several moderate to moderate-high sensitivity cultural resources were recorded in the 0-250-foot distance zone during the Class II sample survey within a small survey area (one 1-mile segment), which increased the calculated density of sites and accounts for the higher level of potential impact.

Segment 4—Brogan Area

The results and implications of the Potential Impact Index study are discussed separately below for two alternatives and corresponding portions of the Proposed Action in Segment 4.

Willow Creek Alternative

Both the Willow Creek Alternative and corresponding segment of Proposed Action possess medium Potential Impact Index scores for cultural resources. The slightly higher Potential Impact Index score for the segment of Proposed Action (3) over the Alternative (2) is based on the six archaeological sites recorded during the Class II survey, compared to the alternative route for which no sites were recorded.

Tub Mountain South Alternative

The Tub Mountain South Alternative possesses a high Potential Impact Index score for cultural resources, while the corresponding segment of Proposed Action possesses a medium Potential Impact Index score. The difference in the two index scores derives from the presence of five low-moderate and moderate-sensitivity archaeological sites within the analysis area for the Tub Mountain South alternative, compared to only eight low-sensitivity sites within the analysis area of the Proposed Action. Sensitivity of cultural resources appears to be the factor driving the differences between the Proposed Action and alternative in this area, as the overall frequencies of resources recorded through Class I and Class II surveys and RLS are similar.

Segment 5—Malheur

The results and implications of the Potential Impact Index study are discussed separately below for three alternatives and corresponding portions of the Proposed Action in Segment 5.

Malheur A Alternative

Both the Malheur A Alternative and corresponding segment of the Proposed Action possess medium Potential Impact Index scores for cultural resources. Relatively comparable numbers of low- to medium-sensitivity archaeological sites were recorded during the Class II survey for both the Malheur A Alternative and Proposed Action, although nearly twice as many resources are included in the RLS and Class I data for the alternative. Few of these cultural resources, however, possess sensitivity values in the moderately-high and high ranges.

Malheur S Alternative

Both the Malheur S Alternative and corresponding segment of the Proposed Action possess medium Potential Impact Index scores for cultural resources. The few cultural resources recorded during the Class II survey for the alternative and Proposed Action possessed low sensitivity values, although substantially more cultural resources were included in the RLS and Class I data for the alternative.

Double Mountain Alternative

Both the Double Mountain Alternative and corresponding segment of Proposed Action possess very few previously recorded cultural resources. No cultural resources were recorded for either route during

the Class II survey, even though two 1-mile sample segments were surveyed for both the alternative and Proposed Action. The RLS and Class I data included only two resources recorded within the 750-foot-5 mile distance zone for both routes. Both routes have a low Potential Impact Index score for cultural resources.

Segment 6—Treasure Valley

The Treasure Valley Segment produced a combined potential impact index score of 9 and is considered to have a high potential for impacts to cultural resource. The high score mostly stems from the presence of three NRHP-listed properties within the 750 feet–5 miles distance zones: a segment of the Oregon Trail, Bernard's Ferry and Farm, and the Poison Creek Stage Station.

Summary of Comparative Analysis of Proposed Action and Alternatives

Four of the segments yielded combined Class II and RLS/Class I Potential Impact Index scores of 0 or 1 (with a mode of 0),which were categorized as "low" potential impact to cultural resources; eight routes produced Potential Impact Index scores between 2 and 4 (with a mode of 3), which were categorized as "medium" potential impact; and three routes generated higher combined Potential Impact Index scores ranging from 5 to 9 (with a mode of six), which were categorized as "high potential" impact. One other alternative—the corresponding segment of the Proposed Action as compared to the Burnt River Mountain Alternative—produced a very high "outlier" score of 16, which is defined as an area with *"very high*" potential impacts.

As discussed above, no Class II survey was conducted along either the Proposed Action or alternatives in the Longhorn, Glass Hill and Flagstaff areas. Consequently, only the RLS/Class I Potential Impact Index can be used to assess potential impact to cultural resources in these areas, which required a means of assessing the Potential Impact index results based exclusively on the RLS/Class I Potential Impact Index. Among all segments of the Proposed Action and alternatives, the RLS/Class I index scores range from 0 to 6, with three "modes" or clusters of scores. Eight routes produced RLS/Class I index scores of 0 or 1 (with a mode of 0), which are again categorized as "low" potential impact to cultural resources; 13 alternatives produced scores between 2 and 4 (with a mode of 2), which are categorized as "medium" potential impact; and three routes produced scores of 5 or 6 (with a mode of 6) and are categorized as "high" potential impact. This approach was used to assess Potential Impact Index scores in the Longhorn, Glass Hill and Flagstaff areas only. The discussion below provides a detailed presentation of the Potential Impact Index scores for cultural resources for each of the six segments and the alternative and corresponding portions of Proposed Action within each one.

3.2.8.8 Design Features

The following design features are identified in Appendix C to avoid, reduce, or minimize direct impacts to cultural resources:

- CULT 1—All cultural resources work conducted for the Project would be performed by qualified archeologists.

- CULT-2—Where needed, cultural and historic sites would be flagged for avoidance prior to start of construction activities. Flagging would be removed once construction is completed in an area.
- CULT-3—To minimize unauthorized collecting of archaeological material or vandalism to known archaeological sites, all workers would attend mandatory training on the significance of cultural resources and the relevant federal regulations intended to protect them.

In addition, the following steps would be taken to further reduce project effects to cultural resources:

- Modification of the Project and associated elements through micrositing and relocation to avoid identified cultural resources
- Erection of fencing around areas known to possess cultural resources or considered likely to possess buried cultural resources
- Monitoring of construction activities in order to ensure avoidance of identified cultural resources and to prevent disturbance in areas considered likely to possess buried cultural resource

The following design features are proposed to avoid, reduce, or minimize visual impacts on cultural resources:

- A surface finish for each galvanized steel lattice tower (single or double circuit) to produce a dulled finish that reduces surface reflectivity
- A surface finish for each single circuit weathered steel pole H-frame, which forms a rust-like appearance that can blend into some landscapes
- Conductors for the 500-kV and 230-kV lines that are made of aluminum/steel stranding with a nonspecular or diffuse finish

3.2.8.9 Mitigation Planning

In consultation with appropriate land-managing agencies and parties to the project PA (Appendix G), avoidance and mitigation measures specific to cultural resources would be developed and implemented to resolve adverse effects to resources determined NRHP eligible. The project PA also provides for the development of a Historic Properties Management Plan (HPMP), which will specify avoidance and protection measures, as well as mitigation, for NRHP-eligible cultural resources for construction, operations, maintenance, and potential decommissioning of the B2H Project. The HPMP will be approved prior to issuance of Notice to Proceed to resolve adverse direct, indirect and/or cumulative effects to NRHP-eligible cultural resources that may result from the project.

Mitigation measures for direct impacts to NRHP-eligible cultural resources will also be articulated in the approved HPMP for the project and may consist of archaeological data recovery and/or preparation of Historic American Building Survey (HABS), Historic American Engineering Record (HAER), or Historic American Landscape Survey (HALS) documentation. Other mitigation measures for direct, indirect, and/or cumulative impacts may include:

- Preparation of National Register nominations
- Interpretive and/or education materials in a variety of media formats
- Partnerships and funding for public programs geared at preservation and interpretation of resources
- Partnerships and funding for public archaeology projects
- Conservation easements
- Purchase of land for long-term protection of historic properties

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3.2.9 National Historic Trails

3.2.9.1 Introduction

The National Trails System Act, P.L. 90-543 (NTSA) of 1968, authorized the establishment of a system of trails to provide for public outdoor recreational opportunities and promote the preservation of access to the outdoors and the historic resources of the United States. Section 7(C) of the NTSA further establishes that the Secretary of the Interior is to consider the effects of agency actions that may be incompatible with the nature and purposes "for which such trails were established." Two such Congressionally designated National Historic Trails (NHTs)—the Oregon NHT and—the Lewis and Clark NHT and two trails under study for designation (Study Trails)—the Meek Cutoff and Goodale's Cutoff—are located in the analysis area. The following discussion describes the nature and purpose of these NHTs and the Study Trails and provides an analysis of impacts for the Proposed Action and alternatives.

This section of the EIS also presents the results of a detailed inventory and analysis of impacts for segments of the Oregon NHT and Study Trails located on BLM-administered lands in the analysis area. This inventory and impact assessment presented in Appendix B.8, was conducted in compliance with BLM Manual 6280, *Management of National Scenic and Historic Trails and Trails under Study or Recommended as Suitable for Congressional Designation (Public)* (BLM 2012). BLM Manual 6280 requires BLM to evaluate and disclose potential impacts of agency undertakings on national scenic or historic trails on BLM-administered lands.

It is important to note that as multi-use, specially designated properties, the analysis of impacts to NHTs is a multidisciplinary undertaking; an assessment of visual impacts to NHTs is also presented in Visual Resources (Section 3.2.7) and an assessment of both direct and indirect impacts to NHTs is presented in Cultural Resources (Section 3.2.8). As National Register of Historic Places-listed and -eligible historic properties, both previously documented and undocumented segments of NHTs will be recorded and evaluated for impacts through an intensive pedestrian survey within the direct area of potential effect (APE) and the results presented in the Final EIS.

3.2.9.2 Regulatory Framework

National Trails System Act

The NTSA, P.L. 90-543, enacted by Congress in 1968, authorized the establishment of the National Trails System, which includes four categories of trails: National Scenic Trails , NHTs, National Recreation Trails (NRTs), and Connecting or Side Trails. The Connecting or Side Trails serve to provide access to the other three categories of trail. When initially enacted, P.L. 90-543 established two trails, the Appalachian and Pacific Crest National Scenic Trails. Since that time, and through additional acts of Congress, 20 National Trails have been identified. Both of the NHTs present in the B2H Project analysis area- the Oregon NHT and Lewis and Clark NHT- were established in 1978 by P.L. 95-25.

The NTSA also directs the Secretary of the Interior or the Secretary of the Agriculture to administer and manage designated National Trails. Section 5(b) of the Act charges these two authorities with conducting feasibility studies to identify and designate additional National Trails, often referred to as "Study Trails." Two Study Trails are located within the analysis area: the Goodale's Cutoff and the Meek Cutoff. The feasibility of adding both of these trails to the Oregon NHT is currently being studied by NPS as part of the larger Four Trails Feasibility Study, authorized by Congress under the Omnibus Public Lands Act of 2009.

Section 7(c) of the NTSA charges the Secretaries to consider the effects of proposed actions on designated National Trails. The NTSA states that the Secretary charged with administration of the NHT may permit other uses along the trail provided that they do not "substantially interfere with the nature and purpose of the trail." Furthermore Section 7(c) specifies, "reasonable efforts shall be made to provide sufficient access opportunities to such trails and, to the extent practicable… avoid activities incompatible with the purposes for which such trails were established". In this regard, easements or rights-of-way granted by the Secretary of the Interior or Secretary of Agriculture must comply with laws applicable to the national park system and national forest system and conditions established in the easements or rights-of-way must reflect the policy and purposes of the NTSA (16 U.S.C. 1248).

National Historic Preservation Act

Section 106 of the National Historic Preservation Act (16 U.S.C. 470) (NHPA) requires that the federal agency permitting the undertaking "take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register" and provide the Advisory Council on Historic Preservation an opportunity to comment. Effect is defined in the implementing regulations for Section 106 (36 CFR §800.16(i)) as an "alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." Section 106 requires the lead federal agency to consult with the State Historic Preservation Office, members of the public, affected Indian Tribes, and the Advisory Council on Historic Preservation throughout the process of identification, evaluation, and resolution of effects. Section 106 compliance is considered satisfied with the execution of the Programmatic Agreement, a legal document that describes the lead federal agencies' (in this case, the BLM) process of identifying and evaluating impacts to historic properties, and its plans for resolving adverse effects.

As NRHP-listed or eligible historic properties, the Oregon and the Lewis and Clark NHTs, and the Meek Cutoff and Goodale's Cutoff study trails are all properties that require evaluation of effect under Section 106. Segments and sites associated with the trail located in the direct and indirect area of potential effects established for the project will be assessed through a combination of desktop analysis, reconnaissance survey and intensive level survey associated with the Section 106 process. Project effects will be determined in consultation with tribes and parties to the Programmatic Agreement.

Federal Land Policy and Management Act

The Federal Land Policy and Management Act governs the manner in which public lands shall be managed. This act, also known as the BLM Organic Act, establishes the agency's "multiple-use mandate to serve and protect future generations" (BLM and Office of the Solicitor 2001). The concept of "multiple-use" management is defined within the act (43 U.S.C. 1702) as "management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people."

BLM Manual 6280

BLM Manual 6280, Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation, states that National Environmental Policy Act analysis for a proposed action must (1) be able to identify reasonable alternative project locations with potentially less or no adverse impact, (2) document the resources, qualities, values, associated setting, and primary uses that support the nature and purposes for which the trail was designated, and (3) assess potential impacts to the landscape elements of designated NHTs. The policy also requires consideration of impacts to Study Trails and trails recommended as suitable for National Trail designation through the National Trail Feasibility Study. The National Park Service (NPS) is currently conducting a Feasibility Study/Environmental Assessment for additional alternate routes of the Oregon NHT under the NTSA - P.L. 90-543, as amended through P.L. 111-11, March 30, 2009 (NTSA).

Inventory and analysis for purposes of BLM Manual 6280 compliance is limited to the potentially affected segments of the Oregon NHT and Study Trails that are located on BLM-administered lands within the B2H Project analysis area. Detailed inventory of these segments and analysis of impacts is presented in Appendix B.8, and is summarized in Section 3.2.9.6.

BLM Manuals 8400 and 8431

BLM Manual 6280 directly references the BLM's Manual 8400, Visual Resource Management (VRM), in the process of completing the inventory of trails and Manual 8431, Visual Resource Contrast Rating, in any analysis of potential effect from proposed activities. The purpose of the BLM VRM system is to classify and manage visual resources on lands under its jurisdiction as outlined in BLM Manual 8400. The VRM system involves inventorying scenic values, establishing management objectives for those values through the resource management planning process, and then evaluating proposed activities to determine whether they conform to the management objectives (BLM 1984). In its planning process, the BLM weighs visual and competing resource values and designates the VRM Classes I thru IV, which represents a range of acceptable modifications within the landscape. Class I's objective is to preserve the existing character of the landscape and Class IV's objectives allow for major modifications.

The analysis stage of the VRM process involves assessing and disclosing the potential visual impacts from proposed activities (National Environmental Policy Act compliance) and then determining whether such impacts will meet the management objectives established for the area (plan conformance). To analyze and mitigate potential visual impacts associated with proposed activities, the BLM uses

guidelines described in BLM Handbook H-8431. The degrees of contrast are categorized in a range including none, weak, moderate, or strong—where strong indicates a proposed activity will create contrast that demands attention, will not be overlooked, and is dominant in the landscape. Factors to be considered when applying the contrast criteria include distance, angle of observation, the duration of the view of the project components, relative size or scale, and spatial relationships.

3.2.9.3 Issues Identified for Analysis

The following issues were identified for analysis during scoping efforts related to the B2H Project:

- What physical alterations to significant viewsheds associated with the Oregon NHT and other historic trails will occur?
- Will the project affect the Oregon Trail Areas of Critical Environmental Concern?

3.2.9.4 Trail History

Oregon National Historic Trail

The numerous braided trails that comprise the Oregon NHT are actually a network of trail segments, river crossings, and sites that stretch across 2,282 miles of landscape and link what at the time was considered to be the western frontier to the settled lands of the east. Interconnecting with these braided transcontinental trail alignments are regional and local historic stage and freight roads.

The Oregon NHT represented the principal route of westerly migration across southern Idaho, Oregon, and northern California. The trail was originally blazed by Native Americans to meet their short and long distance transportation needs, and later refined by early Euro-American explorers and fur trappers, including members of the Astor expedition of 1811–1812 and the 1843 Frémont expedition. Although formal documentation has never occurred, the Shoshone-Paiute Tribes maintain that segments of the Oregon NHT generally follow the “Trail of Tears” followed by Shoshone and Paiute peoples during their forced march to Fort Simcoe, Washington.

The first wave of migration along the trail came during the 1830s as Protestant missionaries journeyed west to convert native populations in Idaho and Oregon (Hutchinson and Jones 1993). The Bartleson-Bidwell Party, led by Captain John Bartleson and John Bidwell, was the first true emigrant wagon train to attempt a wagon crossing from Missouri to California. However, when the wagon train arrived in the 19th-century military and trading outpost of Fort Hall in southeastern Idaho, the party fractured and only 34 members continued west accompanying missionaries along what would eventually become the Oregon NHT. Shortly after, in 1843, Captain John C. Frémont explored the region as part of a federal expedition, publishing accounts that would eventually become trail guides for emigrants traveling along the Oregon Trail (Hutchinson and Jones 1993). By the mid-1840s, the Oregon Trail had become a major, nationally recognized thoroughfare for emigrants making their way west.

Emigrants were generally driven by a mindset which held that it was Euro-Americans' destiny to settle and reclaim western lands for productive use, converting the natural resources of the Pacific Northwest (land, minerals, wildlife, and fisheries) into wealth. Native peoples, who maintained a subsistence strategy, moved seasonally along many travel routes that later formed the Oregon Trail to utilize available resources prior to historic emigrant use. The sudden influx of emigrants severely disrupted the subsistence patterns upon which Native American traditional lifeways depended.

Portions of the Oregon Trail continued to be used into the late 1890s. Use of the route declined once the transcontinental railroad, which provided faster, safer, and, usually, cheaper travel, was completed in 1869. Many well-traveled segments of the Oregon Trail were converted to modern highways and railroad segments, including several segments of I-84 in Idaho and Oregon. Numerous markers and memorials have been erected at burial sites, springs, emigrant camps, and inscription sites along these segments.

In the past decade, community interest and partnerships have led to the development, improvement, and rehabilitation of several recreation facilities and interpretive sites. Most notably are the construction of the National Historic Oregon Trail Interpretive Center (NHOTIC) in 1992 and ongoing rehabilitation of its historic landscape (BLM Preserve America 2004), as well as improvements to parking facilities and interpretive signage at several Oregon NHT interpretive sites. Malheur and Baker Counties have identified investments in tourism industries, attractions, and activities, particularly those related to the Oregon NHT, to further bolster the region's economy (BLM 2002).

Nature and Purpose

Management of the NHT and its associated resources is dictated through a Comprehensive Management and Use Plan (CMUP), which provides for coordinated action between federal, state, and private entities to provide for opportunities for use and interpretation along the various identified segments of the water, land, and associated motor routes. The Oregon Trail was designated a NHT on November 10, 1978, and is administered by the National Park Service (NPS) Although neither the NTSA nor the CMUP developed for the Oregon Trail by the NPS specifically define the "nature and purpose" of the Oregon NHT, the CMUP does describe the trail's "purpose and significance" (NPS 1999). According to the CMUP, the primary purposes of the Oregon NHT are "to identify, preserve, and interpret the sites, route, and history of the Oregon Trail for all people to experience and understand," and "to commemorate the westward movement of emigrants to the Oregon country as an important chapter of our national heritage" (NPS 1999).

The CMUP (NPS 1999) further states that the Oregon NHT is significant because:

- It was the first trail that demonstrated the feasibility of moving families, possessions, and cultures by wheeled vehicles across an area previously perceived as impassable;
- It was the corridor for one of the largest and longest emigration of families in the history of the United States;

- It is a symbol of American westward traditional migration embodied in traditional concepts of pioneer spirit, patriotism, and rugged individualism; and
- It strengthened the United States' claim to the Pacific Northwest.

A Multiple Property Documentation Form, prepared by Dr. Stephen Dow Beckham in 2012, defines a period of significance of 1840 to 1880 for the segments of the trail located in Oregon and eastern Idaho (Beckham 2012). This period begins with the commencement of overland emigrant travel through Oregon and concludes with completion of the Oregon Railway & Navigation Company's line between Portland and Umatilla, which ultimately led to a decline in trail use (Beckham 2012).

Primary Uses

The Oregon NHT CMUP (1999) identifies a variety of recreational uses including: interpretation; heritage tourism; media interest (which manifests itself in production of movies and documentaries); walking, biking; horseback riding; historic reenactments of the trails experience, including handcart and covered wagon expeditions; and commemorative activities such as trail visitation, driving along auto-tour routes and BLM backcountry byways, reading interpretive brochures and publications, and visiting associated museums and educational facilities.

The primary use or uses of the Oregon NHT as defined in BLM Resource Management Plans are as follows:

- Baker Resource Management Plan (BLM 1989): Sightseeing, historical interpretation, historic sightseeing, hiking, hunting, and interpretation.
- Southeastern Oregon Resource Management Plan (BLM 2002): Recreation management emphasizing public education and enjoyment of the Oregon NHT and its setting while protecting important cultural resource values, with specific management for semi-primitive motorized and roaded natural recreation.
- Owyhee Resource Management Plan (BLM 1999): Sightseeing, hiking, picnicking, and horseback riding.

Visitors wishing to follow the Oregon NHT can do so through a number of means such as hiking, biking, horseback riding, and driving along county roads and specially designated roadways. Many of the cross-country sections along the Oregon NHT provide recreational opportunities for motorized travel in a semi-primitive setting. Trail-related sites along the Old Oregon Trail Highway (OR Hwy 30) and I-84 provide easy access to recreational opportunities. Interpretive sites can be accessed throughout the year, with most visitations occurring between June and October (NPS 1989).

As the Oregon Trail Auto Tour Route (NHT), I-84 provides opportunities for visitors to enjoy the trails year round. The Auto Tour Route has been marked consistent with the provisions of the NTSA and existing state departments of transportation plans. The purpose of the Auto Tour Route is to heighten public awareness of the trails and to stimulate interest in visiting actual trail sites, segments, and interpretive facilities. The Route and NPS brochures guide visitors on a line of travel that parallels the

designated route of the Oregon NHT to the extent possible, making it convenient for auto tourists to locate designated trail sites and trail segments (NPS 1999).

The Oregon BLM has designated three separate Areas of Critical Environmental Concerns to provide special management attention to protect the historic, cultural, and scenic values associated with the Oregon NHT. The Oregon Trail at Flagstaff Hill, Oregon Trail- Tub Mountain, and Oregon Trail-Birch Creek Areas of Critical Environmental Concerns are described in more detail in Section 3.2.6.

Lewis and Clark National Historic Trail

The approximately 3,700-mile long Lewis and Clark NHT was designated to commemorate the 1804–1806 route of the Corps of Discovery from Wood River, Illinois to the mouth of the Columbia River, near what is now Astoria, Oregon. Commissioned by President Thomas Jefferson in part to survey newly-acquired lands associated with the Louisiana Purchase, the Corp of Discovery was also charged with charting a navigable water transportation corridor through the continent. Led by Captain Meriweather Lewis and Second Lieutenant William Clark, the well-chronicled expedition was among the first to document Native American groups living along the Missouri and Columbia Rivers, as well as the natural resources in the area. Established in 1978 as one of the four original NHTs, the Lewis and Clark Trail represents a system of water and land based trails and auto tour routes that connect contemporary communities—including tribal communities—to the places associated with the expedition. The NHT also provides visitors with connections to the historical events associated with the Corps of Discovery through recreational, interpretive, and educational opportunities (NPS 2012).

The motor route is part of the Federal Highways Administration's National Scenic Byways Program and is referred to as the Lewis and Clark Trail Scenic Byway. The segment of designated NHT in the analysis area follows Washington State Highway 14 (WA 14) and commemorates Lewis and Clark's land-based return route.

The 2.2-mile-long segment of the Trail/Scenic Byway located in the B2H Project is only being considered in the analysis in terms of the visual APE (5 miles) for cultural resources which extends across the river into Washington (see Section 3.2.8 Cultural Resources). It is on private land on the north side of the Columbia River in Washington State and is identified in the 1982 CMUP as part of the "Columbia River Segment" of the NHT (NPS 1982).

Nature and Purpose

The nature and purpose of the Lewis and Clark NHT, as articulated in the NPS Foundation Document is "to commemorate the 1804 to 1806 Lewis and Clark Expedition through the identification; protection; interpretation; public use and enjoyment; and preservation of historic, cultural, and natural resources associated with the expedition and its place in U.S. and tribal history" (NPS 2012). The Lewis and Clark Trail Foundation Document further establishes that the Trail is nationally significant for

- Its commemoration of the 1804–1806 Corps of Discovery expedition;
- Its ability to provide context for furthering the understanding of the expedition and its outcomes;

- Its ability to connect contemporary communities and "demonstrate the continuum of human history…and subsequent relationships that developed among multiple cultures";
- Its retention of "characteristics and a sense of place" similar to that which would have been experienced by the Corps of Discovery;
- Its ability to educate the public about landscapes, resources and people encountered and documented by the Corps of Discovery; and
- Its diversity of landscapes, biological communities, and ecological zones.

Primary Uses

The primary uses of the Lewis and Clark NHT, as defined in the 1982 CMUP is to provide for public commemoration and interpretation of the historic events and "approximate retracement of the historic route" (NPS 1982). The CMUP acknowledges that much of the original features of the Corps of Discovery route have been altered by the damming and channelization of waterways, as well as by mining, farming, and urbanization. However, it also acknowledges that the Missouri and Columbia Rivers offer the public the best opportunity for continuous "retracement" of the route. The 1982 CMUP recommended a series of sites, trail segments, and motor routes to facilitate recreational and interpretive connectivity between landmarks of the expedition.

Goodale's Cutoff Study Trail

The Goodale's Cutoff Study Trail (also known as the Goodale/Sparta Trail) is also currently under feasibility study by the NPS as part of three alternate routes to be added to the Oregon NHT in Idaho and Oregon.

The Goodale's Cutoff to the Oregon Trail had its origins as a migration route used by Shoshone peoples and was popularized as an alternate route to the Oregon Trail by John Jeffrey, a river ferry operator, as early as 1852 (NPS n.d.) This Cutoff Trail left the Oregon Trail at Fort Hall, Idaho proceeding west through the Camas Prairie to the north of the Snake River Valley en route to where it rejoined the Trail at the Powder River, near Baker City. The Trail saw little emigrant travel until 1862 when a party hired guide Tim Goodale to lead them on the passage. Many of these emigrants were lured by the prospect of gold in the Boise Basin. Goodale successfully led the group of more than 1,000 persons from Fort Hall to Fort Boise. As tension increased between Shoshone and Bannock peoples and the emigrants along the main Oregon Trail, larger numbers of people began to use Goodale's alternate route (Dary 2004).

A northern alternate of Goodale's Cutoff continued into Oregon crossing Hells Canyon of the Snake River on the Brownlee Ferry to reach Baker Valley (McGill 2009). This alternative was purportedly used by prospectors, including George Grimes, who used the route to traverse between the Boise mines and Walla Walla. This route became known as the Brownlee Ferry Route (Wells 1972).

Nature and Purpose

The nature and purpose of the Goodale's Cutoff Study Trail has not yet been defined, as it is currently under feasibility study.

Primary Uses

As the Goodale's Cutoff Study Trail is currently under feasibility study and does not yet have a CMP, its primary uses have not been identified.

Meek Cutoff Study Trail

The NPS is currently conducting a feasibility study to add the Meek Cutoff to the Oregon NHT. The Meek Cutoff has been recognized by the Oregon State Legislature as one of five alternate routes of the historic alignment of the Oregon Trail that pass through the state of Oregon (NPS 1998).

The Meek Cutoff Study Trail was blazed as an alternate route of the Oregon Trail in 1845. In August of that year, fur trapper Stephen Meek proposed to take emigrants from Fort Hall to the Willamette Valley via a cutoff through the Cascade Mountains, which he alleged would reduce the overall length of travel by 150 miles. Roughly 1,000 persons decided to follow Meek on this Trail, which was anticipated to head directly west from the Oregon Trail's juncture with the Malheur River through central Oregon. Meek led the wagon train along the rough and rocky banks of the Malheur River, before heading over precipitous bluffs, which caused injury to both wagons and livestock. When the wagon train was not able to find water, the group forced Meek to abandon the westward route and turn north with the hopes of reaching The Dalles along the Columbia River. As the emigrants faced continued water and food shortages, the group divided into those who wanted to take a direct route to The Dalles and those who wanted to travel west to the Deschutes River to see if there was a passage over the Cascades and, if not, follow the Deschutes north towards The Dalles (Beckham 1991).

The wagon train ultimately split south of the Maury Mountains, with one faction following Meek northwest toward the Deschutes River, while the other group sought to travel due north towards the Columbia River. The northbound group, in particular, experienced bouts of illness and suffered from lack of food and water before inadvertently arriving at Sagebrush Springs on the Deschutes River where the second group joined them. Each wagon train had to be ferried across the river in order to continue the journey to The Dalles, which they reached in mid-October. While accounts vary, at least two dozen people lost their lives on the trip due to disease and hunger (Beckham 1991).

Nature and Purpose

The nature and purpose of the Meek Cutoff Study Trail has not yet been defined, as it is currently under feasibility study.

Primary Uses

As the Meek Cutoff Study Trail is currently under feasibility study and does not yet have a CMUP, its primary uses have not been identified.

3.2.9.5 Methodology

As previously noted, the National Register of Historic Places-listed and -eligible historic properties, both previously documented and undocumented segments of NHTs will be recorded and evaluated for

impacts through a combination of desktop analysis, reconnaissance survey and intensive level survey performed associated with the Section 106 process. The survey results will be presented in the Final EIS. The historic and cultural setting of the trails will also be documented as part of the historic properties intensive survey. Potential impacts will be included in the Final EIS. .

Analysis Area

The analysis area for the NHTs and Study Trails is defined as the area within approximately 5 miles from either side of the Proposed Action and alternatives' centerlines (10 miles total), and includes all ancillary facilities related to the proposed project.

Visibility Analysis and Distance Zones

The visibility of the Proposed Action and the alternatives from the trails was developed using a GIS-based "bare-earth" viewshed analyses based on the centerlines of the Proposed Action and alternatives. This type of viewshed analysis is based on a digital elevation model and therefore reflects visible areas of the landscape based on existing landforms, without consideration of vegetation or built environment. Because availability of data regarding existing vegetation and built environment is limited, the bare-earth analysis makes the best use of available GIS digital elevation model data and also provides a worst-case scenario for visibility.

For this analysis, the foreground distance zone is defined as the area up to 0.5 mile from the Proposed Action or the alternatives, and the middleground distance zone is the area from 0.5 mile to 5.0 miles.

Impact Thresholds

The amount of visual contrast, dominance, and level of attraction introduced by project components would have an effect on the Oregon and Lewis and Clark NHTs and the Study Trails' views from the trails (also referred to as the trails' viewsheds). For this project-level analysis, the factors that were used to evaluate the changes to the viewsheds included the scale and spatial relationship and the duration of view of the Proposed Action and alternatives in relation to the trails (BLM 1986a).

Scale and spatial relationship evaluates the degree of prominence or contrast of the project components in relation to the surrounding landscape when viewed from the trails. Scale refers to the size of the project components relative to the features in the landscape. The larger the project components would appear, the less they would repeat the common elements and patterns in the surrounding landscape; that is, the project components would appear to dominate the landscape. In addition to scale, the arrangement or spatial relationship of landscape features can also affect the visual prominence of project components from sensitive viewing platforms. Consideration of the amount of visual contrast created is directly related to the amount of attention that is drawn to an element in the landscape. For this analysis, the contrast is assessed by comparing the Proposed Action (and alternatives) and the associated facilities with the major features within the existing setting of the trails.

The duration of view refers to how long (in miles) the project components would be seen from the trail. It is used to quantify the magnitude of potential impacts on the views from the trail. For example, the

project components may dominate the setting adjacent to the trail but whether the project components can be seen for 1 mile or 10 miles would help better understand the magnitude of the potential impacts.

Table 3-247 defines the threshold of the impacts on the NHTs and Study Trails' existing landscape setting, i.e., the trail's viewshed in terms of two factors, (1) scale and spatial relationship of the project components as seen from along the trail and (2) the duration of the view of the project components associated with the Proposed Action and alternatives. The magnitude of impacts is defined as none, negligible, low, moderate, or high for each factor.

Table 3-247. Scale/Spatial Relationship and Duration of View Thresholds

Scale/Spatial Relationship	Duration of View
None/ Negligible Impact	
• No perceived change	• Not seen
• Project components would repeat elements/patterns common in the landscape. • Project components would not be visually evident.	• Project components would be seen from 20 percent or less of the total miles of the trail within the analysis area.
Low Impact	
• Project components would introduce elements/patterns common in the landscape. that would be visually subordinate • Project components would create low contrast as compared to other features in the landscape.	• Project components would be seen from 20 percent to 40 percent of the total miles of the trail within the analysis area.
Moderate Impact	
• Project components would introduce elements/patterns not common in the landscape. • Project components would be visually prominent in the landscape and would create moderate contrast as compared to other features in the landscape.	• Project components would be seen from 40 percent to 80 percent of the total miles of the trail within the analysis area.
High Impact	
• Project components would introduce elements/patterns that would be visually dominant and create strong contrast as compared to other features in the landscape.	• Project components would be seen 80 percent or greater of the total miles of the trail.

3.2.9.6 Affected Environment

Table 3-248, Table 3-249, Table 3-250, and Table 3-251 provide the total miles of the Oregon and Lewis and Clark NHTs and the Goodale's Cutoff and Meek Cutoff study trails located within the respective analysis areas of the Proposed Action and alternatives. These tables also indicate the distance along the trails that the proposed transmission lines and towers would be seen based on the visibility analysis as well as the number of crossings. The visibility and potential crossings of the trails by the proposed access roads are not included in the analysis. A general description of the location of the trails by B2H Project analysis segment with respect to the Proposed Action and alternatives along with an overview of land uses adjacent to the trails is also included in this section.

Table 3-248. Miles of Viewed Trail and Crossings of the Oregon NHT for Proposed Action and Alternatives

Alternative	Segment	Total Miles of Trail within Analysis Area	Total Miles of Trail with Views of Project Components	Total Number of Crossings
Proposed Action	1, 2, 3, 4, 5, and 6	227.0	173.3	11
Horn Butte Alternative	1	36.8	27.4	1
Longhorn Variation	1	15.6	13.8	1
Longhorn Alternative	1	12.9	9.9	1
Section of the Proposed Action Compared to the Horn Butte / Longhorn/ Longhorn Variation	1	36.9	27.4	1
Glass Hill Alternative	2	20.9	4.3	0
Section of the Proposed Action Compared to the Glass Hill Alternative	2	21.0	5.4	0
Flagstaff Alternative	3	20.1	9.5	1
Section of the Proposed Action Compared to the Flagstaff Alternative	3	20.6	18.0	1
Burnt River Mountain Alternative	3	31.3	22.2	2
Section of the Proposed Action Compared to the Burnt River Mountain Alternative	3	31.4	20.4	2
Timber Canyon Alternative	3	25.8	12.2	0
Section of the Proposed Action Compared to the Timber Canyon Alternative	3	57.6	46.05	2
Willow Creek Alternative	4	20.0	8.9	0
Section of the Proposed Action Compared to the Willow Creek Alternative	4	13.0	5.0	0
Tub Mountain South Alternative	4	37.6	28.2	2
Section of the Proposed Action Compared to the Tub Mountain South Alternative	4	13.7	7.5	0
Double Mountain Alternative	5	0	0	0
Section of the Proposed Action Compared to the Double Mountain Alternative	5	0	0	0
Malheur S Alternative	5	3.4	2.3	0
Malheur A Alternative	5	3.2	0.2	0
Section of the Proposed Action Compared to the Malheur A and Malheur S Alternatives	5	11.8	10.1	0

Table 3-249. Miles of Viewed Trail and Crossings of the Lewis and Clark NHT for Proposed Action and Alternatives

Alternative	Segment	Total Miles of Trail within Analysis Area	Total Miles of Trail with Views of Project Components	Total Number of Crossings
Proposed Action	1, 2, 3, 4, 5, and 6	0	0	0
Horn Butte Alternative	1	0	0	0
Longhorn Variation	1	2.2	1.4	0
Longhorn Alternative	1	1.8	1.2	0
Section of the Proposed Action Compared to the Horn Butte / Longhorn/ Longhorn Variation	1	0	0	0
Glass Hill Alternative	2	0	0	0
Section of the Proposed Action Compared to the Glass Hill Alternative	2	0	0	0
Flagstaff Alternative	3	0	0	0
Section of the Proposed Action Compared to the Flagstaff Alternative	3	0	0	0
Burnt River Mountain Alternative	3	0	0	0
Section of the Proposed Action Compared to the Burnt River Mountain Alternative	3	0	0	0
Timber Canyon Alternative	3	0	0	0
Section of the Proposed Action Compared to the Timber Canyon Alternative	3	0	0	0
Willow Creek Alternative	4	0	0	0
Section of the Proposed Action Compared to the Willow Creek Alternative	4	0	0	0
Tub Mountain South Alternative	4	0	0	0
Section of the Proposed Action Compared to the Tub Mountain South Alternative	4	0	0	0
Double Mountain Alternative	5	0	0	0
Section of the Proposed Action Compared to the Double Mountain Alternative	5	0	0	0
Malheur S Alternative	5	0	0	0
Malheur A Alternative	5	0	0	0
Section of the Proposed Action Compared to the Malheur A and Malheur S Alternatives	5	0	0	0

Table 3-250. Miles of Viewed Trail and Crossings of the Goodale's Cutoff Study Trail for Proposed Action and Alternatives

Alternative	Segment	Total Miles of Trail within Analysis Area	Total Miles of Trail with Views of Project Components	Total Number of Crossings
Proposed Action	1, 2, 3, 4, 5, and 6	23.6	17.6	2
Horn Butte Alternative	1	0	0	0
Longhorn Variation	1	0	0	0
Longhorn Alternative	1	0	0	0
Section of the Proposed Action Compared to the Horn Butte / Longhorn/ Longhorn Variation	1	0	0	0
Glass Hill Alternative	2	0	0	0
Section of the Proposed Action Compared to the Glass Hill Alternative	2	0	0	0
Flagstaff Alternative	3	12.7	2.8	0
Section of the Proposed Action Compared to the Flagstaff Alternative	3	23.6	17.6	2
Burnt River Mountain Alternative	3	0	0	0
Section of the Proposed Action Compared to the Burnt River Mountain Alternative	3	0	0	0
Timber Canyon Alternative	3	41.7	30.3	2
Section of the Proposed Action Compared to the Timber Canyon Alternative	3	23.6	17.6	2
Willow Creek Alternative	4	4.1	1.1	0
Section of the Proposed Action Compared to the Willow Creek Alternative	4	0	0	0
Tub Mountain South Alternative	4	6.5	4.2	0
Section of the Proposed Action Compared to the Tub Mountain South Alternative	4	0	0	0
Double Mountain Alternative	5	0	0	0
Section of the Proposed Action Compared to the Double Mountain Alternative	5	0	0	0
Malheur S Alternative	5	0	0	0
Malheur A Alternative	5	0	0	0
Section of the Proposed Action Compared to the Malheur A and Malheur S Alternatives	5	0	0	0

Table 3-251. Miles of Viewed Trail and Crossings of the Meek Cutoff Study Trail for Proposed Action and Alternatives

Alternative	Segment	Total Miles of Trail within Analysis Area	Total Miles of Trail with Views of Project Components	Total Number of Crossings
Proposed Action	1, 2, 3, 4, 5, and 6	13.1	11.8	1
Horn Butte Alternative	1	0	0	0
Longhorn Variation	1	0	0	0
Longhorn Alternative	1	0	0	0
Section of the Proposed Action Compared to the Horn Butte/ Longhorn/ Longhorn Variation	1	0	0	0
Glass Hill Alternative	2	0	0	0
Section of the Proposed Action Compared to the Glass Hill Alternative	2	0	0	0
Flagstaff Alternative	3	0	0	0
Section of the Proposed Action Compared to the Flagstaff Alternative	3	0	0	0
Burnt River Mountain Alternative	3	8.2	4.1	0
Section of the Proposed Action Compared to the Burnt River Mountain Alternative	3	0	0	0
Timber Canyon Alternative	3	0	0	0
Section of the Proposed Action Compared to the Timber Canyon Alternative	3	0	0	0
Willow Creek Alternative	4	0	0	0
Section of the Proposed Action Compared to the Willow Creek Alternative	4	0	0	0
Tub Mountain South Alternative	4	2.5	0	0
Section of the Proposed Action Compared to the Tub Mountain South Alternative	4	0.9	0	0
Double Mountain Alternative	5	0	0	0
Section of the Proposed Action Compared to the Double Mountain Alternative	5	0	0	0
Malheur S Alternative	5	11.9	5.2	0
Malheur A Alternative	5	11.9	5.2	0
Section of the Proposed Action Compared to the Malheur A and Malheur S Alternatives	5	11.5	3.8	0

SEGMENT 1—MORROW-UMATILLA

Segment 1 encompasses a portion of the Proposed Action, the Longhorn Variation, and the Horn Butte, and Longhorn alternatives. Neither the Goodale's Cutoff nor Meek Cutoff study trails are located within this segment.

OREGON NATIONAL HISTORIC TRAIL

The Oregon NHT enters Segment 1 approximately 2 miles west of the unincorporated community of Cecil, Oregon. The Trail's alignment in the western section of Segment 1 is generally west to east, trending slightly north. Existing development adjacent to the Trail in this portion of the B2H Project analysis area is predominantly agricultural, with fallow fields, numerous paved and two-track roads, transmission lines and towers, wind farms, and scattered ranches. Just north of Immigrant Lane and continuing east to Bombing Range Road, the Trail crosses the Boardman Grasslands Conservation Area, which consists of relatively undisturbed native grasses and shrubs.

The Proposed Action and Horn Butte Alternative would largely parallel the Trail, crossing it once approximately 0.6 miles south of Immigrant Lane and 4.6 miles east of Cecil. The Longhorn Variation alignment would generally parallel Bombing Range Road and would cross the trail once approximately 6.2 miles south of Homestead Lane. Similarly the Longhorn Alternative would cross the Oregon NHT once, approximately 5.6 miles south of Homestead Lane. The National Register of Historic Places-listed Wells Spring segment of the Oregon NHT begins immediately west of Longhorn Variation and Longhorn Alternative. With the exception of the Boardman Grasslands Conservation Area to the west of the Longhorn Variation, agriculture dominates the land use surrounding the Trail within the analysis areas of the Longhorn Alternative and Longhorn Variation.

LEWIS AND CLARK NATIONAL HISTORIC TRAIL

Within Segment 1, the Lewis and Clark NHT follows the same alignment as State Route 14 (also known the Lewis and Clark Trail Scenic Byway), a predominantly southeast to northwest trending road that generally parallels the northern bank of the Columbia River. The area to the north of the Trail has been developed for agricultural use and consists of agricultural fields, modern home sites and associated outbuildings, transmission lines, and numerous paved and unpaved roads. There are similar land uses south of the Columbia River within the analysis areas of the Longhorn Variation and Longhorn Alternative including development associated with the community of Boardman, Oregon. The Longhorn Variation and Longhorn Alternative alignments would run perpendicular to, but approximately 5 miles southwest of the Lewis and Clark NHT. The Trail only slightly overlaps the northernmost extent of the analysis areas.

SEGMENT 2—BLUE MOUNTAINS

Segment 2 encompasses a portion of the Proposed Action and one alternative, the Glass Hill Alternative, which is located in the approximate midpoint of this segment. The Lewis and Clark NHT and Goodale's Cutoff and Meek Cutoff study trails are not present within the segment.

Oregon National Historic Trail

The alignment of the Oregon NHT within Segment 2 begins approximately 4.2 miles northwest of the unincorporated community of Meacham, Oregon and continues to the southeast past the unincorporated communities of Kamela and Hilgard. Between Meacham and Kamela, the Trail crosses the I-84 corridor twice. This portion of the Oregon NHT also traverses the forested hills of the Blue Mountains. This forested area contains a series of unnamed two-track and off-road vehicle roads, but is otherwise undeveloped. Just south of Hilgard, the Trail turns to the west and crosses I-84 and Highway 244 (also known as the Ukiah-Hilgard Highway) before veering to the southeast. This portion of the Oregon NHT passes to the west of La Grande and along the western edge of the Grande Ronde River valley. Development adjacent to the Trail in this area is predominantly agricultural and urban development associated with the city of La Grande. After La Grande, the Trail turns south toward the community of North Powder (in Segment 3) and crosses over I-84 three times. Between La Grande and North Powder, the Oregon NHT traverses across areas of agricultural uses as well as areas of relatively undisturbed lands with the exception

The Glass Hill Alternative and Proposed Action would roughly parallel the Oregon NHT within Segment 2. The Glass Hill Alternative would not intersect the Trail; however, approximately 14.7 miles south of La Grande, the Proposed Action would cross the Oregon NHT.

Segment 3—Baker Valley

Segment 3 encompasses a portion of the Proposed Action and three alternatives: the Timber Canyon, Flagstaff, and Burnt River Mountain alternatives. The Lewis and Clark NHT and the Meek Cutoff Study Trail are not present within this segment.

Oregon National Historic Trail

The Oregon NHT enters Segment 3 near the unincorporated community of North Powder, Oregon and continues generally in a southeasterly direction toward Baker City. The Trail crosses agricultural fields in Baker Valley and Missouri Flat and continues south along the western and southern flanks of Flagstaff Hill, where the NHOTIC is located. It then crosses Oregon Route 86 and Virtue Flat. South of Virtue Flat the Oregon NHT turns east where it parallels the I-84, Old US 30, and the Union Pacific Railroad to the west of the unincorporated community of Durkee. Approximately 2.7 miles southeast of Durkee, the Trail curves to the east and near the southern end of the Durkee Valley exits the segment at Weatherby.

The Proposed Action would cross the Oregon NHT three times, once approximately 1.1 miles south of the NHOTIC and 9 miles northwest as well as 4.9 miles southeast of Durkee. The Flagstaff and Burnt River Mountain would each cross the Trail once, approximately 1.3 miles northwest of the NHOTIC and 6.2 miles of Durkee, respectively. The Timber Canyon Alternative would not intersect the Oregon NHT.

Goodale's Cutoff Study Trail

Two generally east-west trending alignments of the Goodale's Cutoff Study Trail stretches from the unincorporated community of Richland to Baker City. The two Study Trail alignments generally parallel

Oregon Route 86. Within this portion of Segment 3, existing development adjacent to the Study Trail consists of transmission lines and towers, scattered ranches and agricultural lands, and numerous paved and unpaved roads.

The Proposed Action would run perpendicular to the Trail and crosses both Trail alignments within the sage steppe hills of Virtue Flat, approximately 1.2 miles southeast of the NHOTIC and Flagstaff Hill. The Timber Canyon Alternative would also run perpendicular to the Trail and would cross both Study Trail alignments in the eastern portion of Segment 3. This alternative would cross the northern alignment of the Trail approximately 1.1 miles east of the unincorporated community of New Bridge and would intersect the southern alignment of the Trail approximately 2.4 miles west of Richland. Agriculture and rural residential development are common land uses surrounding the Trail within the analysis area of Timber Canyon Alternative.

Segment 4—Brogan Area

Segment 4 encompasses a portion of the Proposed Action along with two alternatives, the Willow Creek and Tub Mountain South alternatives. The Lewis and Clark NHT and the Goodale's Cutoff and Meek Cutoff study trails are not present within this segment.

Oregon National Historic Trail

From the northern portion of Segment 4, the Oregon NHT runs general south from Weatherby to Lime to Vale. The Trail parallels I-84, crossing it once approximately 1.3 miles south of Weatherby. The surrounding land is predominately undeveloped, but there are paved and unpaved roads and scattered ranches as well as transmission lines and towers that traverse the Trail. Between Lime and Huntington, the Oregon NHT generally follows Burnt Rive and Business US Route 30 (Oregon Trail Boulevard). The Trail continues south and crosses Willow Creek near Vale. Until reaching the agricultural lands associated with the creek, the land surrounding the Trail is predominately undeveloped. Closer to Vale the Oregon NHT passes through the city of Vale and the associated infrastructure, residential, and commercial development.

The centerlines for both the Willow Creek Alternative and the Proposed Action would be located within a mile to the east of the Oregon NHT. The Proposed Action would largely parallel the Trail and would cross it once approximately 1.4 miles southeast of Weatherby and just north of I-84. To the south of the unincorporated community of Lime, the Willow Creek Alternative would generally parallel the Trail and I-84; however, this alternative would veer to the southwest and away from the Trail approximately 5.7 miles south of Huntington. The Tub Mountain South Alternative would also generally parallel I-84 to the south of Huntington and cross the Trail twice, approximately 5.2 miles south of Huntington and 6.7 miles north of Vale.

Segment 5—Malheur

Segment 5 encompasses a portion of the Proposed Action along with three alternatives: the Malheur A, Malheur S, and Double Mountain alternatives. The Oregon and Lewis and Clark NHTs and Goodale's Cutoff Study Trail are not present in this segment.

Meek Cutoff Study Trail

A segment of the Meek Cutoff Study Trail is present within the northern portion of Segment 5. The Trail, which generally parallels State Route 20 (also known as the Central Oregon Highway) to the north, enters Segment 5 approximately 8.9 miles west of Vale and continues east. In this area, the land use is predominately agriculture and associated farm buildings and paved and unpaved roads. The Trail does follow a portion of the Malheur River where the landscape setting surrounding the Trail is strongly enclosed and development is limited to gravel and two-track roads, the canal, and an abandoned railroad alignment.

The Proposed Action would cross the Trail just west of where it veers north to follow the incised Malheur Canyon landform, approximately 11.6 miles west of Vale. The Malheur A, Malheur S, and Double Mountain Alternatives are also located within Segment 5; however, these alternatives would be to the south of the Meek Cutoff Study Trail and would not intersect the Trail.

Segment 6—Treasure Valley

Segment 6 includes only the Proposed Action. The Lewis and Clark NHT and Goodale's Cutoff and Meek Cutoff study trails are not present within this segment.

Oregon National Historic Trail

An intact alignment of the South Alternate of the Oregon NHT is present in the southern portion of Segment 6. The Trail enters the segment to the west of Rippee Island and parallels the Snake River and State Highway 78 (also known as the Owyhee Highway) for several miles before passing the agricultural community of Wilson, Idaho and turning east. Development in this area is predominantly agricultural, with clustered agricultural buildings, structures, and fields, utility poles and lines, and paved and gravel roads located along the Trail.

The Proposed Action would parallel the Trail to the west, but would not intersect it.

3.2.9.7 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the agencies would not issue a permit for the construction or operations of the B2H Project on federally managed lands. This Alternative would result in no direct or indirect Project-related impacts on identified NHT or Study Trail resources. Other effects associated with continued access, recreation, and similar actions would continue at the current rate, and would be the responsibility of the land managing agencies.

Design Features

Refer to Section 3.2.6 (Land Use, Agriculture, Recreation, Transportation), Section 3.2.7 (Visual Resources), Section 3.2.8 (Cultural Resources) of this Draft EIS regarding design features considered during the evaluation of environmental consequences. These design features were assumed to be part of the project design and standard best management practices that would be executed during the

construction and maintenance of the Proposed Action and alternatives, and were therefore considered during the evaluation of environmental consequences.

Impacts Common to Alternatives

Impacts common to all action alternatives would include impacts associated with construction, operation and maintenance. Construction of the Proposed Action and/or alternatives would potentially introduce temporary impacts on visual resources, recreational experiences, and historic and cultural settings, as well as permanent impacts on historic properties. The Proposed Action and alternatives would also include temporary impacts such as tower construction, line stringing, equipment operation, equipment/material transport, construction-related dust, and material stockpiling. These impacts would attract attention within the analysis area, resulting in short-term impacts on visual resources and historic and cultural settings. Ground disturbing activities related to construction and access road development/improvement could result in permanent adverse impacts on unidentified NHT-associated historic and cultural resources, particularly those that are buried.

Once the transmission line has been constructed, the presence of large transmission towers would potentially introduce permanent impacts on visual resources, recreational experiences, and historic and cultural settings. Transmission line replacement/re-stringing, potential transmission tower replacement, ongoing vegetative clearing within the right-of-way, and routine transmission line maintenance (and associated vehicular access) could attract attention within the analysis area. Auditory impacts associated with transmission line “buzzing” or “humming” would also detract from the emote sense of feeling contributing to the historic character of NHT resources.

Development of the Proposed Action and/or alternatives may result in short-term and long-term indirect impacts. Vegetative clearings and permanent access roads would create opportunities for people to access previously inaccessible areas. This could result in trampling of additional vegetation and additional impacts on the resources such as increased erosion. Implementation of the project would also provide lands adjacent to the alignment with stronger connectivity to the power grid, which may result in increased energy development along the alignment. These indirect impacts could lower the scenic quality and further diminish the historic settings of the NHTs and Study Trails.

Increased use of existing and new or improved access roads may likewise lead to adverse impacts on cultural resources through increased artifact collection and/or looting, and potential vandalism to historic and cultural sites, and trail segments. Alternately, increased use of access roads could indirectly result in beneficial impacts on recreational resources because the new routes could provide and/or increase access to NHT-associated recreational resources. Recreational use of the trails may also decrease in areas where the scenic quality and historic setting are impacted.

Summary of Direct and Indirect Impacts

Table 3-252 and the following narrative summarize the residual direct and indirect impacts on the Oregon and Lewis and Clark NHT and the Goodale’s Cutoff and Meek Cutoff Study Trails from the construction and operation of the Proposed Action and alternatives. The definition of the threshold of

the magnitude of impact for the scale/spatial relationship and duration of view factors are provided in Table 3-252.

Oregon National Historic Trail

The Proposed Action and all the alternatives with the exception of the Double Mountain Alternative would contain some portion of the Oregon NHT within their respective analysis areas. The Glass Hill, Malheur A, and Malheur S alternatives as well as Willow Creek Alternative would have substantially less impact on the landscape setting as viewed from the Oregon NHT than the Proposed Action and remaining alternatives. The Proposed Action would cross the Oregon NHT 11 times, the Burnt River Mountain and Tub Mountain South alternatives would cross the trail two times, and the Longhorn Variation and the Horn Butte, Longhorn, and Flagstaff alternatives would cross the Trail once.

The magnitude of the miles of the Oregon NHT that would be visible within the foreground of the Proposed Action and the alternatives would range from negligible to moderate (up to 80 percent). From the middleground of the Trail (0.5 miles to 5 miles), the Proposed Action, Longhorn Variation, and the Horn Butte, Glass Hill, Flagstaff, Willow Creek, Tub Mountain South, Malheur S, and Malheur A alternatives would be visible greater than 80 percent within the portion of the Oregon NHT within the analysis areas of the respective alternatives. The Proposed Action, Longhorn Variation, and Longhorn, Horn Butte, Timber Canyon, Flagstaff, Burnt Mountain, and Tub Mountain South alternatives would dominant the landscape in the foreground of the trail and create strong visual contrast as compared to other features in the existing landscape. The Proposed Action, Longhorn Variation, and Longhorn, Horn Butte, Timber Canyon, Flagstaff, Burnt Mountain, and Tub Mountain South alternatives would have direct, long-term adverse impacts to the visual setting with the foreground of the Oregon NHT.

Lewis and Clark National Historic Trail

The Longhorn Alternative and Longhorn Variation would have identical overall low to moderate impacts to this relatively small portion (2.2 miles) of the Lewis and Clark NHT in Washington. In either alternative, the project components would be visible for the entire length of the byway within the respectively analysis areas. The portion of the byway where the Longhorn Alternative and Longhorn Variation would be visible represents approximately 0.3 percent of the total length of the designated route within the respective analysis areas. Therefore, the Longhorn Alternative and Longhorn Variation would not compromise the landscape setting of the Lewis and Clark Trail NHT in the analysis areas of the Longhorn Alternative or Longhorn Variation.

Goodale's Cutoff Study Trail

The Proposed Action and the Timber Canyon, Flagstaff, Willow Creek, and Tub Mountain South alternatives would be visible from the Goodale's Cutoff Study Trail. The Proposed Action and the Timber Canyon Alternative would cross the trail twice each; the remaining three alternatives would only parallel the trail. The project components associated with the Proposed Action and the Timber Canyon Alternative would dominant the landscape in the foreground of the trail and create strong visual contrast as compared to other features in the existing landscape. The Willow Creek and Tub Mountain South alternatives would not be seen from the foreground of the trail. However, both of these alternatives

would be visible for more than 80 percent of the length of the trail in the middleground within these two alternatives' analysis areas. The project components of the Tub Mountain South Alternative would create a moderate level of contrast and the Willow Creek Alternative would not be visually evident. The Proposed Action and The Timber Canyon would have direct, long-term adverse impacts to the visual setting for the relatively small portion of the trail within the foreground of the Proposed Action (approximately 4.9 miles) and Flagstaff Alternative (approximately 1.0 mile) within the respective analysis areas.

Meek Cutoff Study Trail

The Proposed Action and the Malheur A and Malheur S alternatives would be the only alternatives that would impact the Meek Cutoff Study Trail within their respective analysis areas. The project components associated with the Malheur A and Malheur S alternatives would not be visually evident in the existing landscape setting, but the alternatives would be seen for more than 80 percent of the total miles of Trail within the analysis areas. The Proposed Action would create strong contrast in the foreground and moderate contrast in the middleground, and would be seen less than either of the Malheur alternatives from the trail. The Proposed Action would cross the Trail once and would have direct, long-term adverse impacts to the landscape setting for the 2.8 miles of the Trail that would be visible within the foreground of the Proposed Action.

Table 3-252. Summary of Impacts on Views from National Historic and Study Trails for Each Alternative

Trail (total miles of trail)	Alternative (total miles of the trail within analysis area)	Scale/Spatial Relationship		Duration of View	
		FG	MG	FG	MG
Goodale's Cutoff Study Trail	Proposed Action including 138/69-kV Rebuild Alternative (23.6 miles)	H	L	L	M
	Timber Canyon Alternative (41.7 miles)	H	M	L	M
	Section of Proposed Action Compared to the Timber Canyon Alternative (23.6 miles)	H	M	L	N
	Flagstaff Alternative including 230-kV Rebuild (12.7 miles)	M	L	L	M
	Section of Proposed Action Compared to the Flagstaff Alternative including 230-kV Rebuild (23.6 miles)	H	M	L	M
	Willow Creek Alternative (4.1 miles)	None	N	None	H
	Tub Mountain South Alternative (6.5 miles)	None	M	None	H
Lewis & Clark National Historic Trail	Longhorn Alternative (1.8 miles)	None	N	None	H
	Longhorn Variation (2.2 miles)	None	N	None	H

Trail (total miles of trail)	Alternative (total miles of the trail within analysis area)	Scale/Spatial Relationship		Duration of View	
		FG	MG	FG	MG
Meek Cutoff Study Trail	Proposed Action including 138/69-kV Rebuild Alternative (13.1 miles)	H	M	L	M
	Section of Proposed Action Compared to the Tub Mountain South Alternative (0.9 mile)	None	None	None	None
	Malheur A Alternative (11.9 miles)	None	N	None	H
	Malheur S Alternative (11.9 miles)	None	N	None	H
	Section of Proposed Action Compared to the Malheur A and Malheur S Alternatives (11.5 miles)	None	N	None	H
Oregon National Historic Trail	Proposed Action including 138/69-kV Rebuild Alternative (194.4 miles)	H	L	N	H
	Longhorn Alternative(12.9 miles)	H	M	L	M
	Section of Proposed Action Compared to the Horn Butte/Longhorn/Longhorn Variation (36.7 miles)	H	M	N	H
	Longhorn Variation (15.6 miles)	H	L	N	H
	Horn Butte Alternative(36.8 miles)	H	M	N	H
	Glass Hill Alternative (20.9 miles)	None	N	None	H
	Section of Proposed Action Compared to the Glass Hill Alternative (21.0 miles)	N	L	N	H
	Timber Canyon Alternative (25.8 miles)	H	L	N	M
	Section of Proposed Action Compared to the Timber Canyon Alternative (57.6 miles)	H	M	L	M
	Flagstaff Alternative including 230kV Rebuild (20.1 miles)	H	N	N	H
	Section of Proposed Action Compared to the Flagstaff Alternative including 230-kV Rebuild (20.6 miles)	H	M	N	H
	Burnt River Mountain Alternative (31.3 miles)	H	L	L	M
	Section of Proposed Action Compared to the Burnt River Mountain Alternative (31.5 miles)	H	L	M	M
	Willow Creek Alternative (20.0 miles)	None	N	None	H
	Section of Proposed Action Compared to the Willow Creek Alternative (13.0 miles)	None	N	None	H
	Tub Mountain South Alternative (37.6 miles)	H	L	N	H
	Section of Proposed Action Compared to the Tub Mountain South Alternative (13.7 miles)	None	L	None	H

Trail (total miles of trail)	Alternative (total miles of the trail within analysis area)	Scale/Spatial Relationship		Duration of View	
		FG	MG	FG	MG
	Malheur S Alternative (3.4 miles)	None	N	None	H
	Malheur A Alternative (3.2 miles)	None	N	None	H
	Section of Proposed Action Compared to the Malheur A and Malheur S Alternatives (11.8 miles)	None	L	None	H

Table Abbreviations: FG = foreground distance; MG = middleground distance; H = high (red); M = moderate (blue); L = low (yellow); N = negligible (green); None = no impact (green).

3.2.9.8 Compliance With BLM Manual 6280

As identified in the Regulatory Framework Section (3.2.9.2) above, BLM Manual 6280 requires that potential impacts associated with proposed actions are disclosed with respect to NHTs and Study Trails on BLM-managed lands. In general terms, the programmatic policy associated with BLM Manual 6280 suggests that the evaluation of potential impacts should consider whether or not a proposed action would:

- "affect the BLM's ability to effectively manage the nature and purposes of the trail, trail resources, qualities, values, uses, and associated settings"
- "require a major relocation of the National Trail Management Corridor"
- "affect the characteristics that made the trail worthy of designation"
- "affect the Federal Protection Components, including high-potential historic sites or high potential route segments"
- "affect designated NHT properties, including remnants and artifacts from the associated period of use that may be eligible or listed on the National Register"
- "limit the agency's ability to manage the trail for the purpose of identifying and protecting the historic route and its historic remnants and artifacts for public use and enjoyment, including interpretation, education, appreciation, and vicarious experiences"

More specifically, BLM Manual 6280 provides separate guidance regarding the analysis of both NHTs and Study Trails. Analysis of potential impacts to NHTs include the following considerations—some of which are specifically required when a National Trail Corridor has not yet been established (as is the case with the Oregon NHT):

- Determine if the proposed action is consistent with the purpose for which the Trail was designated; determine if the proposed action would "substantially interfere" with the nature and purposes of the trail
- Complete a viewshed analysis to evaluate whether the proposed action is within the viewshed
- If the proposed action is likely to cause adverse impact, complete a BLM National Trail inventory and assessment, and identify alternative locations with less or no adverse impacts

- Identify any adverse impacts to the nature and purposes, resources, qualities, values, associated settings, and primary use or uses of the trails

Analysis of potential impacts to Study Trails includes the following considerations:

- "describe the values, characteristics, and settings of trails"
- "analyze and describe any impacts of the proposed action on the values, characteristics, and settings of trails"
- "consider an alternative that would avoid adverse impacts to the values, characteristics, and settings of the trail"

In order to comply with the requirements and guidance provided in BLM Manual 6280, an inventory and analysis of potential impacts was completed for the trails located on lands managed by the BLM from which the project components would be visible. The trails that are on BLM-administered lands are the Oregon NHT and the Goodale's Cutoff and Meeks Cutoff Study Trails. The portion of the Lewis and Clark NHT within the B2H Project analysis area is not located on BLM-administered lands. The inventory and analysis provide the necessary information and data to satisfy the considerations listed above. The full inventory and analysis covers portions of the Oregon NHT, and Goodale's Cutoff and Meeks Cutoff Study Trails—and is included as Appendix B.8. The following summary provides a brief overview of the methodology and impacts of the NHT and study trail analysis.

Summary of BLM Manual 6280 Analysis Methodology

Impacts on the Oregon NHT and Study Trails were assessed in terms of the potential effects on the three trail-related resources (visual resources, historic and cultural resources, and historic and cultural settings) within the BLM Manual 6280 analysis area. This analysis area is consistent with the area identified and explained in detail for the NHT inventory and analysis in Appendix B.8. Analysis methodologies associated with the trail-related resources are described below. Table 3-253 is an abbreviated version of the threshold table from Appendix B.8 and has been formatted to include the most critical NHT/study trail analysis thresholds. Per the inventory guidelines provided in BLM Manual 6280 (3.4, A), the inventory area has been divided into analysis units (AUs) by trail segment. The AUs that were developed for this inventory were based on breaks in landform that serve to define historic and contemporary user experience.

Visual Resource Analysis

In broad terms, impacts on visual resources refer to the change in aesthetic values resulting from modifications to the landscape. Because BLM Manual 6280 does not specifically identify methodology for evaluation of impacts on visual resources related to the viewshed of the identified trail segments, the methodology for evaluating visual impacts in this assessment was based on the general concepts of visual contrast evaluation as outlined in the BLM Handbook H-8431-1, Visual Resource Contrast Rating (BLM 1986).

Although the VRM system does not specifically discuss analysis of NHTs and Study Trails, the trails and trail segments represent sensitive linear viewing platforms or key observation points (KOPs) from which viewers could potentially see the project components. Impacts for this analysis were therefore assessed in terms of changes to the landscape that could be seen by viewers along the BLM-managed trail segments identified in the NHT inventory. These changes were identified using the thresholds identified in Section 3.2.7 (Visual Resources). An abbreviated version is provided in Table 3-253. The impacts associated with spatial relationships were considered as the key indicator of the potential impacts on visual resources because they represent the overall degree to which the project components would be noticeable from the trail segments, as well as the perceived degree of contrast from trail users on the trail segments.

The magnitude of change related to visual resources (sensitive viewers) in the BLM Manual 6280 assessment is divided into impacts associated with visibility conditions, angles of observation, quantifications of view, and spatial relationships. The impacts “adverse to the nature and purpose and primary uses” of the Oregon NHT were specifically based on the spatial relationships for each linear platform.

Cultural and Historic Resource Analysis

To evaluate potential impacts on the qualities and values of the Oregon NHT and Study Trails, cultural resource studies completed for the B2H Project were consulted to determine the condition, National Register of Historic Places eligibility, and character-defining features of the trail segments and their associated cultural and historic resources. These findings were then compared with observations made during the field inventory to determine what impacts, if any, the project would have on National Register of Historic Places -eligible trail segments and cultural and historic resources located within the B2H analysis area.

Cultural and historic resources were evaluated according to the impact thresholds provided in Table 3-253. These thresholds are based on the alteration of character-defining features, the diminishment to aspects of National Register of Historic Places integrity (i.e., location, design, setting, materials, workmanship, feeling, and association), and whether or not the degree of alteration would constitute an adverse effect that would or would not be amenable to minimization or mitigation.

In general, if there was no alteration to the character-defining features of the trail segments and no diminishment to aspects of National Register of Historic Places integrity, then the impact threshold of the project was considered to be “none.” In comparison, an impact threshold of “high” was assigned to trail segments and associated cultural and historic resources if the character-defining features of the trail were subject to both indirect and direct impacts which severely altered the aspects of National Register of Historic Places integrity to such a degree that the National Register of Historic Places eligibility of the trail segments was adversely affected and could not be minimized and/or mitigated. As the field assessment associated with the draft NHT inventory report did not include comprehensive physical documentation of trail resources per professional cultural resources standards, impacts on trail segments for which an National Register of Historic Places eligibility assessment has not yet been made, a sixth category, of “undetermined” was assigned.

Cultural and Historic Setting Analysis

The analysis of cultural and historic settings is dependent on both the existing historic character of the landscape and the degree to which the historic character would be affected by the project. Based on observations made during the field inventory, the historic setting of each trail segment was categorized in the draft NHT inventory report as either retained or diminished. Generally, the historic setting of a trail segment was considered to be retained if the segment was located in a pristine wilderness area with no visible modern intrusions, such as transmission lines, and/or buildings and structures. In comparison, if the trail segment was located within a utility corridor or right-of-way, or the surrounding landscape was dominated by modern intrusions, then the historic setting of the trail segment was considered to be diminished. Cardinal directions were also taken into account, making it possible for the historic setting of a trail segment to be diminished in some views, and retained in others.

Changes in historic setting were then compared to the historic character of the landscape to determine what impact, if any, the project would have on the trail segment. These impacts on cultural and historic settings were evaluated based on the thresholds provided in Table 3-253. If the cultural and historic setting of the trail segment was retained and there was no perceived change to the historic character of the landscape, then the impact of the project to the cultural and historic setting of the trail segment was considered to be “none.” However, if the historic character of the landscape was considered to be diminished, one of four impact thresholds were assigned—negligible, low, moderate, or high—based on the perceived level of impact that the project would have on the surrounding landscape of the trail segment. For example, the project was considered to have a negligible impact on the cultural and historic setting of a trail segment if intact supporting or contributing elements of the historic character of the landscape would be *subtly modified*. Similarly, if historic character of the landscape was considered to be *notably*, *substantially*, or *severely modified* by the project, then the trail segments were assigned low, moderate, and high impact thresholds, respectively.

Assessing Impacts on the Nature and Purpose and Primary Uses of the Oregon National Historic Trail

According to BLM Manual 6280, the NHT analysis must identify “any adverse impacts on the nature and purposes” or “primary use or uses” of the NHT. This requirement does not apply to Study Trails because they do not have an established nature and purpose or primary uses. For this assessment, it was assumed that low and very low adverse impacts would not specifically have a considerable impact on the nature and purpose or primary uses of the Oregon NHT. Potential impacts on the nature and purpose and primary uses of the Oregon NHT for this analysis were therefore based on the assumption that both moderate and high magnitudes of impact would be specifically “adverse to the nature and purpose and primary uses” because they represent substantial and severe impacts, respectively. These impacts would vary for the Proposed Action and alternatives based on the three identified trail-related resources (visual resources, historic and cultural resources, and historic and cultural settings). For this reason, the number of impacts “adverse to the nature and purpose and primary uses” are included in the summary of impacts for the Proposed Action and each alternative.

The BLM Manual 6280 analysis described the potential impacts associated with the Proposed Action and each of the alternatives. This analysis included disclosure of potential impacts regarding the No Action Alternative. Under the No Action Alternative, the agencies would not issue a permit for the construction or operations of the B2H Project on federally managed lands. The No Action Alternative would result in no direct or indirect Project-related impacts on identified NHT or Study Trail resources. Other effects associated with continued access, recreation, and similar actions would continue at the current rate, and would be the responsibility of the land managing agencies.

Table 3-253. Abbreviated National Trails System Impact Thresholds

Visual Resources (Spatial Relationship)	Cultural and Historic Resources	Cultural and Historic Settings
None • No perceived change	**None** • No alteration of the character defining features of the Trail and/or associated resources; no diminishment to aspect of National Register of Historic Places (NRHP) integrity (location, design, setting, materials, workmanship, feeling, setting and association).	**None** • No perceived change to the historic character of the landscape.
Negligible • Project components would repeat elements/patterns common in the landscape. • Project components would not be visually evident.	**Negligible** • Character defining features of the Trail and/or associated resources would be subtly altered with some degree of diminishment to aspects of NRHP integrity (location, design, setting, materials, worksmanship, feeling, setting, and association.). However, this degree of alteration would not constitute an “adverse effect” to the NRHP-listed and/or eligible property.	**Negligible** • Existing historic character of the landscape is diminished. • Intact elements that support or contribute to the historic character of the landscape would be **subtly** modified by the project.
Low • Project components would introduce elements/patterns common in the landscape that would be visually subordinate • Project components would create **low** contrast as compared to other features in the landscape.	**Low** • Character defining features of the Trail and/or associated resources would be **notably** altered with some degree of diminishment to aspects of NRHP integrity (location, design, setting, materials, worksmanship, feeling, setting, and association.) However, this degree of alteration would not constitute an “adverse effect” to the NRHP-listed and/or eligible property.	**Low** • Existing historic character of the landscape is diminished. • Intact elements that support or contribute to the historic character of the landscape would be **notably** modified by the project.

Visual Resources (Spatial Relationship)	Cultural and Historic Resources	Cultural and Historic Settings
Moderate • Project components would introduce elements/patterns not common in the landscape. • Project components would be visually prominent in the landscape and would create **moderate** contrast as compared to other features in the landscape.	**Moderate** • Character defining features of the Trail and/or associated resources would be **substantially** altered with a degree of diminishment to aspects of NRHP integrity (location, design, setting, materials, worksmanship, feeling, setting, and association) such that the NRHP eligibility of the Trail and/or associated resources would be adversely affected. The adverse effect would be indirect and amenable to minimization and/or mitigation.	**Moderate** • Existing historic character of the landscape is diminished. • Intact elements that support or contribute to the historic character of the landscape would be **substantially** modified by the project.
High • Project components would introduce elements/patterns that would be visually dominant and create **strong** contrast as compared to other features in the landscape.	**High** • Character defining features of the Trail and/or associated resources would be **severely** altered with a degree of diminishment to aspects of NRHP integrity (location, design, setting, materials, worksmanship, feeling, setting, and association) such that the NRHP eligibility of the Trail and/or associated resources would be adversely affected. The adverse effect would be either direct or indirect and not amenable to minimization and/or mitigation.	**High** • Existing historic character of the landscape is intact. • The historic character of the landscape would be **severely** modified by the project.

Summary of Impacts per BLM Manual 6280

The BLM Manual 6280 impact analysis identifies how the B2H Project would affect the trail-specific visual resources with respect to the viewshed, historic and cultural resources, and historic and cultural settings identified by the NHT inventory. The impact analysis provides data to enable identification of the project alternatives locations that result in lesser degrees of impact, including identification of adverse impacts on the nature and purposes and primary uses of the Oregon NHT for each alternative location. Because the nature and purposes and primary uses of the Study Trails have not been established, there would be no associated impacts. Determination of conformance with National Trail VRM Classes is not included in this analysis because no specific “National Trail VRM Classes” have been established for the Oregon NHT or Study Trails within the analysis area.

The following summary provides the key potential impacts for the Proposed Action and affected alternatives as well as the comparison of the alternatives to the Proposed Action, i.e., the compare-to sections of the Proposed Action for the Oregon NHT and the two Study Trails. The Proposed Action is described for its entire length and is not broken down by segment with the exception of the compared-to sections for each of the alternatives.

There would be no direct or indirect impacts related to the BLM Manual 6280 analysis for the Horn Butte, Longhorn, Double Mountain, Malheur A, and Malheur S alternatives and the Longhorn Variation because the project components associated with these alternatives would not be visible from the trail segments on BLM-managed lands. Each of the remaining alternatives, Glass Hill, Timber Canyon, Burnt River Mountain, and Tub Mountain South, are discussed in the segments in which they would be located.

The potential impacts are arranged as they relate to the most critical NHT analysis factors—visual resources (sensitive viewers), historic and cultural resources, historic and cultural settings, and the number of high and moderate adverse impacts on the nature and purpose and primary uses of the Oregon NHT. Similarly, the impacts on the Meek Cutoff and Goodale's Cutoff Study Trails are summarized with the exception of the quantity of adverse impacts on the nature and purpose and primary uses of the Study Trails because the nature and purposes and primary uses of the Study Trails have not been established. There would be no direct or indirect impacts related to the BLM Manual 6280 analysis for the Burnt River Mountain for either Study Trails because the project components associated with these alternatives would not be visible from the trail segments on BLM-managed lands. Detailed data and explanations of impacts can be found in Appendix B.8.

Proposed Action (including 138/69-kV Rebuild Alternative) – Oregon National Historic Trail

Visual Resources

- Within the foreground (up to 0.5 mile from the trail), the Proposed Action would visually dominate people's view from 6 of the 23 trail specific KOPs and would therefore experience high impacts associated with the spatial relationship of the project components.
- Within the middleground (0.5 mile to 5 miles from the trail), people at 2 of the 23 trail specific KOPs would experience high impacts associated with the spatial relationship of the project components because these components would visually dominate people's views from these platforms.

Cultural and Historic Resources

- No impacts were identified to previously recorded, trail-related cultural resources on BLM lands in the general area between Bodie and Hilgard (Blue Mountain Analysis Unit). The 0.23-mile-long section of the NRHP-eligible Blue Mountain Crossing segment of the Oregon NHT on BLM land is located approximately 1.1 miles east of the Proposed Action and would not be directly impacted; however, moderate impacts on the historic setting of the trail are anticipated. As the National Register of Historic Places eligibility of the trail traces in the general area between Bodie and Hilgard have not yet been evaluated, impacts on these trail segments could not be determined.

  None of the previously-recorded, trail-related historic and cultural resources located on BLM land in the general vicinity of the two Oregon Trail Flagstaff Hill and White Swan ACECs (Flagstaff Hill/Virtue Flat Analysis Unit) would be impacted by the Proposed Action. The NHOTIC, identified as high-potential historic site No. 106 in the NPS CMUP, is situated on top

of Flagstaff Hill and overlooks the transmission line, which is sited approximately 1.1 miles to the southeast. Additionally, the NRHP-eligible Flagstaff Hill and White Swan Segments of the Oregon NHT, and their contributing resources—the Meeker Marker and Flagstaff Hill Monument—are all located approximately 0.5 mile from the centerline of the Proposed Action. The magnitude of impact on the historic and cultural setting of the trail segments in these locations is expected to be high. However, impacts on the trail south of the Oregon Trail ACEC – Flagstaff Hill could not be determined as the NRHP eligibility for this segment has not yet been evaluated.

- No impacts were identified to previously recorded, trail-related cultural resources in the general vicinity of area between Quartz and Huntington (Burnt River Canyon Analysis Unit). The three segments of the Oregon NHT on BLM land that were previously recommended eligible for inclusion in the National Register of Historic Places are located within the Straw Ranch I and II ACECs and along Swayze Creek would not be directly affected; however, moderate impacts on the historic setting of the trail segments between Oxman and Nelson are anticipated. Additionally, the segment of trail within the Chimney Creek ACEC, as identified by the State of Oregon as a Goal 5 Resource, is situated 0.9 mile to the west of the Proposed Action and would not be impacted by the transmission line. As the historic setting within the Chimney Creek ACEC at has already been diminished, the magnitude of impact on the historic setting is considered to be low. As the National Register of Historic Places eligibility of the trail traces in the general area between Quartz and Huntington have not yet been evaluated, impacts on these trail segments could not be determined.
- No impacts were identified to previously recorded, trail-related cultural resources in the general vicinity of Adrian (South Alternative Analysis Unit). A short segment of the 126-mile-long, National Register of Historic Places -eligible South Alternate Route (10OE6025) of the Oregon NHT is located on BLM land approximately 0.4 mile to the southwest of the Proposed Action (at its closet location) and would not be directly impacted. However, it is possible that the historic setting of the trail in this location may be impacted by construction of the transmission line. Impacts on segments of the Oregon NHT that are not considered part of the South Alternate Route could not be determined, as the National Register of Historic Places eligibility of these segments have not yet been evaluated.

Cultural and Historic Settings

- Generally, the trail segments on BLM land in the general vicinity between Bodie and Hilgard (Blue Mountain Analysis Unit).are representative of their historic setting. As planned, the Proposed Action would intersect the braided trail segments in six of locations, although none of these crossings occur on BLM land. The historic setting of the trail segments in this area has already been diminished by modern intrusions. As such, the impact on the historic and cultural setting in these locations would generally be low. Near Bodie, however, impacts would vary greatly based on the portion of the trail trace under consideration. The trail trace in this location has not been impacted by modern intrusions near the southern portion of the trail trace where the setting opens into a pocket of grassland. The portion of the trail trace within the open grassland setting would experience open views of the project components at a close distance of

less than one tenth of a mile. Construction of the Proposed Action would therefore have a high magnitude of impact on the historic and cultural setting of the Oregon NHT in this location.

- In general, the numerous braided trail segments in the general vicinity of the two Oregon Trail Flagstaff Hill and White Swan ACECs (Flagstaff Hill/Virtue Flat Analysis Unit) have retained their integrity of historic setting. Although the Proposed Action crosses BLM land in three principal areas, including the White Swan ACEC, the transmission line would not physically impact any of the BLM-managed trail segments. The transmission line is located in closest proximity to area just south of the Oregon Trail ACEC – Flagstaff Hill, approximately 0.6 mile to the west. In this location, the integrity of the historic setting is retained as the surrounding sage steppe landscape remains largely the same as it did during the historic period. For these reasons, construction of the Proposed Action in this location would have a moderate magnitude of impact on the historic setting of the Oregon NHT. Historic setting would be retained where the congressionally designated route and its multiple travel paths span the Flagstaff Hill and White Swan ACECs. Although modern development is visible from all of these ACEC locations, these modifications are subordinate to the historic scenic values and are representative of their original setting. As such, the magnitude of impact on the historic and cultural setting of the Oregon NHT in these locations would also be moderate.
- Despite existing impacts from modern development and erosion, 13 segments of the Oregon NHT on BLM land in the general vicinity of area between Quartz and Huntington (Burnt River Canyon Analysis Unit) have retained their historic setting. The Proposed Action, as planned, would intersect with the braided trail segments and congressionally designated route of the Oregon NHT in six areas, although none of these crossings occur on BLM land. However, the trail segments located within the Straw Ranch I and II ACECs, respectively do not show evidence of having been impacted by subsequent use or alterations. In particular, several sets of trail ruts in excellent condition are retained in the vicinity of Straw Ranch I. For these reasons, the magnitude of impact on the historic and cultural setting of the Oregon NHT would range from moderate to high magnitude of impact in this portion of the trail.
- As previously discussed, the historic setting of the Oregon NHT resources in the general vicinity of Adrian (South Alternative Analysis Unit) has diminished integrity due to residential and agricultural development. As planned, the Proposed Action would not intersect with either the congressionally designated route or its parallel alignment; only an approximately 0.7-mile-long section of the trail on BLM land near the southern end of the Proposed Action is located within 0.5 mile of the centerline. Due to the distance of the proposed transmission line to the trail routes, as well as the presence of numerous modern intrusions in this location, construction of the transmission line would have a low magnitude of impact on the historic and cultural setting of the Oregon Trail within the southern end of the analysis area.

Summary of High and Moderate Impacts on the Nature and Purpose and Primary Uses of the Oregon National Historic Trail

- There would be 13 high and 20 moderate impacts associated with the Proposed Action on the nature and purpose and primary uses of the Oregon NHT.

Proposed Action (Including 138/69-kV Rebuild Alternative) – Meek Cutoff Study Trail

Visual Resources

- Within the foreground (up to 0.5 mile from the trail), the Proposed Action would not be visible from the Meek Cutoff Study Trail.
- Within the middleground (0.5 mile to 5 miles from the trail), people would experience low impacts associated with the spatial relationship of the project components because the Proposed Action would create a low contrast as compared to other features in the landscape.

Cultural and Historic Resources

- No trail-related cultural resources, other than the historic alignment of the trail itself, have been identified. A small section of the trail on private land in Malheur County, Oregon was evaluated during the 2013 RLS. The newly-recorded segment of trail, assigned site number B2H-MA-003, was recommended not eligible for listing in the NRHP due to lack of integrity as the site was previously impacted by road construction (Tetra Tech 2013:13). Due to this recommendation, the magnitude of impact resulting from construction of the Proposed Action would be none.

Cultural and Historic Settings

- One section of the Meek Cutoff trail is located within the 5-mile analysis area of the Proposed Action. Although this portion is located within an incised canyon, the transmission line would be visible as it is sited roughly 1.3 miles to the west. Desktop analysis suggests that this segment of trail has been only minimally impacted by modern development. Although intrusions are visible from multiple vantage points along the trail, the majorities of these features is at a higher elevation than the trail segment and are thus not visible or are shielded from view by the steep canyon walls and surrounding hills. For these reasons, as well as the proximity of the Proposed Action to the trail segment, construction of the transmission line would have a moderate magnitude of impact on the historic and cultural setting of the Meek Cutoff at this location.

Proposed Action (Including 138/69-kV Rebuild Alternative) – Goodale's Cutoff Study Trail

Visual Resources

- The portion of the Goodale's Cutoff Study Trail that would be within the analysis area of the Proposed Action lies within the Baker Valley to Powder River geographic area. Within the foreground in the Baker Valley to Powder River area, the Proposed Action would be predominantly skylined, with unobstructed views of the project components, and would dominate the visual setting. For these reasons, as well as the proximity of the project components to the trail segment, the Proposed Action would have a high level of contrast when viewed from this portion of the Goodale's Cutoff Study Trail.
- Within the middleground, the Proposed Action would be equally backdropped against rolling hills and skylined, and would be partially obstructed. The project components would begin to attract attention and be visually subordinate within the visual setting. The Proposed Action would have a moderate level of contrast when viewed from this portion of the Goodale's Cutoff Study Trail.

Cultural and Historic Resources

- A segment of the trail on BLM and private land, referred to as Goodale's/Sparta Trail (B2H-BA-327), was identified during the 2013 RLS of the analysis area. Although this segment was not evaluated as part of this effort, it was recommended for further study during the ILS (Tetra Tech 2013:13). This segment, however, was not evaluated because it is not within the 5-mile analysis area of the Proposed Action.

Cultural and Historic Settings

- In many of the areas where trail segments are present on BLM land, modern intrusions have diminished the integrity of historic setting. In total, approximately ten of the roughly 31 trail segments would fall within the 5-mile analysis area of the Proposed Action. Of these trail segments, six would be subject to visual impacts from the proposed transmission line. As previously discussed, many of the trail alignments parallel modern roads, and intrusions associated with agricultural development and ranching have impacted the historic setting of trail segments in the eastern and westernmost portions of the 5-mile analysis area. Because the historic setting of the trail segments along Ruckles Creek and Ruckles Creek Road (in the Baker Valley to Lower Powder Valley geographic area) has been only minimally impacted by modern development, construction of the Proposed Action in these locations would have a moderate magnitude of impact on the historic and cultural setting of these trail segments.

Segment 1 – Morrow - Umatilla

There would be no direct or indirect impacts related to the BLM Manual 6280 analysis for the Horn Butte, and Longhorn alternatives and the Longhorn Variation as well as the Proposed Action within Segment 1, because the project components associated with these alternatives and the Proposed Action would not be visible from the trail segments on BLM-managed lands.

Segment 2—Blue Mountains

Glass Hill Alternative – Oregon National Historic Trail

Visual Resources

- The portion of the Oregon NHT Trail that would have views of the Glass Hill Alternative is just south of Hilgard. Within the foreground, this alternative would be predominantly skylined and would dominate the visual setting. For these reasons, as well as the proximity of the project components to the trail segment, the Glass Hill Alternative would have a high level of contrast when viewed from this portion of the Oregon NHT.
- Project components associated with the Glass Hill Alternative would not be seen within the middleground area from the Oregon NHT.

Historic and Cultural Resources

- The Glass Hill Alternative would potentially impact the Whiskey Creek Site in the BLM's Oregon NHT Management Plan (Oman 1989:64). This alternative would cross the unevaluated site approximately 0.2 mile east of its western terminus on BLM land. Although the NRHP eligibility of the trail trace and stone marker have not yet been determined, the landscape and scenery in this area is both beautiful and panoramic and these rare resources would be impacted by construction of this alternative. Impacts on character defining features of the Trail and/or associated resources would be undetermined for the linear platform.

Historic and Cultural Settings

- Of the numerous braided trail segments of the Oregon NHT located on BLM land in the general vicinity between Bodie and Hilgard (Blue Mountain Analysis Unit), only one alignment is located within the 5-mile analysis area of the Glass Hill Alternative. The historic setting at this location has been diminished by numerous modern intrusions including gravel and two-track roads, fences, and an existing H-frame transmission line. Additionally, it is unclear if the trail trace in this location, which has been permanently altered by the construction of Mill Canyon Road, represents the remains of a historic wagon road or an alternate route of the Oregon NHT. Due to this modern development and the unclear association of the trail segment to the Oregon NHT, the magnitude of impact related to the Glass Hill Alternative would be none.

Summary of High and Moderate Impacts on the Nature and Purpose and Primary Uses of the Oregon National Historic Trail

- There would be one high impact associated with this alignment, for a total of one adverse impact on the nature and purpose and primary uses of the Oregon NHT.

Section of the Proposed Action Compared to Glass Hill Alternative- Oregon NHT

Visual Resources

- Similar to the Glass Hill Alternative.

Historic and Cultural Resources

- Similar to the Glass Hill Alternative.

Historic and Cultural Settings

- As previously discussed, the historic setting of the trail segment has already been diminished by modern intrusions including fence lines, two-track roads, I-84 (which is both visible and audible), and clusters of ranch buildings. As such, the impact on the historic and cultural setting in this location would generally be low.

Nature and Purpose and Primary Uses of the Oregon National Historic Trail

There would be four high adverse impacts associated with this alignment, for a total of one adverse impact on the nature and purpose and primary uses of the Oregon NHT

Segment 3—Baker Valley Segment

Timber Canyon Alternative – Oregon National Historic Trail

Visual Resources

- Project components associated with the Timber Canyon Alternative would not be seen within the foreground area from the Oregon NHT.
- The portion of the Oregon NHT Trail that would have views of the Timber Canyon Alternative is in the general vicinity of area between Quartz and Huntington (Burnt River Canyon Analysis Unit). Within the middleground, this alternative would be predominantly unobstructed but would not be visual evident. For these reasons, the Timber Canyon Alternative would have a negligible level of contrast when viewed from this portion of the Oregon NHT.

Historic and Cultural Resources

- Previously recorded trail-related cultural resources include four NRHP eligible segments of the Oregon NHT identified in the 2013 RLS as Straw Ranch I and II, Swayze Creek, and Powell Creek (Tetra Tech 2013). As none of these resources are located within the 5-mile analysis area of the Timber Canyon Alternative, the magnitude of impact on these cultural resources was not evaluated.

Historic and Cultural Settings

- The trail segments on BLM land in the general vicinity of area between Quartz and Huntington (Burnt River Canyon Analysis Unit) have generally retained their scenic value and are representative of their historic setting. As previously discussed, the integrity of historic setting of the Oregon NHT south of Durkee has been notably diminished by the development of agricultural fields, industrial and circulation features, and power transmission structures. As such, the magnitude of impact resulting from construction of the Timber Canyon Alternative would be none as the historic and cultural setting at this location would not be affected.

Number of Adverse (High and Moderate) Impacts on the Nature and Purpose and Primary Uses of the Oregon National Historic Trail

- There would be no high or moderate impacts on the nature and purpose and primary uses of the Oregon NHT.

Timber Canyon Alternative – Goodale's Cutoff Study Trail

Visual Resources

- The portion of the Goodale's Cutoff Study Trail that would be within the analysis area of the Timber Canyon Alternative lies within the Lower Powder Valley to Eagle Valley and Eagle Valley to Posey Valley geographic areas. Within the foreground in Lower Powder Valley to Eagle Valley area, the Timber Canyon Alternative would be predominantly backdropped against the landforms with intermittent views of the project components. The Timber Canyon Alternative would not be visible in the foreground of the Eagle Valley to Posey Valley area. For these reasons, as well as the proximity of the project components to the trail segment, the Timber Canyon Alternative would have a moderate level of contrast when viewed from this portion of the Goodale's Cutoff Study Trail in the Lower Powder Valley to Eagle Valley area but none in the Eagle Valley to Posey Valley area.
- Within the middleground, the Timber Canyon Alternative would be predominantly backdropped against landforms within the Lower Powder Valley to Eagle Valley and Eagle Valley to Posey Valley geographic areas—with intermittent views of the project components. The project components would not attract attention within the visual setting of these geographic areas. The Timber Canyon Alternative would not be visually evident when viewed from this portion of the Goodale's Cutoff Study Trail.

Historic and Cultural Resources

- No trail-related cultural resources, other than the historic alignment of the trail itself, have been identified within the four general areas of Goodale's Cutoff Study Trail. A segment of the trail on BLM and private land, referred to as Goodale's/Sparta Trail (B2H-BA-327), was identified during the 2013 reconnaissance level survey of the analysis area. Although this segment was recommended for further study during the inventory level survey, the magnitude of impact on the Goodale's/Sparta Trail would be none based on the proposed location of the Timber Canyon Alternative.

Historic and Cultural Settings

- Within the analysis area of the Timber Canyon Alternative, modern intrusions have already diminished the existing integrity of setting in many areas where trail segments are present on BLM land. While modern intrusions have impacted the historic setting of these trail segments, the segments largely retain their historic and cultural setting. As such, construction of the Timber Canyon Alternative would have a moderate magnitude of impact on the historic and cultural setting of the Goodale's Cutoff Study Trail segments located on BLM land within the Lower Powder Valley to Eagle Valley and the Eagle Valley to Posey Valley geographic areas.

Section of the Proposed Action Compared to Timber Canyon Alternative – Oregon National Historic Trail

Visual Resources

- The portion of the Oregon NHT Trail that would have views of the section of the Proposed Action that is equivalent to the Timber Canyon Alternative would experience a range of impacts from negligible to high in both the foreground and middleground. When this portion of the Proposed Action would be predominantly skylined, it would dominate the visual setting and create a high level of contrast, as would be the case in several locations between Quartz and Huntington. Overall, this section of the Oregon NHT would not see this portion of the Proposed Action; however, when it would be visible from the trail, the impact would be a moderate level of contrast.

Historic and Cultural Resources

- None of the previously-recorded, trail-related historic and cultural resources located on BLM land in the general vicinity of the two Oregon Trail Flagstaff Hill and White Swan ACECs (Flagstaff Hill/Virtue Flat Analysis Unit) would be impacted by this section of the Proposed Action that would be comparable to the Timber Canyon Alternative. The NRHP-eligible Flagstaff Hill and White Swan Segments of the Oregon NHT, and their contributing resources—the Meeker Marker and Flagstaff Hill Monument—are all located approximately 0.5 mile from the route's centerline of this section of the Proposed Action. The magnitude of impact on the historic and cultural setting of the trail segments in these locations is anticipated to be high, however. As such, construction of the route would have a moderate magnitude of impact on the NRHP-eligible trail segments in these locations.

Historic and Cultural Settings

- As planned, this portion of the Proposed Action would cross the congressionally designated route and trail segments southwest of the NHOTIC through the open and expansive Virtue Flat landform. Although the route crosses BLM land in three principal areas, including the White Swan ACEC, the transmission line would not directly impact any of the BLM-managed trail segments. The route is located in closest proximity in the area south of the Oregon Trail ACEC – Flagstaff Hill. In this general location, the integrity of the historic setting is retained as the surrounding sage steppe landscape remains largely the same as it did during the historic period, with the only modern intrusions to the setting occurring to the south and east. For these reasons, construction of the route in this location would have a moderate magnitude of impact on the historic setting of the Oregon NHT. Historic setting is also retained where the congressionally designated route and its multiple travel paths span the Flagstaff Hill and White Swan ACECs. Although modern development is visible from these locations of the Oregon NHT, these modifications are subordinate to the strong scenic values and are representative of their original setting. As such, the magnitude of impact on the historic and cultural setting of the Oregon NHT in these locations would also be moderate.
- Trail segment located within the Straw Ranch I and II ACECs and along Swayze Creek, would not be directly affected; however, impacts on the historic and cultural setting of the trail segments are anticipated. For this reason, the magnitude of impact of this section of the Proposed Action compared to the Timber Canyon Alternative would be moderate for these segments of Oregon NHT.

Nature and purpose and primary uses of the Oregon NHT

- The compared-to section of the Proposed Action would have more high and moderate impacts than the Timber Canyon Alternative.

Section of the Proposed Action Compared to Timber Canyon Alternative -Goodale's Cutoff Study Trail

Visual Resources

- The portion of the Goodale's Cutoff Study Trail that would be within the analysis area of the section of the Proposed Action that is equivalent to the Timber Canyon Alternative lies within the Baker Valley to Powder Valley geographic area. Within the foreground, the compared-to segment of the Timber Canyon Alternative would be predominantly skylined, with unobstructed views of the project components, and would dominate the visual setting. For these reasons, as well as the proximity of the project components to the trail segment, this section of the Proposed Action would have a high level of contrast when viewed from this portion of the Goodale's Cutoff Study Trail.
- Within the middleground, the section of the Proposed Action that would be equivalent to the Timber Canyon Alternative would be equally backdropped against rolling hills and skylined, and the project components would be partially obstructed. The project components would attract attention and begin to dominate the visual setting. This section of the Proposed Action would

have a moderate level of contrast when viewed from this segment of the Goodale's Cutoff Study Trail.

Historic and Cultural Resources

- No trail-related cultural resources, other than the historic alignment of the trail itself, have been identified within the four general areas of the Goodale's Cutoff Study Trail. A segment of the trail that is on BLM and private land, referred to as Goodale's/Sparta Trail (B2H-BA-327), was identified during the reconnaissance level survey of the analysis area. Although this trail segment was recommended for further study during the inventory level survey, the magnitude of impact on the Goodale's/Sparta Trail would be none due to this section of the Proposed Action equivalent to the Timber Canyon Alternative.

Historic and Cultural Settings

- Modern intrusions have diminished the integrity of setting in many of the areas where trail segments are present on BLM land in the analysis area of this section of the Proposed Action,. While modern intrusions have impacted the historic setting of these trail segments, and the segments largely retain their historic and cultural setting. As such, construction of the this section of the Proposed Action that would be equivalent to the Timber Canyon Alternative would have a moderate magnitude of impact on the historic and cultural setting of the trail segments located on BLM land within the Baker Valley to Powder Valley geographic areas.

Flagstaff Alternative – Oregon Trail NHT

Visual Resources

- Near the Oregon Trail ACEC – Flagstaff Hill (Flagstaff Hill/Virtue Flat Analysis Unit), views of the project components from the Oregon NHT would be equally backdropped against terrain and skylined. The Flagstaff Alternative would be visually prominent in the landscape and create a moderate level of contrast in the foreground of the Oregon Trail NHT. There would be no impact to the portion of the Oregon NHT south of the Oregon Trail ACEC – Straw Ranch II (Burnt River Canyon Analysis Unit) in the foreground because of the Flagstaff Alternative would not be visible from the trail.
- In the middleground, because of the distance from Oregon NHT in the vicinity of the Oregon Trail ACECs (Flagstaff Hill/Virtue Flat and the Burnt River Canyon Analysis Units) combined with views of the project components predominately backdropped against the terrain, the Flagstaff Alternative would not attract attention, and the impacts to the visual resource would be negligible.

Historic and Cultural Resources

- None of the previously-recorded, trail-related cultural resources on BLM land near the Oregon Trail ACECs (Flagstaff Hill/Virtue Flat Analysis Unit) would be directly impacted by the Flagstaff Alternative. The NHOTIC, identified as a high-potential historic site (No. 106) in the NPS CMUP, is situated on top of Flagstaff Hill and overlooks the transmission line, which is sited approximately 1.2 miles to the northwest. Additionally, the NRHP-eligible

Flagstaff Hill and White Swan Segments of the Oregon NHT, and their contributing resources—the Meeker Marker and Flagstaff Hill Monument—are all located more than 0.5 mile from the centerline and would not be directly impacted by construction of the Flagstaff Alternative. However, impacts on the historic setting of the NRHP-eligible trail segments are anticipated. As such, the magnitude of impact resulting from construction of Flagstaff Alternative would be high.

- Previously recorded trail-related cultural resources include the four NRHP-eligible segments of the Oregon NHT identified in the 2013 reconnaissance level survey as Straw Ranch I and II, Swayze Creek, and Powell Creek (Tetra Tech 2013). One of these resources would have views of the Flagstaff Alternative and a moderate magnitude of change is expected from that location.

Historic and Cultural Settings

- Despite some impacts due to modern development, the four segments of the Oregon NHT near Oregon Trail ACECs (Flagstaff Hill/Virtue Flat Analysis Unit) on BLM land have retained their integrity of historic setting. The Flagstaff Alternative would intersect with the braided trail segments and congressionally designated route of the Oregon NHT in three areas, although none of these crossings occur on BLM land. The trail segments in these locations have been previously impacted by the construction of State Highway 86 and the NHOTIC on the top of Flagstaff Hill, yet several sets of trail ruts in excellent condition remain in their vicinity. For this reason, construction and operation of the Flagstaff Alternative would have a moderate magnitude of impact on the historic setting of the Oregon NHT near the Oregon Trail ACEC-Flagstaff Hill.

Number of Adverse (High and Moderate) Impacts on the Nature and Purpose and Primary Uses of the Oregon National Historic Trail

- There would be one high and three moderate impacts associated with this alignment, for a total of four adverse impacts on the nature and purpose and primary uses of the Oregon NHT.

Flagstaff Alternative– Goodale's Cutoff Study Trail

Visual Resources

- The portion of the Goodale's Cutoff Study Trail that would be within the analysis area of the Flagstaff Alternative lies within the Baker Valley to Powder River geographic area. Within the proximity of the project components to the trail segment, the Flagstaff Alternative would have a high level of contrast when viewed from this portion of the Goodale's Cutoff Study Trail in the foreground.
- Within the middleground, the Flagstaff Alternative would be backdropped against rolling hills and skylined and would be partially obstructed. The project components would not attract

attention within the visual setting. This alternative would have a negligible level of contrast when viewed from this portion of the Goodale's Cutoff Study Trail.

Historic and Cultural Resources

- No trail-related cultural resources, other than the historic alignment of the trail itself, have been identified within the four general areas of the Goodale's Cutoff Study Trail. A segment of the trail on BLM and private land, referred to as Goodale's/Sparta Trail (B2H-BA-327), was identified during the 2013 reconnaissance level survey of the analysis area. Although this segment was recommended for further study during the inventory level study, the magnitude of impact on the Goodale's Study Trail from the Flagstaff Alternative would be none due to its proposed location.

Historic and Cultural Settings

- Due to the expansive nature of the Goodale's Cutoff AU, much of the integrity of the broader historic setting is intact. However, in many of the areas where trail segments are present on BLM land the historic and cultural setting of these segments have been diminished by modern intrusions. The proposed Flagstaff Alternative would cross the westernmost portion of the Goodale's Cutoff Study Trail only and would not intersect with any of the braded trail segments located within it. In total, seven of the roughly 31 trail segments would fall within the 5-mile analysis area of the Flagstaff Alternative in the Baker Valley to Lower Powder Valley geographic area. Three of these trail segments would be subject to visual impacts from the Flagstaff Alternative. Modern intrusions such as State Highway 86 and agricultural and ranching development have compromised the historic setting of these trail segments. As such, the magnitude of impact from construction of the Flagstaff Alternative would be none.

Section of the Proposed Action Compared to Flagstaff Alternative– Oregon NHT

Visual Resources

- Most of the Oregon NHT near the Oregon Trail ACEC – Flagstaff Hill (Flagstaff Hill/Virtue Flat Analysis Unit), would have no or negligible views of the project components. Views from the portion of the trail near the east rim of the Ruckles Creek would be equally backdropped against terrain and skylined with the construction of the section of the Proposed Action that would be comparable to the Flagstaff Alternative. This portion of the Proposed Action would be visually dominate in the landscape and create a high level of contrast in the foreground of the Oregon Trail NHT. There would be no impact to the portion of the Oregon NHT south of the Oregon Trail ACEC – Straw Ranch II (Burnt River Canyon Analysis Unit) in the foreground because this section of the Proposed Action would not be visible from the trail.

- Similarly in the middleground, most of the Oregon NHT near the Oregon Trail ACEC – Flagstaff Hill (Flagstaff Hill/Virtue Flat Analysis Unit) would have no or negligible views of the project components. Views from the portion of the trail near the east rim of the Ruckles Creek would be predominately skylined views of the section of the Proposed Action that

would be comparable to the Flagstaff Alternative. This portion of the Proposed Action would be visually prominent in the landscape and create a moderate level of contrast in the foreground of the Oregon Trail NHT.

Historic and Cultural Resources

- This section of the Proposed Action would have similar impacts to historic and cultural resource as the Flagstaff Alternative.

Historic and Cultural Settings:

- In general, the numerous braided trail segments within the Flagstaff Hill/Virtue Flat area have retained their integrity of historic setting. The section of the Proposed Action that would be comparable to the Flagstaff Alternative, as planned, would cross the congressionally designated route and trail segments on BLM land in one principal location to the southeast of the NHOTIC. This section of the Proposed Action would be located in closest proximity to the portion of the Oregon NHT, where it is sited 0.6 mile to the west. In this location near the Ruckles Creek drainage, the historic setting is retained as the surrounding sage steppe landscape remains largely the same as it did during the historic period, with the only modern intrusions to the setting occurring to the south and east. For these reasons, construction of this section of the Proposed Action in this location would have a moderate magnitude of impact on the historic setting of the Oregon NHT.
- Historic setting is also retained where the congressionally designated route and its multiple travel paths span the Flagstaff Hill and White Swan ACECs. Although modern development including the NHOTIC, is visible from all of these locations, the modifications are subordinate to the strong scenic values and are representative of their original setting. As such, the magnitude of impact on the historic and cultural setting of the Oregon NHT in these locations would be moderate
- Despite moderate impacts due to modern development and erosion, the four segments of the Oregon NHT on BLM land in the Burnt River Canyon area have retained their integrity of historic setting. The section of the Proposed Action that would be comparable to the Flagstaff Alternative, as planned, would intersect with the braided trail segments and congressionally designated route of the Oregon NHT in one area on non-BLM land. As previously discussed, the historic setting of the trail segment southeast of the community of Pleasant Valley has been impacted due to prominent modern circulation features and development associated with mining and power transmission. Similarly, modern intrusions have diminished the integrity of historic and cultural setting for the representative trail segments west of Dogtown Creek. As such, the magnitude of impact to these locations would be none by the portion of the Proposed Action that would be comparable to the Flagstaff Alternative.
- For the Oregon NHT trail traces that are located within canyons or at a low enough elevation that the transmission line would be screened from view or their setting in the

direction of this portion of the Proposed Action has not been impacted by modern intrusions. Additionally, the trail segment located within the Straw Ranch I ACEC does not show evidence of having been impacted by subsequent use or alterations. For these reasons, the magnitude of impact on the historic and cultural setting of the Oregon NHT north of I-84 and south of Virtue Flat would be moderate, and construction of the transmission line would have a high magnitude of impact near Straw Ranch I ACEC.

Nature and purpose and primary uses of the Oregon NHT

- There would be six high and eight moderate impacts associated with this alignment, for a total of 14 adverse impacts on the nature and purpose and primary uses of the Oregon NHT.

Section of the Proposed Action Compared to Flagstaff Alternative– Goodale's Study Trail

Visual Resources

- There would be no impacts from the Lower Powder Valley to Eagle Valley, Eagle Valley to Posey Valley, or Snake River near Indian Head Mountain geographic areas because this section of the Proposed Action that would be comparable to the Flagstaff Alternative is not located within the analysis area.
- The portion of the Goodale's Cutoff Study Trail that would be within the analysis area of the section of the Proposed Action that is equivalent to the Flagstaff Alternative lies within the Baker Valley to Powder Valley geographic area. Within the foreground, the Proposed Action compared-to segment of the Timber Canyon Alternative would be predominantly skylined, with unobstructed views of the project components, and would dominate the visual setting. For these reasons, as well as the proximity of the project components to the trail segment, this section of the Proposed Action would have a high level of contrast when viewed from this portion of the Goodale's Cutoff Study Trail in the foreground.
- Within the middleground, the section of the Proposed Action that would be equivalent to the Flagstaff Alternative would be predominantly skylined with unobstructed views of the project components. The project components would attract attention and begin to dominate the visual setting. This section of the Proposed Action would have a moderate level of contrast when viewed from this segment of the Goodale's Cutoff Study Trail.

Historic and Cultural Resources

- Identified historic and cultural resources are limited to the trail segments under study. A segment of the trail on BLM and private land, referred to as Goodale's/Sparta Trail (B2H-BA-327), was identified during the 2013 reconnaissance level survey of the analysis area. Although this segment was not evaluated as part of this effort, it was recommended for further study during the inventory level survey (Tetra Tech 2013:13). This trail segment, however, is not within the 5-mile analysis area of the section of the Proposed Action that would be comparable to the Flagstaff Alternative. Therefore, the magnitude of impact on the segment of the Goodale's/Sparta Trail on BLM land within the Goodale's Cutoff AU was not evaluated.

Historic and Cultural Settings

- Many of the areas where Goodale's Cutoff Study Trail segments are present on BLM land modern intrusions have diminished the integrity of historic setting. In total, approximately ten of the roughly 31 trail segments would fall within the 5-mile analysis area of the section of the Proposed Action that would be comparable to the Flagstaff Alternative. Of these trail segments, six would be subject to visual impacts from the proposed transmission line. Because the historic setting of the trail segments along Ruckles Creek and Ruckles Creek Road has been only minimally impacted by modern development, construction of this section Proposed Action in these locations would have a moderate magnitude of impact on the historic and cultural setting of these trail segments.

Burnt River Mountain Alternative – Oregon NHT

Visual Resources

- Two areas of the Oregon NHT, one to the west of Prichard Creek north of Durkee and the second, trail segment to the east of Quartz Gulch near Weatherby would experience high impacts associated with the contrast of the project components in the foreground because the Burnt River Mountain Alternative would visually dominate people's views at these locations along the trail.
- Within the middleground, people's views from the Oregon NHT would experience low to moderate impacts associated with the spatial relationship of the project components because the Burnt River Mountain Alternative would be visually subordinate to visually prominent in the landscape.

Historic and Cultural Resources

- Previously recorded trail-related cultural resources within the Burnt River Canyon are include four NRHP-eligible segments of the Oregon NHT identified in the reconnaissance level survey as Straw Ranch I and II, Swayze Creek, and Powell Creek (Tetra Tech 2013). Straw Ranch I and Swayze Creek would be subject to visual impacts from the Burnt River Mountain Alternative as they would be located only 0.5 and 1.5 miles away from the project component, respectively. No impacts were identified for the Straw Ranch II and Powell Creek segments as the transmission line would not be visible or the historic setting has already been compromised by human-made intrusions. With the exception of the Powell Creek segment, all of these trail segments would be documented during the inventory level survey of the analysis area. An additional trail segment located on BLM land has not previously been recorded and would be directly impacted by the Burnt River Mountain Alternative. This trail segment, which has not been evaluated for its NRHP eligibility, would be documented during the inventory level survey of the analysis area.

Historic and Cultural Settings

- Generally, the trail segments on BLM land within the Burnt River Canyon area have retained their scenic character and are representative of their historic setting. As planned, the Burnt River Mountain Alternative would intersect the congressionally designated route,

braided trail segments, and Auto Tour Route at two locations. One crossing of the congressionally designated route is located on BLM land. In total, eight of the 13 trail locations in the inventory level survey would be subject to visual impacts from this alternative. The Burnt River Mountain Alternative would come in closest proximity to Oregon NHT segments on BLM land, which is located 0.5 mile from the project components.

- Modern intrusions including existing transmission lines, I-84 (which is both visible and audible from multiple locations) and Lookout Mountain Road, a communication tower, and the tracks of the Union Pacific Railroad have diminished the historic setting for the representative trail segments just south of Weatherby. The construction of the Burnt River Mountain Alternative would have a low magnitude of impact on the historic and cultural setting in these locations. The trail segments located within the Straw Ranch II ACEC do not show evidence of having been impacted by subsequent use or alterations. Several sets of trail ruts in excellent condition are retained in this ACEC. For these reasons, the magnitude of impact on the historic and cultural setting of the Oregon NHT by the Burnt River Canyon Alternative would generally be moderate; however, the construction of the alternative would have a high magnitude of impact on the relatively intact trail segments in the Straw Ranch II ACEC.

Number of Adverse (High and Moderate) Impacts on the Nature and Purpose and Primary Uses of the Oregon National Historic Trail

- There would be 3 high and 6 moderate impacts associated with this alignment, for a total of 9 adverse impacts on the nature and purpose and primary uses of the Oregon NHT.

Section of the Proposed Action Compared to the Burnt River Mountain Alternative – Oregon NHT

Visual Resources

- Similar to the Burnt River Mountain Alternative, the equivalent section of the Proposed Action would create moderate to high impacts associated with the contrast of the project components in the foreground because the alternative would visually dominate people's views at locations along the trail north of Durkee and near Weatherby. There would predominately be none to negligible impacts to majority of the area within this section of the Proposed Action because of the lack of visibility.

- Within the middleground, people's views from the Oregon NHT would experience low to moderate impacts associated with the spatial relationship of the project components because the section of the Proposed Action comparable to the Burnt River Mountain Alternative would be visually subordinate to visually prominent in the landscape similar to the Burnt River Mountain Alternative.

Historic and Cultural Resources

- Previously recorded trail-related cultural resources within the Burnt River Canyon area include four NRHP-eligible segments of the Oregon NHT identified in the 2013 RLS as Straw Ranch I and II, Swayze Creek, and Powell Creek (Tetra Tech 2013). These trail segments, would not be directly affected by the section of the Proposed Action that would be comparable to the Burnt River Mountain Alternative, but impacts on their historic and cultural setting are anticipated. As such, construction of this portion of the Proposed Action would have a moderate magnitude of impact on these NRHP-eligible segments of the Oregon NHT.

Historic and Cultural Setting

- Generally, the trail segments on BLM land within the Burnt River Canyon area have retained their scenic character and are representative of their historic setting. This section of the Proposed Action that would be comparable to the Burnt River Mountain Alternative, as planned, would intersect with the braided trail segments and congressionally designated route of the Oregon NHT in two areas, neither of which occur on BLM land. In total, ten trail segments in the inventory level survey would fall within the 5-mile analysis area of the sections of the Proposed Action comparable to the Burnt River Mountain Alternative. This section of the Proposed Action would intersect the Oregon NHT most closely north of Weatherby, which is located approximately 0.8 mile to the west.
- Modern intrusions including existing transmission lines, I-84 (which is both visible and audible from multiple locations) and Lookout Mountain Road, a communication tower, and the tracks of the Union Pacific Railroad have diminished the historic setting for the representative trail segments in the Burnt River Canyon area. As such, the route would have a low magnitude of impact in these locations. The Oregon NHT segments located within the Straw Ranch II ACEC do not show evidence of having been impacted by subsequent use or alterations. Several sets of trail ruts in excellent condition are retained in the vicinity of Straw Ranch II ACEC. For these reasons, the magnitude of impact on the historic and cultural setting of the Oregon NHT at five of the trail segments identified in the inventory level survey would be moderate, whereas construction of the route would have a high magnitude of impact at Straw Ranch II ACEC.

Segment 4—Brogan Area Segment

Willow Creek Alternative – Oregon NHT

Visual Resources

- The Willow Creek Alternative would create none to low impact on the Oregon NHT because the project components would not dominate the features in the landscape within the foreground or middleground of the trail and therefore, there would be no high impacts on people's views.

Historic and Cultural Resources

- No trail-related cultural resources, other than the historic alignment of the trail itself, have been identified within the Burnt River Canyon area, which is roughly from the Oregon Trail ACEC-Straw Ranch II down to the community of Huntington. The 0.25-mile-long braided segment of trail located within a canyon to the east of the Willow Creek Alternative would not be subject to visual impact by the alternative, nor would it be crossed by project components. Therefore, the magnitude of impact on the trail resulting from construction of the Willow Creek Alternative would be none.
- Historic and cultural resources between in general the communities of Huntington and Vale (Alkali Springs/Tub Mountain Analysis Unit) include three discontinuous alignments of the Oregon NHT known as the Birch Creek, Alkali Springs, and Tub Mountain segments (Tetra Tech 2013). All three of these segments are located entirely within ACECs. Additionally, the Alkali Springs segment is considered to be a high-potential route segment (No. 7) by the NPS. This segment, as defined by the NPS CMUP (NPS 1999:286), begins 6 miles north of the present-day community of Vale and extends north to a former emigrant camp site at Willow Springs. All three segments are recommended as eligible for listing in the NRHP and further documentation during the inventory level survey. Although the Willow Creek Alternative would not cross any of these Oregon NHT segments, it is anticipated that the project components would have a moderate magnitude of impact on the segments of trail in this area.

Historic and Cultural Settings

- The trail segments on BLM land roughly located in the area between the Oregon Trail ACEC-Straw Ranch II down to Huntington (Burnt River Canyon Analysis Unit), have generally retained their scenic values and remain representative of their historic setting. The proposed Willow Creek Alternative would not cross any congressionally designated or braided trail segments within Burnt River Canyon area. Of the 13 trail segment inventories within the Burnt River Canyon area, only one trail segment would fall within the 5-mile analysis area of the Willow Creek Alternative. However, because this trail segment south of Lime is located within the Burnt River Canyon it would not be subject to visual impact from the Willow Creek Alternative, and therefore the magnitude of impact on its historic and cultural setting in this area would be none.
- Generally, the trail segments on BLM land generally between the communities of Huntington and Vale (Alkali Springs/Tub Mountain Analysis Unit have outstanding scenic values and are representative of their historic setting. As planned, the Willow Creek Alternative would not intersect the congressionally designated route or braided trail segments..
- The Willow Creek Alternative comes in closest proximity to the braided segments east of Bierman Spring. However, due to topography, only the trail segments near Oregon Trail ACEC-Birch Creek would have visibility of the proposed Willow Creek Alternative. The historic setting of the trail segments near the Oregon Trail ACEC- Birch Creek have retained a high level of integrity as it has not been altered by modern intrusions. As the Willow Creek Alternative would be visible to the northwest, construction of the alternative would have a high magnitude of impact the historic and cultural setting from this location.

Number of Adverse (High and Moderate) Impacts on the Nature and Purpose and Primary Uses of the Oregon National Historic Trail

- There would be 2 high and 2 moderate impacts associated with this alignment, for a total of 4 adverse impacts on the nature and purpose and primary uses of the Oregon NHT.

Willow Creek Alternative– Goodale's Cutoff Study Trail

Visual Resources

- There would be no visual impacts associated with the Snake River near Indian Head Mountain geographic area because the Willow Creek Alternative would not be visible from the trail. There would be no impacts from the Baker Valley to Lower Powder Valley, Lower Powder Valley to Eagle Valley, or Eagle Valley to Posey Valley geographic areas because the Willow Creek Alternative is not located within the analysis area.

Historic and Cultural Resources

- No trail-related cultural resources, other than the historic alignment of the trail itself, have been identified within the four general areas of the Goodale's Cutoff Study Trail. A segment of the trail on BLM and private land, referred to as Goodale's/Sparta Trail (B2H-BA-327), was identified during Tetra Tech's reconnaissance level survey of the analysis area in 2013. Although this segment was recommended for further study during the inventory level survey, the magnitude of impact on the Goodale's/Sparta Trail would be none due to the proposed location of the Willow Creek Alternative.

Historic and Cultural Setting

- Many of the areas where Goodale's Cutoff Study Trail segments are present on BLM land modern intrusions have diminished the integrity of setting. The Willow Creek Alternative would not cross any of the braded trail segments under study. In total, two of the roughly 31 trail segments would fall within the 5-mile analysis area of the Willow Creek Alternative. Both of these trail segments are located in the Snake River near Indian Head Mountain geographical area and would potentially be subject to visual impacts from this alternative.
- Modern circulation features including Olds Ferry Road, Interstate 84, and State Highway 201 are present in this area. As the historic setting for both of these trail traces has been previously diminished by these intrusions, the magnitude of impact would be none as construction of the Willow Creek Alternative would have no impact on historic and cultural setting in these locations.

Section of the Proposed Action Compared to the Willow Creek Alternative– Oregon NHT

Visual Resources

- The Willow Creek Alternative would create none to low impact on the Oregon NHT because the project components would not dominate the features in the landscape within the foreground or middleground of the trail and therefore, there would be no high impacts on people's views.

Historic and Cultural Resources

- One cultural resource, represented by the trail trace north of Huntington, is located within the Burnt River Canyon area and within 5 miles of the section of the Proposed Action that would be comparable to the Willow Alternative. Because the NRHP eligibility of this trail trace has not yet been determined, it is not clear what, if any, impacts construction of the route would have on this cultural resource.

Historic and Cultural Settings

- Of the numerous braided segments of the Oregon NHT located on BLM land within the Burnt River Canyon area, which is roughly from the Oregon Trail ACEC-Straw Ranch II down to Huntington, only one trail alignment is located within 5 miles of the Proposed Action. Because this trail trace is located in a canyon, this portion of the Proposed Action comparable to the Willow Creek Alternative would not be visible and the magnitude of impact from its construction would be none.

Nature and purpose and primary uses of the Oregon NHT

- There would be no high or moderate impacts associated with this section of the Proposed Action, for no adverse impacts on the nature and purpose and primary uses of the Oregon NHT.

Tub Mountain South Alternative – Oregon NHT

Visual Resources

- Two of the 11 Oregon NHT segments one north of Birch Creek and the other near Willow Creek in the area between Huntington and Vale (Alkali Springs/Tub Mountain Analysis Area) would experience high impacts associated with the spatial relationship of the project components in the foreground because these components would visually dominate people's views from these platforms.
- Within the middleground, the Oregon NHT segment near Willow Creek people experience any high impacts associated with the spatial relationship of the Tub Mountain South Alternative and impacts to seven other trail segments would range from low to moderate. The remaining three Oregon NHT segments would not have views of the Tub Mountain South Alternative.

Historic and Cultural Resources

- One cultural resource, represented by the trail trace near Huntington, is located within the buffer of the Tub Mountain South Alternative. Because the NRHP eligibility of this trail trace has not yet been determined, it is not clear what, if any, impacts construction of the Tub Mountain South Alternative would have on this cultural resource.
- Historic and cultural resources in the area between Huntington and Vale (Alkali Springs/Tub Mountain Analysis Area) include three discontinuous alignments of the Oregon NHT known as the Birch Creek, Alkali Springs, and Tub Mountain segments (Tetra Tech 2013). All three of these segments are located entirely within ACECs and were assigned site numbers (B2H-MA-042, B2H-MA-10, and B2H-MA-041) during the 2013 reconnaissance level survey of the analysis area (Tetra Tech 2013). Additionally, the Alkali Springs segment is considered to be a high-potential route segment (No. 7) by the NPS as the springs for which the route is named was the only water source for emigrants travelling the 22 mile stretch of trail between the Malheur River and Birch Creek (NPS 1999:286). This segment, as defined by the NPS CMUP (NPS 1999:286), begins 6 miles north of the present-day community of Vale, Oregon and extends north to a former emigrant camp site at Willow Springs. Portions of all three segments are recommended to be eligible for listing in the NRHP. For this reason, it is anticipated that construction of the Tub Mountain South Alternative would have a moderate magnitude of impact on these trail segments.

Historic and Cultural Settings

- Of the numerous braided segments of the Oregon NHT located on BLM land in the area between Huntington and Vale (Alkali Springs/Tub Mountain Analysis Area), only one alignment which is located near Huntington, would be within the 5-mile analysis area of the Tub Mountain South Alternative. Because this trail trace is located in a canyon, the proposed transmission line would not be visible and the magnitude of impact from its construction would be none.
- Generally, the trail segments on BLM land within the Alkali Springs/Tub Mountain have outstanding scenic values and are representative of their historic setting. The Tub Mountain Alternative would not intersect the congressionally designated route or braided trail segments. With the exception of one trail segment, the transmission line is visible from all of the KOP locations within this AU.
- The historic setting of the trail segments southwest of Love Reservoir and east of Bierman Spring have retained as the landscape surrounding these locations has not been impacted by modern development. Therefore, the proposed transmission line would have a high magnitude of impact upon the historic setting of trail traces in these locations. The other Oregon NHT segments however, have been diminished by modern intrusions. As such, the magnitude of impact on historic and cultural setting in these trail segments locations would be none.

Number of Adverse (High and Moderate) Impacts on the Nature and Purpose and Primary Uses of the Oregon National Historic Trail

- There would be 3 high and 10 moderate impacts associated with this alignment, for a total of 13 adverse impacts on the nature and purpose and primary uses of the Oregon NHT.

Tub Mountain South Alternative– Goodale's Cutoff Study Trail

Visual Resources

- There would be no visual impacts associated with the Snake River near Indian Head Mountain geographic area because the Willow Creek Alternative would not be visible from the trail in the foreground. In the middleground, the Tub Mountain South Alternative would create a low level of contrast when viewed from this geographic area. There would be no impacts from the Baker Valley to Lower Powder Valley, Lower Powder Valley to Eagle Valley, or Eagle Valley to Posey Valley geographic areas because the Willow Creek Alternative is not located within the analysis area.

Historic and Cultural Resources

- No trail-related cultural resources, other than the historic alignment of the trail itself, have been identified within the four general areas of the Goodale's Cutoff Study Trail. A segment of the trail on BLM and private land, referred to as Goodale's/Sparta Trail (B2H-BA-327), was identified during Tetra Tech's RLS of the analysis area in 2013. Although this segment was recommended for further study during the ILS, the magnitude of impact on the Goodale's/Sparta Trail would be none due to the location of the Tub Mountain South Alternative.

Historic and Cultural Settings

- Many of the areas where Goodale's Cutoff Study Trail segments are present on BLM land modern intrusions have diminished the integrity of setting. The Tub Mountain South Alternative would not cross any of the braded trail segments. In total, five of the roughly 31 trail segments would fall within the 5-mile analysis area of the Tub Mountain South Alternative. All five of these segments are located in the Snake River near Indian Head Mountain area, and three would be subject to visual impacts from the alternative. As previously discussed, modern circulation features including Olds Ferry Road, I-84, and Highway 201 are present in this area, as well as agricultural and ranching development in the form of fields and buildings. These alterations have impacted the historic setting of these trail segments and, as such, the magnitude of impact on the historic setting in these locations would be none.

Section of the Proposed Action Compared to Tub Mountain South Alternative – Oregon NHT

Visual Resources

- The magnitude of impact from this section of the Proposed Action that would be comparable to the Tub Mountain South Alternative on BLM-managed segments of the Oregon NHT was not evaluated because the trail segments are not within the 5-mile analysis area of this section of the Proposed Action or would not have views of this alternative.

Historic and Cultural Resources

- One cultural resource located on BLM land roughly located in the area between the Oregon Trail ACEC-Straw Ranch II down to Huntington (Burnt River Canyon Analysis Unit), would be within 5 miles of the this section of the Proposed Action that would be comparable to the Tub Mountain South Alternative. Because the NRHP eligibility of this trail trace has not yet been determined, it is not clear what, if any, impacts construction of the route would have on this cultural resource.

Historic and Cultural Settings

- Of the numerous braided segments of the Oregon NHT located on BLM land in the area roughly located in the area between the Oregon Trail ACEC-Straw Ranch II down to Huntington (Burnt River Canyon Analysis Unit), only one alignment would be located within 5 miles of the section of the Proposed Action that would be comparable to the Tub Mountain South Alternative. Because this trail trace is located in a canyon, the Proposed Action route would not be visible and the magnitude of impact from its construction would be none.

Nature and purpose and primary uses of the Oregon NHT

- There would be no high or moderate impacts associated with this section of the Proposed Action, for no adverse impacts on the nature and purpose and primary uses of the Oregon NHT.

Section of the Proposed Action Compared to Tub Mountain South Alternative – Goodale's Cutoff Study Trail

There would be no portions of the Goodale's Cutoff Study Trail on BLM-administered lands in the portion of the Proposed Action that would be comparable to the Tub Mountain South Alternative.

Segment 5—Malheur Segment

There would be no portions of the Oregon NHT, Goodale's Cutoff Study Trail, or Meek Cutoff Study Trail on BLM-administered lands in the Segment 5 of the B2H Project analysis area.

Segment 6—Treasure Valley Segment

There would be no portions of the Oregon NHT, Goodale's Cutoff Study Trail, or Meek Cutoff Study Trail on BLM-administered lands in Segment 6 of the B2H Project analysis area.

3.2.9.9 MITIGATION PLANNING

In consultation with appropriate land-managing agencies, mitigation measures would be developed and incorporated into the final project design to avoid, minimize, and compensate for adverse effects specific to the setting of the trails prior to the issuance of the Final EIS. This Draft EIS describes the ongoing mitigation planning work and the types of mitigation measures available to address residual impacts, but it does not quantify the mitigation that could be required once final project engineering and design is complete. Mitigation measures that could be implemented to reduce residual adverse effects to impacted NHT nature and purpose and primary uses in the B2H Project area include modification of the project and associated elements such as micrositing of towers, use of other tower types, relocation of staging areas, topographic screening and site specific re-routing of the transmission line and/or permanent access roads. For residual impacts that cannot be avoided or minimized, compensatory mitigation may be required and could include actions such as fee-purchases, easements, and restoration work. Mitigation measures could also include, but not be limited to, best management practices (BMPs) from the appendix on BMPs presented in BLM Manual 6280. These BMPs include measures to safeguard the nature and purposes of the Oregon NHT, including NHT-related resources, qualities, values, and associated settings; and the primary use or uses. Monitoring would be included as part of the project design. BMPs may include proactive trail conservation or protection project work commensurate with the level of impact to the resources, qualities, values, and associated settings; and the primary use or uses. Reduction of adverse effects to visual resources would directly benefit the landscape setting of the Oregon and Lewis and Clark NHT and the Goodale's Cutoff and Meek Cutoff Study Trails. Sections 2.2.8.4 and 2.2.10 in Chapter 2 provide more information about mitigation.

3.2.10 AIR QUALITY AND CLIMATE CHANGE

This section describes the existing air quality environment in the B2H Project analysis area and discusses predicted emissions of air pollutants and effects on air quality and climate change from the proposed B2H Project. The regulatory framework, scoping issues, methodology, and affected environment are presented, followed by a discussion of the environmental impacts.

3.2.10.1 REGULATORY FRAMEWORK

FEDERAL

CLEAN AIR ACT

The Environmental Protection Agency (EPA) (2011) summarizes the history of the Clean Air Act of 1970 as follows:

> The legal authority for federal programs regarding air pollution control is based on the 1990 Clean Air Act Amendments (1990 CAAA). These are the latest in a series of amendments made to the Clean Air Act (CAA). This legislation modified and extended the federal legal authority provided by the earlier Clean Air Acts of 1963 and 1970.
>
> . . . The 1990 CAAA substantially increased the authority and responsibility of the federal government. New regulatory programs were authorized for the issuance of stationary source operating permits. The NESHAPs [National Emission Standards for Hazardous Air Pollutants] were incorporated into a greatly expanded program for controlling toxic air pollutants. The provisions for attainment and maintenance of NAAQS were substantially modified and expanded.

The EPA adopted ambient air quality standards in a series of rule makings that are codified in 40 CFR Part 50. The current National Ambient Air Quality Standards (NAAQS) for listed air pollutants are shown in Table 3-254.

Areas in which the NAAQS are being met are called attainment areas, while areas where the standards are not currently being met are called nonattainment areas. Separate procedures have been established for federal review of projects in attainment areas versus nonattainment areas. The proposed B2H Project and alternatives do not traverse any identified nonattainment areas in either Oregon or Idaho.

The EPA has also adopted standards to prevent the significant deterioration of air quality in attainment areas like the B2H Project area. Those regulations address stationary sources for air pollutants. None of the B2H Project construction facilities or activities are considered stationary sources, and none of the operational facilities are large enough to trigger Prevention of Significant Deterioration (PSD) or New Source Review (NSR) program requirements.

Table 3-254. National Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	National Standards Concentration
O_3	1 hour	No current standard
O_3	8 hours	0.075 parts per million, (147 micrograms per cubic meter of air) (3-year average of annual fourth-highest daily maximum)
CO	8 hours	9 parts per million (10,000 micrograms per cubic meter of air)
CO	1 hour	35 parts per million (40,000 micrograms per cubic meter of air)
NO_2	Annual average	0.053 parts per million (100 micrograms per cubic meter of air)
NO_2	1 hour	No current standard
SO_2	Annual average	No current standard
SO_2	24 hours	0.14 parts per million (365 micrograms per cubic meter of air)
SO_2	3 hours	0.5 parts per million (1,300 micrograms per cubic meter of air)
SO_2	1 hour	No current standard
PM_{10}	24 hours	150 micrograms per cubic meter of air
PM_{10}	Annual arithmetic mean	No current standard
$PM_{2.5}$	24 hours	35 micrograms per cubic meter of air (3-year average of 98th percentile)
$PM_{2.5}$	Annual arithmetic mean	15 micrograms per cubic meter of air (3-year average)
Lead	Calendar quarter	0.15 micrograms per cubic meter of air

Table Source: 40 CFR Part 50.

Table Abbreviations: O_3 = ozone; CO = carbon monoxide; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; PM_{10} = particulate matter less than 10 microns (coarse particles); $PM_{2.5}$ = particulate matter less than 2.5 microns (fine particles).

Figure 3-50 identifies areas with air quality designations near the Proposed Action and Alternatives. These include federal Class 1 areas (designated wilderness areas), nonattainment and maintenance areas in Idaho and Oregon, and federal Class 1 areas and areas of concern established by federal land agencies. There are no nonattainment areas, areas of concern, or maintenance areas in the project area.

In addition to the PSD and NSR regulatory programs, the EPA administers other air quality regulatory programs. Table 3-255 summarizes the EPA regulatory programs that do and do not apply to the B2H Project.

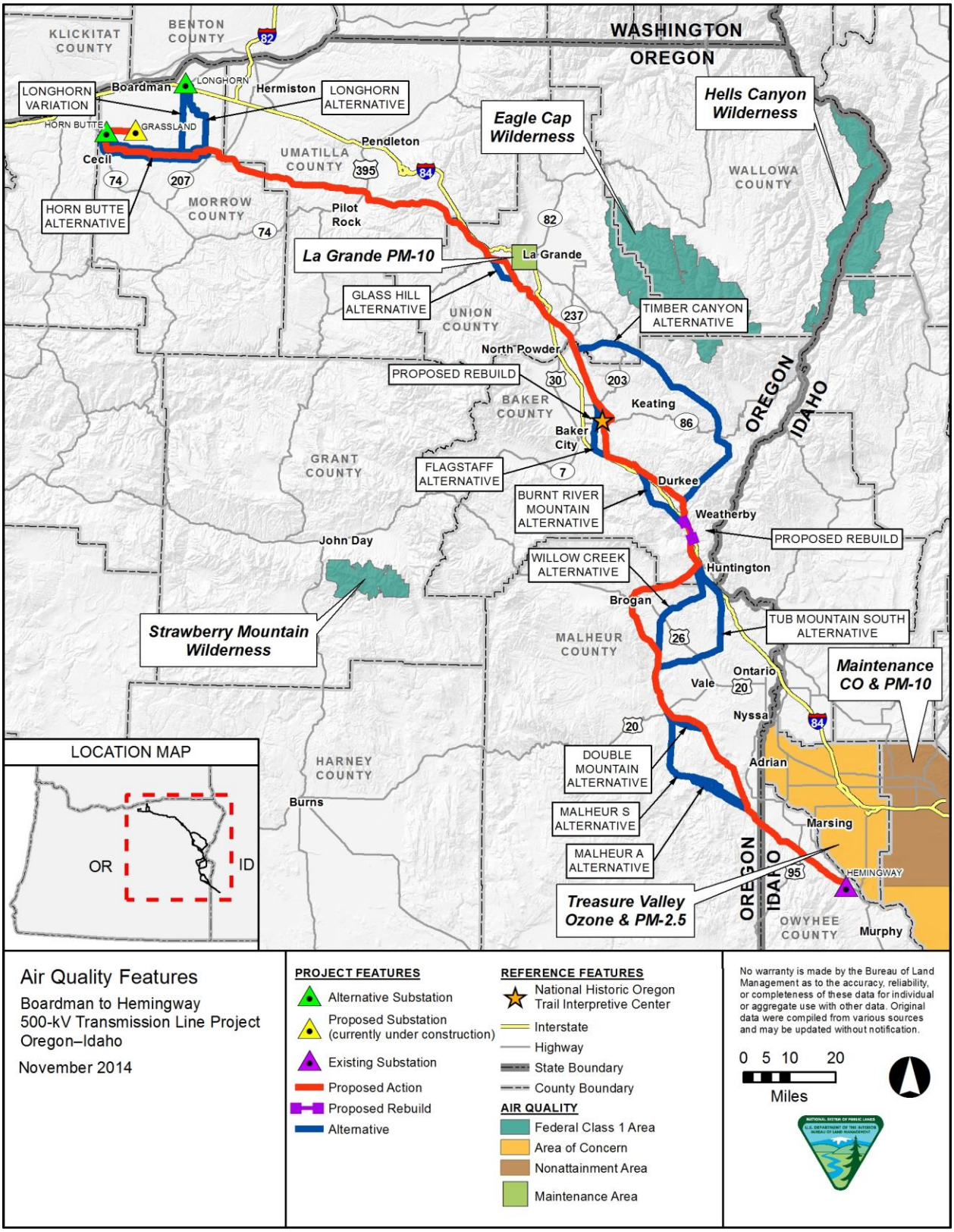


Figure 3-50. Air Quality Features

Table 3-255. Summary of Regulatory Program Applicability

Applicable General Regulatory Programs	Oregon	Idaho
New Source Performance Standards	No	No
Prevention of Significant Deterioration	No	No
New Source Performance Standards [1]	Possibly	Possibly
Title III—National Emissions Standards for Hazardous Pollutants	No	No
Title IV—Acid Rain	No	No
Title V—Part 70 Operating Permits [1]	Possibly	Possibly
General permit requirements [2]	Yes	Yes
Dispersion modeling	No	No
Impact analysis	No	No
Fugitive dust mitigation guidelines	Yes	Yes

Table Notes: [1] New Source Performance Standards and the application of Title V may be invoked by the siting and use of communication-site standby generator engines. Program applicability would be determined through consultation with the state air agencies. [2] Permits may be required for portable concrete batch plants.

New Source Performance Standards

No New Source Performance Standards applicable to construction activities on transmission lines and substations (construction or expansion) exist. However, IPC would consult with the state air quality agencies to determine whether any New Source Performance Standards apply to the communication-site standby generator engines.

Title V Operating Permits

Currently, no Title V regulations applicable to construction activities on transmission line and substation construction or expansion exist. However, IPC would consult with the state air quality agencies to determine whether Title V is applicable to the communication-site standby generator engines and potential pollutant loads associated with permanent or temporary generators.

Conformity with State Implementation Plan

Neither the proposed B2H Project nor any of the alternatives are located in any known federally designated nonattainment areas; therefore, a conformity determination is not required.

USFS Land and Resource Management Plan

The proposed B2H Project crosses approximately 6 miles of the Wallowa-Whitman National Forest. The Wallowa-Whitman *Land and Resource Management Plan* (USFS 1990) contains standards for the management of various resources. Prescribed burning standards may apply to the B2H Project if open burning of vegetation cleared from the right-of-way takes place. There is currently no firm estimate of the number of acres that would require clearing and subsequent burning. Cleared materials would likely be a combination of unspecified forestry wastes and rangeland brush and grasses. The standards

require that, where appropriate, the following prescribed burning techniques be used to minimize smoke emissions and to meet emission objectives:

- Avoid burning when air stagnation advisories are in effect, during pollution episodes, or when temperature inversions exist.
- Design burning activities to use climatic conditions that favor rapid smoke dispersion.
- Burn under favorable moisture conditions, using guides developed by the Pacific Wildland Fire Sciences Laboratory.
- Accomplish mop-up quickly to reduce residual smoke.
- Design ignition method and firing technique to aid dispersion.
- Use smoke models to predict impacts, including plume trajectory.
- Use rake-type dozer blades to keep soil out of piles and windrows.
- Keep fire from spreading into decks of cull logs.

BLM Resource Management Plans

Portions of the proposed B2H Project and alternatives are located in two BLM resource management plan (RMP) areas for which the applicable RMPs identify specific air quality management objectives.

Southeastern Oregon Resource Management Plan

The Southeastern Oregon RMP identifies the following air quality objective: “Meet or exceed NAAQS and PSD regulations with all authorized actions” (BLM 2002). The RMP provides the following management actions to achieve the plan objective:

> Prior to the actual ignition of any prescribed fire, an approved prescribed fire burn plan would be in place and adhered to throughout the project. The burn plan would include information and techniques used to reduce or alter smoke emission levels. Information (including resource objectives, acres to be burned, fuel types, fuel moisture, fuel loading, fuel continuity, topography, location of population centers and Class 1 air sheds) assists fire managers in determining what weather conditions, firing methods, and mop-up standards should be used to minimize impacts. All prescribed fire projects would be completed in accordance with the “Oregon Smoke Management Plan.” The majority of fuel types in the planning area do not allow opportunities to reduce emissions; therefore, emissions will be managed by timing and atmospheric dispersal.

Baker Resource Management Plan

The Baker RMP includes the following management actions:

> Under the 1977 Clean Air Act Amendment, BLM-administered lands were given Class II air classification, which allows moderate deterioration associated with moderate population and industrial growth. The BLM will manage public lands as Class II unless they are reclassified.

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. Review all proposed resource projects and surface disturbing activities to ensure that soils and watersheds are protected, rehabilitated, or improved.

Owyhee Resource Management Plan

The Owyhee RMP identifies the following air quality objective: "Meet or maintain the NAAQS and the PSD regulations with all authorized actions" (BLM 1999). The management actions and allocations identified to meet the objective include the following:

Limit prescribed burning in juniper/sagebrush/grassland areas to a maximum of 15,000 acres per year (or the equivalent of 100,000 tons of fuels) and average 7,500 acres of prescribed burns per year over the life of the plan. Projected emissions from individual burns will be calculated to ensure compliance with NAAQS and PSD regulations.

Limit unnecessary emissions from existing and new point and nonpoint sources by requiring and implementing standard operating procedures and stipulations for reducing or controlling emissions.

State of Oregon

Oregon air emissions are regulated by the Oregon Department of Environmental Quality (ODEQ) pursuant to the Oregon Revised Statutes, Chapter 468A, and the Oregon Administrative Rules (OARs), Divisions 200–268. Prescribed burning on forestland in Oregon would be conducted in compliance with the Oregon Smoke Management Rules (OAR 629-048-0001 through 629-048-0500).

State of Idaho

Idaho air emissions are regulated by the Idaho Department of Environmental Quality, Air Quality Division. Chapter 58.01.01 of the Idaho Administrative Procedures Act presents the applicable regulations for criteria pollutants and fugitive-dust control.

Idaho and Oregon have established ambient air quality standards for their respective states. Table 3-256 presents Idaho's and Oregon's criteria-pollutant standards for protecting human health (primary standards) and public welfare (secondary standards).

Permitting Requirements (Construction and Operations)

State of Oregon

Pursuant to OAR 340-216-0056, portable concrete batch plants, used during the construction phase, would be required to obtain stationary-source location and operations permits. Concrete batch plants are generally classified as "minor sources" under OAR 340-216-0020. In addition, IPC would consult with the ODEQ regarding the need for operations permits for the small communication-site standby generator engines.

STATE OF IDAHO

Sections 220 through 222 of Chapter 58.01.01 of the Idaho Administrative Procedures Act provide for permit exemptions. According to Section 220, "fugitive emissions shall not be considered in determining whether a source meets the applicable exemption criteria unless required by federal law." The proposed portable concrete batch plants would likely meet the requirements for permit exemption, given that fugitive emissions would be the predominant emissions from such plants. In addition, IPC would consult with the Idaho Department of Environmental Quality regarding the need for operational permits for the small communication-site standby generator engines.

Table 3-256. Oregon and Idaho State Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Idaho Standards Concentration	Oregon Standards Concentration
O_3	1 hour	N/A	N/A
O_3	8 hours	0.075 part per million (147 micrograms per cubic meter) (3-year average of annual fourth-highest daily maximum)	0.075 part per million (147 micrograms per cubic meter) (3-year average of annual fourth-highest daily maximum)
CO	8 hours	9 parts per million	9 parts per million (10,000 micrograms per cubic meter)
CO	1 hour	35 parts per million	35 parts per million (40,000 micrograms per cubic meter)
NO_2	Annual average	0.053 part per million	0.053 part per million (100 micrograms per cubic meter)
NO_2	1 hour	100 part per billion	N/A
SO_2	Annual average	80 micrograms per cubic meter	0.02 part per million as an annual arithmetic mean for any calendar year at any site (80 micrograms per cubic meter)
SO_2	24 hours	365 micrograms per cubic meter	0.10 part per million as a 24-hour average concentration more than once per calendar year at any site (365 micrograms per cubic meter)
SO_2	3 hours	0.5 part per million	0.5 part per million as a three-hour average concentration more than once per year at any site
SO_2	1 hour	75 part per billion	N/A
PM_{10}	24 hours	150 micrograms per cubic meter	150 micrograms per cubic meter
PM_{10}	Annual arithmetic mean	N/A	N/A
$PM_{2.5}$	24 hours	35 micrograms per cubic meter (3-year average of 98th percentile)	35 micrograms per cubic meter (3-year average of 98th percentile)
$PM_{2.5}$	Annual arithmetic mean	15 micrograms per cubic meter (3-year average)	15 micrograms per cubic meter (3-year average)
Lead	Calendar Quarter	0.15 micrograms per cubic meter	0.15 micrograms per cubic meter as a maximum arithmetic mean averaged over a calendar quarter

Criteria Pollutant	Averaging Time	Idaho Standards Concentration	Oregon Standards Concentration
Particle Fallout	1 Month	N/A	10 grams per square meter in an industrial area 5.0 grams per square meter in an industrial area if visual observations show a presence of wood waste or soot and the volatile fraction of the sample exceeds 70 percent 5.0 grams per square meter in residential and commercial areas 3.5 grams per square meter in residential and commercial areas if visual observations show the presence of wood waste or soot and the volatile fraction of the sample exceeds 70 percent

Table Source: Oregon Revised Statutes, Chapter 468A; Oregon Administrative Rules, Divisions 200–268; Idaho Administrative Procedures Act, Chapter 58.01.01.

Table Abbreviations: O_3 = ozone; CO = carbon monoxide; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; PM_{10} = particulate matter less than 10 microns (coarse particles); $PM_{2.5}$ = particulate matter less than 2.5 microns (fine particles); N/A = not applicable.

FUGITIVE-DUST CONTROL

Sources, including construction projects, operating within Oregon and Idaho are required to control fugitive dust (i.e., airborne particulate matter). The following are fugitive-dust regulations and control measures that apply to the B2H Project.

STATE OF OREGON

OAR Sections 340-200 through 340-268 do not provide specific rules for fugitive-dust control. Section 340-200-0020 defines *fugitive emissions* as follows:

> (a) Except as used in subsection (b) of this section, [fugitive emissions] means emissions of any air contaminant which escape to the atmosphere from any point or area that is not identifiable as a stack, vent, duct, or equivalent opening
>
> (b) As used to define a major Oregon Title V Operating Permit program source, [fugitive emissions] means those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening.

STATE OF IDAHO

The Idaho Administrative Procedures Act contains specifics regulations for controlling fugitive dust and preventing particulate matter emissions, as excerpted below (Section 58.01.01, Rules 650 and 651):

> **650. RULES FOR CONTROL OF FUGITIVE DUST.**
> The purpose of Sections 650 through 651 is to require that all reasonable precautions be taken to prevent the generation of fugitive dust. (5-1-94)
>
> **651. GENERAL RULES.**
> All reasonable precautions shall be taken to prevent particulate matter from becoming airborne. In determining what is reasonable, consideration will be given to factors such as the

proximity of dust emitting operations to human habitations and/or activities, the proximity to mandatory Class I Federal Areas and atmospheric conditions which might affect the movement of particulate matter. Some of the reasonable precautions may include, but are not limited to, the following: (3-30-07)

01. Use of Water or Chemicals. Use, where practical, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land. (5-1-94)

02. Application of Dust Suppressants. Application, where practical, of asphalt, oil, water or suitable chemicals to, or covering of dirt roads, material stockpiles, and other surfaces which can create dust. (5-1-94)

03. Use of Control Equipment. Installation and use, where practical, of hoods, fans and fabric filters or equivalent systems to enclose and vent the handling of dusty materials. Adequate containment methods should be employed during sandblasting or other operations. (5-1-94)

04. Covering of Trucks. Covering, when practical, open bodied trucks transporting materials likely to give rise to airborne dusts. (5-1-94)

05. Paving. Paving of roadways and their maintenance in a clean condition, where practical. (5-1-94)

06. Removal of Materials. Prompt removal of earth or other stored material from streets, where practical. (5-1-94)

Outdoor Burning

ODEQ regulations prohibit certain types of burning in selected areas of the state. Outside the Willamette Valley, in cities with populations larger than 4,000 people, Oregon's air quality rules prohibit open burning of commercial, construction, demolition, and land-clearing debris within 3 miles of the city limits. Under rare circumstances, when no other means of disposal are available or when other means are severely restricted, ODEQ may issue a permit, known as an Open Burning Letter Permit, to allow the burning of these kinds of waste in the restricted areas. IPC would consult with the state air quality agencies to determine whether an Open Burning Letter Permit would be required for the B2H Project.

State Clean-Air Plans

The proposed B2H Project and alternatives do not traverse any nonattainment or air quality maintenance areas in either state. Therefore, no state clean-air plans would apply.

3.2.10.2 Issues Identified for Analysis

The following list summarizes air quality issues that were raised during scoping, as well as issues that must be considered as stipulated by laws or regulations. For a complete list of scoping issues, see the B2H Project *Revised Scoping Report* (BLM 2011a).

- Will the project be inconsistent with county, state, and federal air quality plans?
- Will emissions of air pollutants exceed what is allowable by state and federal law?
- Will the project cause any adverse impacts on air quality in wilderness areas?
- How much dust will be generated by construction activities? How will it be managed?

3.2.10.3 METHODOLOGY

Appendix B.9 details the methods used to estimate emissions from the construction and operation phases of the proposed B2H Project and alternatives. These methods represent currently accepted techniques for deriving emissions estimates from construction and operational activities. Emission Factors 2007 (EMFAC 2007), Version 2.30 (California Air Resources Board 2006), was used to generate a set of composite factors for the statewide area of California. It was assumed that the overall vehicle mix in California is similar to the vehicle mix in Oregon and Idaho. The EMFAC run was generated for a vehicle mix covering 1969–2013. The composite factors generated were then applied to worker travel data for 2013–2015.

The analysis considered the following:

- Construction disturbance areas within the Proposed Action and alternatives (e.g., access road construction and use during the construction phase, tower construction areas, and substation construction areas)
- Construction equipment exhaust emissions
- Use of portable concrete batch plants during the construction phase
- Vehicle exhaust emissions associated with construction worker travel and construction supply delivery along the routes
- Use of unpaved access and service roads during the operations phase
- Vehicle emissions used for inspection and maintenance during the operations phase
- Minor stationary-source emissions applicable to operations activities

The analysis area for air quality encompasses the geographic areas defined by applicable state air quality plans, federal conformity thresholds, and local requirements within the geographic areas of the Proposed Action and Alternatives. The analysis area used for quantifying emission impacts includes the construction corridor and substation sites along with emissions sources such vehicles traveling on public roads and construction-site access roads and helicopters used during construction.

The majority of the emissions related to the B2H Project would occur within the construction corridor and at the substation sites. Most impacts from project-related emissions would likely be confined to the proximity of the construction corridor or substation/communication-site property lines.

3.2.10.4 Affected Environment

Air Quality

A review of published annual air quality monitoring reports indicates that existing air quality in each state is generally good to excellent. In Oregon, the closest Class I area to the B2H Project is the Eagle Cap area, which lies approximately 25 miles northeast of the Proposed Action in Wallowa County. In Idaho, the closest Class I area to the Proposed Action is the Sawtooth area, which lies more than 55 miles to the east. Because Class I areas are distant from the Proposed Action and Alternatives, no adverse air quality effects on Class I areas are anticipated as a result of project construction or operation.

Figure 3-50 shows the current locations of the Idaho and Oregon nonattainment areas for particulate matter less than 10 microns (PM_{10}), as well as other areas of air quality concern. Idaho is in attainment, with the exception of two PM_{10} nonattainment areas in the southeast corner of the state and the north Ada County carbon monoxide and PM_{10} maintenance area. Oregon has a small PM_{10} nonattainment area in the La Grande area.

Preliminary inventories of emissions from greenhouse gases (GHGs)—primarily carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—have been prepared for each state through a cooperative effort with the Center for Climate Strategies, ODEQ, or both. These inventories do not include reporting from all identified sectors and, therefore, most likely do not represent a complete analysis of GHG emissions for each state. Table 3-257 presents the total GHG emissions for Idaho and Oregon from 2000 to 2011. The total emissions are presented in million metric tons of carbon dioxide (CO_2) equivalent.

Table 3-257. Total Greenhouse Gas Emissions by State

State	Year	Total GHG Emissions ($MtCO_2e$)
Idaho	2000	26.4
Idaho	2001	26.7
Idaho	2002	26.2
Idaho	2003	25.8
Idaho	2004	27.0
Idaho	2005	27.6
Idaho	2006	28.4
Idaho	2007	28.7
Idaho	2008	27.7
Idaho	2009	27.0
Idaho	2010	27.9
Idaho	2011	27.8
Oregon	2000	60.8
Oregon	2001	59.8

State	Year	Total GHG Emissions ($MtCO_2e$)
Oregon	2002	58.6
Oregon	2003	59.2
Oregon	2004	60.5
Oregon	2005	60.8
Oregon	2006	60.2
Oregon	2007	57.0
Oregon	2008	55.5
Oregon	2009	53.3
Oregon	2010	52.9
Oregon	2011	49.2

Table Source: World Resources Institute 2014.

Table Abbreviations: $MtCO_2e$ = million metric tons of carbon dioxide equivalent (CO_2e).

CLIMATE

STATE OF OREGON

Oregon has a mild, though varied, climate; violent weather events are rare but are severe enough to cause serious widespread damage. Oregon is divided into six major agroclimatic areas, with the Proposed Action and Alternatives lying predominantly in the Columbia and Snake River Basins. The climate in these basins is best characterized as a continental climate. The climate has maritime influences in winter, particularly west of the Blue Mountains, and monsoonal influences in the summer, particularly south of the Blue Mountains and the western Snake River Plain. In the Columbia River Basin and the Blue Mountains, annual precipication totals are about 15 to 20 inches; however, some of the mountain regions receive as much as 35 inches per year (Western Regional Climate Center 2011a).

STATE OF IDAHO

Sizable areas in the Boise River Basin receive an average of 40 to 50 inches of precipitation per year, with a few points or small areas receiving more than 60 inches. Large areas, including the northeastern valleys, much of the upper Snake River Plain, Central Plains, and the lower elevations of the southwestern valleys receive less than 10 inches annually. The major mountain ranges of the state accumulate a deep snow cover during winter months, and the release of water from the melting snowpack in late spring furnishes irrigation water for more than 2 million acres, mainly within the Snake River Basin above Weiser, Idaho (Western Regional Climate Center 2011b).

CLIMATE CHANGE

Ongoing scientific research has identified the potential impacts on global climate of anthropogenic (human-made) GHG emissions and changes in biological carbon sequestration (natural storage of carbon in soils, plants, and marine life) due to land management activities. Several activities contribute to climate change, including emissions of GHGs (especially CO_2 and methane) from fossil fuel development, activities using combustion engines, changes to the natural carbon cycle, and changes in albedo (amount of solar energy reflected by the earth's surface).

In 2001, the Intergovernmental Panel on Climate Change estimated that by the year 2100, global average surface temperatures would increase by 2.5 to 10.4 degrees Fahrenheit above 1990 levels. The National Academy of Sciences has confirmed these findings but also has indicated uncertainties regarding how climate change may affect different regions. Computerized models predict that increases in temperature would not be distributed equally but would likely be accentuated at higher latitudes. Warming during the winter is expected to be greater than during the summer, and increases in daily minimum temperatures are more likely than increases in daily maximum temperatures. While increases in temperatures would increase water vapor in the atmosphere and enhance heavy storm events, they would also reduce soil moisture and increase generalized drought conditions. Although large-scale spatial shifts in precipitation distribution may occur, these changes are more uncertain and difficult to predict (Intergovernmental Panel on Climate Change 2001; National Academy of Sciences 2001; US Global Change Research Program 2009).

Forests, woodlands, and rangelands store carbon, which affects atmospheric concentrations of CO_2 and thereby affects global climate. Vegetation management can provide either a source of CO_2 or a sink of CO_2 through vegetation growth. In the United States, forests have acted as a carbon sink throughout the last century (Birdsey et al. 2006). Forests and harvested wood in the United States currently represent a carbon pool of 43.9 billion metric tons (EPA 2007). In addition, forest management currently represents an annual accumulation of 191 million metric tons of carbon, which represents an offset of approximately 11 percent of total carbon emissions in the United States (EPA 2007). Globally, the combination of vegetation, soil, and detritus currently store 2.3 trillion metric tons of carbon (Denman et al. 2007:515). Furthermore, atmospheric carbon in the form of CO_2 is increasing at a rate of 3.2 to 4.1 billion metric tons of carbon per year (Denman et al. 2007:512).

Because there is incomplete and unavailable information on both the current inventory of carbon storage and the effect of management on carbon storage (as described below), it is not possible to describe the total storage of carbon in forests, rangelands, and wood harvested from the Decision Area with precision and accuracy (BLM 2011b:3-5).

Current scientific assessments of future climate change are more global and regional in scale. As a result, there are no precise scientific assessments regarding either the impact future climate change or projections for specific localized. Estimating quantitative changes in the local environment is not feasible at this time, although several scientific organizations are working on downscaling models that should be useful in the near future. With this in mind, it is still reasonable to assume that over the next 20 years the region will experience some noticeable changes attributable to factors related to climate

change. Changes in stream systems, including their flow, temperature, and turbidity, should be substantial enough to influence irrigation activities, flood control, and water related recreational activities. Spring runoff is expected to come earlier and more quickly with lower stream flows later in the season. Stream temperatures are expected to rise enough to reduce cold-water fisheries habitat. Furthermore, both the timing and length of seasons should be affected. This, in turn, would influence changes in the ranges, phenology, community composition, biotic interactions, and behavior of both plants and animals. Climate change predictions include an increase in duration and frequency of drought conditions and, conversely, increased precipitation events. This combination can result in an increase in soil erosion and stream sedimentation and can alter stream channels (Climate Impacts Group 2010; Intergovernmental Panel on Climate Change 2007; BLM 2011b:3-3).

The 2010 Oregon Climate Assessment Report states the following: “Some model simulations of future vegetation changes in Oregon indicate that high elevation areas of subalpine forest and alpine tundra as well as areas of shrubland in eastern Oregon will contract under projected future climate changes. These projected vegetation changes would reduce critical habitat for species of management concern, such as greater sage-grouse (*Centrocercus urophasianus*)” (Oregon Climate Change Research Institute 2010).

3.2.10.5 Environmental Consequences

This section discusses potential effects of the Proposed Action and alternatives on air quality and climate change. Air quality and climate change effects may be generated from the following activities:

- Construction of access roads
- Construction of the transmission towers and pad sites
- Construction of substations and communication sites
- Activities involved with the ongoing use and maintenance of the transmission line, substations, and right-of-way and decommissioning

Effects of the Proposed Action and alterntives are described project-wide because the intensity and duration of air quality and climate change effects would be substantially the same for the Proposed Action and all the alternatives.

No Action Alternative

The No Action Alternative would result in the continuation of current air quality conditions and would avoid any effects on climate change through direct effects of GHG emissions or the indirect effects of reductions in carbon storage capacity.

Design Features

In addition to compliance with all applicable federal, state, and local air quality regulations, Appendix C includes design features and construction and operation standards to reduce effects on air quality and climate that would be conditions of any project authorizations including the following:

- AIR-1—Minimize idling time for diesel equipment whenever possible.

- AIR-2—Ensure that diesel-powered construction equipment is properly tuned and maintained and shut off when not in direct use.
- AIR-3—Prohibit engine tampering to increase horsepower.
- AIR-4—Reduce construction-related trips as feasible for workers and equipment, including trucks.
- AIR-5—Project-related vehicles and construction equipment would be required to use low sulfur diesel fuel as soon as it is commercially available.
- AIR-6—All requirements of those entities having jurisdiction over air quality matters would be adhered to. Any necessary dust control plans would be developed and permits for construction activities would be obtained. Open burning of construction trash would not be allowed, unless permitted by appropriate authorities.

RESIDUAL EFFECTS

PROPOSED ACTION

Construction

Air Quality

Construction activities for the proposed B2H Project would take place in the following sequence: site preparation/trenching, foundation work, installation of structures and conductors, and right-of-way/site restoration. Anticipated construction periods for the various components of the proposed B2H Project are further described in Appendix B.9. Appendix B.9 describes the methodologies used to quantify the estimated emissions from the identified construction and operations activities for the Proposed Action.

Construction activities that would generate emissions include land clearing, ground excavation, and cut and fill operations. These construction activities would occur 6 days per week for up to 10 to 12 hours per day during the construction period. The intermittent and short-term emissions generated by these activities would include dust from soil disruption and combustion emissions from the construction equipment. Emissions associated with construction equipment include PM_{10}, $PM_{2.5}$ (particulate matter less than 2.5 microns), nitrogen oxides, carbon monoxide, volatile organic compounds, sulfur oxides, and small amounts of air toxic pollutants. These emissions could result in low, short-term impacts on air quality in the immediate vicinity of project construction. Table 3-258 lists the estimated emissions of these criteria pollutants that would be generated by the construction of proposed project facilities in each county.

Table 3-258. Estimated Emissions of Criteria Pollutants from Construction

Portion of Route and County	Approximate Length (miles)	PM_{10} (tons) [1]	$PM_{2.5}$ (tons) [1]	NOx (tons)	CO (tons)	SOx (tons)	VOCs (tons)
Morrow County	45.8	80.8	59.5	70.9	529.6	0.7	74.3
Umatilla County	49.5	87.3	64.4	76.6	572.4	0.8	80.3
Union County	39.4	69.5	51.2	61.0	455.6	0.6	63.9
Baker County	74.4	131.3	96.7	115.1	860.3	1.2	120.7
Malheur County	72.1	127.2	93.7	111.5	833.7	1.2	116.9

Portion of Route and County	Approximate Length (miles)	PM_{10} (tons) [1]	$PM_{2.5}$ (tons) [1]	NOx (tons)	CO (tons)	SOx (tons)	VOCs (tons)
Owyhee County	23.8	42.0	30.9	36.8	275.2	0.4	38.6
Total Emissions in Oregon		496.1	365.5	435.1	3,251.6	4.5	456.1
Total Emissions in Idaho		42.0	30.9	36.8	275.2	0.4	38.6
Total B2H Project Emissions [1]		538.1	396.4	471.9	3,526.8	4.9	494.7

Table Abbreviations: PM_{10} = particulate matter less than 10 microns (coarse particles); $PM_{2.5}$ = particulate matter less than 2.5 microns (fine particles); NOx = nitrogen oxides; CO = carbon monoxide; SOx = sulfur oxides; VOCs = volatile organic compounds.

Table Note: [1] Totals may not match other tables due to mileage multiplication and rounding.

Refer to Appendix B.9 for the methodologies used to quantify the estimated emissions.

Transmission line and construction data supplied by IPC indicate that approximately 8 percent of the Proposed Actionis located in Idaho, with the remaining 92 percent of the Proposed Action in Oregon. Table 3-259 shows the approximate total anticipated emissions for construction of the B2H Project by state. Table 3-260 presents the construction emissions on a normalized yearly basis. Table 3-261 presents the construction emissions breakdown (from Table 3-260) on a per-mile basis.

Table 3-259. Construction Emissions Breakdown by State

Pollutant	Oregon Emissions (tons per construction period)	Idaho Emissions (tons per construction period)
NO_2	434.7	37.1
CO	3,249.1	277.5
VOCs	455.8	38.9
SOx	4.5	0.4
PM_{10}	495.8	42.3
$PM_{2.5}$	365.4	31.2
CO_2e	49,376.0	4,294.0

Table Abbreviations: NO_2 = nitrogen dioxide; CO = carbon monoxide; VOCs = volatile organic compounds; SOx = sulfur oxides; PM_{10} = particulate matter less than 10 microns (coarse particles); $PM_{2.5}$ = particulate matter less than 2.5 microns (fine particles); CO_2e = carbon dioxide equivalent.

Refer to Appendix B.9 for the methodologies used to quantify the estimated emissions.

Table 3-260. Annualized Construction Emissions Breakdown by State

Pollutant	Oregon Emissions (tons per year)	Idaho Emissions (tons per year)
NOx	193.2	16.5
CO	1,444.1	123.3
VOCs	202.6	17.3
SOx	2.0	0.2
PM_{10}	220.4	18.8
$PM_{2.5}$	162.4	13.9

Pollutant	Oregon Emissions (tons per year)	Idaho Emissions (tons per year)
CO_2e	21,945.0	1,908.0

Table Abbreviations: NOx = nitrogen oxides; CO = carbon monoxide; VOCs = volatile organic compounds; SOx = sulfur oxides; PM_{10} = particulate matter less than 10 microns (coarse particles); $PM_{2.5}$ = particulate matter less than 2.5 microns (fine particles); CO_2e = carbon dioxide equivalent.

Table Note: Refer to Appendix B.9 for the methodologies used to quantify the estimated emissions.

Construction equipment would be operated as needed during daylight hours only, and the emissions from gasoline and diesel engines would be minimized by engine compliance with mobile-source exhaust standards established by the EPA. Therefore, emissions from the construction of the transmission line, substations, and communication facilities are not expected to cause or contribute to: a violation of an applicable ambient air quality standard or contribute substantially to an existing or projected air quality violation. Most of the construction equipment would be powered by diesel engines that would meet current EPA emissions standards based on engine size and the date of the manufacture. In addition, B2H Project-related vehicles and construction equipment would be required to use low-sulfur diesel fuel as soon as it is commercially available.

Table 3-261. Construction Emissions per Mile

Pollutant	Average Emissions (tons per mile per period) [1]
NOx	1.62
CO	11.56
VOCs	1.62
SOx	0.016
PM_{10}	1.76
$PM_{2.5}$	1.30
CO_2e	174.1

Table Abbreviations: NOx = nitrogen oxides; CO = carbon monoxide; VOCs = volatile organic compounds; SOx = sulfur oxides; PM_{10} = particulate matter less than 10 microns (coarse particles); $PM_{2.5}$ = particulate matter less than 2.5 microns (fine particles); CO_2e = carbon dioxide equivalent.

Table Note: [1] Assumes route mileage is about 305 miles, with about 281.2 miles in Oregon and about 23.8 miles in Idaho.

Refer to Appendix B.9 for the methodologies used to quantify the estimated emissions.

The anticipated construction activities are generally not required to have stationary- or indirect-source permits by either of the affected states and are exempt from the major regulatory programs such as NSR, PSD, NESHAPs, Title IV, Title V. Construction activities must, however, comply with applicable state requirements for fugitive-dust control. Temporary operations permits may also be required for the portable concrete batch plants.

Fugitive-dust emissions would depend on the moisture content and texture of the soils that would be disturbed. The construction emissions would vary from day to day depending on the level of activity, specific operations, and prevailing weather. Appendix B.9 presents the support data and methodologies

used to estimate fugitive-dust emissions from the construction phase. Fugitive-dust emissions tend to stay localized and settle to the ground quickly. Fugitive-dust emissions would be short-term and low intensity.

Electrical power needs within the construction corridor would be met through the use of portable electrical generators. These generators are typically diesel powered and would be located at the various construction sites according to need. Emissions from portable generators are included in the construction equipment exhaust estimates presented in Appendix B.9.

Table 3-262 compares annualized construction emissions to the statewide emissions inventory values. The construction emissions are for the emissions in the five counties in Oregon and one county in Idaho. This comparison indicates that construction emissions of criteria pollutants represent small (less than one-half percent) temporary additions to the statewide point- and area-source inventories.

Table 3-262. Comparison of Project Construction Emissions

Pollutant	2002 State Totals (tons/year) [1]	2018 State Totals (tons/year) [1]	Estimated Project Construction (tons/year)	Project % of 2002 State Totals	Project % of 2018 State Totals
NO_2	81,679	104,802	209.7	0.26	0.20
CO	446,701	513,170	1,567.4	0.35	0.31
VOCs	405,705	573,485	219.9	0.054	0.038
SO_2	48,032	43,643	2.2	0.0046	0.0050
PM_{10}	239,981	304,057	239.2	0.10	0.079

Table Abbreviations: NO_2 = nitrogen dioxide; CO = carbon monoxide; VOCs = volatile organic compounds; SOx = sulfur oxides; PM_{10} = particulate matter less than 10 microns (coarse particles).

Table Note: [1] State totals do not include mobile source emissions.

Refer to Appendix B.9, Table B.9-13 for the methodologies used to quantify the estimated emissions.

Open Burning of Right-of-Way Vegetation

Open burning of vegetation cleared from the right-of-way during construction may take place, although there is currently no firm estimate of the number of acres that would require clearing and subsequent burning. Cleared materials would likely be a combination of unspecified forestry wastes and rangeland brush and grasses. Section 2.5 of EPA Publication AP-42, *Compilation of Air Pollution Emissions Factors* (EPA 1992), presents data on waste generation rates and emissions factors for open burning of these types wastes. Based on preliminary data, it is estimated that approximately 681 acres of unspecified forest residue may be cleared and burned. These data are used to estimate emissions from open burning activities until a definitive estimate of waste generation rates is developed prior to issuance of the right-of-way. These emissions are included in the project construction emissions tables above.

Climate Change

Greenhouse-Gas Emissions

GHG emissions from construction (primarily CO_2, methane, and nitrous oxide) come primarily from fuel combustion sources. Data for the GHG analysis was derived from the California Climate Action Registry General Reporting Protocol, Version 3.1 (California Climate Action Registry 2009a), and Power Generation/Electric Utility Reporting Protocol, Version 1.1 (California Climate Action Registry 2009b). Appendix B.9 presents the emissions calculations, methodologies, and support data for the GHG emissions. The direct effects of construction on GHG emissions are estimated to be 53,086 tons over the 3-year construction period. Approximately 8 percent of these emissions, or 4,294 tons of CO_2 equivalent, are allocated to Idaho, and 92 percent of these emissions, or 49,376 tons of CO_2 equivalent, are allocated to Oregon. On an annual basis, the estimated B2H Project construction GHG emissions for Oregon and Idaho are 21,945 and 1,908 tons per year, respectively. By comparison the annual emissions would constitute less than 0.04 percent of annual GHG emissions for Oregon and 0.005 percent for Idaho. This does not represent a substantial contribution to annual GHG emissions for Oregon and Idaho.

The Council on Environmental Quality's (CEQ's) February 18, 2010, memorandum for heads of federal departments and agencies suggests that "the reference point of 25,000 metric tons of direct CO_2-equivalent GHG emissions [per year] may provide agencies with a useful indicator, rather than an absolute standard, of insignificant effects" (CEQ 2010:3). Table 3-257 shows GHG emissions inventories for Oregon and Idaho. Considering the inventory totals for the construction-period emissions of CO_2 equivalent allocated to each state and the CEQ guidance, the direct effects of GHG emissions from construction of the Proposed Action or alternatives would represent low and short-term contributions to the state annual totals of CO_2 equivalent.

Carbon Storage

The BLM Baker Draft RMP states, "The net storage or loss of carbon on rangelands and grasslands in the Planning Area is generally small and difficult to measure. Soils on these sites also contain relatively little organic matter compared to forest soils (Ryan et al. 2008). Although forests and woodlands make

up only 20 percent of the total acres on public lands in the Planning Area, these vegetation communities sequester and store approximately 72 percent of the carbon [in the Planning Area]" (BLM 2011b:3-5). The Planning Area for the BLM Baker Draft RMP includes all of the forested areas within the B2H Project analysis area for the Proposed Action and alternatives. The Draft RMP also provides estimates of the tons of carbon stored above-ground in live and dead vegetation for different types of plant communities as follows (BLM 2011b: 3-5, Table 3-1):

- Sagebrush steppe: 1.35 tons per acre
- Mixed grasslands: 0.25 tons per acre
- Mixed grasslands and juniper: 3 tons per acre
- Nonnative annual grass: 0.31 tons per acre
- Nonnative seeded grass: 0.22 tons per acre
- Dry forest: 10 tons per acre
- Moist forest: 64 tons per acre
- Riparian: 2 tons per acre

The Proposed Action and Alternatives anticipates construction disturbance to approximately 3,806 acres of shrublands and grasslands and 454 acres of combined forest vegetation. Assuming the highest estimated carbon storage capacity for the two main vegetation types, and assuming all disturbed areas remain disturbed for the duration of construction, construction of the Proposed Action or an alternative would be short-term and have an indirect effect of reducing vegetative carbon storage capacity of shrublands/grasslands by approximately 11,500 tons, and forested areas by approximately 29,000 tons. In the context of available carbon storage in the analysis area and the short-term nature of the disturbance, the indirect construction effects of reduced carbon storage capacity would be low.

Operations

Air Quality

Operations-related emissions would be from the following types of sources and activities:

- Use of motor vehicles to transport inspection and maintenance personnel to the transmission line and associated facilities as required
- Travel on the unpaved access and service roads during the inspection- and maintenance-related activities
- Minor emissions from the use of small stationary engines for emergency power at the proposed communication sites

Appendix B.9 presents the emissions estimation methodologies and support data for the operations phase. The following are estimated annual emissions from inspection and maintenance activities during the operations phase:

- Volatile organic compounds: 0.06 ton per year

- Carbon monoxide: 0.40 ton per year
- Nitrogen oxides: 0.65 ton per year
- Sulfur oxides: 0.0005 ton per year
- PM_{10}: 0.64 ton per year
- $PM_{2.5}$: 0.14 ton per year
- CO_2 equivalent: 63 tons per year

Emissions for the proposed B2H Project operations phase are broken down for each state based on the above-mentioned estimated values and are shown in Table 3-263.

Climate Change

Greenhouse-Gas Emissions

GHG emissions from operations activities are anticipated to be approximately 63 tons of CO_2 equivalent per year. See the GHG calculation methods presented in Appendix B.9, Table B.9-15.

Carbon Storage

The Project estimates operations disturbance to approximately 411 acres of shrublands and grasslands and 41 acres of combined forest vegetation. Assuming the highest estimated carbon storage capacity for the two main vegetation types, and assuming all disturbed areas remain disturbed for the duration of construction, construction of the proposed Project would result in the indirect effect of reducing vegetative carbon storage capacity in of shrublands/grasslands by approximately 1,200 tons, and forested areas by approximately 2,600 tons for the long-term of project operations. In the context of available carbon storage in the analysis area, the proposed B2H Project operations indirect effects of reduced carbon storage capacity would be low.

Corona Discharges

In energized transmission lines, electric fields around a conductor can become concentrated enough to create an electric discharge. This type of discharge, known as a *corona*, ionizes the air around the conductor. The voltage at which the conductor is energized, the conductor shape and diameter, as well as any scratches, dust, and water that have accumulated on the conductor can affect its electrical performance and cause the creation of coronas. Corona forming on the transmission line is a natural phenomenon, and is recognized as a buzzing sound in the vicinity and an energy loss when the line is energized. Ionization of the air can produce gaseous emissions, typically being highest during periods of rain and fog.

A corona on an electrical conductor can produce small amounts of ozone, which constitutes most of what this process generates, along with some nitrogren oxide emissions. Corona levels on the proposed 500-kV line are expected to be very low. The current national standard for ozone emissions is 75 parts per billion over an 8-hour averaging time. The maximum increase in ozone levels at the ground

produced by corona activity on the proposed transmission line would be on the order of 1 part per billion or less.

Table 3-263. Operations Emissions Breakdown by State

Pollutant	Oregon Emissions (tons per year)	Idaho Emissions (tons per year)
NOx	0.60	0.05
CO	0.37	0.03
VOCs	0.055	0.005
SOx	0.00046	0.00004
PM_{10}	0.59	0.046
$PM_{2.5}$	0.125	0.011
CO_2e	58.0	5.0

Table Abbreviations: NOx = nitrogen oxides; CO = carbon monoxide; VOCs = volatile organic compounds; SOx = sulfur oxides; PM_{10} = particulate matter less than 10 microns (coarse particles); $PM_{2.5}$ = particulate matter less than 2.5 microns (fine particles); CO_2e = carbon dioxide equivalent.

ALTERNATIVES

Air Quality

Table 3-264 presents construction emissions increases and decreases anticipated for each of the alternatives as compared with the Proposed Action. To facilitate this comparison, the construction emissions anticipated for each of the alternatives are compared to the portion of the Proposed Action.. The first section of the table lists the emissions expected for the Proposed Action in its entirety. The next section shows the emissions anticipated for each alternative in comparison to the Proposed Action, and the net difference in anticipated emissions between the two. The main variable is the relative length of each alternative compared to the Proposed Action. The methods for calculating emissions are discussed in Appendix B.9. Project operations emissions for the alternatives would be approximately four orders of magnitude less than construction emissions (approximately one ten-thousandth) and would therefore be low.

Climate Change

Greenhouse-Gas Emissions

GHG emissions for the construction and operations for the alternatives are similar to those for the Proposed Action, with minor variations in amounts based primarily on the relative length of the line.. The maximum variation would be the Longhorn Alternative, which would produce approximately 2,600 fewer tons of GHG during construction than would the Proposed Action, an approximate 5 percent reduction.

Carbon Storage

The effects of the Timber Canyon Alternative on short-term carbon storage capacity during construction and operations differ noticeably from the Proposed Action. Construction of the Timber Canyon Alternative would temporarily disturb 357 more acres of combined forest vegetation than the Proposed Action. Compared to the Proposed Action, this disturbance would result in a loss of approximately 23,000 more tons of carbon storage. Operations on the Timber Canyon Alternative would cause long-term disturbance to 41 more acres of combined forest vegetation than the Proposed Action, a doubling of the long-term loss of carbon storage capacity from operations to approximately 5,200 tons.

1 **Table 3-264. Comparison of Emissions by Alternative**

Alternative	Length (miles)	PM_{10} [1]	$PM_{2.5}$ [1]	NOx [1]	CO [1]	SOx [1]	VOCs [1]	CO_2e [1]
Proposed Action								
Morrow County (Oregon)	45.8	80.8	59.5	70.9	529.6	0.7	74.3	7,971.5
Umatilla County (Oregon)	49.5	87.3	64.4	76.6	572.4	0.8	80.3	8,615.5
Union County (Oregon)	39.4	69.5	51.2	61.0	455.6	0.6	63.9	6,857.6
Baker County (Oregon)	69.1	121.9	89.8	106.9	799.0	1.1	112.1	12,026.9
Malheur County (Oregon)	72.1	127.2	93.7	111.5	833.7	1.2	116.9	12,549.0
Owyhee County (Idaho)	23.8	42.0	30.9	36.8	275.2	0.4	38.6	4,142.4
Proposed 138/69-kV Relocate/Rebuild								
Baker County (Oregon)	5.3	9.4	6.9	8.2	61.3	0.1	8.6	922.5
Proposed Action Totals	305.0	538.1	396.4	471.9	3,526.8	4.9	494.7	53,085.4
Proposed Action and Alternative Action to Substation Comparisons								
Proposed Action Compared to Horn Butte Alternative	33.7	59.5	43.8	52.1	389.7	0.5	54.7	5,865.5
Horn Butte Alternative	26.9	47.5	35.0	41.6	311.0	0.4	43.6	4,681.9
Emissions Difference	-6.8	-12.0	-8.8	-10.5	-78.7	-0.1	-11.1	-1,183.6
Proposed Action Compared to Longhorn Alternative	33.7	59.5	43.8	52.1	389.7	0.5	54.7	5,865.5
Longhorn Alternative	19.0	33.5	24.7	29.4	219.7	0.3	30.8	3,307.0
Emissions Difference	-14.7	-26.0	-19.1	-22.7	-170.0	-0.2	-23.9	-2,558.5
Proposed Action and Alternative Action Comparisons								
Proposed Action Compared to Glass Hill Alternative	7.6	13.4	9.9	11.8	87.9	0.1	12.3	1,322.8
Glass Hill Alternative	7.6	13.4	9.9	11.8	87.9	0.1	12.3	1,322.8
Emissions Difference	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proposed Action Compared to Timber Canyon Alternative	46.3	81.7	60.2	71.6	535.4	0.7	75.1	8,058.5
Timber Canyon Alternative	57.5	101.5	74.8	89.0	664.9	0.9	93.3	10,007.9
Emissions Difference	11.2	19.8	14.6	17.4	129.5	0.2	18.2	1,949.4

Alternative	Length (miles)	PM_{10} [1]	$PM_{2.5}$ [1]	NOx [1]	CO [1]	SOx [1]	VOCs [1]	CO_2e [1]
Proposed Action Compared to Flagstaff Alternative	14.2	25.1	18.5	22.0	164.2	0.2	23.0	2,471.5
Flagstaff Alternative including 230-kV Rebuild	15.3	27.0	19.9	23.7	176.9	0.2	24.8	2,663.0
Emissions Difference	1.1	1.9	1.4	1.7	12.7	0.0	1.8	191.5
Proposed Action Compared to Malheur S Alternative	30.6	54.0	39.8	47.3	353.8	0.5	49.6	5,325.9
Malheur S Alternative	33.6	59.3	43.7	52.0	388.5	0	54.5	5,848.1
Emissions Difference	3.0	5.3	3.9	4.7	34.7	-0.5	4.9	522.2
Proposed Action Compared to Malheur A Alternative	30.6	54.0	39.8	47.3	353.8	0.5	49.6	5,325.9
Malheur A Alternative	33.2	58.6	43.2	51.4	383.9	0.5	53.8	5,778.5
Emissions Difference	2.6	4.6	3.4	4.1	30.1	0.0	4.2	452.6
Proposed Action Compared to Double Mountain Alternative	7.4	13.1	9.6	11.4	85.6	0.1	12.0	1,288.0
Double Mountain Alternative	7.4	13.1	9.6	11.4	85.6	0.1	12.0	1,288.0
Emissions Difference	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table Abbreviations: NOx = nitrogen oxides; CO = carbon monoxide; VOCs = volatile organic compounds; SOx = sulfur oxides; PM_{10} = particulate matter less than 10 microns (coarse particles); $PM_{2.5}$ = particulate matter less than 2.5 microns (fine particles); CO_2e = carbon dioxide equivalent.

Table General Notes: Grassland Substation, Burnt River Mountain Alternative, Willow Creek Alternative, Tub Mountain Alternative are not yet included. Columns may not sum exactly due to rounding and multiplication.

Table Note: [1] Emission rates are in tons per period.

3.2.10.6 MITIGATION PLANNING

No additional mitigation of effects on air quality or climate change are proposed beyond compliance with all applicable federal, state, and local air quality regulations and the Appendix C design features.

3.2.11 Socioeconomics and Environmental Justice

3.2.11.1 Introduction

This section describes the current social, economic, and environmental justice conditions within the analysis area. This includes analysis of trends, current conditions and other factors pertaining to social, economic, and environmental justice indicators to provide an accurate assessment of baseline conditions in the project area relative to the States of Oregon and Idaho and the nation.

National Environmental Policy Act (NEPA) or Council on Environmental Quality (CEQ) regulations do not provide specific thresholds of significance for socioeconomic impact assessment. This is due to the observation that significance is contextual in nature and varies with the setting of the Proposed Action (40 CFR 1508.27[a]). As such, the following criteria were developed for the analysis of alternatives. The action would:

- Generate demand for temporary housing of construction workers that exceeds the supply of local housing or hotel/motel facilities
- Require public service expenditures substantially greater than available approved revenue
- Have a substantial impact on property values
- Disproportionately affect minority and/or low-income populations

3.2.11.2 Regulatory Framework

Federal

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires each federal agency to make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. The order further stipulates that the agencies conduct their programs and activities in a manner that does not exclude persons from participation in them, deny persons the benefits of them, or subject persons to discrimination because of their race, color, or national origin.

State of Oregon

The State of Oregon requires that a site certificate from the Oregon Energy Facility Siting Council (EFSC) be obtained. EFSC must find that construction and operation of the facility, taking into account mitigation, is not likely to result in significant adverse impacts to the ability of public and private providers to provide public services. The public services identified by EFSC are as follows: sewers and sewage treatment, water, stormwater drainage, solid-waste management, housing, traffic safety, police and fire protection, health care, and schools (Oregon Administrative Code 345-022-0110).

State of Idaho

There are no regulatory requirements in Idaho.

3.2.11.3 Issues Identified for Analysis

The analyses incorporated the following social and economic, and environmental justice-related issues that were raised by the public, Native American Tribes, or federal and state agencies during scoping or are issues that must be considered as stipulated in law or regulation.

- Would the project reduce property values, and therefore reduce the amount of state and local tax revenues?
- What is the potential impact on the Umatilla Indian Reservation? And, would the project affect the tribal use of land?
- Will the project affect local electricity rates?
- What is the potential for disproportionate adverse impacts on minority and low-income communities?
- How will the project affect local quality of life and business?
- Will there be a loss of income to local businesses?
- Will any of the counties benefit financially?
- How would the project affect the economy of small towns and cities along the transmission line?

3.2.11.4 Methodology

The analysis area for social and economic values and environmental justice considerations includes the six counties crossed by the proposed B2H Project and alternatives, including five counties in Oregon and one county in Idaho (Table 3-265). The analysis area also includes counties adjacent to or close to the north and south ends of the proposed project area: Gilliam County, Oregon, and Canyon and Ada counties, Idaho. These three counties are also included in the analysis area due to the assumption that project construction workers may permanently or temporarily reside in these counties.

The methodology to estimate the social and economic, and environmental justice effects of the Proposed Action and alternatives relies on secondary data compiled from federal, state, and local government sources. Key sources of data for the analysis area include:

- U.S. Census Bureau
- U.S. Bureau of Economic Analysis
- U.S. Bureau of Labor Statistics
- State of Oregon
- State of Idaho

Regional economic impacts were estimated using a multi-county input-output model developed using Impact Analysis for Planning (IMPLAN) modeling software and data (Minnesota IMPLAN Group 2011).

State and local governments were contacted for data on potentially affected community services, including solid waste management, police, fire protection and emergency response, health care, and schools.

The potential effects of the Proposed Action and alternatives are evaluated with respect to the key aspects of the socioeconomic environment, including demographic characteristics, housing, economic conditions, property values, community services, and tax revenues. These evaluations employ different resource-specific analysis methods that are described in their respective sections.

Table 3-265. Counties Crossed by the B2H Proposed Action

County	Proposed Action (miles)	% of Total Route
Morrow (Oregon)	45.8	15
Umatilla (Oregon)	49.5	16
Union (Oregon)	39.4	13
Baker (Oregon)	74.4	24
Malheur (Oregon)	72.1	24
Owyhee (Idaho)	23.8	8
Total	305.0	100

Table Abbreviations: % = percent.

Table Notes: [1] Counties are presented in this table as they are crossed by the Proposed Action from north to south. [2] The Proposed Action route extends 281.2 miles in Oregon and 23.8 miles in Idaho for a total length of 305.0 miles. The proposed alternatives involve the same set of counties as the Proposed Action.

Key project-related income generating indicators used in the socioeconomic analysis include projected construction employment and expenditures. Operations-related employment and expenditures are also used in the analysis. Construction employment and spending estimates are disaggregated by county, where appropriate, primarily based on the share of overall construction that would occur in that county. These estimates represent the best available information and a reasonable approximation of the likely distribution of potential impacts but should not be considered precise forecasts. In most cases, estimated impacts may be compared with the existing conditions data presented in this section. For example, estimated property tax revenues may be compared with total property tax revenues collected in 2010.

The environmental justice component of this analysis involves identifying whether the proposed B2H Project would result in disproportionately high and adverse impacts on minority and/or low-income populations. This typically involves two steps: 1) identifying whether minority and/or low-income communities are present in the analysis area and 2) if these types of communities are present, evaluating whether high and adverse human-health or environmental effects will disproportionately affect the identified communities.

Data from the U.S. Census Bureau are used to identify minority and/or low-income communities that could be affected by the B2H Project. The results of other resource-specific analyses conducted for the project may then be used to evaluate the potential for adverse or human health effects.

The analysis in Table 3-266 assumes the proposed B2H Project would be constructed in two, approximately 150-mile-long spreads built concurrently. The affected counties for each construction spread are identified in Table 3-266.

Table 3-266. Proposed B2H Construction Spreads and Affected Counties

Construction Spread	Proposed Action (miles)	Counties
1	150	Oregon: Morrow, Umatilla, Union, Baker
2	150	Oregon: Baker, Malheur Idaho: Owyhee

Table General Note: Total miles do not sum to 305.3 miles because the total length of the Proposed Action includes rebuilding 5.3 miles of 138 kilovolt (kV) and 69-kV of transmission line, this rebuild is not included in the construction spreads identified in this table.

3.2.11.5 Affected Environment

Population Characteristics and Projections

The nine counties comprising the overall socioeconomic and environmental justice analysis area had a combined population of 754,942 in 2010 (Table 3-267) with 23% or 171,783 people located in the six counties that would be crossed by the Proposed Action. The vast majority of the remaining 77% of the overall analysis area population was located in Ada and Canyon counties, Idaho. Although these counties are not crossed by the Proposed Action, these counties are included in the socioeconomic analysis area because they include relatively large population centers—Boise in Ada County and Nampa in Canyon County—that are within commuting distance of Hemingway Substation and the south portion of the Proposed Action. Boise had a 2010 population of 205,671; Nampa had a 2010 population of 81,557.

The majority of the six counties crossed by the Proposed Action are sparsely populated, with an overall average population density of 8.6 persons per square mile (persons/square mile) in 2010 compared to statewide averages of 39.9 persons/square mile in Oregon and 19.0 persons/square mile in Idaho (Idaho Department of Labor 2011a; Portland State University 2011; U.S. Census Bureau 2011a). Population densities in the six counties ranged from 1.5 persons/square mile in Owyhee County, Idaho to 23.6 persons/square mile in Umatilla County, Oregon.

Table 3-267. Population in the B2H Analysis Area: 1990, 2000, and 2010

				1990-2000 Change		2000-2010 Change	
Counties and Cities	1990	2000	2010	Number	Percent (%)	Number	Percent (%)
Baker County Oregon	15,317	16,741	16,134	1,424	9.3	-607	-3.6
Baker City	9,140	9,860	9,828	720	7.9	-32	-0.3
Gilliam County Oregon	1,717	1,915	1,871	198	11.5	-44	-2.3
Arlington	425	524	586	99	23.3	62	11.8
Malheur County Oregon	26,038	31,615	31,313	5,577	21.4	-302	-1.0
Adrian	131	147	177	16	12.2	30	20.4
Ontario	9,392	10,985	11,366	1,593	17.0	381	3.5

Counties and Cities	1990	2000	2010	1990-2000 Change		2000-2010 Change	
				Number	Percent (%)	Number	Percent (%)
Morrow County Oregon	7,625	10,995	11,173	3,370	44.2	178	1.6
Boardman	1,387	2,855	3,220	1,468	105.8	365	12.8
Fairview	2,391	7,561	8,920	5,170	216.2	1,359	18.0
Umatilla County Oregon	59,249	70,548	75,889	11,299	19.1	5,341	7.6
Hermiston	10,040	13,154	16,745	3,114	31.0	3,591	27.3
Pendleton	15,126	16,354	16,612	1,228	8.1	258	1.6
Pilot Rock	1,478	1,532	1,502	54	3.7	-30	-2.0
Umatilla	3,046	4,978	6,906	1,932	63.4	1,928	38.7
Union County Oregon	23,598	24,530	25,748	932	3.9	1,218	5.0
La Grande	11,766	12,327	13,082	561	4.8	755	6.1
Union	1,847	1,926	2,121	79	4.3	195	10.1
Counties Total	133,544	156,344	162,128	NA	NA	NA	NA
Oregon Total	2,842,321	3,421,399	3,831,074	579,078	20.4	409,675	12.0
Ada County Idaho	205,775	300,906	392,365	95,131	46.2	91,459	30.4
Boise	125,738	185,787	205,671	60,049	47.8	19,884	10.7
Meridian	9,596	34,919	75,092	25,323	263.9	40,173	115.0
Canyon County Idaho	90,075	131,441	188,923	43,365	45.9	57,482	43.7
Caldwell	18,400	25,967	46,237	7,567	41.1	20,270	78.1
Nampa	28,365	51,867	81,557	23,502	82.9	29,690	57.2
Owyhee County Idaho	8,392	10,644	11,526	2,252	26.8	882	8.3
Homedale	1,963	2,528	2,633	565	28.8	105	4.2
Marsing	798	890	1,031	92	11.5	141	15.8
Counties Total	304,242	442,991	592,814	NA	NA	NA	NA
Idaho Total	1,006,749	1,293,953	1,567,582	287,204	28.5	273,629	21.1
United States	248,709,873	281,421,906	308,745,538	32,712,033	13.2	27,323,632	9.7

Table Source: Idaho Department of Labor 2011a; Portland State University 2011; U.S. Census Bureau 1990, 1995, 2000a.

Table General Note: Counties Total = total population for counties within State. Three counties in Idaho and six counties in Oregon.

Table Note: [1] Shaded rows represent counties that comprise the analysis area.

The population in Oregon increased at faster rates than the national average from 1990 to 2000 and from 2000 to 2010. Population increased in all 6 Oregon counties in the analysis area from 1990 to 2000, with increases ranging from 4 percent in Union County to 44 percent in Morrow County.

The population in Baker, Gilliam, and Malheur counties decreased from 2000 to 2010. The population increases in Morrow, Umatilla, and Union counties were smaller than the statewide average.

The population in Idaho increased more than twice the national average between 1990 and 2000 and again between 2000 and 2010. All three Idaho counties in the analysis area experienced dramatic increases in population between 1990 and 2000 (26.8 percent in Owyhee County, 46.2 percent in Ada County, and 46.9 percent in Canyon County) and the population continued to grow between 2000 and 2010 (8.3 percent in Owyhee County, 30.4 percent in Ada County, and 43.7 percent in Canyon County).

Population data are also presented for communities within 25 miles of the Proposed Action and alternatives in Table 3-267. The closest community to the project is the city of Boardman. Boise and Nampa, the most populated communities in Idaho within 25 miles, are located about 23 miles and 12 miles from the Proposed Action route, respectively. The cities of Hermiston and Pendleton, both in Umatilla County, are the largest cities in Oregon within 25 miles of the B2H Project, with 2010 populations of 16,745 and 16,612, respectively (Table 3-267). Other relatively large communities within 25 miles in Oregon include La Grande (13,082) in Union County and Ontario (11,366) in Malheur County.

Population growth results from either natural increase (more births than deaths) or net in-migration (when more people move to an area then leave). From 2000 to 2009, all six Oregon counties experienced net out-migration (more people moving out of the area). Over the same time period, two of the Oregon counties (Baker and Gilliam) also experienced a natural decrease (more deaths than births) (U.S. Census Bureau 2010a).

The three Idaho counties in the analysis area all experienced a natural increase from 2000 to 2009, with Ada and Canyon Counties also experiencing net in-migration (U.S. Census Bureau 2010a).

Population projections developed by the Oregon Office of Economic Analysis (2004) anticipated that the state's overall population would increase by 13 percent between 2010 and 2020. The population in Umatilla County was also projected to increase by 13 percent, and the population in Morrow County projected to increase by 22 percent. Population is also expected to increase in the other analysis area counties in Oregon but at a slower rate than the state average (Oregon Office of Economic Analysis 2004).

The population in Idaho is expected to increase by 15 percent between 2010 and 2020. The population in Owyhee County is projected to increase at a slower rate (11%), and larger than average increases are projected for Ada and Canyon counties, with 22 percent and 17 percent, respectively (Valley County Economic Development Council 2008).

Race and Ethnicity

The majority of the populations in Oregon (78%) and Idaho (84%) were identified as White in the 2010 Census (Table 3-268). In Oregon, the populations of Baker, Gilliam, and Union counties were less diverse than the state as a whole, with more than 90 percent of their respective populations identifying as White in 2010. The populations in Malheur, Morrow, and Umatilla counties were more diverse than the state in 2010. People identifying as Hispanic or Latino were the largest minority group in all three counties, accounting for 32 percent, 31 percent, and 24 percent of the respective total county populations. The Umatilla Indian Reservation is located in Umatilla County, and Native Americans accounted for a relatively large share of that county's total population—3 percent versus 1 percent statewide.

In Idaho, the share of the population identifying as White in Ada County (86%) was similar to the state average (84%) in the 2010 Census (Table 3-268). The populations in Canyon and Owyhee counties were more diverse than the state in 2010, with people identifying as Hispanic or Latino the largest minority group in both counties. Part of the Duck Valley Indian Reservation is located in the south part Owyhee County and Native Americans accounted for 4 percent of that county's total population versus 1 percent statewide.

Table 3-268. Race and Ethnicity 2010

Geographic Area	Total Population	% of Total Population				
		White [1]	Hispanic or Latino	American Indian and Alaska Native [1]	Black or African American [1]	Other Race [1], [2]
Baker	16,134	93	3	1	0	3
Gilliam	1,871	92	5	1	0	2
Malheur	31,313	64	32	1	1	3
Morrow	11,173	65	31	1	0	3
Umatilla	75,889	69	24	3	1	3
Union	25,748	91	4	1	0	4
Oregon County Total	3,831,074	78	12	1	2	7
Ada	392,365	86	7	1	1	5
Canyon	188,923	72	24	1	0	3
Owyhee	11,526	68	26	4	0	2
Idaho County Total	1,567,582	84	11	1	1	3

Table Source: U.S. Census Bureau 2011b.

Table Notes: [1] Non-Hispanic only. The federal government considers race and Hispanic/Latino origin (ethnicity) to be separate and distinct concepts. The data summarized in this table present Hispanic/Latino as a separate category. People identifying as Hispanic or Latino origin and counted in this category may be of any race. [2] The Other Race category includes census respondents identifying as Asian, Native Hawaiian, other Pacific Islander, some other race, or two or more races.

HOUSING

Housing estimates are presented in Table 3-269 for the nine counties within the analysis area and for the states of Oregon and Idaho. These estimates suggest that limited housing is available for rent in Gilliam and Owyhee counties, with estimates of less than 100 available units in each county. An estimated 718 units are available for rent in Umatilla County, Oregon, and an estimated 4,038 units and 1,840 units are available in Ada and Canyon counties, Idaho, respectively. Table 3-270 shows housing units and availability for the incorporated cities in the analysis area.

The availability of temporary housing varies seasonally and geographically within the counties that would be crossed by the project. Demand for temporary housing is generally greatest during the tourism season in the summer months. Statewide in Oregon, the average hotel and motel occupancy rate in 2009 was 63.2 percent in June compared to 38.3 percent in December, with an annual average rate of 53.9 percent (Travel Oregon 2009a, 2009b). Hotel and motel occupancy rates also vary by region.

Table 3-269. Housing Data by State and County, 2010

Geographic Area	Total Housing Units	Number of Rental Units [1]	Units Available for Rent	Rental Vacancy Rate (%)	For Seasonal, Recreational, or Occasional Use [2]
Baker County	8,826	2,431	181	7	1,058
Gilliam County	1,156	365	60	16	116
Malheur County	11,692	4,238	297	7	303
Morrow County	4,442	1,191	70	6	242
Umatilla County	29,693	10,752	718	7	888
Union County	11,489	3,931	283	7	281
Oregon County Total [3]	67,298	22,908	1,609	7	2,888
Ada County	159,471	51,081	4,038	8	1,018
Canyon County	69,409	20,653	1,840	9	280
Owyhee County	4,781	1,332	104	8	307
Idaho County Total [3]	233,661	73,066	5,982	8	1,605

Table Source: U.S. Census Bureau 2012a.

Table Notes: [1] Total number of housing units consists of housing units classified in the 2010 Census as renter occupied, for rent, rented, or not occupied. [2] These are vacant units used or intended for use only in certain seasons or for weekend or other occasional use throughout the year. These units are not included in the Number of Rental Units or Unit Available for Rent totals presented here, but some units may be available for rent. [3] These totals are the sum of the potentially affected counties in each state (six in Oregon; three in Idaho), not the total for each state.

Table 3-270. Housing Data by City, 2010

Community	Total Housing Units	Number of Rental Units [1]	Units Available for Rent	Rental Vacancy Rate	For Seasonal, Recreational, or Occasional Use [2]
Baker City (Baker County, OR)	4,653	1,675	120	7	59
Arlington City (Gilliam County, OR)	315	129	27	21	20
Condon City (Gilliam County, OR)	455	132	16	12	28
Ontario City (Malheur County, OR)	4,620	2,190	139	6	22
Boardman City (Morrow County, OR)	1,017	390	22	6	8
Hermiston City (Umatilla County, OR)	6,373	2,854	97	3	39
Pendleton City (Umatilla County, OR)	6,800	3,029	274	9	54
Umatilla City (Umatilla County, OR)	1,766	753	63	8	17
La Grande City (Union County, OR)	5,794	2,705	194	7	43
Boise City (Ada County, ID)	92,700	36,694	3,154	9	595
Eagle City (Ada County, ID)	7,570	1,385	76	5	93
Garden City (Ada County, ID)	5,429	2,108	266	13	63
Meridian City (Ada County, ID)	26,674	6,171	293	5	135
Caldwell City (Canyon County, ID)	69,409	20,653	1,840	9	280
Nampa City (Canyon County, ID)	30,507	10,544	1,024	10	105
Cities in Owyhee County, ID	N/A	N/A	N/A	N/A	N/A

Table Source: U.S. Census Bureau 2012a.

Table Abbreviations: N/A = data not available.

Table Notes: [1] Total number of housing units consists of housing units classified in the 2010 Census as Renter occupied, For rent, or Rented, not occupied. [2] These are vacant units used or intended for use only in certain seasons or for weekend or other occasional use throughout the year. These units are not included in the Number of Rental Units or Unit Available for Rent totals presented here, but some units may be available for rent.

RV Parks

Comprehensive data are not available on recreational vehicle (RV) parks in the project vicinity. Table 3-271 presents data for RV parks in the analysis area by community. These data were compiled from travel web sites, primarily TravelOregon.com, VisitIdaho.org, and rvparking.com, but do not necessarily account for all of the RV parks in the vicinity of the project. Approximate numbers of spaces are provided. These represent the total approximate number of spaces available at the identified RV parks in each community, not the number that would necessarily be available to rent.

Table 3-271. RV Parks by Community

County	Community	Number of RV Parks [1]	Estimated Number of RV Spaces [2]
Baker (Oregon)	Baker City	5	219
Gilliam (Oregon)	Arlington	3	73
Malheur (Oregon)	Adrian	1	64

County	Community	Number of RV Parks [1]	Estimated Number of RV Spaces [2]
Malheur (Oregon)	Ontario	2	67
Malheur (Oregon)	Vale	2	68
Morrow (Oregon)	Boardman	2	166
Umatilla (Oregon)	Hermiston	5	263
Umatilla (Oregon)	Pendleton	8	425
Umatilla (Oregon)	Umatilla	2	66
Union (Oregon)	La Grande	7	404
Union (Oregon)	Union	2	28
Ada (Idaho)	Boise	4	285
Ada (Idaho)	Meridian	2	263
Canyon (Idaho)	Caldwell	4	352
Canyon (Idaho)	Nampa	1	88
Owyhee (Idaho)	Homedale	2	64
Owyhee (Idaho)	Marsing	2	70

Table Source: rvparking.com 2012; TravelOregon.com 2012; VisitIdaho.org 2012

Table General Note:

Table Notes: [1] These data were compiled from travel web sites and do not necessarily account for all RV parks in the vicinity of the project. [2] These estimates represent the total number of spaces available at the identified RV parks in each community, not the number that will necessarily be available to rent.

Hotels and Motels

Hotel and motel accommodations for each county are listed in Table 3-272 and by community in Table 3-273. These data do not necessarily account for all of the existing hotel, motel, and bed and breakfast rooms within 20 miles of the proposed B2H Project because the Smith Travel Research data does not include establishments with less than 15 rooms, and the data compiled on the state tourism Web sites, which does include hotels, motels, and bed and breakfast inns with less than 15 rooms, are for participating businesses only. The hotel and motel data summarized in Table 3-272 and Table 3-273 do, however, represent a reasonable approximation of the number of hotel and motel rooms based on the best available data.

Table 3-272. Hotels and Motels by County

County	Number of Hotels [1]	Number of Rooms	Estimated Number of Available Rooms [2]
Baker (Oregon)	10	443	163
Gilliam (Oregon)	5	110	40
Malheur (Oregon)	12	793	292
Morrow (Oregon)	3	140	52
Umatilla (Oregon)	24	1,639	603

County	Number of Hotels [1]	Number of Rooms	Estimated Number of Available Rooms [2]
Union (Oregon)	10	427	157
Ada (Idaho)	84	6,915	2,545
Canyon (Idaho)	22	1,054	388
Owyhee (Idaho)	2	13	5

Table Sources: Smith Travel Research 2009, 2011; Travel Oregon 2009a; TravelOregon.com 2012; VisitIdaho.org 2012.

Table Notes: [1] Data were compiled by Smith Travel Research and include hotels, motels, and bed and breakfasts with 15 or more rooms. [2] Average number of rooms is estimated based on the average hotel occupancy rate in Oregon in June 2009.

Table 3-273. Hotels and Motels by Community

County	Community	Number of Hotels [1]	Number of Rooms	Estimated Number of Available Rooms [2]
Baker (Oregon)	Baker City	10	443	163
Gilliam (Oregon)	Arlington	2	68	25
Gilliam (Oregon)	Condon	3	42	15
Malheur (Oregon)	Ontario	12	793	292
Morrow (Oregon)	Boardman	3	140	52
Umatilla (Oregon)	Hermiston	5	365	134
Umatilla (Oregon)	Pendleton	17	1,198	441
Umatilla (Oregon)	Umatilla	2	76	28
Union (Oregon)	La Grande	9	423	156
Union (Oregon)	Union	1	4	1
Ada (Idaho)	Boise	71	5,810	2,138
Ada (Idaho)	Eagle	1	98	36
Ada (Idaho)	Garden City	2	50	18
Ada (Idaho)	Meridian	10	957	352
Canyon (Idaho)	Caldwell	9	254	93
Canyon (Idaho)	Nampa	13	800	294
Owyhee (Idaho)	Homedale	1	8	3
Owyhee (Idaho)	Marsing	1	5	2

Table Source: Smith Travel Research 2009, 2011; Travel Oregon 2009a; TravelOregon.com 2012; VisitIdaho.org 2012

Table Notes: [1] Data were compiled by Smith Travel Research and include hotels, motels, and bed and breakfasts with 15 or more rooms. These data are supplemented by hotel information compiled from other sources, primarily TravelOregon.com and VisitIdaho.org. Data are for selected communities within each county only. [2] The number of available rooms was estimated for each community based on the average hotel occupancy rate in Oregon in June 2009.

Economy and Employment

Agriculture is an important employer in the six counties in Oregon, ranging from 7 percent of total employment in Union County in 2009 to 23 percent in Morrow County, compared to 3.1 percent of total employment statewide (Table 3-274). All of the counties also have a larger share of employment

concentrated in government, ranging from 14.2 percent of total employment in Baker County to 20.3 percent in Malheur County, compared to 13.5 percent statewide.

Morrow County had a relatively high concentration of employment in manufacturing, and Gilliam and Umatilla counties had relatively high concentrations of employment in transportation and warehousing.

Agriculture is also an important employer in Owyhee County, Idaho, with farm employment accounting for 24.9 percent of total employment, compared to 4.2 percent statewide. Canyon County, Idaho, had a relatively high share of employment in manufacturing, which accounted for 10.4 percent of total employment, compared to 6.7 percent statewide.

Trends in the annual, seasonally adjusted employment rates for the six analysis area counties in Oregon and the state as a whole are shown in Table 3-275. Seasonally adjusted unemployment rates were lower than the Oregon state average in two of the six analysis area counties in Oregon (Gilliam and Morrow) in September 2011; rates were equal to, and slightly higher than, the state average in the other counties (Table 3-275).

Adjusted unemployment rates were lower than the Oregon state average in two of the six analysis area counties in Oregon (Gilliam and Morrow) in September 2011; rates were equal to, and slightly higher than, the state average in the other counties (Table 3-275). Trends in the adjusted unemployment rates for the six analysis area counties in Oregon and the state as a whole are shown in Figure 3-51.

Table 3-274. County and State Employment by Economic Section, 2010

Economic Sector	Baker	Gilliam	Malheur	Morrow	Umatilla	Union	Oregon	Ada	Canyon	Owyhee	Idaho
Total employment [1]	8,721	1,561	17,197	6,016	38,381	14,720	2,201,451	263,700	76,224	4,272	877,367
% of Total [2]											
Farm Employment	10.5	16.7	12.3	23.3	8.2	7.1	3.2	0.7	4.3	25.3	4.3
Mining, forestry, and other	(D)	(L)	(D)	(D)	2.8	(D)	1.5	0.3	1.6	(D)	1.8
Utilities	0.9	(L)	0.2	(D)	0.5	(D)	0.2	0.3	0.2	(D)	0.3
Construction	5.0	12.5	2.3	1.5	3.9	4.9	4.8	5.6	7.2	5.5	6.3
Manufacturing	7.0	(D)	6.1	19.4	8.5	8.2	8.1	5.9	10.6	5.5	6.7
Wholesale trade	1.4	(D)	4.5	5.2	2.2	1.7	3.7	3.6	3.3	2.9	3.3
Retail trade	11.8	(D)	12.7	5.0	10.5	12.3	10.5	11.1	12.3	8.1	11.3
Transportation and warehousing	3.0	8.8	2.9	(D)	7.1	(D)	2.8	2.2	3.9	(D)	2.9
Real Estate	4.1	2.1	2.1	2.4	2.6	2.4	4.5	5.7	4.3	(D)	4.8
Consumer Services [3]	6.4	3.5	12.0	7.0	11.8	13.4	14.6	13.2	11.4	10.8	13.4
Producer Services [3]	11.6	(D)	(D)	(D)	(D)	10.1	18.7	24.9	14.3	(D)	18.4
Social Services [3]	12.6	(D)	11.9	5.4	11.2	14.2	13.9	13.8	14.0	(D)	11.9
Government	13.9	14.5	20.0	14.4	18.8	18.9	13.6	12.6	12.7	17.9	14.5

Table Source: U.S. Bureau of Economic Analysis 2012a

Table Notes: [1] U.S. Bureau of Economic Analysis 2012a. [2] Percentages for the counties do not sum to 100 because employment counts are not provided for sectors with less than 10 jobs (L) or for sectors where counts will disclose confidential information (D). These numbers are, however, included in the totals. [3] Nine 2-digit North American Industry Classification System (NAICS) service categories are combined here into these 3 divisions for ease of presentation; Consumer services consists of other services; arts, entertainment, and recreation; and accommodation and food services. Producer services consists of information; finance and insurance; professional and technical services; management of companies and enterprises; and administrative and waste services; Social services consists of educational services and health care and social assistance.

Table 3-275 shows that the seasonally adjusted unemployment rate in Owyhee County, Idaho, was less than two-thirds the state average in September 2011. The corresponding rates in Ada and Canyon counties were lower (-1.2 percent) and higher (+2.6 percent) than the state average, respectively. Statewide, the unemployment rate in Idaho in September 2011 was lower than in September 2010. This was also the case with Ada and Canyon counties, while the unemployment rate in Owyhee County was very slightly higher than it was in September 2010. Figure 3-52 shows that unemployment rates in Idaho and the three analysis area counties in Idaho reached their highest annual levels in a decade in 2010.

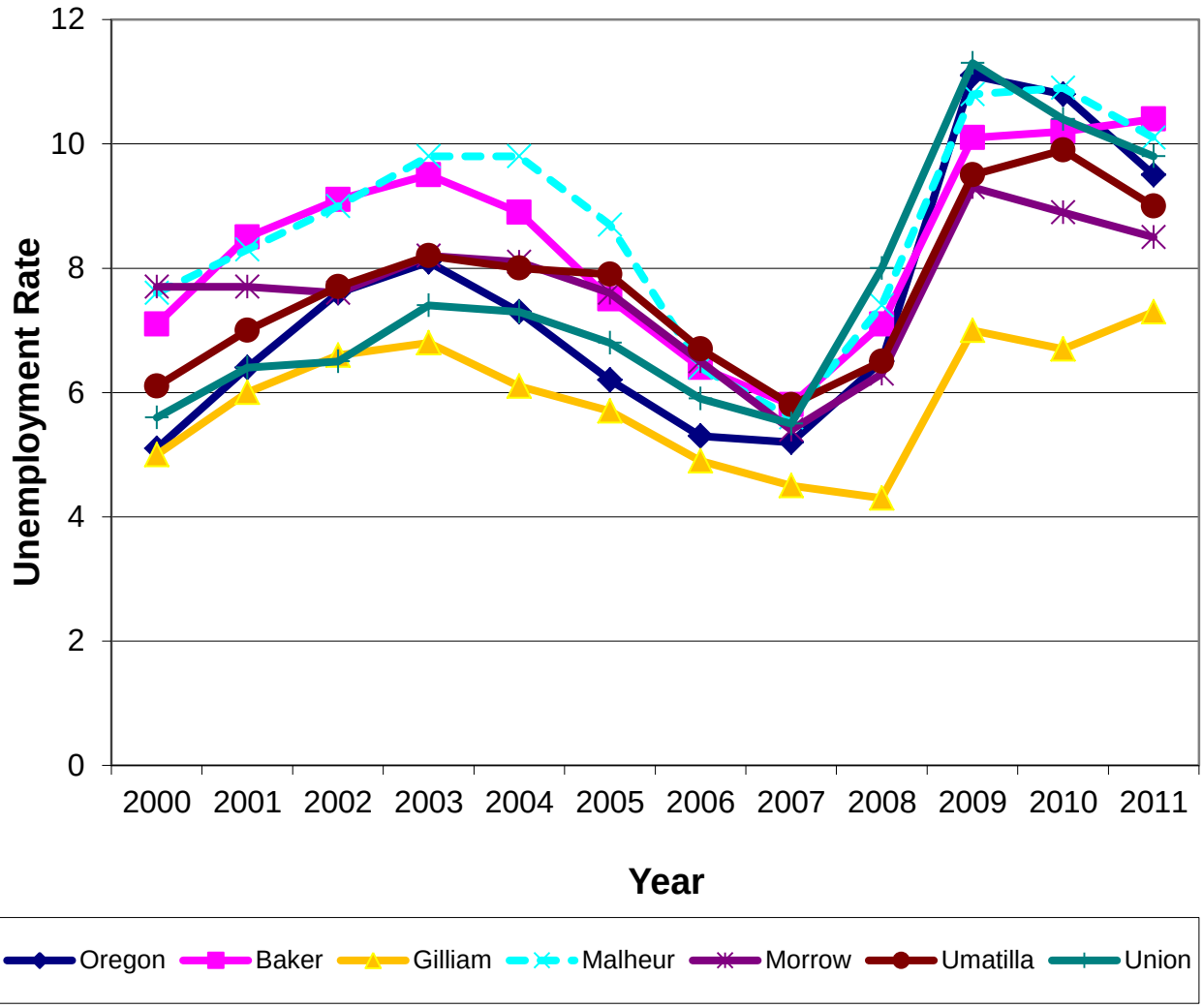
Employee earnings for 2010 are presented in Table 3-276 (Oregon) and Table 3-277 (Idaho) by economic sector for the affected counties, states, and the United States.

Table 3-275. Employment Overview, September 2012

Geographic Area	Civilian Labor Force [1], [2]	Employed [2]	Unemployed [2]	Adjusted Unemployment Rates [3]	
				Sept 2011	Sept 2012
Baker	7,480	6,897	583	10.8	9.9
Gilliam	1,059	985	74	7.3	8.7
Malheur	13,552	12,490	1,062	11.6	9.9
Morrow	5,720	5,327	393	8.9	8.9
Umatilla	40,493	37,801	2,692	9.6	8.3
Union	12,270	11,343	927	10.1	9.0
Oregon	1,972,049	1,821,671	150,378	9.6	8.7
Ada	203,182	190,462	12,721	7.8	6.3
Canyon	86,889	79,956	6,933	11.6	8.0
Owyhee	4,660	4,435	224	5.3	4.8
Idaho	775,956	720,648	55,308	9.0	7.1

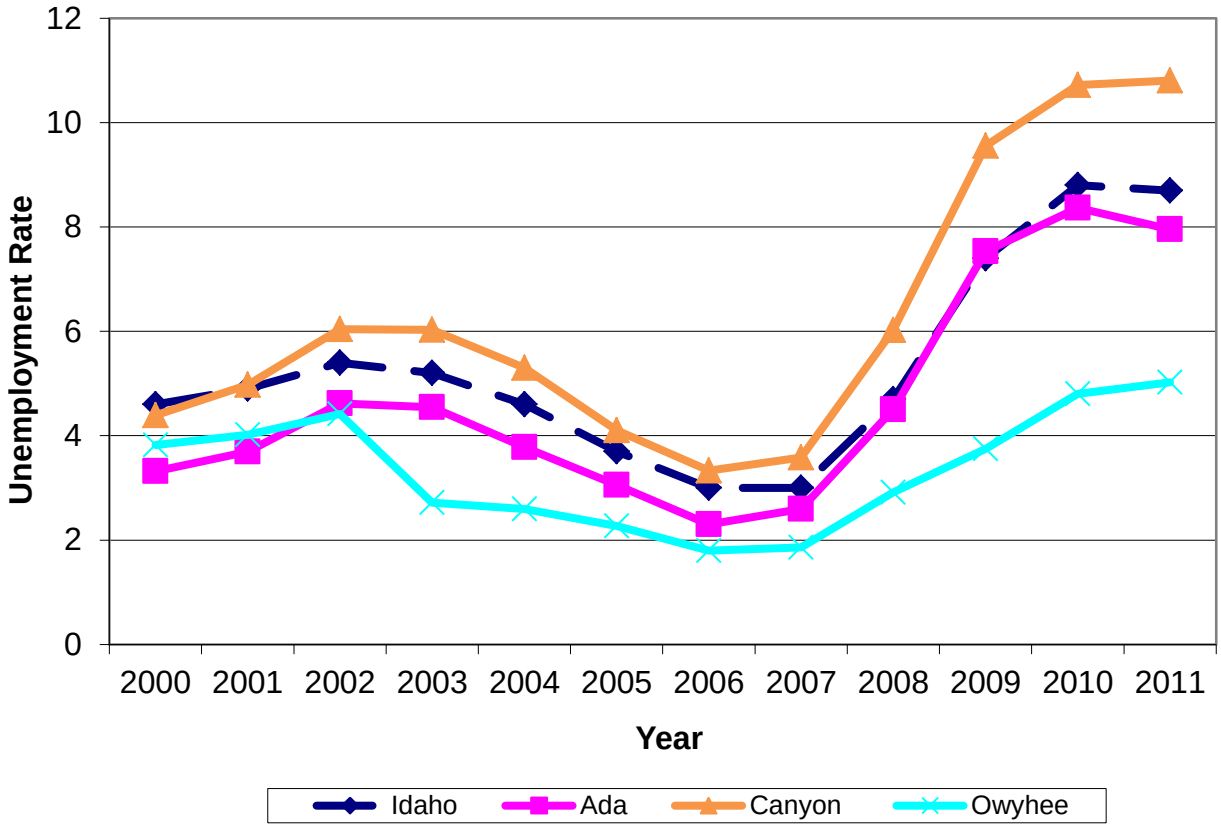
Table Source: Oregon Employment Department 2012; Idaho Department of Labor 2012a

Table Notes: [1] Civilian labor force includes employed and unemployed workers 16 years and older by place of residence. Employed includes non-farm payroll employment and the self-employed. [2] Numbers for the civilian labor force, employed, and unemployed for Oregon are actual counts and not seasonally adjusted. [3] All unemployment rates presented here are seasonally adjusted. Unemployment rates fluctuate with the seasons, with unemployment generally higher during the winter months. Adjusted unemployment rates are adjusted to account for these known fluctuations to reveal underlying economic trends.



***Source*: Oregon Employment Department 2011b, 2012**

Figure 3-51. Annual Unemployment Rates in Oregon, 2000, 2011



Source: Idaho Department of Labor 2011b, 2012a

Figure 3-52. Annual Unemployment Rates in Idaho, 2000, 2011

1 **Table 3-276. Oregon Employee Earnings by Economic Sector 2010 (thousands of dollars)**

Economic Sector	Oregon	County						United States
		Baker	Gilliam	Malheur	Morrow	Umatilla	Union	
Total Earnings	99,690,904	242,856	59,420	568,984	306,168	1,577,948	487,397	8,986,229,000
Farm earnings	1,185,356	2,033	8,412	38,460	104,172	122,903	16,758	77,215,000
Nonfarm earnings	98,505,548	240,823	51,008	530,524	201,996	1,455,045	470,639	8,909,014,000
Private Employment	80,432,010	172,913	40,433	348,522	156,473	1,030,297	340,585	7,266,340,000
Forestry, fishing, and related activities	1,034,412	(D)	(D)	(D)	(D)	30,807	(D)	22,548,000
Mining	117,996	(D)	(L)	(D)	(D)	1,541	(D)	83,081,000
Utilities	615,620	7,336	(L)	1,610	(D)	20,951	(D)	73,306,000
Construction	5,568,431	9,926	14,696	10,830	2,466	60,286	24,348	479,541,000
Manufacturing	12,261,445	26,803	(D)	38,608	58,906	127,890	60,336	891,607,000
Wholesale trade	6,299,209	3,491	(D)	29,620	15,765	40,221	10,205	456,185,000
Retail trade	6,735,049	21,643	(D)	59,841	5,632	106,883	43,482	553,528,000
Transportation and warehousing	3,173,308	10,924	7,977	17,353	(D)	161,751	(D)	295,408,000
Information	2,787,863	3,255	277	3,787	1,385	13,603	4,990	294,252,000
Finance and insurance	4,703,080	5,935	719	12,483	2,953	32,481	11,780	647,655,000
Real estate and rental and leasing	1,764,191	4,796	203	5,457	3,703	18,746	4,203	148,119,000
Professional, scientific, and technical services	7,092,571	8,322	(D)	13,307	(D)	(D)	13,699	886,746,000
Management of companies and enterprises	2,857,611	1,344	319	(D)	(D)	(D)	2,678	223,576,000
Administrative and waste management services	3,508,708	3,599	(D)	(D)	4,151	100,670	6,931	353,648,000
Educational services	1,275,488	1,026	(L)	1,242	(L)	2,155	904	146,724,000
Health care and social assistance	12,627,100	34,896	2,175	71,192	6,481	156,548	75,076	1,000,258,000
Arts, entertainment, and recreation	832,128	(D)	(D)	1,200	398	3,471	2,149	100,953,000
Accommodation and food services	3,365,064	(D)	(D)	19,207	3,322	41,825	16,378	278,844,000
Other services, except public administration	3,812,736	14,249	1,970	22,640	7,068	55,925	17,144	330,361,000

Economic Sector	Oregon	County						United States
		Baker	Gilliam	Malheur	Morrow	Umatilla	Union	
Government and government enterprises	18,073,538	67,910	10,575	182,002	45,523	424,748	130,054	1,642,674,000
Federal, civilian	3,003,199	21,114	726	18,472	5,372	86,147	21,002	320,396,000
Military	671,840	2,145	249	4,175	2,118	11,149	3,438	178,831,000
State and local	14,398,499	44,651	9,600	159,355	38,033	327,452	105,614	1,143,447,000

Table Source: U.S. Bureau of Economic Analysis 2012b.

Table Notes: Earnings are shown in thousands of dollars. (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals. (L) Less than 10 jobs, but the estimates for this item are included in the totals.

1 **Table 3-277. Idaho Employee Earnings by Economic Sector, 2010**

Economic Sector	Idaho	County			United States
		Ada	Canyon	Owyhee	
Total Earnings	34,771,452	12,591,899	2,429,507	176,015	8,986,229,000
Farm earnings	1,566,389	46,558	135,413	82,616	77,215,000
Nonfarm earnings	33,205,063	12,545,341	2,294,094	93,399	8,909,014,000
Private Employment	26,558,649	10,559,944	1,853,714	62,990	7,266,340,000
Forestry, fishing, and related activities	353,988	11,561	31,052	(D)	22,548,000
Mining	198,489	14,182	1,223	(D)	83,081,000
Utilities	298,188	120,921	14,430	(D)	73,306,000
Construction	2,344,748	910,332	175,105	9,445	479,541,000
Manufacturing	3,536,737	1,443,561	327,397	10,536	891,607,000
Wholesale trade	1,656,966	651,776	131,849	5,698	456,185,000
Retail trade	2,678,536	889,798	231,909	6,311	553,528,000
Transportation and warehousing	1,109,237	262,103	129,658	(D)	295,408,000
Information	539,116	235,944	29,601	1,010	294,252,000
Finance and insurance	1,407,363	714,808	64,794	(D)	647,655,000
Real estate and rental and leasing	477,284	189,503	25,419	(D)	148,119,000
Professional, scientific, and technical services	3,121,072	1,257,264	95,791	(D)	886,746,000
Management of companies and enterprises	580,533	436,479	18,127	(D)	223,576,000
Administrative and waste management services	1,339,987	757,332	77,400	3,912	353,648,000
Educational services	340,199	104,639	48,056	(D)	146,724,000
Health care and social assistance	3,995,464	1,694,208	284,516	(D)	1,000,258,000
Arts, entertainment, and recreation	332,291	125,106	7,007	315	100,953,000
Accommodation and food services	982,098	331,260	55,123	2,283	278,844,000
Other services, except public administration	1,266,353	409,167	105,257	4,575	330,361,000

Economic Sector	Idaho	County			United States
		Ada	Canyon	Owyhee	
Government and government enterprises	6,646,414	1,985,397	440,380	30,409	1,642,674,000
Federal, civilian	1,233,320	559,797	33,349	4,243	320,396,000
Military	657,146	77,924	34,721	2,095	178,831,000
State and local	4,755,948	1,347,676	372,310	24,071	1,143,447,000

Table Source: U.S. Bureau of Economic Analysis 2012b

Table Notes: Earnings are shown in thousands of dollars; (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

AGRICULTURE

Land use in three of the six analysis area counties in Oregon (Gilliam, Morrow, and Umatilla counties) is largely agricultural, ranging from about 70 percent of the total land area in Umatilla County to 95 percent in Gilliam County (Table 3-278). Agriculture also accounted for a larger share of total land use than the state average in two of the other analysis area counties in Oregon (Union and Baker counties). In Malheur County, agricultural lands accounted for just 19 percent of the total county area. By comparison, the statewide average was 27 percent. The average farm size ranged from 554 acres in Union County to 4,472 acres in Gilliam County, compared to a statewide average of 425 acres.

The market value of agricultural products sold in the six analysis area counties in Oregon in 2007 ranged from about $37 million in Gilliam County to about $354 million in Morrow County. Umatilla County ranked second in gross farm and ranch sales in Oregon in 2009, with Morrow and Malheur counties ranked third and eighth, respectively (Oregon Department of Agriculture 2010). Crops comprised the majority of the total value of agricultural products sold in three of the six counties (Gilliam, Umatilla, and Union counties); livestock and poultry accounted for more than half of the total value in the other three counties (Baker, Malheur, and Morrow counties).

Table 3-278. Summary of Agriculture by County and State, 2007

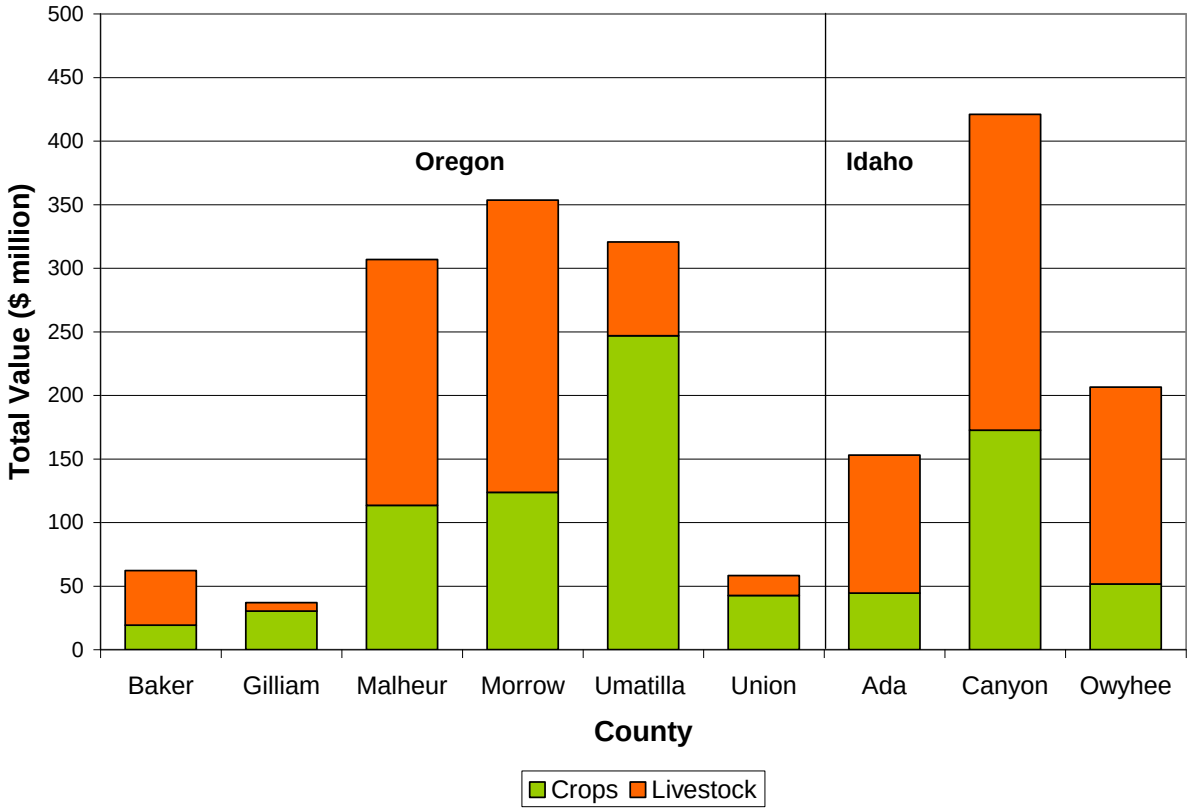
Geographic Area	Number of Farms	Farm Land (acres)	Total County Area (%)	Total Market Value of Agriculture Products Sold (Dollars)	Percent of Total Market Value (Crops)	Percent of Total Market Value (Livestock)
Baker	688	711,809	36	62,138	31	69
Billiam	164	733,387	95	37,048	82	18
Malheur	1,250	1,170,664	19	306,795	37	63
Morrow	421	1,104,250	85	353,519	35	65
Umatilla	1,658	1,447,321	70	320,679	77	23
Union	880	487,584	37	58,244	73	27
Oregon	38,553	16,399,647	27	4,386,143	68	32
Ada	1,323	11,477	28	153,031	29	71
Canyon	2,368	260,247	69	420,928	41	59
Owyhee	620	569,305	12	206,552	25	75
Idaho	25,349	11,497,383	22	5,688,765	41	59

Table Source: USDA National Agricultural Statistics Service 2009.

Table Abbreviations: % = percent

More than half the land (69%) in Canyon County, Idaho, is used for agriculture, compared to 22 percent statewide. In Ada and Owyhee counties, agricultural lands accounted for 28 percent and 12 percent of the total county's area, respectively. Average farm size ranged from 110 acres in Canyon County to 918 acres in Owyhee County, compared to a statewide average of 454 acres.

In 2007, the overall market value of agricultural products sold in the three Idaho counties in the project area ranged from about $153 million in Ada County to about $421 million in Canyon County. Livestock comprised the majority of the total value of agricultural products sold in all three counties and statewide, ranging from 59 percent of the total value to 75 percent, as shown in Figure 3-53.



***Source*: USDA National Agricultural Statistics Service 2009**

Figure 3-53. Total Market Value of Agricultural Products Sold, 2007

Timber

The total annual timber harvest in Oregon from 2003 to 2009 ranged from 2,748 million board feet (MMBF) in 2009 to 4,451 MMBF in 2004. Timber harvest in the six analysis area counties in Oregon accounted for 2.4 percent to 3.2 percent of the state total over this period, with total harvested volumes ranging from 88 MMBF in 2009 to 136 MMBF in 2005. There was no recorded timber harvest in Gilliam and Malheur counties in 2009. Timber harvest in 2011 is accounted for in Table 3-279.

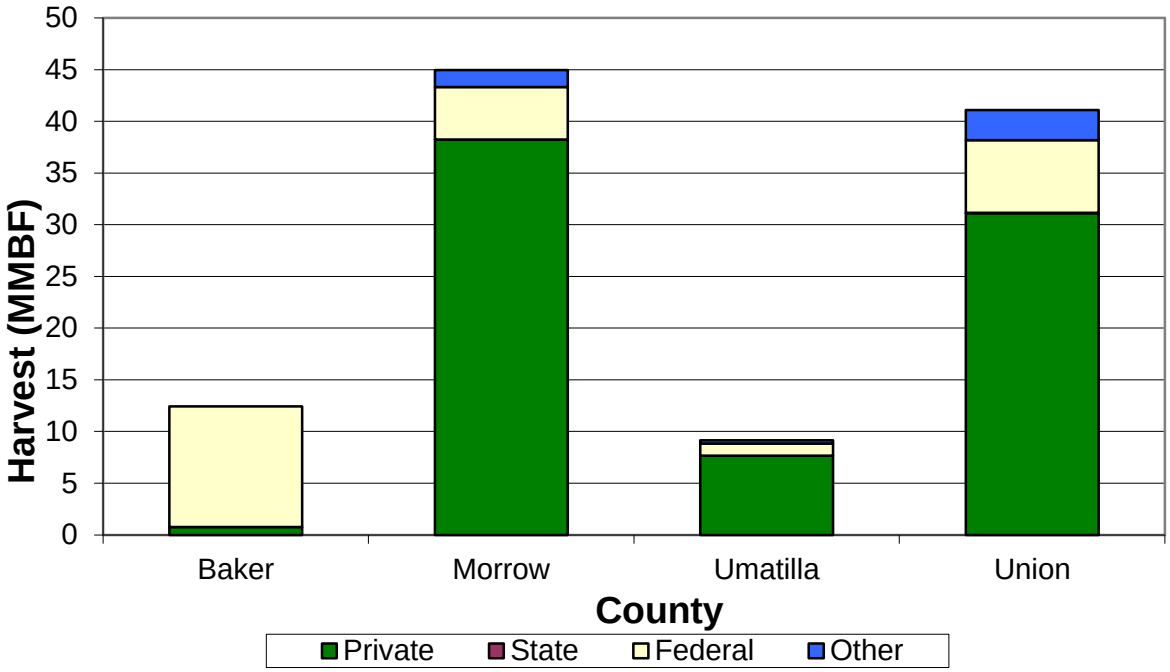
Table 3-279. Timber Harvest (MMBF) in Affected Oregon Counties, 2011

Geographic Area	Private	State	Federal	Other	Total
Baker	0.8	0.0	11.7	0.0	12.4
Gilliam	0.0	0.0	0.0	0.0	0.0
Malheur	0.0	0.0	0.0	0.0	0.0
Morrow	38.2	0.0	5.1	1.6	44.9
Umatilla	7.7	0.0	1.2	0.3	9.2
Union	31.1	0.0	7.0	2.9	41.1
Oregon	2,732.9	280.5	539.4	96.4	3,649.1

Table Source: Oregon Department of Forestry 2012.

Table Note: The land ownership categories identified in this table include the following Oregon Department of Forestry categories: Private = Forestry industry and other private lands; State = State; Federal = BLM and USFS lands; Other = Other public and Native American lands.

Private lands accounted for a majority (72%) of the timber volume harvested in the analysis area counties in 2009, with federal lands accounting for about 23 percent. Statewide, private lands accounted for 75 percent of the total harvested, federal lands comprising 15 percent, and with state lands comprising just 7 percent. Figure 3-54 shows the distribution of harvest volume by land ownership for the affected counties that had recorded harvest in 2009.



***Source*: Oregon Department of Forestry 2012**

Figure 3-54. Timber Harvest by Affected Oregon County and Land Ownership, 2009

Recreation and Tourism

Recreation and tourism is not classified or measured as a standard industrial category; therefore, employment and income data are not specifically collected for this sector. Components of recreation and tourism activities are instead captured in other industrial sectors, primarily the retail sales and services sectors. Estimates of travel-related spending and associated employment in Oregon for 2009 prepared for the Oregon Tourism Commission found that statewide travel-related employment accounted for about 4.2 percent of total employment (Table 3-280). In Umatilla and Baker counties, travel-related employment accounted for a larger share of total employment than the statewide average (5.4 percent and 7.9 percent). Travel-related employment in the other four analysis area counties in Oregon accounted for about the same or a smaller share than the statewide average. These estimates are primarily based on travel-related spending on accommodation, food and beverages, local transportation, recreation and entertainment, and shopping. While these estimates include business travel and recreation and tourism-related travel, they provide a useful indication of the relative importance of recreation and tourism to the local economies within the analysis area.

Table 3-280. Travel Related Economic Impacts in Oregon Counties, 2010

Geographic Area	Travel Spending ($M)	Travel-Related Earnings ($M)	Travel-Related Employment	Percent of Total Employment[1]
Baker	41.8	91.2	690	7.9
Gilliam[2]	9.0	2.3	110	7.0
Malheur	37.3	10.0	560	3.3
Morrow	12.2	2.9	160	2.7
Umatilla	131.7	36.6	2,060	5.4
Union	29.5	9.6	550	3.7
Oregon	8,500.0	2,200.0	92,400	4.2

Table Source: Dean Runyan Associates 2012.

Table Abbreviations: M = million.

Table Notes: [1] Travel-related employment is estimated as a percent of total employment using data from the U.S. Bureau of Economic Analysis 2012. [2] The total for Gilliam County also includes adjacent Sherman County.

The most recent comprehensive assessment of travel-related spending and associated employment in Idaho counties was prepared in 2004 (Global Insight and D.K. Shifflet & Associates 2005). This analysis found that statewide travel-related employment accounted for about 7 percent of total employment (Table 3-281). Travel-related employment accounted for a larger share of total employment than the statewide average in Ada County (9 percent versus 7 percent) and a smaller share than the state average in Canyon and Owyhee counties (4 percent and 1 percent, respectively).

Table 3-281. Travel-Related Economic Impacts by Idaho County, 2004

Geographic Area	Travel Spending ($M)	Travel-Related Earnings ($M)	Travel-Related Employment	Percent of Total Employment
Ada	1,128.9	277.0	17,951	9
Canyon	126.9	31.1	2,017	4

Geographic Area	Travel Spending ($M)	Travel-Related Earnings ($M)	Travel-Related Employment	Percent of Total Employment
Owyhee	1.8	0.4	28	1
Idaho	2,968.1	728.3	47,203	7

Table Source: Global Insight and D.K. Shifflet & Associates 2005.

Table Abbreviations: M = million.

Estimates of statewide travel-related impacts prepared by the U.S. Travel Association (2009), however, suggest that the 2004 estimates prepared by Global Insight and D.K. Shifflet (Global Insight) may overestimate the importance of travel-related employment in Idaho, at least at the state level. The U.S. Travel Association (2009) estimates found that travel-related employment accounted for 23,700 jobs in Idaho in 2004, about half the number estimated by Global Insight. The 2005 Global Insight estimates do, however, represent the best available data at the county level and provide an indication of the relative importance of recreation and tourism in the three analysis area counties in Idaho.

Designated recreation areas within 0.5 mile of the proposed B2H Project and alternatives are discussed in section 3.2.6 Land Use, Agriculture, Recreation, Transportation. These areas include the BLM-managed Virtue Flat Extensive Recreation Management Area (ERMA), the Owyhee River Below the Dam Special Recreation Management Area (SRMA), the Oregon Trail and Owyhee River Areas of Critical Environmental Concern (ACECs). Section 3.2.6 also discusses dispersed recreation activities, including hunting, off-highway vehicle (OHV) use, and camping that may occur within the analysis area.

Income and Poverty

Median household income was below the Oregon state median ($46,536) in all of the Oregon counties in the analysis area in 2010, ranging from 70 percent to 98 percent of the state median (Table 3-282). Four of the six Oregon counties had a larger percentage of their county populations below the poverty level than the state average (15.8 percent). Malheur County had the highest percentage (36.5 percent) of the population below the poverty level in 2010. The poverty thresholds for 2010 vary by size of family. The weighted average thresholds are $11,139 for one person and $14,218 for a family of two.

In Idaho, Ada County ($50,909) had a median household income above the Idaho state median ($43,259; while Canyon County ($42,419) and Owyhee County ($36,670) both had median household incomes below the Idaho state median. A larger percentage of Canyon County (19.7 percent) and Owyhee County's (22.7 percent) population was below the poverty level when compared with the Idaho state average (15.8 percent), while a smaller percentage of Ada County's (13.9 percent) was below the poverty level when compared to Idaho state as a whole.

Table 3-282. Income and Poverty, 2010

County/State	Median Household Income		Percent of Population Below the Poverty Level
	Dollars[1]	Percent of State Median[2]	
Baker	37,868	81	20
Gilliam	45,827	98	11.4

County/State	Median Household Income		Percent of Population Below the Poverty Level
	Dollars[1]	Percent of State Median[2]	
Malheur	32,412	70	39.5
Morrow	45,652	98	16.7
Umatilla	43,691	94	15.5
Union	41,192	89	16.7
Oregon	46,536	100	15.8
Ada	50,909	118	13.9
Canyon	42,419	98	19.7
Owyhee	36,670	85	22.7
Idaho	43,259	100	15.8

Table Source: U.S. Census Bureau 2012b

Table Notes: [1] Median incomes are presented in 2010 dollars unadjusted for inflation. [2] Presented as a share of the Oregon median for counties in Oregon and as a share of the Idaho median for counties in Idaho.

Tribal Household Economy

As a portion of the project area passes through lands ceded to the U.S. Government by 1855 treaty with Confederate Tribes of the Umatilla Indian Reservation (CTUIR), the BLM- as manager of these federal lands- has the legal responsibility to consult with CTUIR and consider the conditions necessary to satisfy the rights reserved by the Tribe as part of its Treaty. Exercise of treaty rights could include, but is not limited to, water rights, taking fish, mineral rights, collection of plant resources such as roots and berries, and hunting of small and large game for economic, religious, and cultural use. Treaty rights also include pasturing stock on open and unclaimed lands.

Although CTUIR is the only Tribe with ceded lands in the project area, several other Tribes consider portions of, or the entirety of, the project area as part of their aboriginal territory, subsistence range, traditional use area, or zone of influence. These Tribes include the Shoshone-Paiute Tribes of the Duck Valley Indian Reservation, 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.

There are currently no data available to estimate the percent contribution which fishing, hunting and gathering of wild plants provides to households of members of the abovementioned tribes. There are also no data to examine the percentage contribution of these activities at a community level.

Property Values

Approximately 71 percent of the land that would be crossed by the proposed B2H Project is privately owned. The BLM manages about 24 percent of the land that would be crossed, and the remaining 5 percent is managed by other federal (Department of Defense, USFS, and Bureau of Reclamation) or state agencies. The entire new construction portion of transmission line requires new rights-of-way that would involve a combination of right-of-way grants and easements between IPC and federal, state, and

local governments; and private landowners. Rights-of-way for transmission line facilities on private lands would be obtained as perpetual easements by IPC.

COMMUNITY SERVICES

Local governments and other entities provide public services, such as solid-waste disposal, law enforcement, fire protection, health care, and education in the analysis area counties. Interviews were conducted with local authorities in each county to assess the availability of public services and infrastructure in the six counties that would be crossed by the proposed Project and alternatives. These interviews had two purposes: 1) identify the current capacities of different organizations to provide services, and 2) identify the ability of these service providers to meet the potential increase in demand associated with the proposed project.

SOLID-WASTE MANAGEMENT

Solid waste generated during construction would likely be disposed of at landfills located within or near the analysis area. Landfills located within or near the analysis area include those located in Morrow, Baker, and Malheur counties in Oregon and in Canyon and Payette counties in Idaho. These landfills are listed in Table 3-283, which also identifies the volume of waste each landfill currently receives (tons per day), as well as the amount of waste each landfill is permitted to receive (tons per day), where this information is available.

Table 3-283. Landfills within the Analysis Area

Facility Name	County	Current Volume of Waste Received (Tons/Day)	Current Volume of Waste Permitted to Receive (Tons/Day)
Finley Buttes Landfill	Morrow, OR	1,923 tons	No permitting restriction
Baker Sanitary Landfill	Baker, OR	50 to 60 tons	No permitting restriction
Lytle Boulevard Landfill	Malheur, OR	15,500 tons	20,000 tons
Pickles Butte Landfill	Canyon, ID	Unknown[1]	Unknown[1]
Clay Peak Landfill	Payette, ID	700 tons	No permitting restriction

Table Source: Freese 2011; Geedes 2011; Large 2011; Schmidt 2011.

Table Note: [1] Multiple attempts were made to contact Pickles Butte Landfill to obtain information about current and future operations. No response has been received to date.

LAW ENFORCEMENT

The proposed B2H Project and alternatives would cross through the jurisdiction of six county sheriff's departments (Table 3-284). Four of these sheriff's departments responded to requests for information (Bentz 2011; Diehl 2011; Hoagland 2011; Southwick 2011).

Response times from local stations to the B2H Project area would vary and depend on the time of day, the priority of the emergency, environmental conditions, the location of the emergency, and whether law enforcement personnel were already patrolling the area. Estimated response times would range from 5 minutes to 1 hour for the Baker, Malheur, and Owyhee County sheriffs' departments (Bentz 2011; Hoagland 2011; Southwick 2011). The Umatilla County Sheriff's Department indicated that response

times for non-emergency calls during the day could take several hours and that non-emergency calls at night would not likely be responded to until the next day. Response times for emergency calls (i.e., life-threatening situations) by the Umatilla County Sheriff's Department would likely range from 20 minutes to 1 hour (Diehl 2011).

Table 3-284. Law Enforcement

Department	Number of Law Enforcement Personal	Response Time to Project Area
Morrow County Sheriff	Unknown[1]	Unknown[1]
Umatilla County Sheriff	7 deputies (3 within the project area)	20 minutes to next day
Union County Sheriff	Unknown[1]	Unknown[1]
Baker County Sheriff	8 deputies	5 minutes to 1 hour
Malheur County Sheriff	18 deputies	1 hour
Owyhee County Sheriff	13 deputies	20 minutes

Table Sources: Bentz 2011; Diehl 2011; Hoagland 2011; Southwick 2011.

Table Note: [1] The Morrow County and Union County Sheriff's offices did not respond to several requests for information.

Fire Protection and Emergency Response

The proposed Project and alternatives would cross through the jurisdiction of 13 fire departments (Table 3-285). These departments were initially identified by contacting offices with jurisdiction over the counties crossed by the proposed Project. In addition, the Oregon State Fire Marshal's office was contacted to confirm that the departments shown in Table 3-285 covered the entire Project area (Warner 2011). Each fire department was contacted and 10 of the 13 fire departments and 1 federal fire office responded to requests for information (Carter 2011; Enright 2011; Harper 2011; Johnson 2011; Martin 2011; Morgan 2011; Payton 2011; Rogelstad 2011; Skerjanec 2011; Webb 2011; Wooldridge 2011).

Table 3-285. Fire Departments

Department	County	Number of Fire Fighters	Equipment	Response Time
Boardman Rural Fire Protection District	Morrow	7 paid; 17 volunteers	(3) type 1 interface engines (off-road) (2) type 1 engines (1) type 1 tender with a 3,000-gallon tank (1) type 6 engine	0.5 hour south-route; 10 minutes north-route.
Ione Rural Fire Protection District	Morrow	14–15 volunteers	(2) pumper engines (2,000- and 1,000-gallon tanks) (3) brush trucks (1) tender with a 3,000-gallon tank	Unknown[1]
Echo Rural Fire Department	Umatilla	20–21 volunteers	(5) brush rigs (3) tankers (4) pumpers	20–25 minutes near Pilot Rock; 40 minutes in other areas

Department	County	Number of Fire Fighters	Equipment	Response Time
Pilot Rock Rural Fire Protection District	Umatilla	Unknown[1]	Unknown[1]	Unknown[1]
North Powder Fire Department	Union	16 volunteers	(1) type 6 brush rig (1) 2,500 gallon tender (1) 1,800 gallon tender (1) 1,500 gallon tender	12–15 minutes
La Grande Rural Fire Protection District	Union	1 paid; 20 volunteers	(3) type 1 engines (1) brush truck (1) 3,000-gallon water tender (2) rescue vehicles	10 minutes
Union Emergency Services-Fire Department	Union	15 volunteers	(2) ambulances (1) rescue rig (4) fire engines (2) tankers (1) brush truck	11–12 minutes
Wallowa-Whitman National Forest Fire Management Office	Union	Unknown[1]	Unknown[1]	Unknown[1]
Keating Rural Fire District	Baker	15 volunteers	(2) structure engines (1) tender (4) wildland engines	25 minutes
Diamond Rural Fire Protection District	Baker	Unknown[1]	Unknown[1]	Unknown[1]
Baker Rural Fire Protection District	Baker	18 volunteers	(3) structure trucks (2) 4,200-gallon tenders (4) brush trucks	8–14 minutes
BLM Vale District Fire, Oregon		34 permanent seasonal personnel; 60 temporary personnel	(11) heavy engines (8) light engines (1) tactical tender (1) dozer (1) single engine air tanker (July – September) (1) type 2 helicopter (July – September)	Varies with distance
Adrian Rural Fire Protection District	Malheur	14 volunteers	(1) 1,000-gallon pumper engine (1) 3,000-gallon tender truck (1) heavy truck with an 800-gallon tank (1) light truck with a 300-gallon tank	20–25 minutes
Homedale Fire Department	Owyhee	Unknown[1]	Unknown[1]	Unknown[1]

Department	County	Number of Fire Fighters	Equipment	Response Time
Marsing Rural Fire Department	Owyhee	32 volunteers	(2) engines (2) brush trucks (4) tenders	15 minutes
BLM Fire Management Officer	Project Wide	N/A	N/A	N/A

Table Sources: Carter 2011; Enright 2011; Harper 2011; Johnson 2011; Martin 2011; Morgan 2011; Payton 2011; Rogelstad 2011; Skerjanec 2011; Webb 2011; Wooldridge 2011.

Table Abbreviations: N/A = Not applicable.

Table Note: [1] Multiple attempts were made to contact the Ione Rural Fire Protection District, the Pilot Rock Rural Fire Protection District, the Wallowa-Whitman National Forest Fire Management Office, and the Homedale Fire Department to obtain information about current operations. No responses were received.

Not all lands fall within a designated fire district. In these cases, the closest or best-situated fire district would likely respond (Enright 2011; Wooldridge 2011). Mutual-aid agreements have been established between local fire districts for mutual response to ensure cooperation pool resources, ensure cooperation, and (Payton 2011; Martin 2011; Webb 2011). As a result of these mutual-aid agreements, the fire district that responds to fires may not be the district the fire occurs in or even the closest district, but rather the district best situated and suited to respond.

Response times to a fire along the B2H Project would vary. Most of the fire districts in the analysis area are comprised of volunteers and, in some cases, it could take time to collect and mobilize an entire fire crew. In addition, most of the B2H Project crosses open remote lands where access is often limited. Were a fire to occur in one of these areas, it might not be immediately identified.

Health Care

A number of medical facilities serve the communities and outlying areas in the vicinity of the B2H Project. If minor project-related injuries occurred, they would be treated at local medical facilities or emergency rooms. Workers suffering more serious injuries would be taken to one of the major hospitals in the general project vicinity. Four major hospitals capable of treating serious injuries are located within the counties of the proposed project: Saint Anthony Hospital in Pendleton, Oregon, Grande Ronde Hospital in La Grande, Oregon, Saint Alphonsus Regional Medical Center in Ontario, Oregon and another Saint Alphonsus level four hospital in Baker City with life flight services.

Saint Anthony Hospital is a level 3 hospital licensed for 49 beds, 5 of which are intensive-care beds. The hospital employs about 80 nurses, and 30 physicians have staffing privileges. Medical transportation is provided by Life Flight. A Life Flight helicopter is stationed at the hospital and the hospital also has access to a fixed-wing craft. Flight times between the hospital and the project area would take about 15 minutes for the portions of the Proposed Action route and alternatives located near Pilot Rock and 40 minutes for the areas located further east. Patients suffering major injuries, such as severed limbs or electrical burns, would be stabilized at Saint Anthony Hospital and then transported to a regional hospital for treatment (Blanc 2011).

Grande Ronde Hospital is a level 4 hospital licensed for 25 beds, 6 of which are intensive-care beds. The hospital employs about 175 nurses, and 45 physicians have staffing privileges. Medical transportation is provided by Airlink. An Airlink fixed-wing craft is stationed at the local airport, and flight times between the airport and the Proposed Action and alternatives would likely be about 20 to 90 minutes. Patients suffering major injuries, such as severed limbs or electrical burns, would be stabilized at Grande Ronde Hospital and then transported to a regional hospital for treatment (McCowan 2011).

Saint Alphonsus Regional Medical Center in Boise, Idaho, is a level 2 hospital licensed for 387 beds, 20 of which are intensive-care beds. The hospital employs about 665 nurses, and 613 physicians have staffing privileges. Medical transportation is provided by Air Medical. An Air Medical helicopter is stationed at the Boise International Airport, and flight times been the hospital and the Proposed Action and alternatives will likely be about 15 minutes. This medical facility will be able to treat any injury that could occur during construction or operation of the project, with the exception of major burns; patients suffering major burns will be stabilized at this center and then sent to a burn center in Salt Lake City, Utah, or Portland, Oregon (Ryan 2012).

SCHOOLS

The Proposed Action and alternatives would cross six counties and multiple school districts. The school districts most likely to be affected are identified by county in Table 3-286, which also identifies current student enrollment and student/teacher ratios, as well as enrollment trends for the 10 school districts that responded to requests for information. All 10 of these districts indicated that enrollment has either been flat or declining in recent years, with current trends expected to continue in the future. Student/teacher ratios for the 2010/2011 school year ranged from 7.2 students per teacher in the Huntington School District 16J to 21 students per teacher in the La Grande School District 001.

Table 3-286. School Districts

Area	School District	Student Enrollment (2010-2011)	Student: Teacher Ratio (2010-2011)	Enrollment Trends
Baker (Oregon)	Baker School District	2,000	19.6	flat to declining
Baker (Oregon)	Huntington School District 16J	71	7.2	declining
Malheur (Oregon)	Ontario School District 8C	2,400	18.0	flat
Malheur (Oregon)	Vale School District 084	878	16.0	declining
Malheur (Oregon)	Nyssa School District 026[1]	1,130	17.0	unknown
Malheur (Oregon)	Adrian School District 061	242	13.6	flat
Morrow (Oregon)	Morrow School District 001	2,200	16.8	flat
Umatilla (Oregon)	Pilot Rock School District 002	352	14.6	declining
Union (Oregon)	La Grande School District 001	2,204	21.0	declining
Union (Oregon)	Union School District 005	370	16.1	declining
Owyhee (Idaho)	Marsing Joint School District 363	850	12.6	flat

Area	School District	Student Enrollment (2010-2011)	Student: Teacher Ratio (2010-2011)	Enrollment Trends
Owyhee (Idaho)	Melba Joint School District 136	740	17.3	flat

Table Sources: Allison 2011; Burrows 2011; Hogg 2011; Lowry 2011; Milburn 2011; Nunn 2011; Panike 2011; Stalk 2011; Wegener 2011; Wood 2011.

Table Abbreviations: N/A = not available

TAX REVENUES

OREGON

Property taxes are an important source of revenue for the public sector in Oregon (Oregon Department of Revenue 2011a). Property taxes are based on the assessed value of the property. In Oregon, the appropriate county assessor administers most property assessments, but the Oregon Department of Revenue assesses the value of some properties, including public utilities and large industrial properties.

Property taxes imposed for fiscal year 2011/2012 are presented for the State of Oregon and the analysis area counties in Oregon in Table 3-287. This table also presents the net assessed value and average tax rates. Total property taxes imposed ranged from approximately $1,007,455 in Gilliam County to about $72,730 in Umatilla County.

The State of Oregon does not have sales tax but does impose a statewide transient lodging tax of 1 percent. The majority of the revenue generated from this tax (80 percent) is used to fund state tourism marketing programs, with up to 15 percent used to implement regional tourism marketing programs. Lodging tax revenues generated in the affected counties in 2009 ranged from $18,315 in Gilliam and Sherman counties (which are combined to avoid disclosure due to the small number of providers) to $177,004 in Umatilla County (Oregon Department of Revenue 2010a).

Table 3-287. Property Tax Revenue in Oregon Counties, 2011-2012

Area	Net Assessed Value ($,1000)	Property Tax Imposed ($1,000)
Baker	1,207,339	16,235
Gilliam	1,007,455	11,826
Malheur	1,638,499	22,546
Morrow	1,423,030	22,980
Umatilla	4,476,221	72,730
Union	1,480,818	19,235
Oregon	312,702,119	4,924,270

Table Source: Oregon Department of Revenue 2012a.

Corporations doing business in Oregon pay a corporate excise tax. Net corporate tax receipts in Oregon were $476.5 million in fiscal year 2010-11 (Oregon Department of Revenue 2011b). For tax years 2011 and 2012, corporations pay a tax rate of 6.6 percent on income up to $250,000 and a rate of 7.6 percent for any amount greater than $250,000. Viewed by industry sector, utilities accounted for

$1.6 million of corporate tax receipts in fiscal year 2010-11, less than 1 percent of the total for that year. Corporate tax revenues contribute to the General Fund, which is used to support state services including schools and education, human services, public safety, and other programs.

Personal income tax is Oregon's largest source of revenue, expected to account for 87 percent of the General Fund for 2011-13 (Oregon Department of Revenue 2012b). Taxable income and net income tax revenues are presented for the State of Oregon and the analysis area counties in Oregon in Table 3-288. Income tax revenues generated in the affected counties in 2010 ranged from $2.3 million in Gilliam County to $63.8 million in Umatilla County.

Table 3-288. Income Tax Revenues in Oregon Counties, 2010

Geographic Area	Taxable Income ($1,000)	Net Income Tax ($1,000)
Baker	180,287	11,926
Gilliam	30,813	2,338
Malheur	276,697	16,941
Morrow	142,844	9,681
Umatilla	926,300	63,803
Union	334,634	23,247
Oregon	67,359,660	4,999,374

IDAHO

Property taxes in Idaho are based on a property's current market value, and most homes, farms, and businesses are subject to property tax. Property tax values for operating property, including industries engaged in electric generation, transmission, and distribution, are set by the Idaho State Tax Commission. The Idaho State Tax Commission appraises operating property using a unit-appraisal approach, which values a group of property items as one entity. The market value of each unit is estimated using cost, income, and/or market approaches to valuation (Idaho State Tax Commission 2003). Property tax revenues for 2011 are summarized for Idaho counties in the broader analysis area in Table 3-289. Total property taxes imposed ranged from $402 million in Owyhee County to $23 million in Ada County.

Table 3-289. Property Tax Revenues in Idaho Counties, Fiscal Year 2011

County	Real and Personal Property Assessed Value ($1,000)[1]	Operating Property Assessed Value ($1,000)[1][2]	Total Assessed Value ($1,000)	2011 Property Tax Revenue ($1,000)[3]
Ada	23,814,462	692,004	24,566,467	391,693
Canyon	6,614,288	214,417	6,840,706	138,820
Owyhee	402,933	103,140	507,439	5,001
Idaho	101,365,623	4,822,889	106,659,746	1,380,558

Table Source: Idaho State Tax Commission 2012a.

Table Notes: [1] Real and personal property includes residential, industrial, and commercial property and farms, timber, and mining. [2] Operating property includes industries engaged in electric generation, transmission, and distribution. [3] Property tax rates vary by and within each county. The total property tax revenues shown here are for all taxing districts within each county, including towns, cities, and special taxing districts.

The sales and use tax rate in Idaho is 6 percent. Sales tax is levied on goods and services purchased within the state. Use tax is imposed on goods purchased tax-free outside Idaho for consumption, use, or storage in Idaho. Use tax is paid directly to the state rather than to the seller of the good. The state also applies a travel and convention tax of 2 percent on hotel/motel occupants and campground users (Idaho State Tax Commission 2012b). Long-term, temporary residents (more than 30 days) are exempt from the travel and convention tax. Sales, use, and travel and convention tax revenues are summarized for Fiscal Year 2011 by affected Idaho counties in Table 3-290. Total revenues ranged from about $1.5 million in Owyhee County to $258.9 million in Ada County.

Individual income tax generated $1.45 billion in revenues in Idaho in fiscal year 2011 (Idaho State Tax Commission 2012c). Data on income tax revenues by county are not readily available for Idaho (Pack 2012). The corporate tax rate in Idaho is 7.6 percent. Corporate income tax generated $22.6 million in revenues in Idaho in fiscal year 2011 (Idaho State Tax Commission 2012c).

Table 3-290. Sales, Use, and Travel and Convention Tax Revenues in Idaho Counties, Fiscal Year 2011 ($1,000)

Area	Sales and Use Tax ($1,000)	Travel and Convention Tax ($1,000)	Total ($1,000)
Ada	258,909.9	1,805.49	260,715.3
Canyon	41,564.5	211.82	41,776.3
Owyhee	1,568.2	2.55	1,570.8

Table Source: Idaho State Tax Commission 2012b.

Table General Note: Tax revenues are shown in thousands of dollars.

NONMARKET VALUES

Nonmarket values reflect the benefits individuals attribute to experiences of the environment, uses of natural resources, or the existence of particular ecological conditions that do not involve market transactions, and therefore lack prices. Nonmarket values are not limited to the natural environment and apply to visual resources and archaeological sites.

This socioeconomic analysis does not account for non-market benefits or other values, benefits, and costs that are not easily quantifiable. This is not to imply that such values are not significant or important, but to recognize that non-market values are difficult to represent by appropriate dollar figures.

Although the BLM and Forest Service have been exploring the use of ecosystem services concepts to describe the benefits provided by forests and other public lands, this type of approach has not been applied operationally in a management context (Kline 2006; Smith et al. 2011).The effects of the action alternatives on these types of services are assessed in the sections of this EIS that address wildlife, fish, vegetation, water resources, cultural resources, and visual resources, among others. Monetary

values are not assigned to these services, but this does not lessen their importance in the decision-making process. Decision-makers will consider the economic values presented in this section within the context of the information presented elsewhere in this document, much of which cannot readily be translated into economic terms.

3.2.11.6 Environmental Consequences

The B2H Project is expected to affect social and economic conditions in all counties in the analysis area. Specifically, the B2H Project is likely to affect population, housing, economy and employment, other economic sectors, tax revenues, and environmental justice communities. The following sections discuss how the construction and operations of the Proposed Action and alternatives would affect social economics and environmental justice communities. Effects are reported for the B2H Project as a whole, rather than by Project Segment.

No Action Alternative

Selection of the No Action Alternative would result in no socioeconomic effects, either positive or negative, as a result of the B2H Project. The No Action Alternative would also not have any effects on minority or low-income residents of the project area.

Effects Common to All Alternatives

This section addresses the socioeconomic and environmental justice impacts common to the Proposed Action and all alternatives during construction and operation activities for the B2H Project.

Population

Construction

Estimated construction workforce requirements are summarized by construction spread and month in Figure 3-55, Figure 3-56, and Figure 3-57. Figure 3-55 shows the total estimated construction employment by month for each construction spread. These estimates were developed by IPC's transmission engineering contractor based on average crew sizes and production rates by job type. Figure 3-56 and Figure 3-57 show total estimated construction employment by month and job type for spreads 1 and 2 respectively. Overall, project construction is expected to require 24-30 months. These estimates are for the 500-kV transmission line component of the B2H Project and do not include estimated monthly employment for the 138/69-kV rebuild or construction of the proposed Grassland Substation or modifications to the Hemingway Substation.

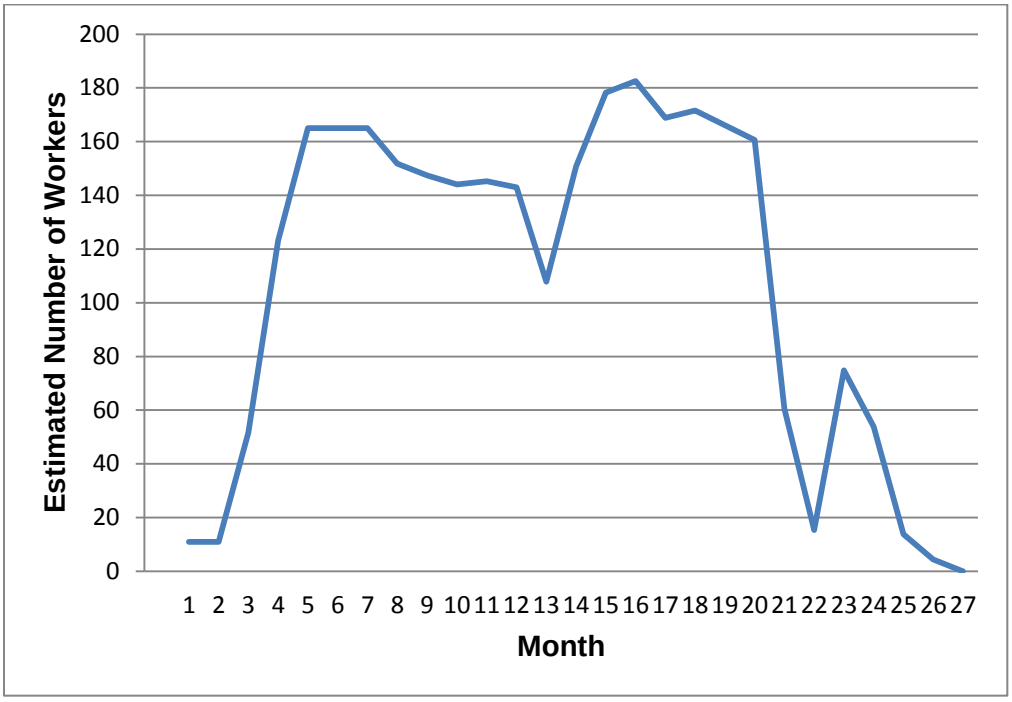


Figure 3-55. Estimated Number of Construction Workers by Month per Construction Spread

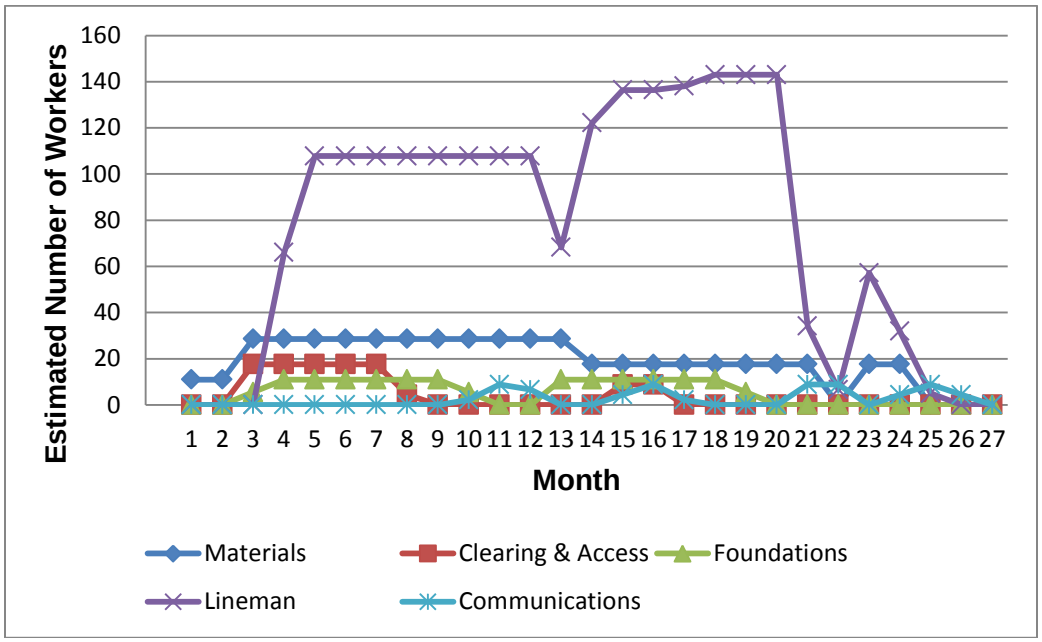


Figure 3-56. Estimated Number of Construction Workers by Month and Job Type – Construction Spread 1

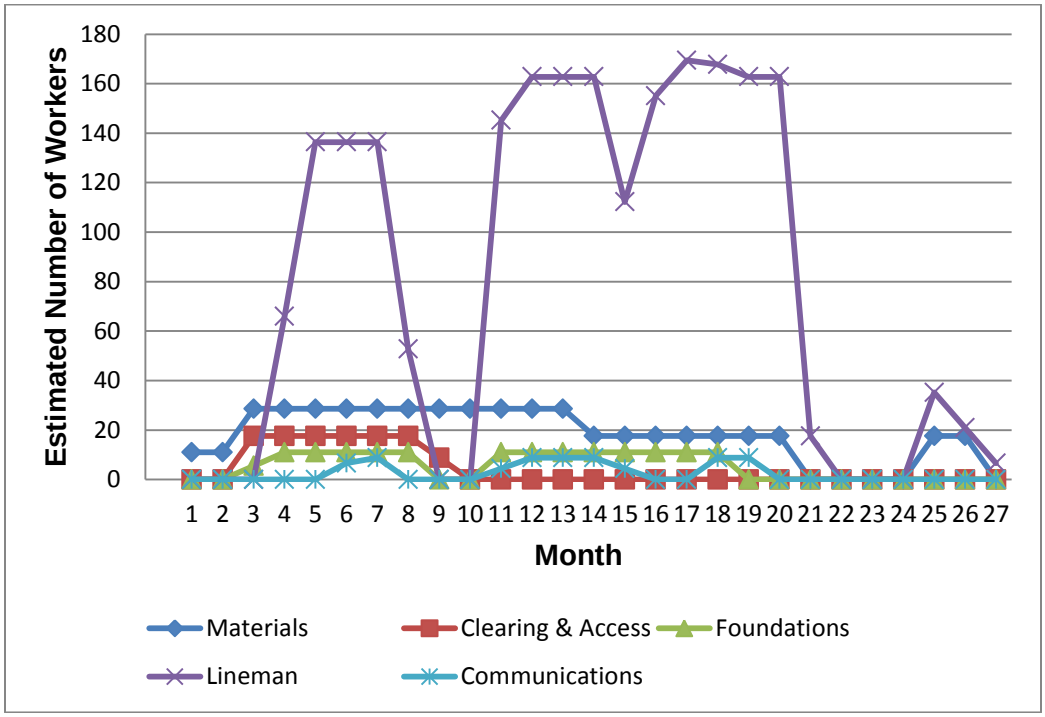


Figure 3-57. Estimated Number of Construction Workers by Month and Job Type – Construction Spread 2

The proposed 138/69-kV rebuild is expected to take approximately 21 weeks, with the estimated labor force expected to peak at 20. Construction of the proposed Grassland Substation is expected to take approximately 9 months, with the estimated labor force expected to peak at 60. The proposed modifications to the Hemingway Substation are expected to take approximately 4 months, with the estimated labor force expected to peak at 40. Construction employment for both substations will follow an evenly distributed bell-shaped pattern. The projected workers and population change estimates assume that both substation construction projects will occur in 2015 and labor demands will peak at the same time as the labor demands for the corresponding transmission line construction spread.

Projected employment and potential population changes are presented for the peak construction period by construction spread in Table 3-291. For analysis purposes, 10 percent of relocating workers are assumed to be accompanied by their families, including school-age children. Based on data compiled by the U.S. Census Bureau (2009a) as part of the 2008 American Community Survey, the average relocating family is assumed to consist of 2 adults and 1 school-age child.

Table 3-291. Projected Workers and Population Change During Peak Construction

Workers	Construction Spread [1], [2]	
	1st Segment	2nd Segment
Permanent workers likely to commute to Site Daily [3]	61	63
Temporary workers likely to move to the analysis area alone [4]	164	169
Temporary workers likely to move to analysis area with family [4]	18	19

Workers	Construction Spread [1], [2]	
	1st Segment	2nd Segment
Total	243	251
Population		
2010 population (analysis area) [5]	128,944	58,973
Number of people temporarily relocating [6]	219	226
As a percent of the 2010 population	0.2	0.4

Table Source: US Census Bureau 2010a, Population Estimates Program, 2010 Population Estimates.

Table Notes: [1] Estimates for construction spread 1 assume the labor demands for this portion of the transmission line and the proposed Grassland Substation would peak at the same time. The transmission line labor force is estimated to peak at 183 workers; the substation labor force is expected to peak at 60 workers. [2] Estimates for construction spread 2 assume the labor demands for this portion of the transmission line and modifications to the Hemingway Substation would peak at the same time. The transmission line labor force is estimated to peak at 211 workers; the substation labor force is expected to peak at 40 workers. [3] 25 percent of the average and peak workforce is expected to commute to and from the job site each day. [4] 75 percent of the average and peak workforce is expected to temporarily relocate to the project area. Ten percent of workers temporarily relocating are assumed to be accompanied by their families for the purposes of this analysis. [5] Population data are from the 2010 census. Total population for construction spread 1 is for Morrow, Umatilla, Union, and Baker counties. Total population for construction spread 2 is for Baker, Malheur, and Owyhee counties. [6] The number of people temporarily relocating assumes that 75 percent of the projected peak construction workforce would temporarily relocate to the project area, with 10 percent of that total accompanied by their families (assuming an average family size of 2 adults and 1 child) (U.S. Census Bureau 2009a).

The effects analysis assumes that approximately 25 percent of the projected peak construction workforce would be hired locally (i.e., normally reside within commuting distance of the job sites) and would likely commute to and from their homes to work each day. The remaining 75 percent of the workforce would either temporarily relocate to the primary analysis area counties or commute in from their permanent residences on Sunday nights and stay in overnight lodging on weekdays, returning home on Fridays.

Less than 10 percent of the workers temporarily relocating would be expected to be accompanied by their families. Some workers like the construction foremen and inspectors would stay the length of the project, but many workers would be employed for just 4 to 6 months. In addition, workers employed on linear projects of this sort tend to relocate along the line as necessary, staying in each location for a fairly short period of time. For these reasons, workers on these types of projects do not typically bring children. However, some may bring significant others if they do not have any dependents.

The maximum projected temporary peak increase in employment associated with construction spread 1 and the construction of the proposed Grassland Substation would be equivalent to approximately 0.2 percent of the total 2010 population in Morrow, Umatilla, Union, and Baker counties. The maximum projected temporary peak increase in employment associated with construction spread 2 and modifications to the Hemingway Substation would be equivalent to about 0.4 percent of the total 2010 population in Baker, Malheur, and Owyhee counties. Very few, if any, of the workers employed during the construction phase of the B2H Project would be expected to permanently relocate to the area. Therefore, B2H Project related anticipated increases in population would be temporary and inconsequential.

Operations

Existing IPC staff would be responsible primarily for the operations and maintenance (O&M) of the new transmission line and associated facilities. One additional part-time position may be filled locally. No existing employees would be required to relocate to the B2H Project area.

HOUSING

Construction

Assuming that approximately 75 percent of the peak construction workforce would temporarily relocate to the analysis area, this suggests that up to 182 workers could temporarily relocate to the northwest (construction spread 1) and 188 workers to the southeast (construction spread 2) parts of the primary socioeconomic analysis area. An estimated 10 percent of these workers are assumed to be accompanied by their families.

Based on past experience with similar projects, IPC's transmission engineering contractor estimates that approximately 35 percent of non-local workers would provide their own housing in the form of RVs or pop-up trailers. The remaining non-local workers would be expected to require rental housing (apartments/houses) (25%), mobile homes (5%), and motel or hotel rooms (35%). Construction workers, particularly those working in less populated areas, often commute relatively long distances to the job site, with commutes of up to 90 minutes each way.

Existing housing resources, rental housing, hotels and motels, and RV spaces tend to be concentrated in and around the larger communities in the analysis area. Workers temporarily relocating to the area would generally be expected to reside in or near larger communities where these housing options and services are more available. Review of the rental-housing units and hotel and motel rooms that would normally be vacant and available for rent suggests there would be sufficient housing resources available for rent in the 2 groups of counties that would be crossed by each construction spread.

Rental-housing resources in the counties crossed by construction spread 1 (Morrow, Umatilla, Union, and Baker counties) include approximately 18,000 rental units, with about 1,200 of these units vacant as of 2010. Hotel and motel resources in these counties include approximately 2,600 rooms, with nearly 1,000 of these rooms vacant and available for rent as of 2010. Additional resources are available in the Tri-Cities of Richland, Kennewick, and Pasco, Washington, which are located about an hour drive north of Boardman, Oregon.

Rental-housing resources in the counties crossed by construction spread 2 (Baker, Malheur, and Owyhee counties) include approximately 8,000 units (Baker County units also included in spread 1) with about 600 of these units vacant as of 2012. Hotel and motel resources in these counties include at approximately 1,200 rooms, with approximately 460 of these rooms vacant and available for rent as of 2012. Additional resources are available in the cities of Boise and Nampa, which are in neighboring Ada and Canyon counties.

The demand for temporary house of construction workers does not exceed the supply of local housing and lodging. Therefore, housing effects due to the construction of the B2H Project would be low.

Operations

Existing IPC staff would be responsible primarily for the operations and maintenance of the new transmission line and associated facilities. One additional part-time position may be filled locally. No existing employees would be required to relocate to the analysis area, so housing effects of B2H Project operations would be low.

Economy and Employment

Construction

Economy

The proposed B2H Project would have a positive direct impact on the regional economy during construction through the local procurement of materials and equipment, the employment of local residents, and the expenditures by construction workers temporarily relocating to the area. These direct impacts would also generate economic activity in other parts of the economy through what is known as the multiplier effect, as initial changes in demand "ripple" through the local economy and generate indirect and induced impacts. Indirect impacts would consist of spending on goods and services by industries that produce the items purchased as part of the B2H Project. Induced impacts would include expenditures made by the households of workers involved either directly or indirectly in the construction process. The following analysis uses the IMPLAN model to assess total (direct, indirect, and induced) economic impacts in the socioeconomic analysis area.

The IMPLAN model divides the economy into 440 sectors including government, households, farms, and various industries, and models the linkages between the various sectors. The linkages are modeled through input-output tables that account for all dollar flows between different sectors of the economy. Using national industry and county-level economic data derived from the U.S. Bureau of Economic Analysis, U.S. Census, and other government sources, IMPLAN models how spending in one sector of the economy is spent and re-spent in other sectors of the economy. By tracing these linkages, the model approximates the flows of initial project spending and employment through the local economy based on the supply lines connecting the various economic sectors. The amount spent locally decreases with each successive transaction away from the initial expenditure due to the effects of savings, taxes, or other activities that happen outside the local economy, known as leakages.

A multi-county, IMPLAN model was developed that consists of the counties that comprise the socioeconomic analysis area, defined for this analysis as the counties crossed by the proposed B2H Project and alternatives (Baker, Malheur, Morrow, Umatilla, and Union counties, Oregon, and Owyhee County, Idaho), and Gilliam County, Oregon, and Canyon and Ada counties, Idaho. Impacts were assessed in terms of employment and labor income. Employment is measured as the average number of employees, both payroll and self-employed, engaged in full- or part-time work by the affected industries. Labor income is the sum of employee compensation (wages, salaries, and benefits paid to the employee and employer-paid payroll taxes) and proprietor income (earnings received by self-employed workers). Estimated impacts are presented by year because IMPLAN is a short-term model that measures annual impacts.

The total construction cost for the transmission line portion of the B2H Project would be expected to be approximately $513 million. These costs were developed for the Proposed Project and include the costs for both 500-kV construction spreads and the proposed 138/69-kV rebuild. This total includes the cost for materials, labor, and equipment, and miscellaneous costs, including general conditions, contractor mobilization/demobilization, project engineering, and construction management. The costs of right-of-way acquisition, permitting, financing, and IPC general and administrative expenses are not included in this estimate. Construction costs for the proposed Grassland Substation and improvements to the Hemingway Substation are estimated to be $30.6 million and $26.1 million, respectively.

The materials required to build the B2H Project would be specialized, and the main Project components, including the transmission structures, conductor, and assemblies, would be purchased outside the socioeconomic analysis area. Local purchases would likely include structure foundation materials, fuel for vehicles and equipment, some equipment rentals, staging-area rentals, and other incidental materials and supplies estimated to total approximately $45 million for the transmission line. Corresponding local purchases for the substation projects would be expected to be approximately $2 million. Estimated local expenditures were allocated by year based on the expected distribution of construction employment.

Spending by construction workers would also support and generate economic activity in the socioeconomic analysis area. Approximately 25 percent of the construction workforce would be expected to reside within commuting distance of the B2H Project (i.e., within the socioeconomic analysis area). The impacts of spending by these resident construction workers were estimated using average household consumption patterns for the analysis area. The remaining 75 percent of the workforce would be expected to temporarily relocate to the analysis area for the duration of their employment. Spending by non-resident construction workers was assumed to be limited to per diem spending, with average daily per diem spending estimated to be equivalent to the prevailing federal per diem rates for the analysis area. Non-resident spending was assumed to be primarily for lodging, food, and gas.

Employment

Construction employment would generally follow a bell-shaped pattern, peaking at up to 243 workers in the northwest part of the analysis area (Morrow, Umatilla, Union, and Baker counties), and up to 251 workers in the southeast part (Baker, Malheur, and Owyhee counties). These patterns are shown for the transmission line portion of the B2H Project by construction spread in Figure 3-56 and Figure 3-57. Substation employment would occur over a shorter period and follow a more evenly distributed bell-shape than the transmission portions. Estimated direct construction employment is presented by year in Table 3-292. Direct employment is presented in “annualized” job-years or full-time equivalents. Annualized jobs are employment estimates adjusted to be based on a full year even though they may consist of more than one worker employed for shorter periods of time. The direct annualized jobs presented in Table 3-292 were developed based on the weekly and monthly employment estimates.

Table 3-292. Estimated Construction Employment Impacts

Type/Level of Impact	Year 1	Year 2	Year 3	Total
Direct	161	353	22	536
Indirect	222	468	30	720
Induced	100	210	13	323
Total	483	1,032	65	1,580

Construction of the B2H Project would directly employ the full-year (annualized) equivalent of 536 workers for the duration of the construction activities, with two-thirds (66 percent) of this total (353 jobs) expected to be employed in year 2. Approximately 25 percent of these jobs would be expected to be filled by workers who normally reside within the socioeconomic analysis area, with the remaining 75 percent expected to be filled from workers temporarily relocating to the B2H Project area. Construction would also support an estimated total of 720 indirect and 323 induced jobs in the socioeconomic analysis area for the duration of the construction phase of the B2H Project. This employment would occur elsewhere in the local economy as a result of local project-related purchases and spending by construction workers. Indirect and induced employment estimates include both full- and part-time work.

Labor Income

Estimated direct labor income is presented by year in Table 3-293. Labor income is the sum of employee compensation and proprietor income. The employee compensation component includes wages, salaries, and benefits paid to the employee and employer-paid payroll taxes. Proprietor income represents earnings received by self-employed workers. The direct labor income estimates presented in Table 3-293 also include per diem payments.

Table 3-293. Estimated Construction Labor Income Impacts

Type/Level of Impact[1]	Year 1	Year 2	Year 3	Total
Direct	$22.3	$47.3	$3.0	$72.6
Indirect	$12.5	$26.6	$1.7	$40.7
Induced	$4.5	$9.5	$0.6	$14.5
Total	$39.2	$83.3	$5.3	$127.8

Table Note: [1] Impacts are presented in millions of dollars; all impacts are expressed in 2012 dollars.

Direct labor income is estimated to total $72.6 million for the duration of B2H Project construction, with approximately 25 percent of this total associated with local workers. Construction would also support an estimated $40.7 million of indirect labor income and $14.5 million of induced labor income. This labor income would occur elsewhere in the local economy as a result of local project-related purchases and spending by construction workers. Indirect and induced employment estimates include both full- and part-time work.

Operations

Operation of the project would generate economic activity in the analysis area in the form of operations and management related expenditures on materials and supplies. These impacts are expected to be small (less than $1 million annually).

Tribal Household and Community Economy

Construction

Construction of the B2H Project may temporarily restrict access to areas of the project within which Indian Tribes procure subsistence resources such as gathered plants, small and large game, and fish. Construction may also serve to temporarily disrupt wildlife populations that constitute subsistence resources. As there are no data to quantify the percent contribution to Tribal household or community income represented by these resources, effects caused by construction are not known.

Operation

Operation of the B2H Project may result in restriction of access to certain areas of the project, or may result in changes to vegetation or disruption to fish, small and large game populations, which could impact Tribes ability to procure subsistence resources. As there are no data to quantify the percent contribution to Tribal household or community income represented by these resources, effects caused by operation are not known.

Tax Revenues

Income, Business and Sales Taxes

Tax revenues will be generated by the B2H Project from income and business taxes. These taxes were not quantified as part of this analysis because they will be collected at the state/federal level and only a small portion will be passed along to county and city agencies. As a result, business and income taxes will likely have a very limited effect upon county and city revenues.

Oregon has no local sales or use taxes. Estimated expenditures were assigned to Owyhee County, Idaho based on the share of construction activity that will take place in that county. Total expenditures for construction materials, supplies, and equipment would be estimated to average approximately $820,000 per mile for the transmission line portion of the B2H Project. Expenditures on materials, supplies, and equipment to modify the Hemingway Substation would be estimated to be approximately $23.5 million. Assuming an Owyhee County sales and use tax rate of 6 percent, these expenditures would generate tax revenues of approximately $2.6 million, which is equivalent to approximately 1.7 times the amount of sales and use tax revenues paid to Owyhee County in 2010.

Operation of the B2H Project would generate sales and use tax revenues in Idaho as a result of local O&M expenditures. These impacts are expected to be small, especially when compared to the construction-related impacts.

Property Taxes

Estimated property tax revenues are presented by county in Table 3-294. These estimates are based on the projected value of the improvements included in the proposed B2H Project by county and average property tax rates. This table illustrates the relative contribution of the estimated project-related property tax revenues to county budgets by comparing estimated annual revenues with actual property tax revenues for 2010 by county. Estimated B2H Project-related property tax revenues range from less than 1 percent of 2010 property tax revenues in Umatilla County to about 5.7 percent of property tax revenues in Baker County.

The estimates presented in Table 3-294 indicate that the B2H Project would generate annual property taxes in Owyhee County equivalent to 4.7 percent of total 2011 property tax revenues. The State of Idaho limits the amount by which annual revenues from property tax can increase in each county. With some exceptions, this amount is limited to 3 percent based on the highest annual budget from the preceding 3 years. Exceptions include new construction (excluding public utilities), annexation, and previously unlevied funds (Houde 2012). In cases where increases in property tax revenues exceed 3 percent and are not exempt, the increase above 3 percent may provide an opportunity to lower levies for other taxpayers in the affected district.

Table 3-294. Estimated Property Tax Revenues

State/County	Estimated Annual Project-Related Property Taxes ($000)[1][2]	Actual 2010 Property Tax Revenues ($000)[1][3]	Estimated Property Tax as a Percent of 2010 Property Tax Revenues
Baker	912	15,980	5.7
Malheur	368	22,297	1.6
Morrow	1,212	21,460	5.6
Umatilla	365	69,974	0.5
Union	215	18,895	1.1
Owyhee	231	4,866	4.7

Table Source: Idaho State Tax Commission 2011

Table Notes: [1] Estimated project-related property tax revenues and actual property tax revenues from 2010 are in thousands of dollars ($000s). [2] Property tax estimates are based on the projected value of the proposed improvements, including transmission line and substation costs. The total value of the transmission line is assumed to be $1,759,500 per mile. Total substation values are assumed to be $26.1 million for Hemingway and $30.6 million for Grassland. Tax revenues are estimated using applicable county property tax rates. [3] These are actual property tax revenues received for 2010 (Idaho State Tax Commission 2011).

COMMUNITY SERVICES

Solid-Waste Management

Solid-waste generated during construction of the B2H Project would include a small portion of the soil and rock excavated for foundations. Other solid-waste generated would include broken insulators, scrap conductor, and empty conductor spools, as well as general construction waste, such as crates, pallets, and paper wrappings used to protect equipment and materials during shipping. The B2H Project is expected to generate about 13,909 cubic yards of waste during construction (or about 124

cubic yards of waste per week). This waste would likely be disposed of at various landfills located along the project's length and therefore no single landfill would be expected to accommodate the entire waste-load generated by project construction.

IPC will promote an aggressive recycling program in order to minimize the waste that will otherwise be disposed of in landfills. Wastes generated during construction will be collected in recycling and disposal containers, which will be located at multiuse areas. Separate disposal and recycling containers will be labeled by waste type in order to segregate materials as appropriate for recycling or disposal. Disposal and recycling containers will be of adequate size, design, and number to handle the amount of waste being generated. Landfill-supplied containers, such as 20- or 30-cubic yard rolloffs, will be used to collect scrap metal, wood and paper products, concrete waste, and other recyclable materials. Paper products and other materials, such as chemicals, batteries, glass, metals, and plastic, will be recycled when practical. As disposal and recycling containers reach capacity they will be sent to disposal facilities that can handle these materials, and the containers will be replaced with empty units. IPC's waste hauling contractor will be responsible for overseeing waste management, transporting waste to appropriate disposal facilities, and managing disposal and recycling containers.

The amounts of waste materials and wastewater generated during Project operation are expected to be minimal. Wastes, including vegetative waste, derived during this part of the project will likely be recycled or disposed of off-site by individual operations and maintenance crews. Therefore, waste management impacts are expected to be low.

Representatives from the Finley Buttes Landfill, which is about 12 miles south of Boardman, indicated the landfill has a total of 200 million cubic yards of storage, with only 8 million cubic yards of this storage used to date (Large 2011). Representatives from the Clay Peak Landfill, which is approximately 3 miles east of Payette, Idaho, indicated the landfill has a total of 2.3 million cubic yards of storage, and there are plans to expand the facility and add about 25 million cubic yards of storage (Schmidt 2011). There are no restrictions on the amount of waste that can be received per day at either facility (Table 3-283). Either landfill would be able to accommodate all the solid waste generated by the B2H Project (Large 2011; Schmidt 2011).

Representatives at the Baker Sanitary Landfill, which is about 7 miles north of Baker City, indicated they do not have a restriction on the amount of waste that can be accepted per day and would be able to accommodate any waste generated by the project (Freese 2011). However, the Lytle Boulevard Landfill in Vale, Oregon, indicated their facility is close to the permitted capacity for the amount of waste they can accept per day (Geedes 2011). Therefore, only limited waste from the B2H Project would likely be sent to the Lytle Boulevard Landfill, with the remaining waste sent to other facilities.

Operation of the transmission line would not produce measureable volumes of solid waste.

Law Enforcement

Construction of a transmission line can result in security issues that can have impacts to local law enforcement resources. The transmission line construction site(s) could become a target for crimes (e.g., theft of construction materials or equipment). In addition, about 75 percent of the work force

needed to construct the line is expected to permanently reside outside the primary socioeconomic analysis area (i.e., the counties crossed by the proposed transmission line). Workers not hired from within the region would either temporarily relocate to the affected regions or commute in from their permanent residences.

Representatives of the 4 potentially affected sheriff's departments that responded to requests for information—Baker, Malheur, Owyhee, and Umatilla County sheriffs' departments—indicated that, while the construction site(s) could become a target for crimes and a temporary influx of construction workers could result in short-term increases in traffic incidents and other disturbances, the B2H Project was unlikely to require additional law enforcement resources or facilities (Bentz 2011; Diehl 2011; Hoagland 2011; Southwick 2011).

During operations, new access roads and the transmission line and associated facilities could slightly increase demands on local law enforcement. These impacts expected to be low.

Fire Protection and Emergency Response

The B2H Project could result in an increased risk of fire during construction and operation. The BLM is responsible for fire suppression on the majority of the public lands crossed by the B2H project. The Deputy Fire Management Officer for the BLM indicated the B2H project would not impact their ability to suppress fires or require additional fire suppression resources.

The Keating Rural Fire District's fire chief expressed concerns regarding the risk of fighting fires near energized transmission lines as electricity could arc through the smoke and strike firefighters (Harper 2011). This issue is typically addressed by waiting for an electric transmission line to be de-energized before attempting to suppress fires in the immediate vicinity. This issue would be addressed through IPC outreach with local fire and emergency response agencies.

A representative of the all-volunteer Union Emergency Services–Fire Department expressed concern about the potential for new construction in Union County (including recent wind-farm developments) to have adverse impacts on their resources or their ability to serve the community (Johnson 2011). Recent construction has not, however, affected the department to date, and they are currently well equipped (Johnson 2011). The Fire Chief for the North Powder Fire Department indicated that an increased risk of fire during the summer could impact his department and their equipment could need to be upgraded to address this potential increase in fire risk.

IPC has proposed a Framework Fire Prevention and Suppression Plan as Appendix J to the Revised POD (2011). The Framework Plan includes provisions for sharing responsibilities and coordination with fire protection agencies; measures to reduce fire hazards during construction; and operations and maintenance procedures to reduce fire risk. Implementation of the Framework Fire Prevention and Suppression Plan measures would reduce the potential for the B2H Project to impact local fire departments to minor effects by reducing the risk of wildfires.

Health Care

Representatives from Saint Anthony Hospital, Grande Ronde Hospital, and Saint Alphonsus Medical Center have indicated that, given the size of the construction and operations workforces, injuries with the potential to occur during project construction and operations would not have a significant impact on these medical facilities (Blanc 2011; McCowan 2011; Vacheck 2011).

Schools

This analysis assumes that the Proposed Action and alternatives would be constructed in 2, approximately 150-mile-long spreads built concurrently. The estimated peak workforce in the northwest part of the analysis area (spread 1) could involve up to 182 construction workers temporarily relocating to the area during construction. Assuming that 10 percent of these non-local workers would relocate with their families, up to 18 children may need to be enrolled in local schools in the northwest part of the B2H Project area. The estimated peak workforce in the southeast part of the B2H Project area (spread 2) could involve the temporary relocation of up to 188 construction workers, with up to 19 children needing to be enrolled in schools in the southeast part of the project area. The school districts responded that they could to additional students.

During operations, existing IPC staff would be responsible primarily for the operation and maintenance of the transmission line and associated facilities. One additional part-time position would be filled locally. No employees would be required to relocate to the B2H Project area. As a result, during operations there would be no impact on school enrollment.

Agriculture

Construction

Construction of the B2H Project would disturb approximately 905.5 acres of agricultural land. Permanent disturbance would affect approximately 194.4 acres of agricultural land (see Section 3.2.6 Land Use, Agriculture, Recreation, Transportation). These totals represent a small share of agricultural land in the six potentially affected counties, which included approximately 5.5 million acres in 2007; subsequently, the overall potential impact on the agricultural industry would be very low.

As discussed in Section 3.2.6, IPC recognizes that construction of the B2H Project may impact agricultural operations. IPC would negotiate damage-related issues, such as reductions in the acreage available for cultivation, with affected farmers during the easement acquisition process.

Operations

The operation of the transmission line could impact farms by reducing the acreage available for cultivation and, in some cases, disrupting existing harvest patterns. The transmission line structures could affect the farmer's ability to maneuver equipment in the vicinity of the immediately affected area. A new transmission line also has the potential to negatively affect farm operations that employ pivot irrigation systems. Potential impacts to agricultural land are discussed in Section 3.2.6 Land Use, Agriculture, Recreation, Transportation. The transmission line may include potential impacts to livestock grazing, crop production, dairy farms, confined animal feeding operations, and aerial spraying patterns.

Overall, the effects on the agricultural economy from operation of the B2H Project are expected to be low.

Timber Harvesting

Construction and Operations

In 2009, timber harvest was recorded in four of the six counties that comprise the analysis area, with harvested volumes ranging from about 9 million board feet (MMBF) in Umatilla County to about 45 MMBF in Morrow County (Figure 3-54). Construction and operation of the proposed Project would temporarily disturb approximately 570 acres of combined forest vegetation in the six counties and affect approximately 115 acres of forest vegetation during operations. The Timber Canyon Alternative would affect approximately 400 more acres of combined forest vegetation during construction than would the Proposed Action and 80 more acres during operations.

Trees cleared on forest land crossed by the B2H Project may or may not be sold for timber depending on a number of factors, including the age and type of tree. IPC has not surveyed the potentially affected forest land or developed estimates of the potential volume of timber that would be impacted. IPC would survey the affected timber prior to its removal to determine its value and ensure that affected land managers and landowners are appropriately compensated.

Non-merchantable timber would most likely be chipped and used for mulch or other restoration purposes or burned. Some landowners may choose to clear and sell timber from forested land prior to the start of Project activities, or IPC may clear the land and sell the timber per its agreement with the affected landowner. IPC would coordinate with all affected land managers and landowners to minimize impacts on forest and timber resources and determine fair compensation for damages that would result from the construction and operation of the B2H Project.

Overall, the project-related effects of construction and operation of the proposed B2H Project and the alternatives on timber harvesting would be negligible.

Recreation and Tourism

Construction and Operations

B2H Project effects on recreation are described in Section 3.2.6. The construction and operations of the project are not expected to have adverse impacts on the economics of recreation and tourism in the analysis area. To the extent possible, recreation areas and features would be avoided during the siting process for the B2H Project. Construction activities, including the presence of construction crews, construction noise, and the generation of construction related dust could have localized temporary effects on dispersed recreation activities. These potential effects would be limited to the immediate areas of construction activity, short-term in nature, and unlikely to noticeably affect recreation and tourism businesses in the analysis area.

Property Values (General Property Impacts and Compensation)

Construction and Operations

The proposed B2H Project would require a new right-of-way involving a combination of right-of-way grants and easements between IPC and federal and state governments; other companies (e.g., utilities and railroads); and private landowners (including fee acquisition). IPC would obtain rights-of-way on private land as perpetual easements. The land for the proposed Grassland Substation is owned by Portland General Electric. IPC would own a portion of the substation equipment only. No additional land would be required at the Hemingway Substation.

The effect a proposed transmission line easement may have on property value is a damage-related issue that would be negotiated between the landowner and IPC during the easement acquisition process. This process is designed to provide just compensation to the landowner for the right to use the property for transmission line construction and operation. In theory, the value of each easement is equal to the difference in value of the affected property before and after easement acquisition and construction of the proposed facilities.

The required easements may encumber the affected right-of-way area with land-use limitations. Each easement would specify the extent of any encumbrances. Typical transmission line easement conditions include the right to clear the right-of-way and keep it clear of trees and structures, including structure-supported crops, brush, vegetation, and other potential fire and electrical hazards. Non-structure supported agricultural crops less than 14 feet tall may be allowed on some easement properties.

The impact of introducing a new right-of-way for transmission structures and lines can vary depending on the placement of the right-of-way in relation to the affected property's size, shape, and location of existing improvements. A transmission line may diminish the utility of a portion of property if the line effectively severs this area from the remaining property, resulting in severance damage. If it is determined that a specific property might obtain serious severance damages resulting from the final line route, an appraisal would likely be ordered to assess the compensation for the land and damages. Table 3-295 lists the number of residences near the Proposed Action and Alternatives.

Table 3-295. Number of Residences near the Proposed Action and Alternatives

Route Name	Residence Within 50 feet of ROW	Residence Within 200 feet of ROW	Residence Within 500 feet of ROW	Residence Within 1,000 feet of ROW
Proposed Action	1	1	5	16
Horn Butte Alternative	0	0	1	1
Longhorn Alternative	0	0	1	1
Longhorn Variation	0	0	0	0
Glass Hill Alternative	0	0	0	0
Timber Canyon Alternative	0	0	0	0
Flagstaff Alternative	0	0	0	2
Burnt River Mountain Alternative	0	0	0	0

Route Name	Residence Within 50 feet of ROW	Residence Within 200 feet of ROW	Residence Within 500 feet of ROW	Residence Within 1,000 feet of ROW
Tub Mountain South Alternative	0	0	0	0
Willow Creek Alternative	0	0	0	0
Malheur S Alternative	0	0	0	0
Malheur A Alternative	0	0	0	0
Double Mountain Alternative	0	0	0	0

Table Abbreviations: ROW = right-of-way.

The placement of the transmission line across a property may also have visual impacts. Each landowner has their perception of what is visually acceptable or unacceptable. This visual factor, as well as any other elements unique to the property, is generally taken into consideration to determine the loss in value within the easement area, as well as outside the easement area in cases of severance.

Regarding access roads, if IPC acquires an easement on an existing access road and the landowner is the only other user, market compensation is generally 50 percent of full fee value. If other landowners share the access road use, compensation is usually something less than 50 percent. For fully improved roads, an appraiser may prepare a cost analysis to identify the value of the access road easement. If IPC acquires an easement for the right to construct a new access road and the landowner has equal benefit and need of the access road, market compensation is generally 50 percent of full fee value. If the landowner has little or no use for the new access road, market compensation for the easement is generally close to full fee value. Changes in land use often raise concerns about the potential effect these changes may have on nearby property values. Zoning is the primary means most local governments use to protect property values. Zoning is intended to avoid conflicting uses by allowing some uses and disallowing others or by permitting them only as conditional uses.

Research into the relationship between electric transmission facilities and local property values tends to focus on residential properties, employing research methods that can, for the most part, be divided into surveys and opinion-based studies and quantitative studies largely based on comparisons of market data.

Research conducted since the 1980s supports the idea that proximity to transmission lines may affect the desirability and, therefore, the value of residential property (Bottemiller et al. 2000; Colwell 1990; Cowger et al. 1996; Delaney and Timmons 1992; Des Rosiers 2002; Hamilton and Schwann 1995). Some observers linked this general change in perspective to increased concerns regarding potential EMF-related health effects, but a nationwide survey of real estate appraisers suggests that, for the most part, potential negative effects on property values tend to be related to the visual impact of transmission line facilities (Delaney and Timmons 1992).

The results of the studies cited above suggest that proximity to electric transmission lines can have negative effects on residential property values, with average impacts ranging from less than 1 percent to about 10 percent. The findings of these studies also suggest that this impact decreases with distance and tends to decline over time. Studies of property-value impacts during periods of physical change, such as new transmission line construction or structural rebuilds, have generally revealed greater short-

term impacts than a long-term effect. Most studies have concluded that other factors, such as the general location, the size of property, improvements, conditions, amenities, and supply and demand factors in a specific market area are more important criteria than the presence or absence of transmission lines in determining the value of residential real estate.

Some short-term adverse impacts on residential property values (and salability) might occur on an individual basis as a result of the B2H Project. However, these impacts would be highly variable, individualized, and are difficult to predict. Unique Project characteristics that need to be taken into consideration when assessing the potential effects of transmission line structures on residential property values include the type and height of the structures, the distance and view from the potentially affected property, intervening topography and vegetation, and the property market and type of landscape involved.

Few studies have addressed the impacts of transmission lines on the value of commercial and industrial properties. Those that have done so generally find the impacts are less than the impacts on residential properties. In interviews with appraisers, real-estate brokers, and owners and managers of commercial and industrial parks, Chapman (2005) found that, for the most part, the presence of a transmission line had little effect on market prices for commercial and industrial properties.

Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires each federal agency to make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human-health or environmental effects of its programs, policies, and activities on minority and low-income populations. The order further stipulates that the agencies conduct their programs and activities in a manner that does not exclude persons from participation in them, deny persons the benefits of them, or subject persons to discrimination because of their race, color, or national origin.

Environmental Justice Screening Analysis

Evaluating whether a project has the potential to have disproportionately high and adverse impacts on minority and/or low-income populations typically involves: 1) identifying any potentially high and adverse environmental or human-health impacts, 2) identifying any minority or low-income communities within the potentially high and adverse impact areas, and 3) examining the spatial distribution of any minority or low-income communities to determine if they would be disproportionately affected by these impacts.

Guidelines provided by the CEQ (1997) and EPA (1998) indicate that a minority community may be defined where either 1) the minority population comprises more than 50 percent of the total population, or 2) the minority population of the affected area is meaningfully greater than the minority population in the general population of an appropriate benchmark region used for comparison. Minority communities may consist of a group of individuals living in geographic proximity to one another or a geographically dispersed set of individuals who experience common conditions of environmental effect. Further, a minority population exists if there is “more than one minority group present and the minority percentage,

as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 1997:26).

The CEQ and EPA guidelines indicate that low-income populations should be identified based on the annual statistical poverty thresholds established by the U.S. Census Bureau. Like minority populations, low-income communities may consist of individuals living in geographic proximity to one another or a geographically dispersed set of individuals who would be similarly affected by the project or program. The U.S. Census Bureau defines a poverty area as a census tract or other area where at least 20 percent of residents are below the poverty level (U.S. Census Bureau 2009b).

Race and ethnicity data from the 2010 census are available at the census block group level. The percent of the population identifying as White alone in the 2010 census exceeded 50 percent in all but one of the potentially affected census block groups, with shares ranging from 55 percent to 97 percent, and as a result, the population in these census block groups did not meet the definition of a minority community based on the criteria that the minority population comprises more than 50 percent of the total population. The block group that would be crossed in Morrow County, Oregon, is the one exception, with 45 percent of the total population identifying as White in the 2000 census and a minority population that exceeds 50 percent of the total (Table 3-296). Census block data for 2000 and 2010 are in Tables B.10-1 and B.10-2 in Appendix B.10.

The minority population in each census block group was also compared with its respective county average in 2010 to identify areas where the minority population is potentially "meaningfully greater" than the minority population in the general population. This comparison identified one census block group in Owyhee County, Idaho, where the Hispanic or Latino share of the population was more than 10 percent higher than the county average (43% versus 26%).

Table 3-296. Race and Ethnicity Census Block Group Comparison, 2010

Geographic Area[1]	Total	Percent of Total Population				
		White[2]	Hispanic or Latino	American Indian and Alaska Native[2]	Black or African American[2]	Other Race[2][3]
Morrow County, Oregon	11,173	65	31	1	0	3
Block Group 5, Census Tract 9701	1,680	45	53	1	0	1
Owyhee County, Idaho	11,526	68	26	4	0	2
Block Group 1, Census Tract 9501.02	1,460	55	43	1	0	1

Table Source: U.S. Census Bureau 2011b

Table Notes: [1] Only those census block groups where a) the minority population exceeds 50 percent of the total population or b) the minority population is more than 10 percent higher than the minority population in the corresponding county are included here. [2] Non-Hispanic only. The federal government considers race and Hispanic/Latino origin (ethnicity) to be two separate and distinct concepts. The data summarized in this table present Hispanic/Latino as a separate category. People identifying as Hispanic or Latino origin and counted in this category may be of any race. [3] The "Other Race" category presented here includes census respondents identifying as Asian, Native Hawaiian and Other Pacific Islander, Some Other Race, or Two or More Races.

The most recent year that income and poverty data are available at the census block group level is 1999, when 2 of the affected census block groups had more than 20 percent of their population below the poverty level. One other group had between 19.7 percent of their population below the poverty level (Table 3-297).

Table 3-297. Income and Poverty Census Block Comparison

Geographic Area[1]	Percent of Total Population		Percent of Population Below the Poverty Level[1]
	Dollars[1][2]	Percent of County/State Median[1][3]	
Baker County, Oregon	30,367	74	14.7
Block Group 2, Census Tract 9503	24,107	79	19.0
Block Group 3, Census Tract 9506	22,014	72	15.3
Malheur County, Oregon	30,241	74	18.6
Block Group 1, Census Tract 9707	28,750	95	24.4
Morrow County, Oregon	37,521	92	14.8
Umatilla County, Oregon	36,249	89	12.7
Union County, Oregon	33,738	82	13.8
Block Group 3, Census Tract 9702	26,354	78	21.9
Oregon	40,916	100	11.6
Owyhee County, Idaho	28,339	75	16.9
Block Group 2, Census Tract 9501.01	34,348	121	19.7
Idaho	37,572	100	11.8

Table Source: U.S. Census Bureau 2000c

Table Notes: [1] All data are for 1999. The most recent data available at the census block group level. Only census block groups with a) a median household income at least 20 percent below the county average and/or b) 20 percent or more of its population below the poverty rate are included here. [2] Median incomes are presented in 1999 dollars unadjusted for inflation. [3] Income for census block groups is presented as a share of the appropriate county average; totals for each county are presented as a share of the respective state average.

Effects to Minority and Low Income Communities

Construction and Operations

The potential minority and low-income census block groups identified in the Environmental Justice Screening Analysis would not be affected by construction or operation of the Proposed Action or alternatives because the B2H Project is not expected to have high and adverse impacts on the populations in these areas or elsewhere. In most cases, the comparison portion of the Proposed Action route and the alternative route crosses one of these census block groups. There are, however, several exceptions where the alternative route would not cross a census block group that is crossed by the comparison portion of the Proposed Action route or vice versa. Viewed in terms of the potential minority and low income census blocks identified, the Malheur S and Malheur A alternatives would avoid

crossing Census Tract 9707, Block Group 1 in Malheur County, and the Timber Canyon Alternative would avoid crossing Census Tract 9503, Block Group 2 in Baker County.

In addition, three alternatives would cross census block groups not crossed by the Proposed Action route. The Timber Canyon Alternative would cross Census Tract 9702, Block Group 1 in Union County, which would not be crossed by the Proposed Action route. Despite having a slightly higher median household income than the county average, 22 percent of the population in this block group was below the poverty level in 1999 (U.S. Census Bureau 2000c). The Tub Mountain and Willow Creek alternatives would both cross Census Tract 9706, Block Group 1 in Malheur County. Despite having a higher median household income than the county average, 21 percent of the population in this block group was below the poverty level in 1999 (U.S. Census Bureau 2000c).The data suggest the B2H Project would cross census block groups that could be considered minority or low-income communities. However, construction of the B2H Project is not expected to have high and adverse human-health or environmental effects on nearby communities. Construction-related impacts would likely include increases in local traffic, noise, and dust which could result in temporary delays at some highway crossings. Construction workers temporarily relocating to the B2H Project area would increase demand for local housing resources. These impacts would be temporary and localized and are not expected to be high.

Construction would also temporarily increase the demand for education, health care, and municipal services, as well as potentially increase the demand for police and fire-protection services. However, these impacts would not measurably affect the quality of services currently received by local communities and residents.

The Proposed Action does not cross any Native American reservations but is located within two-miles of the Umatilla Indian Reservation.

Communities of Shared Interest

The term *community of shared interest* is used here to refer to geographically dispersed individuals who could experience common conditions of environmental effect. The National Agricultural Workers Survey for fiscal years 2001 and 2002 (the most recent available) found that 83 percent of crop workers in the United States identified themselves as members of a Hispanic group, and 78 percent of crop workers were born outside the United States, primarily in Mexico (75% of all crop workers) (U.S. Department of Labor 2005). This survey also found that 30 percent of all farm workers had total family incomes below federal poverty guidelines.

The potential effects of B2H Project construction and operations on agricultural production, and indirectly on agricultural workers, are addressed in Section 3.2.6 Land Use, Agriculture, Recreation, and Transportation. Viewed in terms of agricultural operations in the potentially affected counties, the total estimated construction disturbance represents a very small share of the 5.5 million acres of land on farms in the six potentially affected counties and is unlikely to noticeably affect overall agricultural production and employment in the affected counties. In addition, the impacts to agricultural production that would occur are not expected to have adverse human-health or environmental effects on farm workers.

Socioeconomic Effects to Tribes

Native American tribes in the B2H Project area rely on lands and resources outside reservation areas for traditional uses, including hunting, gathering plants and spiritual practices. Tribal members also harvest and gather materials for economic purposes, to support crafts and manufacture of items for sale to generate income. No reported information describing the types and quantities of materials gathered or products sold and revenue generated, are generally available. However, adverse effects to plants and wildlife that could reduce hunting success or make key plants scarcer could have adverse economic effects on Native Americans who rely on these materials for subsistence and income.

3.2.11.7 Mitigation Planning

On balance, the overall economic effects of the proposed B2H Project and the alternatives are anticipated to be positive, in the form of increased employment opportunities and increased area spending and tax revenue generation. Anticipated social effects on community services are anticipated to be temporary and minor during the construction period, therefore no specific mitigation actions have been proposed.

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3.2.12 Public Health and Safety

3.2.12.1 Introduction

This section discusses the noise environment and noise that may be produced by construction, operations, and decommissioning of the proposed B2H Project. This section addresses the electrical environment that would be created by the proposed B2H Project. The regulatory framework, scoping issues, methodology, and affected environment are presented, followed by a discussion of the environmental impacts.

3.2.12.2 Regulatory Framework

This section describes the applicable federal, state, county, and local government laws and regulations for noise and electrical environment. The State of Idaho does not have applicable noise regulations.

Noise

Federal

U.S. Environmental Protection Agency

The Environmental Protection Agency (EPA) has not promulgated standards or regulations for environmental noise generated by transmission lines and associated ancillary equipment; however, the EPA has published a guideline that specifically addresses issues of community noise (EPA 1974). This document, commonly referred to as the “noise levels document,” contains goals for noise levels affecting residential land use. EPA’s study is the only published study that includes a large database of community reaction to noise to which a proposed project can be readily compared. This publication evaluates the effects of environmental noise with respect to health and safety and activity interference. Its intended purpose is to provide relevant scientific information for state and local governments for use in developing their own ambient noise standards, though it states the levels are not construed as standards because they do not take into account cost or feasibility.

For outdoor residential areas and other locations in which “quiet” is a basis for human use, the recommended EPA guideline is an L_{dn} of less than 55 dBA for exterior levels and less than 45 dBA for interior levels. The EPA also suggests an L_{eq} limit of 70 dBA calculated over a 24-hour day to avoid adverse effects on public health and safety at publicly accessible property lines or work areas where extended public exposure is possible. The EPA criteria results are summarized in Table 3-298, which identifies levels of environmental noise below which there is no evidence that the general population will be at risk to EPA-identified health effects. The general noise limits for avoiding effects of outdoor and indoor activity interference and annoyance are also presented.

Table 3-298. Summary of EPA Noise Levels

Location	Level (dBA)	Effect
All publicly accessible areas with prolonged exposure	70 L_{eq} (24-hour)	Safety/hearing loss concerns
Outdoor areas at residential structures and other noise-sensitive receptors where a large amount of time is spent	55 L_{dn}	Protection against annoyance and activity interference

Location	Level (dBA)	Effect
Outdoor areas where limited amounts of time are spent (park areas, school yards, golf courses, etc.)	55 L_{eq} (24-hour)	Protection against annoyance and activity interference
Indoor residential areas	45 L_{dn}	Protection against annoyance and activity interference
Indoor nonresidential areas	45 L_{eq} (24-hour)	Protection against annoyance and activity interference

Table Abbreviations: dBA = A-weighted decibel; L_{eq} = equivalent sound level; L_{dn} = day-night sound level.

U.S. Department of Housing and Urban Development

The U.S. Department of Housing and Urban Development Noise Guidebook Chapter 2 (24 Code of Federal Regulations, Section 51.101[a][8]) also recommends that exterior areas of frequent human use follow the EPA guideline of 55 dBA L_{dn}. However, the same section indicates that a noise level of up to 65 dBA L_{dn} could be considered acceptable.

U.S. Department of Transportation

The U.S Department of Transportation has established noise abatement criteria for vehicular traffic and airports administered by the Federal Highway Administration (FHWA) (23 CFR 772) and the Federal Aviation Administration (FAA) (14 CFR 150), respectively. While neither agency establishes noise standards for transmission line projects, the noise abatement criteria are useful in determining the noise impacts generated by the construction equipment and helicopters used to construct and operate the B2H Project.

The U.S Department of Transportation has identified criteria for the assessment of short- and long-term construction activities for both stationary and mobile projects, and specifically for linear projects. FHWA recommends abatement of construction noise that exceeds maximum levels at noise-sensitive areas. These Project construction noise criteria take into account the diurnal pattern of construction activities, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. While these criteria were not developed to specifically address construction noise impact for power transmission line projects, the guidelines shown in Table 3-299 provide reasonable criteria for B2H Project construction noise assessment. If these criteria noise levels are exceeded, adverse community reaction may result.

Table 3-299. Summary of U.S. Department of Transportation Guidelines for Short- and Moderate-Duration Construction Noise

Location	Daytime dBA Level (8-hour L_{eq})	Nighttime dBA Level (8-hour L_{eq})
Short-Duration Noise		
Noise-sensitive receptors (residences)	90	80
Commercial	100	100
Industrial	100	100

Location	Daytime dBA Level (8-hour L_{eq})	Nighttime dBA Level (8-hour L_{eq})
Moderate-Duration Noise		
Noise-sensitive receptors (residences)	80	70
Commercial	85	85
Industrial	90	90

Table Source: FHWA2006.

Table Abbreviations: dBA = A-weighted decibels; L_{eq} = equivalent sound level.

FHWA noise guidelines provide procedures for noise studies and noise abatement measures to help protect the public's health, welfare and livability, supply noise abatement criteria, establish requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to Title 23 U.S.C. For this Project FHWA information was used to estimate traffic generated noise for various vehicle types.

The FAA establishes the procedures, standards, and methodology governing the development, submission, and review of airport noise exposure maps and airport noise compatibility programs, including the process for evaluating and approving or disapproving those programs (14 CFR Part 150, Airport Noise Compatibility Planning). Part 150 prescribes single systems for—(a) measuring noise at airports and surrounding areas that generally provides a highly reliable relationship between projected noise exposure and surveyed reaction of people to noise; and (b) determining exposure of individuals to noise that result from the operations of an airport. Part 150 also identifies those land uses which are normally compatible with various levels of exposure to noise by individuals. Studies conducted by the FAA and aircraft manufacturers, such as Bell Helicopters and Sikorsky, have identified typical noise levels for helicopters in various modes. These studies develop reasonable estimates of the noise levels generated by helicopters.

State of Oregon

As a part of the ODOE EFSC process, IPC must provide a set of specific exhibits to document that the proposed B2H Project will meet standards established under the Oregon Administrative Rules (OAR) as well as standards set by other agencies or regulations. OAR 345-021-0010(1)(x) requires "information about noise generated by construction and operation of the proposed facility, providing evidence to support a finding by the Council that the proposed facility complies with the Oregon Department of Environmental Quality's noise control standards in OAR 340-35-0035."

OAR 340-035-0035*, Noise Control Regulations for Industry and Commerce*, prescribes noise regulations applicable throughout the state of Oregon. The ODOE is examining how these requirements may be applied to utility-scale transmission line projects.

The Oregon regulations provide differing standards for new noise sources on a previously used site (OAR 340-035-0035(1)(b)(A)) and new noise sources on an unused site (OAR 340-035-0035(1)(b)(B)(i and ii)). The daytime and nighttime standards for previously used sites set forth in Table 8 of OAR 340-035-0035 (reproduced here as Table 3-300). These standards establish the maximum allowable limits

for statistical (percentile) sound levels. Percentile sound level (L_n) represents the sound level exceeded for a given percentage (n percent) of time over a specified measurement period. For instance, L_{10} is the sound level exceeded 10 percent of the time; it is often referred to as the intrusive noise level.

Table 3-300. New Industrial and Commercial Noise Level Standards at Previously Used Sites

Statistical Descriptor	Maximum Permissible Statistical Noise Levels (dBA)—Daytime (7 a.m.–10 p.m.)	Maximum Permissible Statistical Noise Levels (dBA)—Nighttime (10 p.m.–7 a.m.)
L_{50}	55	50
L_{10}	60	55
L_1	75	60

Table Source: OAR 340-035-0035, Table 8.

Table Abbreviations: L_{50}, L_{10}, and L_1 = sound level exceeded for 50 percent, 10 percent, or 1 percent of a measurement period; dBA = A-weighted decibels.

Where the proposed transmission line involves rebuilding an existing line or is adjacent to an existing line, the interpretation of whether the site will be considered previously used or unused has not been clarified by ODOE. Some indication has been given that if a new transmission line is built within an existing right-of-way and does not modify that right-of-way, the site will be considered previously used, and the statistical noise limits established in Table 8 of the Oregon regulations would be applicable.

The Oregon regulations establish separate standards for new noise sources on a previously unused site. These standards, known as ambient degradation standards, are as follows:

> OAR 340-035-0035(1)(b)(B)(i): No person owning or controlling a new industrial or commercial noise source located on a previously unused industrial or commercial site shall cause or permit the operation of that noise source if the noise levels generated or indirectly caused by that noise source increase the ambient statistical noise levels, L_{10} or L_{50}, by more than 10 dBA in any one hour, or exceed the levels specified in Table 8, as measured at an appropriate measurement point, as specified in subsection (3)(b) of this rule, except as specified in subparagraph (1)(b)(B)(iii).

> OAR 340-035-0035(1)(b)(B)(ii): The ambient statistical noise level of a new industrial or commercial noise source on a previously unused industrial or commercial site shall include all noises generated or indirectly caused by or attributable to that source including all of its related activities. Sources exempted from the requirements of section (1) of this rule, which are identified in subsections (5)(b) - (f), (j), and (k) of this rule, shall not be excluded from this ambient measurement.

In order to determine compliance with Oregon regulations, a rural ambient noise level of 26 dBA was assumed. This is a conservative analysis approach, principally for the purpose of preliminarily assessing whether the B2H Project will meet Oregon standards in advance of the formal determination of compliance by the EFSC. Where localized, existing ambient noise levels are already greater than 26

dBA due to the proximity of a roadway or other noise sources, the threshold for determining whether there is ambient noise degradation will be 10 dBA higher than the measured and documented ambient sound level.

The ambient noise degradation limits apply at "appropriate measurement points" on "noise sensitive property." The appropriate measurement point is defined as whichever of the following is farther from the noise source:

- 25 feet toward the noise source from that point on the noise-sensitive building nearest the noise source
- that point on the noise-sensitive property line nearest the noise source

Noise-sensitive property is defined as "real property normally used for sleeping, or normally used as schools, churches, hospitals or public libraries. Property used in industrial or agricultural activities is not considered noise-sensitive unless it meets the above criteria in more than an incidental manner. Where there are no noise-sensitive properties, the allowable noise levels are not limited. The terms *noise-sensitive property* and *noise-sensitive receptor* refer to the same kinds of properties and are interchangeable. For the purposes of this EIS, the term *noise-sensitive receptor* is used throughout.

OAR 340-035-0035 Table 9 (reproduced here as Table 3-301) sets noise limits for "quiet areas," which are defined by the Oregon rules as any lands or facilities designated by the Oregon Department of Environmental Quality (ODEQ) as an appropriate area where the qualities of serenity, tranquility, and quiet are of extraordinary significance and serve an important public need. There are no ODEQ-designated "quiet areas" identified within the analysis area.

Table 3-301. Industrial and Commercial Noise Level Standards for Quiet Areas

Statistical Descriptor	Maximum Permissible Statistical Noise Levels (dBA)—Daytime (7 a.m.–10 p.m.)	Maximum Permissible Statistical Noise Levels (dBA)—Nighttime (10 p.m.–7 a.m.)
L_{50}	50	45
L_{10}	55	50
L_1	60	55

Table Source: OAR 340-035-0035, Table 9.

Table Abbreviations: L_{50}, L_{10}, and L_1 = sound level exceeded for 50 percent, 10 percent, or 1 percent of a measurement period; dBA = A-weighted decibels.

OAR 340-035-0035(1)(f) establishes standards to regulate octave-band sound-pressure levels and audible discrete tones. Table 10 of OAR 340-035-0035 provides the most restrictive of the octave-band frequency limits applicable to daytime and nighttime periods; these frequency limits are reproduced here as Table 3-302. Such standards can be applied by the ODEQ when it believes the requirements imposed on existing noise sources and new noise sources do not adequately protect the health, safety, or welfare of the public. Given the separation distances between the proposed route and alternative routes and identified noise-sensitive receptors, received sound levels are expected to be at least 10 dB below the allowable sound pressure levels at any given frequency band.

The Oregon noise-control regulations also contain requirements pertaining to blasting and impulse noise, measuring, monitoring, and reporting requirements.

Table 3-302. Median Octave-Band Standards for Industrial and Commercial Noise Sources

	Octave-Band Center Frequencies								
Frequency (hertz)	31.5	63	125	250	500	1,000	2,000	4,000	8,000
Daytime limit (linear decibels)	68.0	65	61	55	52	49	46	43	40
Nighttime limit (linear decibels)	65.0	62	56	50	46	43	40	37	34

Table Source: OAR 340-035-0035, Table 10.

Exemptions to Oregon State Noise Regulations

OAR 340-035-0035(5) specifically exempts construction activity from the state noise standards and regulations as described below. This section of the Oregon rules also provides an exemption for the maintenance of capital equipment, the operation of aircraft (such as helicopters used in B2H Project construction), and sounds created by activities related to timber harvest.

OAR 340-035-0035(5) Exemptions:

Except as otherwise provided in subparagraph (1)(b)(B)(ii) of this rule, the rules in section (1) of this rule shall not apply to:

[note: this section abridged for brevity]

(b) Warning devices not operating continuously for more than 5 minutes;

(g) Sounds that originate on construction sites.

(h) Sounds created in construction or maintenance of capital equipment;

(j) Sounds generated by the operation of aircraft and subject to pre-emptive federal regulation. This exception does not apply to aircraft engine testing, activity conducted at the airport that is not directly related to flight operations, and any other activity not preemptively regulated by the federal government or controlled under OAR 340-035-0045;

(k) Sounds created by the operation of road vehicle auxiliary equipment complying with the noise rules for such equipment as specified in OAR 340-035-0030(1)(e);

(m) Sounds created by activities related to the growing or harvesting of forest tree species on forest land as defined in subsection (1) of ORS 526.324.

OAR 340-035-0035(6), Exceptions, allows for some exemptions to the state noise regulations:

Upon written request from the owner or controller of an industrial or commercial noise source, the Department may authorize exceptions to section (1) of this rule, pursuant to rule 340-035-0010, for:

(a) Unusual and/or infrequent events;

(b) Industrial or commercial facilities previously established in areas of new development of noise sensitive property;

(c) Those industrial or commercial noise sources whose statistical noise levels at the appropriate measurement point are exceeded by any noise source external to the industrial or commercial noise source in question;

(d) Noise sensitive property owned or controlled by the person who controls or owns the noise source;

(e) Noise sensitive property located on land zoned exclusively for industrial or commercial use.

County and Local Regulations

The proposed B2H Project, including alternative segments, traverses six counties: Morrow, Umatilla, Union, Baker, and Malheur in Oregon and Owyhee in Idaho. The proposed route passes within 1 mile of the following 12 incorporated Oregon municipalities: Dixie, Oxman, Pleasant Valley, Quartz, Weatherby, Boardman, Boardman Junction, Cecil, Ella, McKay, Bodie, and Sago. None of these counties or municipalities has any noise ordinances or bylaws directly applicable to the B2H Project, nor any nuisance ordinances that contain decibel limits. The Oregon counties defer to OAR Chapter 340, Division 35, for the purposes of assessing compliance, given the stringency of these criteria limits. The 2012 Umatilla County Development Code includes noise in its conditional-use permit criteria according to Section 152.085: “The project is designed to be compatible with existing land use and social patterns, including noise generation, safety, and zoning.” This qualitative permit criterion is applicable to all county land use zones. There are, however, no applicable numerical decibel limits prescribed by Umatilla County regulations.

Electrical Environment

Federal

Electric and Magnetic Fields

In the United States there are no federal regulations or guidelines that apply directly to occupational or residential exposure to power-frequency electric and magnetic fields. In the 1990s, the National Institute of Environmental Health Sciences (NIEHS) conducted an extensive federal review of electric and magnetic field-related issues as part of a report to Congress (NIEHS 1999). NIEHS concluded that the level and strength of evidence supporting ELF-EMF (extremely low frequency- electromagnetic fields) exposure as a human health hazard are insufficient to warrant aggressive regulatory actions, such as stringent standards on electric appliances or a national program to bury all transmission and

distribution lines. Instead, NIEHS recommended passive regulatory action such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures.

Although there are no federal regulations on low-frequency electric and magnetic fields in the United States, recommendations and guidelines are provided by international organizations and U.S. nongovernment organizations. Bonneville Power Administration (BPA) follows electric field guidelines for design of new transmission lines. BPA's guidelines include guidelines of 9 kV/m maximum on the right-of-way, 2.5 kV/m maximum at the edge of the right-of-way, 5 kV/m for road crossings, and 2.5−3.5 kV/m in parking lots. Table 3-303 lists electric and magnetic field guidelines recommended by the European Union; the Institute of Electrical and Electronics Engineers (IEEE); the International Committee on Electromagnetic Safety (ICES); the International Commission on Non-Ionizing Radiation Protection (ICNIRP), an affiliate of the World Health Organization; and the American Conference of Governmental Industrial Hygienists (ACGIH).

Table 3-303. International Guidelines for AC Electric and Magnetic Field Levels

Agency	Exposure	Location	Electric Field (kV/m)	Magnetic Field (G)
European Union	General public	Edge of ROW	4.2	0.833
IEEE	Occupational	Within ROW	20	27.1
IEEE	General public	Within ROW	10	9.04
ICES	Occupational	Within ROW	20	27.1
ICES	General public	Edge of ROW	5	9.04
ICNIRP	Occupational	Within ROW	8.3	4.17
ICNIRP	General public	Edge of ROW	4.2	0.833
ACGIH	Occupational	Within ROW	25	10.0
ACGIH	Workers with cardiac pacemakers	Within ROW	1	1 (1,000 mG)

Table Sources: IEEE 2002 (Standard C95.6-2002); ICES 2002; ICNIRP 2009; ACGIS 2001.

Table Abbreviations: AC = alternating current; ACGIH = American Conference of Governmental Industrial Hygienists; G = gauss; Hz = hertz; mG = milligauss; ICES = International Committee on Electromagnetic Safety; ICNIRP = International Commission on Non-Ionizing Radiation Protection; IEEE = Institute of Electrical and Electronic Engineers; kV/m = kilovolt per meter; ROW = right-of-way; T = tesla; µT = microtesla.

Table General Note: In the United States, magnetic fields are measured in G and mG; 1.0 G = 1,000 mG. Internationally, magnetic fields are reported and measured in T; 1.0 T = 1,000,000 µT. To convert, 1.0 µT = 10.0 mG or 0.1 µT = 1.0 mG.

Radio and Television Interference

Electromagnetic interference from power transmission systems in the United States is governed by the Federal Communication Commission (FCC) rules and regulations (Title 47 CFR Chapter 1). The FCC categorizes a power transmission line as an *incidental radiation device*, which is defined as follows: "a device that radiates radio frequency energy during the course of its operation although the device is not intentionally designed to generate radio frequency energy" 47 CFR 15.3(n). Such a device shall be operated so that the radio frequency energy that is emitted does not cause harmful interference. In the event that harmful interference is caused, the operator of the device shall promptly take steps to eliminate the harmful interference. *Harmful interference* is defined as "any emission, radiation or

induction which endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radio communication service operating in accordance with this chapter" (47 CFR 15.3(m)).

Complaints related to corona-generated interference are infrequent. The advent of cable and satellite television, with the move to digital broadcast television in June 2009, has further reduced the possibility of corona-generated interference. Cable, satellite, and digital broadcasts are generally not subject to corona-generated interference.

STATE

Electric and Magnetic Fields

Seven states, including Oregon, have regulations for low-frequency electric or magnetic field levels. These states have adopted limits for electric field strength either at the edge or within the right-of-way of transmission line corridors. For Oregon, the guideline for electric field strength is 9-kV/m within the right-of-way. Only Florida and New York currently have regulations limiting magnetic field levels from transmission lines; these regulated levels only apply at the edge of the right-of-way and were based on an objective of preventing field levels from increasing beyond levels currently produced by existing lines and by the public.

3.2.12.3 Issues Identified for Analysis

Noted below are issues identified for analysis in this section, and summary responses to each issue. Detailed explanation in this section provides further details to each issue.

Noise

- Would noise from construction or the electrical line be harmful to people, livestock, and wildlife?
- Would the project cause ground vibrations?
- Will noise from the power line affect livestock?

Electrical Environment

- Would electrical fields interfere or cause harm to nearby metal objects, such as vehicles, animal feeders, watering stations, or other equipment and fences?
- Would electrical fields effect or cause harm to people, livestock, wildlife?
- Will there be any interference from electrical fields to communications or navigation services?

3.2.12.4 Methodology

The methodology used to describe the environmental consequences for noise and electrical environment is described below. This section includes a description of the analysis area and methods.

Noise

The analysis area for noise effects is 0.5 mile from the right-of-way line on both sides of the right-of-way. To analyze noise impacts, all structures within 0.5 mile of the edge of the proposed right-of-way

were inventoried. Noise-sensitive receptors include residences, schools, day care facilities, hospitals, long-term care facilities, places of worship, libraries, historic properties with religious and/or cultural significance, and parks and recreational areas, including wilderness areas.

The evaluation of noise energy created by the B2H Project involves an identification of the existing or ambient sound levels followed by a prediction of the future sound levels attributed to the B2H Project. The difference in sound levels is the sound level impact created by the B2H Project. IPC conducted an inventory of existing ambient sound levels at approximately 730 identified receptors along the Proposed Action and alternative routes. The location of the receptors, distance from the right-of-way, receptor types, and measured ambient noise levels at each receptor are presented in Table B.11-1 in Appendix B.11. A total of 87 noise-sensitive receptors were identified along the Proposed Action, and 29 receptors were identified along the alternatives.

Noise levels from overhead transmission line construction were evaluated using a screening-level analysis approach that is semi-qualitative. The construction calculation methodology requires inputting the number and type of construction equipment by phase, and typical noise-source levels associated with that equipment, to determine the received sound levels by phase. Received construction sound levels are described at set distances of 50 and 1,000 feet from the transmission line, rather than for discrete noise-sensitive receptors, which is a sufficient screening-level effects approach, considering the temporary nature of construction noise impacts.

Transmission line noise would be the principal long-term sound source of the B2H Project, could have potential long-term impacts on noise-sensitive receptors, and was therefore analyzed in more detail. The operations assessment procedure involved the following three steps:

1. Determine sound-source characteristics of the transmission line from standardized engineering technical guidelines and literature sources that reflect actual measurements of existing transmission lines of similar design under similar weather conditions;
2. Simulate sound levels using internationally accepted calculation standards to represent elevated sound sources (such as transmission lines) as accurately as possible under a range of weather conditions, including those that typically result in greater noise production. Receivers outside the L50 36 dBA isopleth are assumed to be within acceptable noise levels.
3. Make assumptions to establish the pre-existing background-noise level at relevant receivers inside the L50 36 dBA noise contour isopleths.

Noise modeling for the B2H Project involved two analytical methods. In the first, corona-source noise levels were calculated using methodologies described in the Corona and Field Effects (CAFE) program (version 3.0) developed by U.S. Department of Energy, Bonneville Power Administration (BPA). CAFE is used to determine anticipated corona noise levels generated along the transmission line conductors. The second acoustic modeling using the Computer Aided Noise Abatement (CadnaA) program (version 4.1.137), published by DataKustik in Munich, Germany, models how sound travels outward from the transmission line and construction sites to noise receptors. Together, these two methods are used to predict levels of project-related noise at noise-sensitive receptor sites.

ELECTRICAL ENVIRONMENT

The electrical environment analysis area is the land directly under and adjacent to the Proposed Action and alternative transmission line routes. The typical right-of-way width would be 250 feet, with a 100-foot-wide right-of-way for the 138/69-kV portions of the B2H Project. Profiles of the expected levels of electric and magnetic fields generated by the project are calculated to a distance of 300 feet on both sides of the centerlines of the proposed and alternative routes.

A computer program developed by the BPA was used to determine expected levels of electric fields, magnetic fields, and radio interference from the B2H Project. Table 3-304 lists the B2H proposed line segments with the characteristics and the peak loadings used for calculation of the magnetic fields.

Table 3-304. Proposed Transmission Lines by County

County	Line Description	Line Status	Type	Loading Peak Current (amps/phase)
Morrow (OR)	Single circuit—500 kV	New	Lattice tower	2,500
Umatilla (OR)	Single circuit—500 kV	New	Lattice tower	2,500
Union (OR)	Single circuit—500 kV	New	Lattice tower	2,500
Baker (OR)	Single circuit—500 kV	New	Lattice tower	2,500
Baker (OR)	Double circuit—138/69 kV	Rebuilt	Tubular	625/275
Malheur (OR)	Single circuit—500 kV	New	Lattice tower	2,500
Owyhee (ID)	Single circuit—500 kV	New	Lattice tower	2,500

Table Abbreviations: amps = amperes; ID = Idaho; kV = kilovolt; OR = Oregon.

3.2.12.5 AFFECTED ENVIRONMENT

NOISE

The existing ambient noise levels in eastern Oregon and western Idaho may be affected by the construction, operations, and decommissioning of the transmission line and ancillary facilities. Specifically, this section discusses the extent of the area and receptors that may be affected by noise generated by the B2H Project.

While the concept of sound is defined by the laws of physics, the term noise has further qualities of being excessive or loud. The perception of sound as noise is influenced by several technical factors, such as intensity, sound quality, tonality, duration, and the existing background levels. Noise is highly subjective and defined as unwanted sound. It is largely dependent on the magnitude (intensity) or duration of the noise; the distance from the noise source; and the time of day the incidence noise occurs (i.e., higher sensitivities will be expected during the quieter overnight periods).

Noise is usually expressed in decibels on the A-weighted scale (dBA), which corresponds to how humans hear sound. Depending on the magnitude, duration and amplitude of the noise and the sensitivity and distance of the receptor, the impact may be negligible, moderate or severe. Table 3-305 shows typical noise levels for common sources, expressed in dBA.

Table 3-305. Common Noise Levels

Noise Source or Effect	Sound Level (dBA[1])
Rock and roll band	110
Truck at 50 feet	80
Gas lawnmower at 100 feet	70
Normal conversation indoors	60
Moderate rainfall on foliage	50
Refrigerator	40
Bedroom at night	25

Notes: 1. Decibels (A-weighted)

Sources: USDOE 1986 and Lee 1996

Depending on local terrain and vegetation conditions, existing general levels of ambient audible noise levels in fair weather range from 20 to 40 dBA due to air movement through brush and trees. Higher levels of audible noise occur during precipitation events due to the noise of the rain on the ground and local vegetation. Local individual sources, such as animal calls or human activity, can also produce audible noise levels exceeding 60 dBA.

To take into account sound fluctuations, environmental noise is commonly described in terms of equivalent sound level (L_{eq}). The L_{eq} value, conventionally expressed in dBA, is the energy-averaged, A-weighted sound level over a measurement period. Another common noise descriptor used when assessing environmental noise is the day-night sound level (L_{dn}), which is calculated by averaging the 24-hour L_{eq} hourly levels at a given location and adding 10 dB to noise emitted during the nighttime period (10:00 p.m.–7:00 a.m.) to account for the increased sensitivity of people to noises that occur at night. The L_{max} is the maximum instantaneous sound level measured during a specified time period. It can also be used to quantify the maximum instantaneous sound pressure level, such as that generated by equipment or an explosion.

IPC conducted an inventory of existing ambient sound levels at approximately 730 identified receptors along the proposed route and alternative routes. The location of the receptors, distance from the right-of-way, receptor types, and measured ambient noise levels at each receptor are presented in Table B.11-1 in Appendix B.11. Existing ambient sound levels are higher near major transportation corridors (i.e., Interstate 84, State Highway 26, and State Routes 203, 237, and 244) and in areas with higher population densities (e.g., Boardman, La Grande). There are also several rural airstrips and small airports in the vicinity, which contribute to ambient noise levels in both surrounding urban and rural areas. The open land, unincorporated areas, and communities that would intersect the proposed transmission line are predominantly open land or rural in nature, and are expected to have comparatively lower ambient sound levels. These lands range from very quiet with natural sounds such as birds, insects, wind effects as it passes through foliage and around objects, to louder motorized noise from off-road vehicle and recreational use, hunting, and other outdoor, commercial, and industrial activities.

Some meteorological conditions, such as foul weather, are favorable to sound propagation and conducive to corona noise generation that could periodically be audible outside the project right-of-way. Conversely, corona noise may be partially or fully masked by elevated ambient sound levels generated by rainfall events or ground-level winds. If ambient noise is very low, even a modest amount of wind can obscure the other noise sources and become the dominant ambient noise, particularly in areas with stands of mature trees.

Electrical Environment

Existing levels of radio interference and electric and magnetic fields are generally at ambient levels since there are no existing high-voltage transmission lines near (within 1,500 feet) the proposed route or alternative alignments. Exceptions occur where existing and proposed transmission lines converge at substations and where short portions of the 230-kV, 138-kV, 115-kV, and 69-kV lines run parallel to each other. This occurs in Morrow, Union, and Baker Counties. See Table 3-306 for a list of existing ambient levels of radio interference and electric and magnetic fields where there are no nearby existing transmission lines, as well as where there are existing nearby lines.

Table 3-306. Existing Ambient Levels

Electric Field (kV/m) [1]	Magnetic Field (mG) [2]	Radio Interference dB (1 µV/m) [3,4]
0.1 to 15-kV/m, Earth's static field <0.1-kV/m, AC electric field	500 to 600 mG, Earth's static field <1 mG, AC magnetic field	20 to 55 dB (1 µV/m), depending on season and atmospheric activity

Table Abbreviations: kV/m = kilovolt per meter; mG = milligauss; dB = decibel.

Table Notes: [1] Chalmers 1967. [2] National Oceanic and Atmospheric Administration 2011. [3] EPRI 1982. [4] New England Hydro Transmission Corporation 1985.

Existing fields are essentially the static natural electric field of the earth, which is due to atmospheric conditions and can range from a few hundred volts per meter to kilovolts per meter, and the natural magnetic field of the earth, which is in the range of 500 to 600 milligauss; however, both of the fields are essentially static or slowly varying instead of oscillating 60 times per second (60 hertz) like alternating current AC fields associated with a typical AC power lines. Much of the area crossed by the proposed transmission line is open range and cultivated fields. Smaller areas of desert, forest, and scattered residential conditions also exist.

Electric and Magnetic Fields

Electric and magnetic fields are associated with the operation of AC power lines or devices supplied with AC electricity. These fields describe properties of a location or point in space and its electrical environment, including the forces that would be experienced by a charged body in that space by virtue of its charge or the movement of charges. The voltage produces an electric field which increases as the voltage increases. The current produces a magnetic field, which increases as the current increases. Thus, wherever there is electric current flowing (including through any type of wiring), there is both an electric and a magnetic field.

The standard unit for measuring the strength of an electric field is volts per meter (V/m); however, with electric high-voltage transmission lines the unit typically given is in kilovolts per meter (kV/m). The unit in which magnetic field levels are measured is gauss or milligauss (in international publications, the standard unit is tesla or microtesla, where 1 microtesla = 10 milligauss). Electric and magnetic fields are characterized by the frequency at which their direction and magnitude oscillate each second. The fields produced by the use of electricity in the U.S. oscillate at a frequency of 60 cycles per second, or 60 hertz. Electric and magnetic fields collectively are sometimes referred to as EMFs, although the term *EMF* often applies only to magnetic field.

Typical sources of these fields include power lines (both transmission and distribution lines), home and office appliances, tools, building wiring, and currents flowing on water pipes. The importance of these sources to overall exposure varies considerably. For example, if a residence is very close, such as within 50 feet of a transmission line or even a distribution line (which runs near most residences), these sources could be the dominant but not necessarily the only source of magnetic fields in the home. Depending on the circumstances, other sources may be of equal or greater importance. For example, a random survey of 1,000 residences in the United States reported that currents flowing on water pipes and on other components of house grounding systems are twice as likely as outside power lines to be the source of the highest magnetic fields measured in homes (Zaffanella 1993).

Electric field levels depend primarily on the line's voltage; the higher the voltage on the line, the higher the electric field levels associated with that line. Little variation is expected with electric field levels from a power line because a line's voltage does not vary significantly. Conducting objects including fences, shrubbery, and buildings easily shield electric fields. Magnetic field levels depend primarily on the current, or load, flowing on the line; as electricity demand increases and the current on the line increases, the magnetic field levels associated with the line generally increase. The transmission of electric power at a higher voltage (e.g., at 500 kV) reduces the current flow on the line to a level below that required to transport the same amount of power over lower-voltage lines. Both electric and magnetic field levels decrease rapidly with distance from a distribution or transmission line (Figure 3-59).

3.2.12.6 Environmental Consequences

No Action Alternative

The Proposed Action and Alternatives would not be constructed or operated. The noise environment at the right-of-way and at noise-sensitive receptors would remain unchanged, subject to the effects of other non-project-related noise sources. In addition, no project-related changes in the electrical environment would occur.

Effects Common to All Alternatives

This section addresses noise effects and impacts to the electrical environmental associated with the Proposed Action construction, operation, and decommissioning activities. The electric and magnetic field effects and resulting environmental consequences of the Proposed Action and alternatives would be substantially similar, and so are described together in this section. To the extent there are

differences in effects among the alternatives, those differences are described in Alternative-specific Effects.

CONSTRUCTION

Noise

Transmission line construction would generate periodically audible noise levels. Additional noise sources may include commuting workers and trucks moving material to and from the work sites. The construction equipment that would be used is similar to that used during typical public works projects and tree service operations (e.g., road resurfacing, storm-sewer installation, natural gas line installation, tree removal, etc.). Transmission line construction would occur sequentially, moving along the length of the project route, or in other areas such as near access roads, structure sites, conductor pulling sites, and staging and maintenance areas (Jackson et al. 1994). One new substation would also be constructed at the Grassland site. Overhead line construction is typically completed in the following stages, but various construction activities may overlap with multiple construction crews operating simultaneously:

- Site access, road construction, and preparation
- Installation of structure foundations
- Erecting of support structures
- Stringing of conductors, shield wire, and fiber-optic ground wire

Noise levels from overhead transmission line construction were evaluated using a screening-level, distance from the right-of-way analysis approach. The calculation methodology requires the input of the number and type of construction equipment by phase, as well as a typical noise-source level associated with that equipment, to determine the composite sound levels for standard distances of 50 and 1,000 feet. Table 3-307 shows the average sound generated for the construction equipment planned for each phase of the B2H Project, and the composite construction noise levels at 50 and 1,000 feet for each phase. The maximum noise level anticipated for construction equipment operation at 1,000 feet from the construction site is 60 dBA, which is below the 70 dBA limit specified in the Federal Highway Administration's Construction Noise Handbook (FHWA 2006).

Sixteen noise-sensitive receptors have been identified as located within 1,000 feet of the right-of-way for the Proposed Action; one for the Horn Butte Alternative; one for the Longhorn Alternative; and two for the Flagstaff Alternative. The comparison of the noise receptors for the proposed route and alternatives can be found in Table 3-311 and Table 3-312.

1 **Table 3-307. Noise Levels by Transmission Line Construction Phase**

Example Construction Equipment	Equipment Noise Level at 15 meters (50 feet), dBA	Composite Noise Level at 15 meters (50 feet), dBA	Composite L_{eq} Noise Level at 305 meters (1,000 feet), dBA
Construction Phase 1: Site Access and Preparation			
Bulldozer	86	85	51
Grader	82		
Roller—compactor	73		
Loader	78		
Water truck	80		
Dump truck	80		
Construction Phase 2: Installation of Structure Foundations			
Bulldozer	86	91	56
Loader	78		
Backhoe-loader	80		
Fork lift	80		
Mobile crane	82		
Mobile crane	82		
Auger rig	85		
Drill rig	87		
Compressor	81		
Pump	83		
Portable mixer	82		
Jackhammer	90		
Cement mixer truck	80		
Dump truck	80		
Slurry truck	80		
Specialty truck	75		
Water truck	80		
Construction Phase 3: Erecting of Support Structures			
Forklift	80	95	60
Mobile crane	82		
Compressor	81		
Flatbed truck	75		
Flatbed truck	75		
Water truck	80		
Heavy lift helicopter	95		

Example Construction Equipment	Equipment Noise Level at 15 meters (50 feet), dBA	Composite Noise Level at 15 meters (50 feet), dBA	Composite L_{eq} Noise Level at 305 meters (1,000 feet), dBA
Construction Phase 4: Stringing of Conductors, Shield Wire, and Fiber-Optic Ground Wire			
Tracked dozer	86	86	52
Backhoe-loader	80		
Compressor	81		
Line puller	81		
Mixed trucks	80		
Specialty truck	75		
Specialty truck	75		
Water truck	80		

Table Source: Title 23 CFR Part 772 (Procedures for Abatement of Highway Traffic Noise and Construction Noise); FHWA 2006; Bolt Beranek and Newman, Inc. 1977.

Table Abbreviations: dBA = A-weighted decibels; L_{eq} = equivalent sound level.

The noise impacts at specific noise-sensitive receptors from construction will depend on the type of equipment used, the mode of equipment operation, the length of time the equipment is in use, the amount of equipment used simultaneously, and the distance between the sound source and the receptor. These factors are expected to vary throughout the construction period, making the calculation of a specific received sound-level value at each receptor location difficult. Transmission line construction in the proximity of any single location would likely last a few days to one week, as construction activities move along the corridor. As a result, no single receptor would be exposed to elevated noise levels or vibrations for an extended period. Construction activities at the substations could last from several weeks to several months on an intermittent schedule. Construction equipment would be operated on an as-needed basis during this period.

Construction activities would occur for limited lengths of daytime hours as established by municipal bylaws or as specified under local zoning codes to minimize impacts at noise-sensitive receptors. In addition, the majority of construction activities would occur away from population centers; therefore, the potential for construction activities to result in temporary or periodic increases in ambient noise levels in the acoustic environment would be low. IPC will comply with established noise ordinances and suggested noise guidelines to reduce the potential for adverse noise impacts at noise-sensitive receptors. The subsequent sections discuss specific construction techniques, including blasting and rock breaking, implosive devices during conductor stringing, and helicopter operations.

Blasting and Rock Breaking

Blasting is a short duration event as compared to rock removal methods, such as using track rig drills, rock breakers, jack hammers, rotary percussion drills, core barrels, and/or rotary rock drills.

Modern blasting techniques include the electronically controlled ignition of multiple small-explosive charges in an area of rock 8/1,000 of a second apart, resulting in total event duration of approximately 3/10 of a second. The detonations are timed so the energy from individual detonations destructively

interferes with each other, called wave canceling. As a result, very little of the kinetic energy is wasted as ground vibration and audible noise. Impulse (instantaneous) noise from blasts could reach up to 140 dBA at the blast location or over 90 dBA for noise-sensitive receptors within 500 feet. Five receptors have been identified as within 500 feet of the right-of-way for the proposed route; one receptor is within 500 feet of the Horn Butte right-of-way; and one receptor is within 500 feet of the Longhorn Alternative right-of-way.

The B2H Project 500 kV lattice tower foundations would typically be installed using drilled shafts or piers; however, if hard rock is encountered within the planned drilling depth, blasting may be required to loosen or fracture the rock to reach the required depth to install the structure foundations. Blasting locations will not be identified until an investigative geotechnical survey of the study area is conducted during the detailed design. However, areas where blasting may potentially take place have been identified on a geologic basis. As described in Section 3.2.1 Earth Resources, areas of shallow bedrock exist along the proposed route and route alternatives. Depth to bedrock varies considerably along the routes, ranging from 1 to 4 feet below ground to greater than 12 feet below ground. The number of potentially impacted noise-sensitive receptors would be determined on the basis of the geotechnical investigations as to where blasting may be required.

To minimize impacts from blasting, IPC would implement the following:

- Blasting plans will be prepared by the contracted blasting specialist, demonstrating compliance with all applicable state and local blasting regulations, including the use of properly licensed personnel and obtaining all necessary authorizations
- A project specific Blasting Plan that meets all State, and Federal requirements shall be approved by the appropriate agency prior to the start of field activities and executed appropriately for the project
- Prior to any detonation of explosives in the vicinity of existing facilities such as pipelines, dwellings, structures, overhead or underground utilities, farm operations, or public crossings, a minimum of 48 hours notice shall be given to IPC, the appropriate authorities, and the owners or operators of any facilities that may be affected by the blasting
- In the vicinity of other electrical lines, the Contractor shall use approved blasting procedures to minimize the potential hazard of a premature detonation due to induced currents

Implosive Devices

Compression or implosive devices are used to make connections between conductors, which is the current industry-preferred method in contrast to previously used conventional hydraulic compression fittings. The use of implosive devices would vary depending on what segment of the transmission line is under construction and the number of conductors per bundle. A three-conductor bundle (IPC 2011) is proposed for each phase, and there are three phases per 500kV circuit. At each single-circuit 500kV dead-end structure and in-line sections where reel ends need to be connected, 18 implosive dead-end sleeves (6 per phase, one for each of the three subconductors on each of the three phases, and on each side of the structure) would be required. Additionally, 18 compression or implosive sleeves would

be required to fabricate and install the jumpers that connect the conductors from one side of the dead-end structure to the other, for a total of 36 sleeves for each single-circuit dead-end structure.

Broadband implosive device sound-source levels were provided by an equipment manufacturer's test report for a similar size charge for comparable implosive dead-end and sleeve compression connector technologies. An average sound-level measurement between 118 and 122 dBA at an approximate distance of 200 feet was reported (Pasini 2006). The duration of sound emitted from the detonation of an implosive device is short, ranging from approximately 210 to 360 milliseconds. Since the potential for noise startle effects at noise-sensitive receptors exists, the use of implosive devices would be limited to daytime periods. In addition, implosive sleeves are typically applied in series, allowing for multiple connections to be made simultaneously.

Helicopter Operations

Access roads to each tower site are generally required for construction, operation, and maintenance activities, but there may be areas where access roads are limited in width, grade, or availability and require assistance by helicopters during construction. Project construction activities that could be facilitated by helicopters may include the delivery of construction laborers, equipment, and materials to structure sites; structure placement; hardware installation; and wire-stringing operations. For areas where the terrain is rugged and hilly, it is anticipated that line-replacement activities would involve using helicopters and this would be the major source of audible noise during the construction phase. Heavy lift helicopters could be used to erect the single-circuit 500kV tower sections. Light-duty helicopters would be used during the stringing phase of construction. Helicopters generally fly at low altitudes; therefore, potential temporary increases to ambient sound levels would occur in the area where helicopters are operating, as well as along their flight path. The fly yards would be approximately 10 to 15 acres and sited at locations to permit a maximum fly time of 4 to 8 minutes to reach structure locations, typically at about 10-mile intervals. In addition to limited flight time, helicopter operations would be limited to daytime working hours.

Summary of Construction Noise Effects

The noise effects of construction of the proposed B2H Project would depend on the location of noise receptors with regard to the locations of the construction activities and a number of other variables. Proximity to the project right-of-way provides a broad generalization of the potential for construction noise effects. For the majority of the right-of-way, construction of the B2H Project would result in low adverse noise effects because of the lack of noise-sensitive receptors in close proximity (i.e., within 1000 feet) along these portions of the right-of-way, and the temporary and localized nature of noise that would be generated during the construction phase. There are, however, certain portions of the right-of-way where noise-sensitive receptors are located close to the right-of-way. One noise-sensitive receptor is located within the 50-feet range where noise from construction equipment could reach 90 dBA and is within the 200-feet range where noise from implosive devices could reach 122 dBA. That noise-sensitive receptor and four others are within the 500-feet range in which blasting noise could reach 90 dBA. Eleven additional noise-sensitive receptors are within 1,000 feet of the proposed B2H Project right-of-way, and could experience up to 60 dBA of temporary construction noise. Whether or not these

noise levels would be reached depends on final geotechnical investigations and final engineering of the B2H Project.

To further reduce noise impacts to sensitive receptors, IPC will identify and provide a public liaison, prior to and during construction, to respond to concerns about construction noise. In addition, IPC will establish a toll-free hotline to receive questions or complaints and develop procedures to respond to callers.

Electrical Environment

During construction, the electric and magnetic field levels in the vicinity of the B2H Project would be at background or ambient levels since the proposed lines would not be energized, and are not near pre-existing transmission lines along most of the proposed B2H Project and alternative routes. Once the transmission lines are energized, the electric and magnetic field levels would increase and be present.

Operations

Noise

Transmission Line

The electrical breakdown of air caused by corona at the surface of a transmission line conductor is accompanied by a crackling, snapping, sputtering or humming sound. If there is sufficient corona activity on a high-voltage line from corona activity along a conductor it may be sufficient to produce discernible audible noise at the edge of the right-of-way. At lower system voltages (voltages below 230 kV), audible noise from the transmission-line conductors is typically not formally evaluated because of the very low levels of corona activity and correspondingly low occurrence of corona effects. For lines at higher voltages (345 kV and above) with higher conductor surface gradients, corona activity is more likely and audible noise more frequent, particularly in inclement weather, and is therefore taken into account in the design of the transmission line.

Noise generated by transmission lines typically contributes little to noise levels compared to other common sources, such as vehicles, aircraft, and industrial sources; however, with increasing transmission line voltages, audible noise produced by corona on transmission line conductors has become a concern. Audible noise from transmission lines occurs primarily in foul weather. In dry conditions, the corona sources are limited to insects, scratches, and vegetation. These sources are such that the corona threshold is barely exceeded and the audible noise generated is very low. Generally, the fair-weather audible noise of transmission lines cannot be distinguished from ambient noise at the edge of the right-of-way. Conversely, in wet conditions, water drops impinging or collecting on the conductors produce a large number of corona discharges, each of them creating a burst of noise.

IPC would implement the following design features to minimize corona:

- Use transmission line materials that have been designed and tested to minimize corona

- Use a bundle configuration and larger conductors to limit audible noise, radio interference, and television interference due to corona
- Maintain tension on all insulator assemblies to ensure positive contact between insulators, thereby avoiding sparking
- Exercise caution during construction to avoid scratching or nicking the conductor surface, which may provide points for corona to occur

Consultation with Indian Tribes that consider portions of or the entirety of the project area to be part of their traditional use areas indicate that Tribes are concerned with the ambient noise that is produced from operation of the transmission line as it affects their ability to conduct practices related to their cultural traditions and religion.

The noise model results for B2H Project transmission line noise are presented in Appendix B.11, which shows the anticipated noise levels for identified receptors within the analysis area for the Proposed Action and alternatives. The modeled sound data are the anticipated B2H Project-generated noise levels, and are independent of the existing ambient sound at that location.

Substations

The principal operations noise sources in substations are transformers. No new transformers are expected to be installed at the Grassland or Hemingway substations as a direct result of the B2H Project.

While no transformers will be installed at the Grassland or Hemingway substations, 500-kV shunt reactor banks will be installed at each location. Shunt reactors contain components similar to power transformers but noise from shunt reactors is generated primarily from vibrational forces resulting from magnetic “pull” effects at iron-air interfaces. Also, unlike transformers, operation of shunt reactors is typically intermittent, operating when voltage stabilization is needed during load variation. The closest identified receptor to the existing Hemingway Substation is located approximately 1,088 feet from the substation fence line. At the proposed Grassland Substation, there are no receptors identified within a 0.5 mile of the line terminal. With the existing and new equipment (e.g., transformers) installed at the Hemingway and Grassland substations, addition of shunt reactor banks is expected to result in low impacts due to negligible increases in received sound levels at noise-sensitive receptors.

Summary of Operations Noise Effects

The ambient noise inventories and operations noise modeling suggest that 63 noise-sensitive receptors in the Proposed Action analysis area could experience project-related operational noise at noticeable levels (10 dBA above assumed rural ambient of 26 dBA, or over 50 dBA). Of these, two noise-sensitive receptors could experience operational noise levels above the 50 dBA limit set by Oregon noise rules. IPC may be required in the EFSC process to propose means to abate noise levels that exceed state noise rules. Overall, operational noise along the right-of-way would be low.

Electrical Environment

Electric Field

The Proposed Action and action alternatives would use three tower structures: a 500-kV single-circuit lattice structure, delta configuration (Figure 3-58); a 500-kV single-circuit H-frame structure (Figure 3-60); and a 138 kV/69-kV double-circuit single-shaft steel pole (Figure 3-62). When a double-circuit structure is proposed (Figure 3-62) the orientation (phasing) of the conductors in relation to each other would affect the resulting levels of the electric field, magnetic field, and radio interference. Phasing of all conductors of the two circuits is factored in the calculations (Phase Management). The phase of a particular conductor or conductor bundle is indicated as either A, B, or C and the order and phasing of the conductor bundles of a circuit that are used to calculate the electrical levels are indicated as ABC. ABC for a single horizontal circuit indicates that the left conductor bundle is phase A, the middle conductor bundle is phase B, and the right conductor bundle is phase C. CAB would indicate that the left conductor bundle is phase C, the middle conductor bundle is phase A, and the right conductor bundle phase is B.

Electric field profiles for each tower type at mid-span were calculated at a 1 meter height above ground (IEEE Standard 644-1994). The electric field profiles for the three tower types are plotted in Figure 3-59, Figure 3-61, and Figure 3-63; these profiles show the anticipated electric field in and adjacent to the right-of-way. The electric field was calculated at the point of minimum clearance between the lowest conductor and ground. This occurs at mid-span for level terrain. The conductor height used for the 500-kV lattice structure lines was 35 feet, 37 feet was used for the 500-kV lines using the H-frame structures, and 34 feet of ground clearance for the 138 kV/69-kV double-circuit configuration. The line height above ground increases as one moves from mid-span back toward the tower, which results in lower electric fields under the line. The electric field was calculated with a 10 percent overvoltage for 500-kV and 138-kV/69-kV lines.

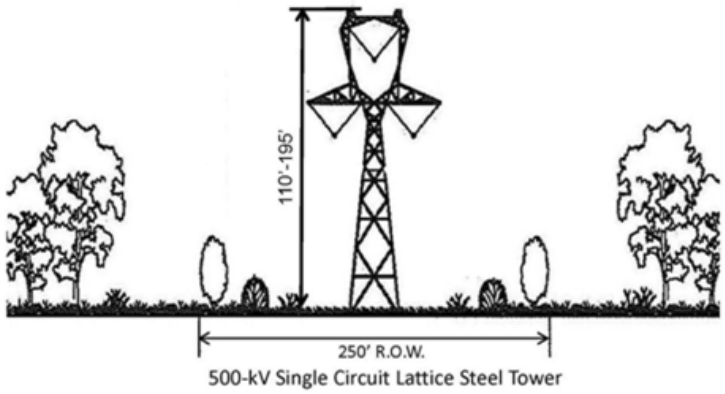

Figure 3-58. 500-kV Single-Circuit Lattice Steel Structure

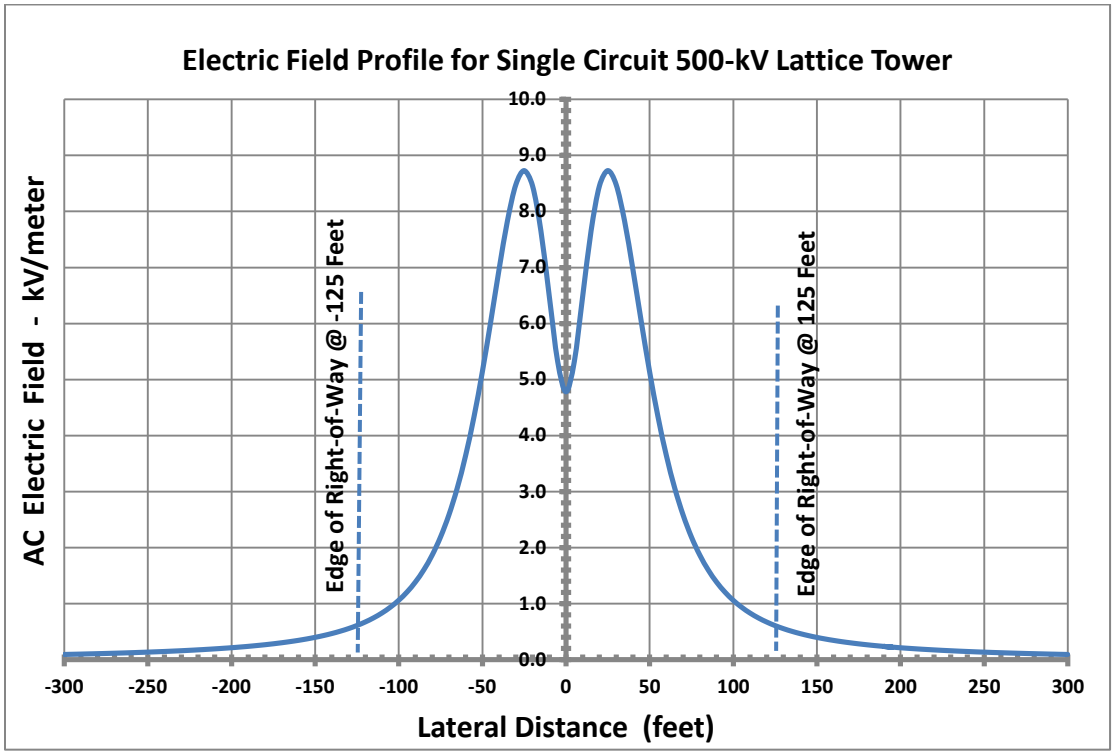

Figure 3-59. Electric Field Profile at Mid-span for 500-kV Lattice Structure

***Figure Note*: RMS Resultant Electric Field calculated at standard height of 1 meter and based on a mid-span clearance of 35 feet.**

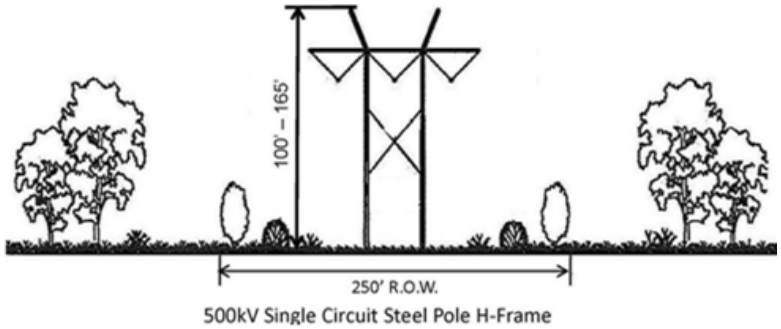

Figure 3-60. 500-kV Single-Circuit Steel Pole H-Frame Structures

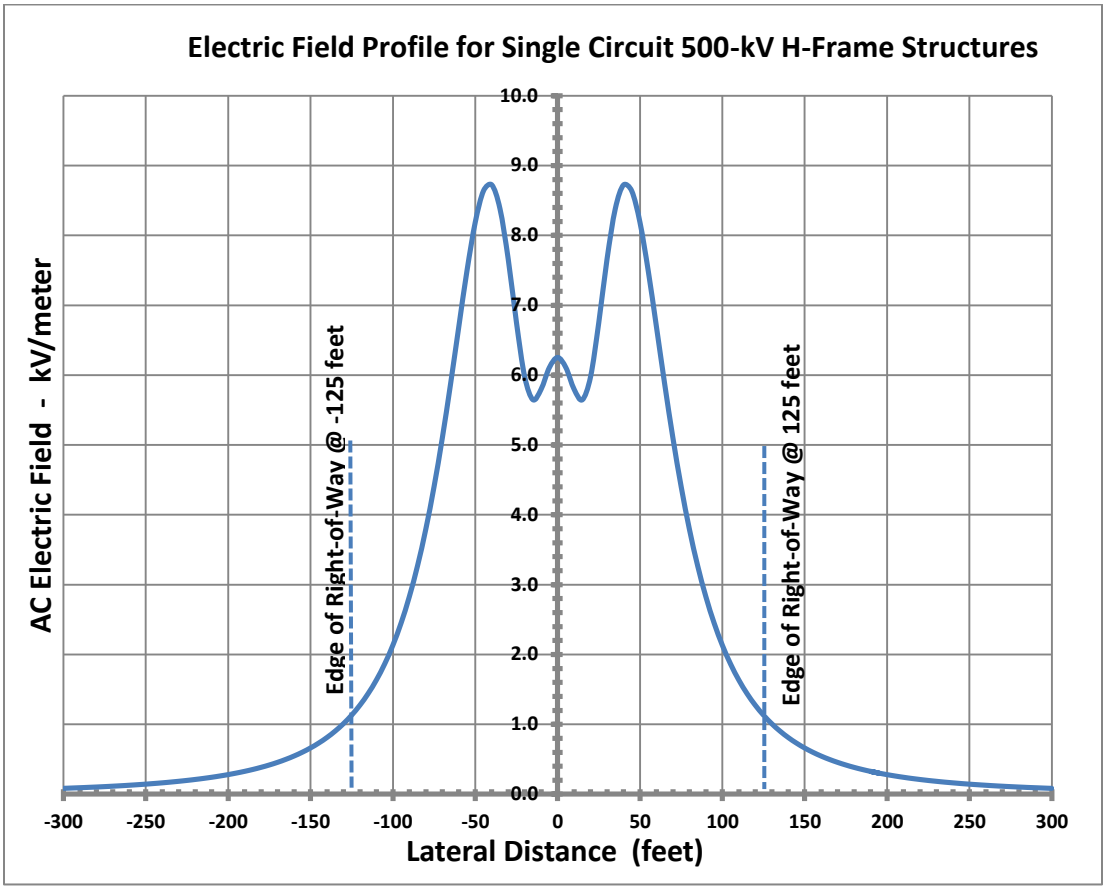

Figure 3-61. Electric Field Profile at Mid-span for 500-kV Single-Circuit H-Frame Structure

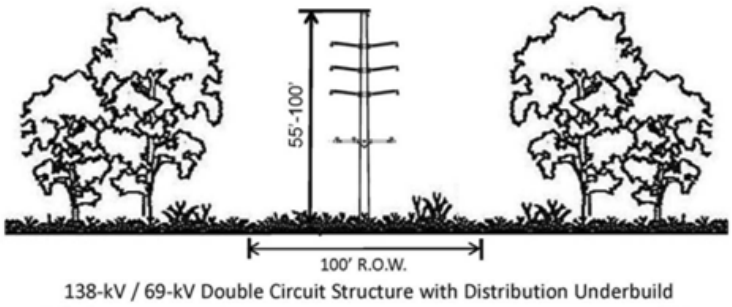

Figure 3-62. 138/69-kV Double-Circuit Tubular Steel Pole

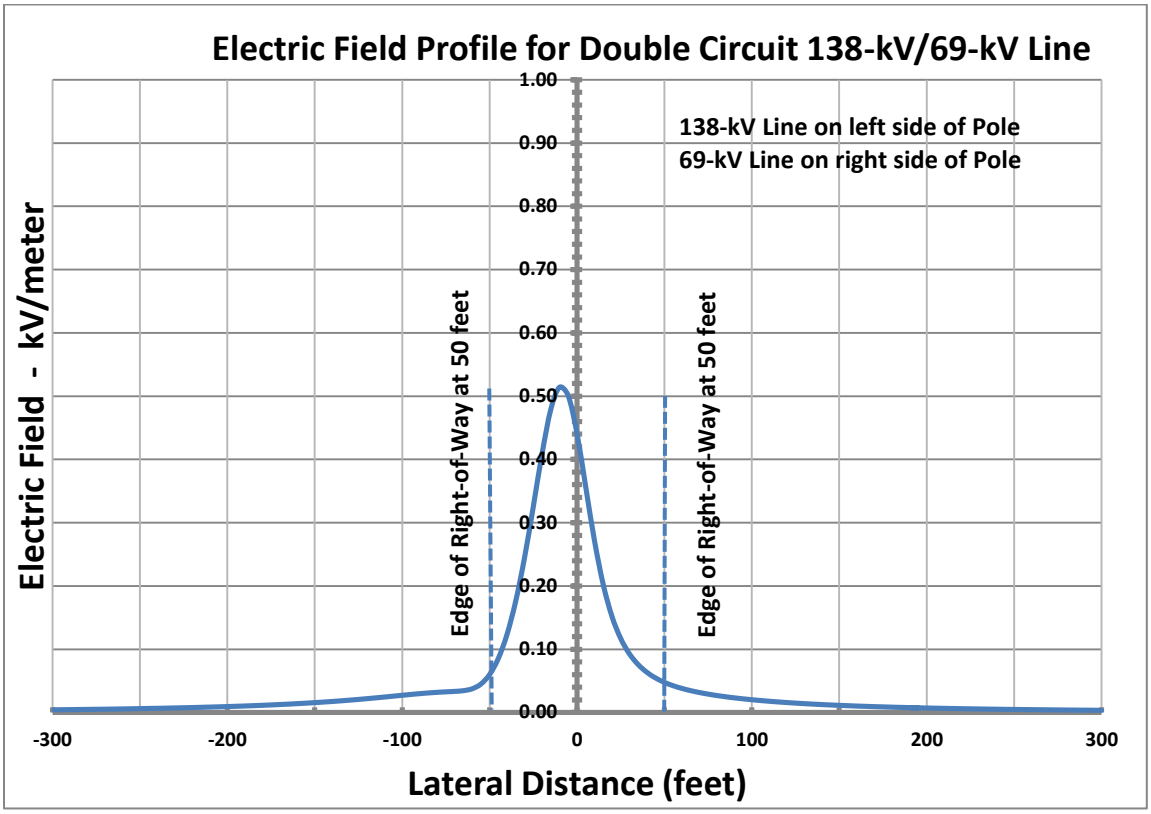

Figure 3-63. Electric Field Profile at Mid-span for Double-Circuit 138/69-Kv Single-Circuit Steel Pole Structure

The maximum modeled electric field within the right-of-way and at the edges of the right-of-way of the proposed B2H Project and alternatives is within the standards of the states. These include standards for high-voltage transmission lines, within BPA's guidelines for new transmission lines, and within the international guidelines summarized in Table 3-308.

Table 3-308. Electric fields within and at edges of Right-of-Way

Portion of Route [1]	ROW Width (feet)	South/West ROW Edge (kV/m)	Maximum within ROW (kV/m)	North/East ROW Edge (kV/m)
Morrow County (500 kV)	250	0.61	8.73	0.61
Umatilla County (500 kV)	250	0.61	8.73	0.61
Union County (500 kV)	250	0.61	8.73	0.61
Baker County (500 kV)	250	0.61	8.73	0.61
Baker County (138/69 kV)	100	0.06	0.51	0.06
Malheur County (500 kV)	250	0.61	8.73	0.61
Owyhee County (500 kV)	250	0.61	8.73	0.61
Tubular H-frame (500 kV)	250	1.13	8.72	1.13

Table General Note: RMS Resultant Electric Field at standard height of 1 meter in accordance with IEEE Standard 644-1994.

Table Notes: [1] Ground clearance: 35 feet for 500 kV lines with lattice tower structures; 37 feet for 500 kV lines with tubular H-frame structures; and 34 feet for 138/69 kV lines with single tubular poles structures.

The B2H Project is designed so that expected levels of electric and magnetic fields and radio noise as measured will be below accepted guidelines at the edge of the proposed rights-of-way. The maximum modeled electric field within the right-of-way and at the edges of the right-of-way of the Proposed Action and alternatives is within Oregon standards for high-voltage transmission lines, within BPA's guidelines for new transmission lines, and within the international guidelines summarized in Table 3-303. There are no established high-voltage transmission line standards for Idaho.

Magnetic Field

Once the transmission lines are energized, the AC magnetic fields would increase, and would vary hourly, daily and seasonally based on line loading and with peak values described in Table 3-309. The resultant magnetic field profiles at mid-span (point of closest approach of conductors to ground) were calculated for the three line types and are plotted in Figure 3-64, Figure 3-65, and Figure 3-66. The magnetic fields at the edges of the rights-of-way and the highest magnetic field found within the right-of-way for each of the line segments in the B2H Project are listed in Table 3-309. There are no established magnetic field standards for Idaho. The highest value of magnetic field calculated at the edge of the right-of-way was 68.3 milligauss, and this level was found where the 500-kV tubular H-frame structure is used. The highest magnetic field found within the right-of-way was 440 milligauss for the rights-of-way containing the 500-kV tubular H-frame structures. Table 3-309 provides expected levels of the magnetic field at various locations along the Proposed Action.

Table 3-309. Magnetic Fields (Peak Loading)

Portion of Route [1, 2]	ROW Width (feet)	South/East ROW Edge (mG)	Maximum within ROW (mG)	North/West ROW Edge (mG)
Morrow County (500 kV)	250	40.4	412	40.4
Umatilla County (500 kV)	250	40.4	412	40.4
Union County (500 kV)	250	40.4	412	40.4
Baker County (500 kV)	250	40.4	412	40.4
Baker County (138/69 kV)	100	8.4	21.5	4.5
Malheur County (500 kV)	250	40.4	412	40.4
Owyhee County (500 kV)	250	40.4	412	40.4
Tubular H-frame (500 kV)	250	68.3	440	68.3

Table General Note: RMF Resultant Magnetic Field at standard height of 1 meter.

Table Notes: [1] Peak loading: 2,500 amps/phase for 500-kV lines; 625 amps/phase for 138-kV line; 275 amps/phase for 69 - kV line. [2] Ground clearance criteria: 35 feet for 500-kV lattice structure lines; 37 feet for 500-kV tubular H-frame structures; and 34 feet for 138-kV/69-kV single tubular poles.

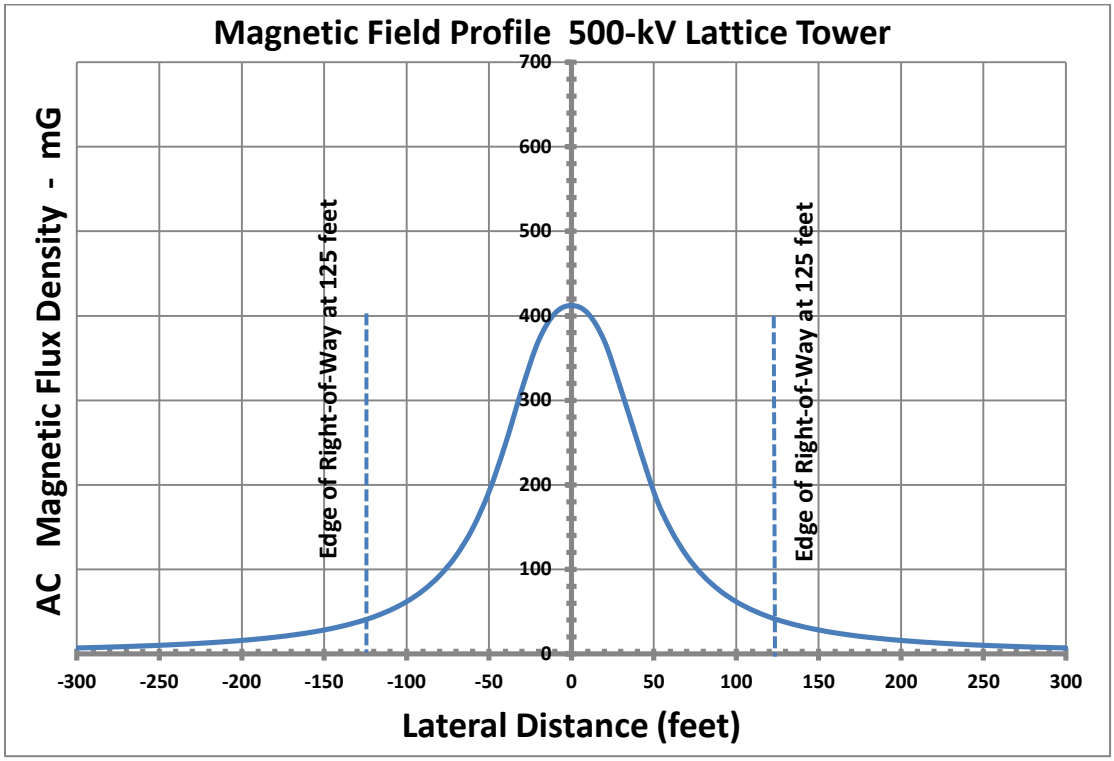

Figure 3-64. Magnetic Field Profile at Mid-Span for500-kV Single-Circuit Lattice Structure

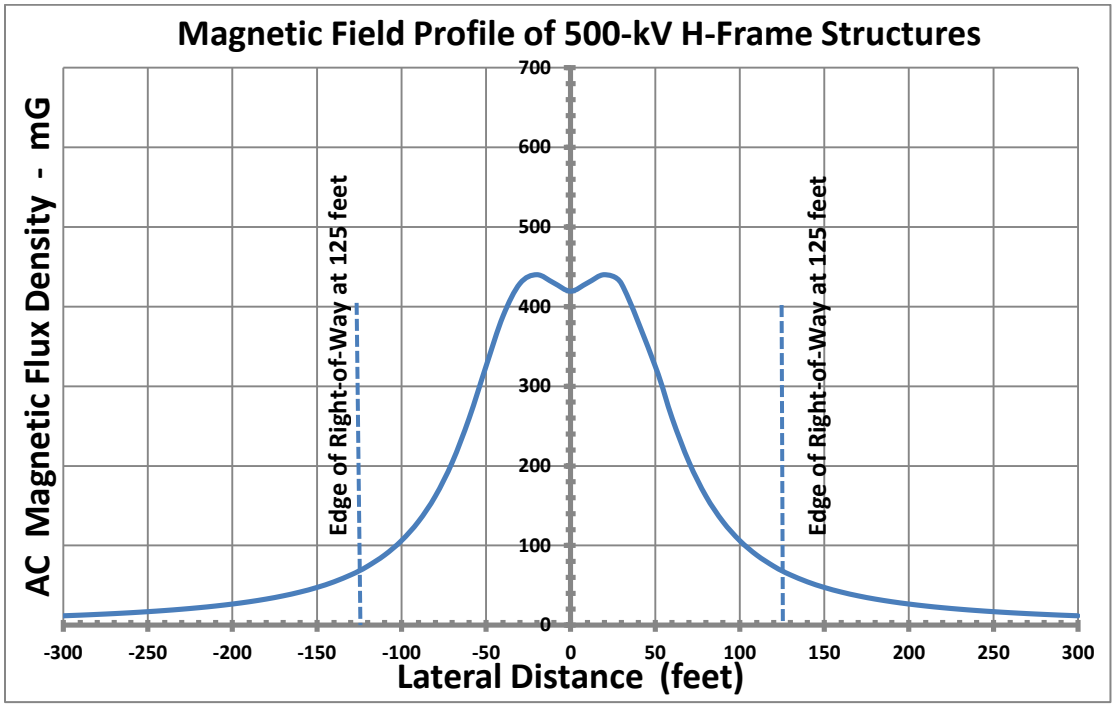

Figure 3-65. Magnetic Field Profile at Mid-Span for 500-kV Single-Circuit Tubular H-Frame Structure

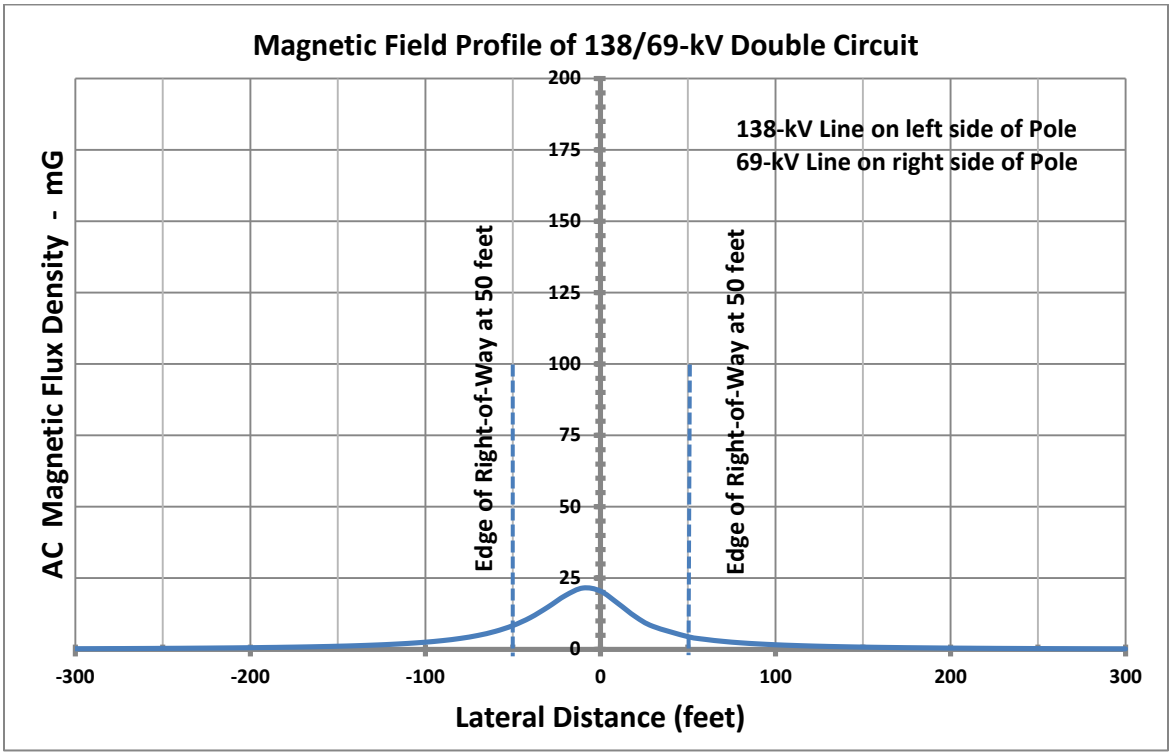

Figure 3-66. Magnetic Field Profile at Mid-Span for 138/69-kV Double-Circuit Tubular Pole Structure

Electric and Magnetic Field Effects

The electric and magnetic fields created by power transmission lines can create short term effects, generally perceived as nuisances such as induced currents or shocks. Concerns about long-term effects of EMF generally relate to human health concerns or effects on livestock, wildlife and nearby vegetation.

Field Induction (Induced Currents and Nuisance Shocks)

The electric fields associated with a transmission lines can cause voltages and/or currents to be induced (capacitive coupling) on otherwise un-energized conductive objects. Metallic roofs, vehicles, equipment, and fences are examples of objects that can develop a small electric charge when in proximity to high-voltage transmission lines. The induced voltage is a function of the transmission line voltage, the height of conductors, insulation between the object and ground, the characteristics and size of the object, and the electric field strength. An electric current can flow when an object has an induced charge and a path to ground. The induced voltage produces a short circuit current. The amount of induced current that can flow is important for evaluating the potential for nuisance shocks to people and the possibility of other effects such as fuel ignition.

Transmission line electric fields can also induce voltages and currents on people who are in the area or on a high voltage transmission line right-of-way. The magnitude of the induced voltage is a function of the line voltage, line geometry, the location of the person within the source electric field and the height and size of the individual. When the individual comes in contact with a grounded object, a short-circuit

current will flow. This short circuit current or spark discharge may be described as an annoying or nuisance shock. These occasions can be characterized as similar to the “static shock” a person could receive from walking on a carpet during a dry weather period, and touching a grounded object. A notable difference is the AC induced voltages from transmission lines spark discharges can be recurring or continuous (EPRI 2005).

The threshold of perception of an electric current is approximately 1 milliampere for humans (Dalziel and Mansfield 1950). If the current is increased sufficiently beyond a person’s perception threshold, it can become bothersome and possibly startling. Larger currents can cause the muscles of the arm and hand to involuntarily contract so that a person cannot let go of an object. The value at which 99.5 percent of men, women, and children can still let go of an object is approximately 9, 6, and 5 milliamperes, respectively. The National Electrical Safety Code (2012) addresses this issue, limiting the steady-state current that can flow between an object and the earth near a transmission line to 5 milliamperes. This is considered to be a safe level.

Transmission lines are designed such that the maximum amount of current induced on the largest metallic object normally expected under the line would be less than 5 milliamperes. Nuisance shocks and induced currents can be eliminated by proper grounding of the object, shielding it from electric fields, or positioning it farther from the transmission line.

Although transmission lines are designed to limit induced currents on objects underneath the lines to a safe level, this level of current or the contact electric shock may still occur and be perceived when an object is contacted. This may be considered a nuisance depending on the magnitude of the current or shock. The peak electric field found under the 500-kV lines is sufficient that currents and potentials induced on vehicles and farm equipment operated within the right-of-way might be perceived. Most of the area under the Proposed Action and alternative lines has lower fields and only a small area under the 500-kV lines where the conductors come closest to ground near mid-span would be likely to induce perceivable currents or potentials on conductive objects such as vehicles or farm equipment.

The relation between short-circuit current and electric field for several vehicles and agriculture-related pieces of equipment has been measured and is listed in Table 3-310 (EPRI 2005). Multiplying the factors listed in Table 3-310 by the electric field yields the short-circuit current expected under conditions that are expected to produce the greatest magnitude short-circuit currents. The highest electric field calculated within the Proposed Action right-of-way and alternatives for the proposed B2H 500-kV lines was 8.73-kV/m. The vehicles and equipment listed in Table 3-310 would have short-circuit currents that are less than the 5-milliampere current required by the National Electric Safety Code (2012) except for the tractor-semitrailer where the induced current would be 5.6 milliamperes if the entire length of the tractor-semitrailer were in a 8.73-kV/m electric field (e.g., parallel to the line). Tractor-semitrailers would generally not be anticipated under the line except at line road crossings. At locations where large vehicles are anticipated, the line height would be increased as necessary (or the line design altered) so that the line complies with the 5-milliampere requirement of National Electric Safety Code Section 23 rules (2012).

Appropriate design practices for the 500-kV B2H Project, proper ground clearances, and acceptable electric field values on and at the edge of the right-of-way minimize electric field induction problems. In addition, proper grounding practices for conductive objects on and at the edge of right-of-way would reduce annoying and nuisance shocks.

Table 3-310. Induced Current Factors

Object	Induced Current Coefficient I_{SC}/E (mA per kV/m)
Car L 4.6m x W 1.78 m x H 1.37 m	0.088
Pickup truck L 5.2 m x W 2.0 m x H 1.7m	0.10
Tractor-semitrailer (40-foot trailer) L 15.75 m x W 2.4 m x H 3.7m	0.64
Farm tractor pulling crop wagon (9.55-m total length)	0.30

Table Abbreviations: L = length; W = width; H = height; I_{SC} = short-circuit current; E = AC electric field; mA/kV = milliampere per kilovolt.

Radio Interference

Radio interference occurs when the 60-hertz electric fields at the surface of a power line conductor (conductor surface gradient) is above a certain critical value to cause a local breakdown in the insulating properties of the air. This electrical breakdown of the air or ionization of the air, at the surface of the conductor is called a *corona*. Corona discharges in general can produce electromagnetic interference to radio and TV reception. If there is sufficient corona activity, radio and TV interference can be noticeable within a few hundred feet of the transmission line, and small amounts of ozone and nitrous oxide can be released. These effects are most pronounced directly underneath the line conductors and decrease with distance from the transmission line.

The impulsive corona activity can cause wide-band electric and radio interference. This radio interference spans the frequency spectrum from below 100 kilohertz to approximately 1,000 megahertz. Inclement weather and high altitude increase radio interference levels. This activity from transmission lines can produce electromagnetic interference to an AM broadcast band (535–1605 kilohertz) signal such as a commercial AM radio audio signal. FM radio stations and the audio portion of a TV station signal (which is also frequency modulated) are generally not affected by interference from a transmission line. Radio interference is measured in decibels based on its field strength referenced to a signal level of 1 microvolt per meter. Existing ambient levels of radio noise are created by atmospheric activity and are approximately at 30 to 40 decibels (dB) (1 microvolt per meter in fair weather at 1 megahertz), depending on the season and amount of storm activity. Radio interference resulting from operation of the B2H Project is anticipated to be low and can be remedied as needed on a case-by-case basis (Appendix C).

Figure 3-67, Figure 3-68, and Figure 3-69 show the anticipated radio interference profiles at mid span (conductor closest to the ground) for the 500-kV lattice towers, 500-kV H-frame towers, and the 138/69-kV towers.

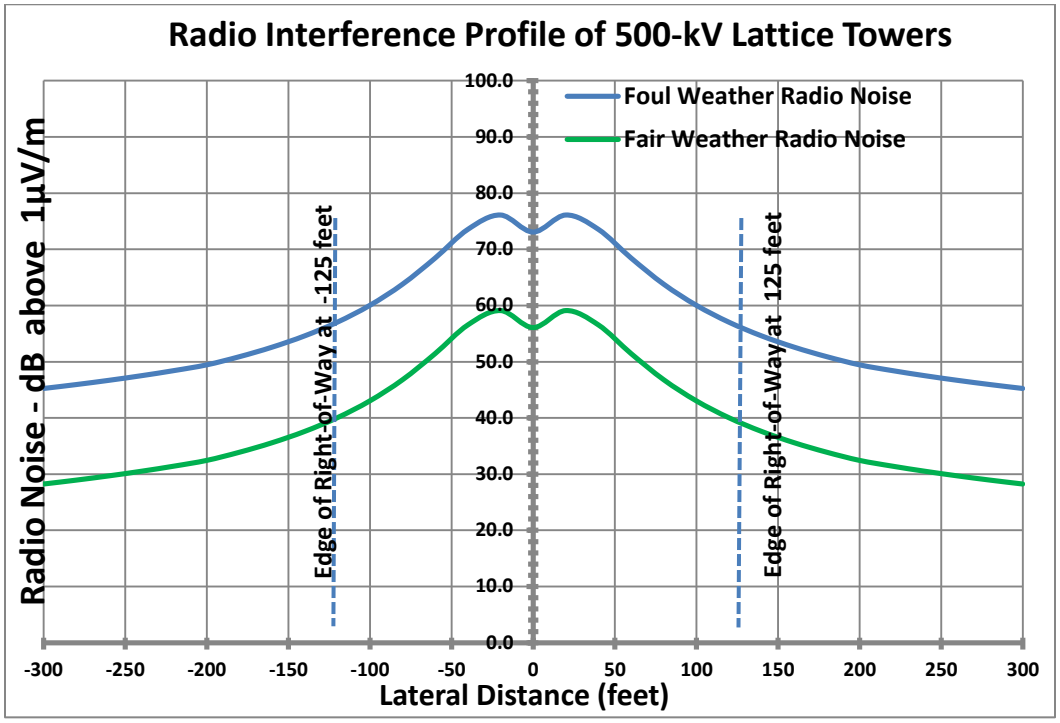

Figure 3-67.Radio Noise Profile at Mid-Span for 500-kV Single-Circuit Lattice Structure

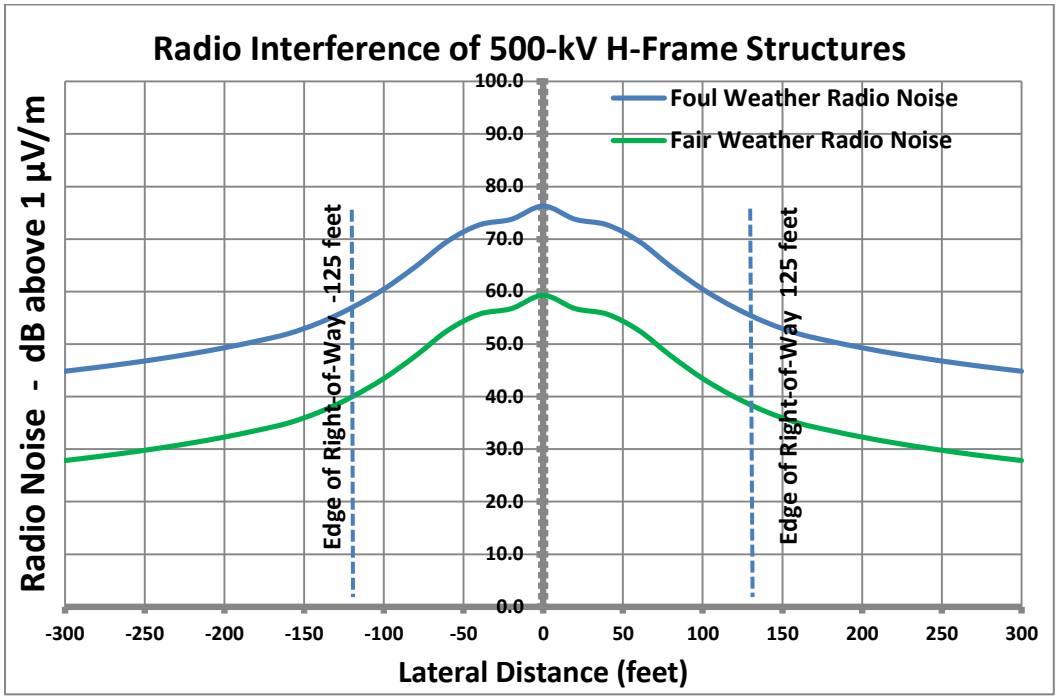

Figure 3-68. Radio Noise Profile at Mid-Span for Single-Circuit 500-kV Tubular H-Frame

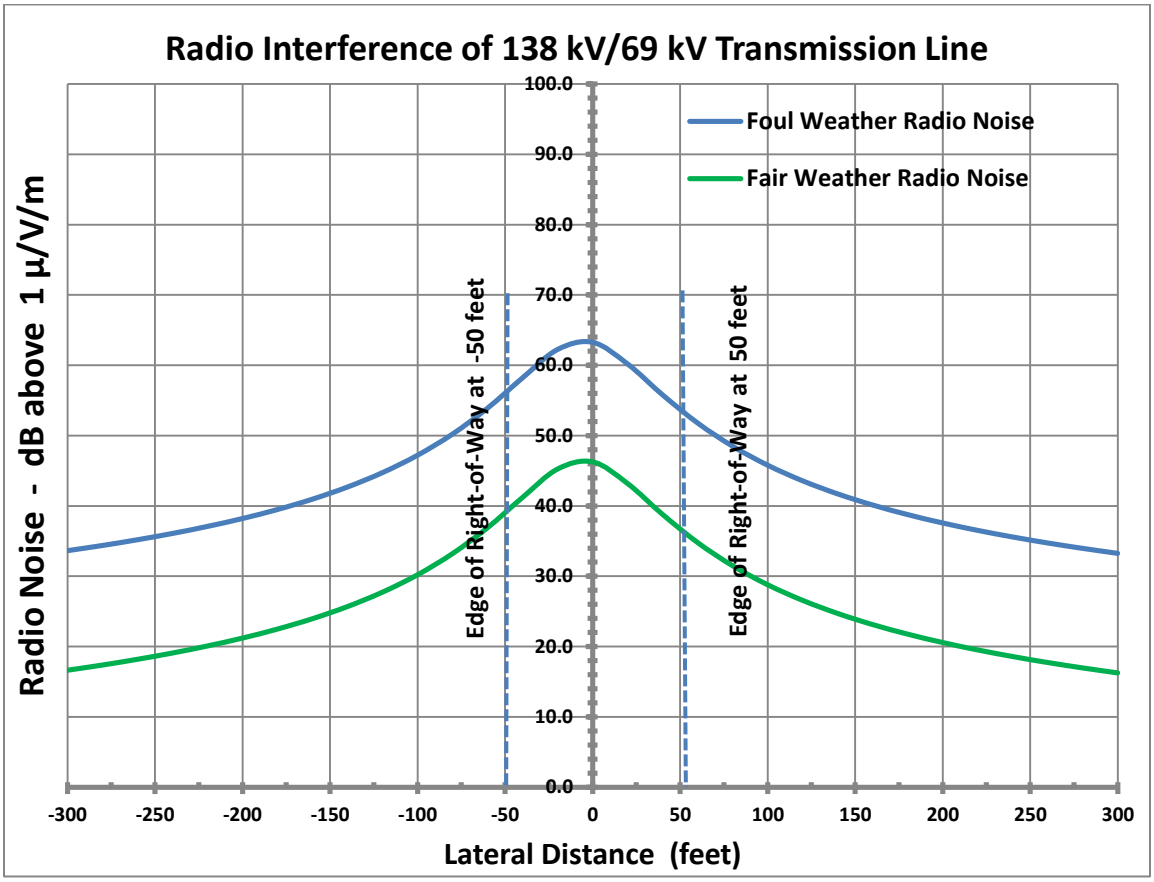

Figure 3-69. Radio Noise Profile at Mid-Span for 138/69 -kV Transmission Line

Television Interference

Corona activity associated with high voltage power lines has produced television signal interference issues at lower channels (Channels 2-6, 54-88 mHZ). Historically, customers' reception problems have been addressed and satisfied with remedial measures to correct the interference. Today, television customers have greater choices such as cable and satellite systems and conversions to digital TV. Television interference is anticipated to be low and, if necessary, can be remedied on a case-by-case basis (Appendix C).

Magnetic Field Effects

Magnetic fields can cause distortion of the image on older style video display terminals and computer monitors (cathode-ray tubes). The threshold magnetic field for interference depends on the type and size of monitor and the frequency of the magnetic field. Interference has been observed for certain monitors at fields at or below 10 milligauss (Baishiki et al. 1990; Banfai et al. 2000). The problem typically arises when cathode-ray tube computer monitors are in use near electrical distribution or transmission facilities in large office buildings. This is becoming less of a concern with the introduction of flat screen monitors, such as laptop computers. Flat screen monitors are not susceptible to distortion from AC magnetic fields. Some specialized equipment (for instance, certain medical equipment such as

a magnetic resonance imaging machine or test equipment such as a scanning electron microscope) may be sensitive to even lower levels of magnetic field. However, equipment that is very sensitive to magnetic fields typically has shielding and is installed in a protected environment, to shield them from the magnetic fields of 1 to 10 milligauss or higher that can be found in buildings due to their wiring, lights, and other equipment. Magnetic field effects would be low based on newer technologies that are not susceptible to distortion.

Electromagnetic Interference to GPS Satellite Receivers and Cell Phones

GPS units, satellite receivers, cell phones, and community communication systems typically operate at high frequencies in the tens to hundreds of megahertz or even into the gigahertz range. These systems also frequently use FM or digital coding of the signals so that they are relatively immune (superior signal-to-noise ratio) to the electromagnetic interference from transmission line corona.

Mobile phones operate in the radiofrequency range of about 0.8 to 1.9 megahertz or higher frequencies. Electric and magnetic fields at these high frequencies have very different physical characteristics from 60-hertz power frequency electric and magnetic fields. Due to the frequencies used by these devices and the modulation and processing techniques used, interference effects would below.

GPS units are used in a wide range of activities including several important agricultural activities in the analysis area such as monitoring pivot irrigation, tracking wheeled and tracked equipment movements during farming operation, and checking the orientation of aerial spraying aircraft. Modern guidance systems have an accuracy of 1 to 2 inches. Comments from local farmers indicate that power lines can interfere with these GPS guidance systems, making them less accurate, being off from 1.5 to 4.5 feet. If so, inefficiencies could result in wasted fuel, increased labor costs, and under-or over-fertilizing resulting in reduced productivity. GPS units operate in the frequency range of 1.2 to 1.6 gigahertz. Tests with satellite receivers operating at frequencies from 3.4 gigahertz to 7 gigahertz have shown no effect from transmission lines unless the receiver was trying to view the satellite through the transmission tower or the conductor bundle of the transmission line. Repositioning the receiver by a few feet was sufficient to eliminate the obstruction and reduced signal.

IPC reports that they do not specifically track reports of interference with GPS tractor navigation systems. However, in the Magic Valley area which is a region in south-central Idaho, these systems are widely used and there are several existing transmission lines up to 500-kV crossing the area. They report that over the last 10 years they have not been contacted about interference with tractor GPS navigation systems. Users of these systems have expressed concerns about the possibility of interference, but no specific examples have been reported (IPC 2010). As a result, interference effects to GPS units would be low.

Electromagnetic Interference to Cardiac Pacemakers

Electric and magnetic fields from a variety of sources, including some industrial equipment, automobile ignition wiring, anti-theft devices in stores, magnetic resonance imaging machines, slot machines, cell phones, and certain medical procedures (e.g., radiation therapy, electrocautery and defibrillation), have

been reported to affect the operation of implanted cardiac pacemakers and defibrillators. In theory, pacemaker interference from the electric fields associated with high-voltage transmission lines might be possible depending upon the type of pacemaker, the person's location and orientation under the conductors of the transmission line, and the voltage and design of the transmission line. However, the opportunities for exposure and interference from power lines are lower than for contact with ordinary household appliances.

Due to recent design improvements, many pacemakers in use would not be particularly susceptible to electrical fields. There remains a small possibility that some pacemakers, particularly those of older designs, and with single-lead electrodes, may sense potentials induced on the electrodes and leads of the pacemaker and provide unnecessary stimulation to the heart.

There are two general types of pacemakers: asynchronous and synchronous. The asynchronous pacemaker pulses at a predetermined rate. It is practically immune to interference because it has no sensing circuitry and is not exceptionally complex. The synchronous pacemaker, on the other hand, pulses only when its sensing circuitry determines that pacing is necessary. Interference resulting from transmission line electric or magnetic fields can cause a spurious signal in the pacemaker's sensing circuitry. However, when these pacemakers detect a spurious signal, such as a 60-hertz signal, they are programmed to revert to an asynchronous or fixed pacing mode of operation and return to synchronous operation within a specified time after the signal is no longer detected.

The potential for pacemaker interference depends on the manufacturer, model, and implantation method, among other factors. Studies have determined thresholds for interference of the most sensitive units to be about 2,000 to 12,000 milligauss for magnetic fields and about 1.5 to 2.0-kV/m for electric fields. The magnetic fields from the transmission lines are well below these values, even for the peak magnetic field of 440 milligauss found on the right-of-way (see Table 3-309). The electric fields expected at the edges of the right-of-way (1.13-kV/m or less; see Table 3-308) are below the threshold level of 1.5-kV/m for the most sensitive pacemaker. The proposed transmission lines would not have an effect on pacemakers outside the right-of-way.

Human Health Effects of EMF

For more than 30 years, there have been questions and concerns that exposure to power frequency electric and magnetic fields from power lines may be a potential human health effect. Early studies focused on electric fields because electric fields can produce physiological effects beneath electric high voltage transmission lines, for example, hair stimulation. However in recent years this concern has diminished. Overall, electric fields studies did not find evidence of biological changes that could lead to adverse health effects (EPRI 2008). Magnetic fields began receiving increased attention in the late 1970s. A substantial amount of research has been conducted in the United States and around the world over the past several decades examining whether exposures to power frequency magnetic fields have health or environmental effects.

Epidemiology studies have addressed many of the issues raised about electric and magnetic fields and health effects. Epidemiology is that branch of medical science that studies the patterns, distribution and possible causes of diseases in human populations. The objective of epidemiology is to identify agents

in the environment that may potentially be causing a disease and then to develop methods of prevention. Epidemiology draws its conclusions from an observational methodology of the diseases in the natural environment; it is not a laboratory study. Consequently epidemiology has unique strengths and limitations. The strength of epidemiology is that it draws its conclusion from humans in their natural environment and avoids the problem of extrapolating cellular or animal research where the appropriateness of the models is frequently questioned. The weakness of epidemiology research provides less conclusive evidence when compared to laboratory research and suffers from the limitation of direct proof of a cause-and-effect relationship (Horton and Goldberg 1995).

EMF and health effects studies are a very large and complex body of research material to objectively assess. Fortunately there have been numerous major reviews of the total body of scientific research on EMF performed by independent advisory groups composed of scientists from a wide variety of disciplines with expertise or knowledge in EMF. These expert groups include the National Research Council (NRC 1997, 1999), National Institute of Environmental Health Sciences (NIEHS 1998, 1999), the International Agency for Research on Cancer (IARC 2002), the National Radiological Protection Board of Great Britain (NRPB 2001, 2004), the Health Council of the Netherlands (HCN 2001, 2004), and the International Commission on Non-Ionizing Radiation Protection (ICNIRP 2001, 2009) have included dozens of scientists with diverse skills that reflect the different research approaches required to answer questions about health. These multidisciplinary reviews express the consensus in the scientific community that the epidemiologic evidence is insufficient to demonstrate a causal relationship between ELF-EMF and any health effect. Summary conclusions from these organizations are excerpted below:

National Institute of Environmental Health Sciences (NIEHS 1999)

The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer: childhood leukemia and chronic Lymphocytic leukemia in occupationally exposed adults. While the support from individual studies is weak, the epidemiological studies demonstrate, for some methods of measuring exposure, a fairly consistent pattern of a small, increased risk with increasing exposure that is somewhat weaker for chronic lymphocytic leukemia than for childhood leukemia. In contrast, the mechanistic studies and the animal toxicology literature fail to demonstrate any consistent pattern across studies although sporadic findings of biological effects have been reported. No indication of increased leukemias in experimental animals has been observed.

The lack of connection between the human data and the experimental data (animal and mechanistic) severely complicates the interpretation of these results. The human data are in the “right” species, are tied to “real life” exposures and show some consistency that is difficult to ignore. This assessment is tempered by the observation that given the weak magnitude of these increased risks, some other factor or common source of error could explain these findings. However, no consistent explanation other than exposure to ELF-EMF has been identified.

Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status. The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this association is actually due to ELF-EMF, but it cannot completely discount the epidemiological findings.

The NIEHS concludes that ELF-EMF exposure cannot be recognized at this time as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. The conclusion of this report is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or noncancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

National Research Council (NRC 1999)

An earlier Research Council assessment of the available body of information on biologic effects of power-frequency magnetic fields (NRC 1997) led to the conclusion ‘that the current body of evidence does not show that exposure to these fields presents a human health hazard. Specifically, no conclusive and consistent evidence shows that exposure to residential electric and magnetic fields produces cancer, adverse neurobehavioral effects, or reproductive and developmental effects’. The new, largely unpublished contributions of the EMF-RAPID program are consistent with that conclusion. NAS concludes that no finding from the EMF-RAPID program alters the conclusions of the previous NRC review on the Possible Effects of Electromagnetic Fields on Biologic Systems (NRC 1997). In view of the negative outcomes of EMF-RAPID replication studies, it now appears even less likely that MFs [magnetic fields] in the normal domestic or occupational environment produce important health effects, including cancer.

National Radiological Protection Board of Great Britain (NRPB 2001, 2004)

Laboratory experiments have provided no good evidence that ELF-EMF are capable of producing cancer, nor do human epidemiological studies suggests that they cause cancer in general. There is, however, some epidemiological evidence that prolonged exposure to higher levels of power frequency magnetic fields is associated with a small risk of leukemia in children. In practice, such levels of exposure are seldom encountered by the general public in the UK [or in the US]. (2001)

Because of the uncertainty… and in absence of a ‘dose-response’ relationship, NRPB has concluded that the data concerning childhood leukemia cannot be used to derive quantitative

guidance on restricting exposure. It is concluded that currently the results of these studies on EMFs and health, taken individually or as collectively reviewed by expert groups, are insufficient either to make a conclusive judgment on causality or to quantify appropriate exposure restrictions. (2004)

Health Council of the Netherlands (HCN 2001, 2004)

Because the association is only weak and without a reasonable biological explanation, it is not unlikely that it [an association between ELF exposure and childhood leukemia] could also be explained by chance… The committee therefore sees no reason to modify its earlier conclusion that the association is not likely to be indicative of a causal relationship. (2001)

"The Committee, like the IARC itself, points out that there is no evidence to support the existence of a causal relationship here. Nor has research yet uncovered any evidence that a causal relationship might exist. (2004)

International Agency for Research on Cancer (IARC 2002)

Studies in experimental animals have not shown consistent carcinogenic or co-carcinogenic effects of exposures to ELF [extremely low frequency] magnetic fields, and no scientific explanation has been established for the observed association of increased childhood leukemia risk with increasing residential ELF magnetic field exposure." IARC categorized EMF as a "possible carcinogen" for exposures at high levels, based on the meta-analysis of studies of statistical links with childhood leukemia at levels above 3-4 mG.

International Commission on Non-Ionizing Radiation Protection (ICNIRP 2009)

The restrictions in these guidelines were based on established evidence regarding acute effects; currently available knowledge indicates that adherence to these restrictions protect workers and members of the public from adverse health effects from exposure to low frequency EMF. The epidemiological and biological data concerning chronic conditions were carefully reviewed and it was concluded that there is no compelling evidence that they are causally related to low-frequency EMF exposure.

The assessments by International Agency for Research on Cancer, the National Research Council, the National Institute of Environmental Health Sciences, the National Radiological Protection Board of Great Britain, the Health Council of the Netherlands, and the International Commission on Non-Ionizing Radiation agree that there is little evidence to suggest ELF-EMF is associated with adverse health effects, including most forms of adult and childhood cancer, heart disease, Alzheimer's disease, depression, and reproductive effects. Nevertheless, all agree that the experimental laboratory data do not support a causal link between EMF and any adverse health effect, including leukemia, and have not concluded that EMF is, in fact, the cause of any disease.

The Oregon Department of Energy's assessment of EMF is also consistent with the EMF assessments by international and other U.S. agencies discussed above. The following is an excerpt from the Executive Summary of Oregon's EMF Report (Golder Associates 2009):

> Research into harmful effects associated with EMF exposure has been in the form of both epidemiological studies (investigating the incidence of disease in a population, compared with incidence of environmental exposures, such as EMF), and laboratory studies involving animals or cells. Some epidemiological reports suggest EMF exposure is associated with several health issues, including certain cancers, neurological diseases, heart disease, and miscarriage. However, other epidemiological studies are unable to demonstrate an association between EMF exposure and these conditions. At the time of this report, no clear biochemical or biomagnetic mechanism leading to a negative health effect has been universally proposed or supported, although many specific proposed rationales exist. Laboratory research investigating EMF is almost universally unable to demonstrate a link between extremely low frequency EMF exposure and negative human or animal health effects. It is the view of many researchers and reviewing bodies that the lack of supporting laboratory data weakens the plausibility of a causal link between environmental EMF exposure and health effects.

Effects of EMF on Tribal Cultural and Religious Practices

Although no adverse human health effects of EMF have been documented, the presence of EMF is reported, through consultation with the BLM, to be of concern to tribes that report that areas in which EMF is present are rendered unsuitable for cultural and religious practices. To the extent that the B2H Project is located in areas that are considered to be of traditional use to tribes, the operation of the project could render those areas not useful for those purposes.

EMF Effects to Wildlife and Livestock

The exposure of animals to electric and magnetic fields has also been investigated for over 30 years. Vegetation in the form of grasses, shrubs, and small trees largely shields small ground-dwelling species such as mice, rabbits, foxes, and snakes from electric fields. Species that live underground, such as moles, woodchucks, and worms, are further shielded from electric fields by the soil. Aquatic species are shielded from electric fields by water. Large species such as deer and domestic livestock have greater potential exposures to electric fields since they can stand taller than the surrounding vegetation. However, the duration of exposure for deer and other large animals is limited to foraging bouts or the time it takes them to cross under the line. All species would be exposed to higher magnetic fields under or near a transmission line than elsewhere, because vegetation and soil do not provide shielding from this aspect of the transmission-line electrical environment.

Field studies have been performed to monitor the behavior of large mammals in the vicinity of high-voltage transmission lines. No effects of electric or magnetic fields were evident in two studies from the northern U.S. on big game species, such as deer and elk, exposed to a 500-kV transmission line (Goodwin 1975; Picton et al. 1985).

Much larger populations of animals that might spend time near a transmission line are livestock that graze under or near transmission lines. To provide a more sensitive and reliable test for adverse effects than informal observation, scientists have studied animals continuously exposed to EMF from high-voltage lines in relatively controlled conditions. For example, grazing animals such as cows and sheep have been exposed to high-voltage transmission lines and their reproductive performance examined (Lee et al. 1996). No adverse effects were found among cattle exposed to a 500-kV direct-current overhead transmission line over one or more successive breeding events (Angell et al. 1990). Compared to unexposed animals in a similar environment, the exposure to 50-hertz fields did not affect reproductive functions or pregnancy of cows (Algers and Hennichs 1985; Algers and Hultgren 1987). Sheep and cattle exposed to EMF from transmission lines exceeding 500-kV were examined and no effect was found on the levels of hormones in the blood, weight gain, onset of puberty, or behavior (Stormshak et al. 1992; Lee et al. 1993; Lee et al. 1995; Thompson et al. 1995; Burchard et al. 1998; Burchard et al. 2004).

Greenberg et al. (1981) studied honeybee colonies placed near 765-kV transmission lines. They found that hives exposed to AC electric fields of 7-kV/m had decreased hive weight, abnormal amounts of propolis (a resinous material) at hive entrances, increased mortality and irritability, loss of the queen in some hives, and a decrease in the hive's overall survival compared to hives that were not exposed. Placing the hive farther from the line, shielding the hive, or using hives without metallic parts eliminates this problem.

EMF Effects to Vegetation

A number of studies have been carried out to assess the effect of exposure of plants to transmission-line electric and magnetic fields. These studies have involved both forest species and agricultural crops. Researchers have found no adverse effects on plant responses, including seed germination, seedling emergence, seedling growth, leaf area per plant, flowering, seed production and germination of the seeds, longevity, and biomass production (Lee et al. 1996).

Research has been performed examining if electric and magnetic field exposure have affected plant growth and crop production. Scientific evidence does not exist that fields produced near electric high voltage transmission lines have a negative impact on plant life and growth. A study of 60-hz electric fields on living plans concluded that 30 to 50 kV/m exposures to plants does not have a measurable effect on economic yield or plant life (McKee 1985). Another study concluded that crops, such as corn oats, and soybeans were unaffected by electric fields up to 16-kV/m (Hodges and Mitchell 1979).

Visible Corona

Corona discharges in air are sometimes visible as a faint bluish glow near the conductors on high-voltage lines. Any corona on the conductors would be visible by human eyes only under the darkest conditions and after the eyes had time to adapt to nighttime levels. Corona cameras are now available that can enhance the ability to see corona activity on conductors and hardware that can identify the location of the source. Knowing the source of disruptive corona activity can assist remediation if the corona activity is causing other problems.

Ozone

Small amounts of ozone and other oxidants can be produced around the conductors when there is corona present. Ozone accounts for the majority of the oxidants, with nitrous oxide accounting for the remainder. Ozone is a naturally occurring part of the air with levels of 10 to 30 parts per billion (ppb) at night in rural areas, increasing during daylight to approximately 70 to 100 ppb. Ozone levels exceeding 100 ppb can be found in urban areas and cities. Ozone is also produced by many common appliances such as copy machines, battery chargers, air fresheners, and welding equipment. The ozone levels from a 500-kV line are typically at the single digit ppb level, well below the environmentally prescribed level of 120 ppb by the EPA. The ozone from the high-voltage lines is at the limit of ozone detection equipment and well below even the fluctuations of ambient levels and would not affect the ambient air quality.

ALTERNATIVE-SPECIFIC EFFECTS

The noise effects of the B2H Project for all of the alternatives will be substantially similar to the effects described for the Proposed Action, except that different noise-sensitive receptors are present along the alternative alignments.

CONSTRUCTION

Noise

Table 3-311 identifies the number of noise-sensitive receptors within the stated distances from the Proposed Action and alternatives. Each distance category includes receptors that are closer than the stated distance. For example, there is one receptor within 50 feet of the Proposed Action right-of-way. That receptor is also reported as within 200 feet, 500 feet, and 1,000 feet, and so would be subject to the potential for noise levels shown for each of the distance categories. The receptors shown for each alternative are in addition to the receptors for the Proposed Action. For example, none of the alternatives increase the number of noise-sensitive receptors within 50 feet of the transmission line right-of-way, but the Longhorn Alternative adds one receptor within 500 feet of the right-of-way.

Similar to the Proposed Action, construction of the alternatives would result in low adverse noise effects along the right-of-way because of the lack of noise-sensitive receptors within 1,000 feet of the right-of-way and the temporary and localized nature of noise during the construction phase. However, for those portions of the right-of-way where noise-sensitive receptors are located close to the right-of-way, the temporary and short-term construction-related noise at these noise-sensitive receptors would be considered moderate. However, given the relatively small number of noise-sensitive receptors within 1,000 feet of the Proposed Action and alternatives, the temporary nature of the construction activities, and the ability to limit noise-producing activities primarily to daylight hours, noise effects from construction of the Proposed Action and all the alternatives are anticipated to be low.

Table 3-311. Number of Noise-Sensitive Receptors within Noise Distance Limits for Construction Activities for the Proposed Action and Alternatives

Alternative	50 feet of ROW (equipment noise, 95 dBA)	200 feet of ROW (implosive devices, 122 dBA)	500 feet of ROW (blasting noise, 90 dBA)	1,000 feet of ROW (equipment noise, 60 dBA)
Proposed Action	1	1	5	16
Morrow-Umatilla Segment				
Horn Butte Alternative	0	0	1	1
Longhorn Alternative	0	0	1	1
Longhorn Variation	0	0	0	0
Blue Mountains Segment				
Glass Hill Alternative	0	0	0	0
Baker Valley Segment				
Timber Canyon Alternative	0	0	0	0
Flagstaff Alternative	0	0	0	2
Burnt River Mountain Alternative	0	0	0	0
Brogan Area Segment				
Tub Mountain South Alternative	0	0	0	0
Willow Creek Alternative	0	0	0	0
Malheur Segment				
Malheur S Alternative	0	0	0	0
Malheur A Alternative	0	0	0	0
Double Mountain Alternative	0	0	0	0

Table Abbreviations: dBA = A-weighted decibels; ROW = right-of-way.

OPERATIONS

Noise

Table 3-312 summarizes the results of the transmission line operations noise analysis from which a comparison by alternatives can be developed regarding the potential for adverse impacts. Actual ambient noise levels vary with location and contribution of sound sources. Table 3-312 lists the number of noise-sensitive receptors at which the modeled project-generated operational noise would exceed the assumed rural ambient noise level of 26 dBA. The modeling results are independent of the existing acoustic environment and represent project-generated sound levels only. The threshold for determining whether the increased noise at outdoor locations associated with human receivers is noticeable is the lower of the following two values: (1) the measured pre-project ambient noise level at the location plus 10 dBA or (2) the 50 dBA absolute nighttime noise limit at the appropriate measurement location established by Oregon State noise rules (OAR 340-035-0035).

Appendix B.11 presents the results of the inventory of ambient noise at identified receptors within the analysis area of the Proposed Action and alternatives. Results presented include the measured sound

level by receptor location and type. Additional information, such as the closest right-of-way milepost and the distance and direction from the transmission line route, is also provided.

Table 3-312 also shows the number of noise-sensitive receptors that the modeling suggests will experience above-background noise levels as a result of operations of the B2H Project. The alternatives are compared to the portion of the Proposed Action that each alternative would replace. For example, the "Proposed Action Compared to Horn Butte Alternative" line shows those receptors affected by the Proposed Action that would be replaced by the Horn Butte Alternative. The "Horn Butte Alternative" line shows only those receptors that would be affected if the Horn Butte Alternative were selected.

Table 3-312. Number of Noise-Sensitive Receptors at Modeled Noise Levels within the Operations Analysis Area of the Proposed Action and Alternatives

Route Name	County	30–35 (dBA)	35–40 (dBA)	40–45 (dBA)	45–50 (dBA)	≥50 (dBA)	≥36 (dBA)
Proposed Action (Segment 1)	Morrow	4	0	0	1	0	1
Proposed Action (Segment 1)	Umatilla	10	3	2	0	0	4
Proposed Action (Segment 2)	Union	9	5	1	0	0	4
Proposed Action	Baker	8	8	4	0	0	11
Proposed Action	Malheur	2	0	0	0	0	0
Proposed Action	Owyhee	4	2	0	0	0	2
Proposed 138/69kV Rebuild	Baker	2	1	3	0	5	9
Total Proposed Action		39	19	10	1	5	31
Proposed Action and Alternative Comparisons							
Proposed Action Compared to Horn Butte Alternative	Morrow	3	0	0	1	0	1
Horn Butte Alternative	Morrow	3	0	0	1	0	1
Proposed Action Compared to Longhorn Alternative	Morrow	3	0	0	1	0	1
Longhorn Alternative	Morrow	1	0	0	1	0	1
Longhorn Variation	Morrow	3	2	0	0	0	0
Proposed Action Compared to Glass Hill Alternative	Union	2	0	0	0	0	0
Glass Hill Alternative	Union	0	0	0	0	0	0
Proposed Action Compared to Timber Canyon Alternative	Baker	4	4	0	0	0	3
Timber Canyon Alternative	Union/Baker	10	5	5	2	0	11
Proposed Action Compared to Flagstaff Alternative	Baker	0	0	0	0	0	0
Flagstaff Alternative including 230kV Rebuild	Baker	2	5	0	1	0	4
Burnt River Mountain Alternative	Baker	2	1	1	2	0	4
Proposed Action Compare to Tub Mountain South Alternative	Baker/Malheur	2	0	0	0	0	0
Tub Mountain South Alternative	Baker/Malheur	16	2	2	0	0	4

Route Name	County	30–35 (dBA)	35–40 (dBA)	40–45 (dBA)	45–50 (dBA)	≥50 (dBA)	≥36 (dBA)
Proposed Action Compared to Willow Creek Alternative	Baker/Malheur	2	0	0	0	0	0
Willow Creek Alternative	Baker/Malheur	5	1	0	0	0	1
Proposed Action Compared to Malheur S Alternative	Malheur	0	0	0	0	0	0
Malheur S Alternative	Malheur	0	1	0	0	0	1
Proposed Action Compared to Malheur A Alternative	Malheur	0	0	0	0	0	0
Malheur A Alternative	Malheur	0	1	0	0	0	1
Double Mountain Alternative	Malheur	0	0	0	0	0	0

Table Abbreviations: dBA = A-weighted decibels.

Overall, 5 noise-sensitive receptors would experience operations noise levels greater than 50 dBA, a level between the sounds of rainfall on leaves and a normal indoor conversation. Thirty-one noise-sensitive receptors would experience noise levels above 36 dBA, a level comparable to a refrigerator. Noise effects of the operation of the Proposed Action and the alternatives are anticipated to be low

3.2.12.7 Mitigation Planning

In addition to the construction and operation standards, other mitigation measures would be included that reduce the potential for stray voltage. For example, perceived currents or potentials on vehicles or farm equipment can be mitigated if they occur by using a ground strap on the vehicle or equipment, or by avoiding stopping the vehicle or equipment while under the lines. Since a spark and current may occur between objects under the line if the objects are not properly connected and grounded, refueling a vehicle while it is under the line should also be avoided.

3.3 CUMULATIVE EFFECTS

This section addresses the cumulative effects associated with the B2H Project that would result when combined with other past, present, and reasonably foreseeable future actions. The following discussion includes a general definition of cumulative effects, cumulative effects analysis methodology, past, present and reasonably foreseeable future actions, and the results of the assessment of cumulative effects by resource. The analysis of cumulative effects by resource includes past, present, and reasonably foreseeable future actions and the incremental impacts of the B2H Project.

3.3.1 DEFINITION

Cumulative impact as defined in Code of Federal Regulations is "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). Further the BLM Handbook (1790-1) states that: "The purpose of cumulative effects analysis is to ensure that Federal decision-makers consider the full range of consequences of actions (the proposed action and alternatives, including the No Action alternative).

3.3.2 METHODOLOGY

The cumulative effects methodology considered scoping and project issues presented in Chapter 1; cumulative effect time frames; resources that could be effected by the alternatives; the geographical area in which the effects would occur; and other past, present, and reasonably foreseeable future actions that have, or could be expected to cause, impacts on these resources. "Reasonably foreseeable future actions" are proposed projects or actions that have applied for a permit from local, state, or federal authorities or which are publicly known.

For the purposes of this analysis, the temporal extent of the projects to be considered would be the expected physical operational service life of this project. Past and present events and projects would be generally identified and the ongoing effects that are similar to those for the B2H Project are discussed. Land uses described as past or present are considered in the baseline conditions of the affected environment in Chapter 3 (Section 3.2.6). Past and present activities considered in the cumulative effects analysis include agriculture; land development; energy projects, mineral extraction, linear transportation and utility corridors, military operations and recreation.

3.3.2.1 GEOGRAPHIC AND TEMPORAL SCOPE OF ANALYSIS

The BLM NEPA Handbook H-1790-1 (2008) recommends that geographic (spatial) and time (temporal) boundaries be established for cumulative effects analysis. The B2H Project "footprint" or direct construction ground disturbance extent is described in Chapter 2. The cumulative effects analysis area varies by resource because the extent of direct and indirect effects of the B2H Project would vary by

resource. Table 3-313 shows the cumulative effects analysis areas for resources affected by the B2H Project. In some cases, the cumulative effects analysis area for a resource is larger than the project-specific analysis area in order to consider an area large enough to encompass likely effects from other projects on the same resource.

The temporal scope of the cumulative effects analysis is the duration of the life of the B2H Project, including construction, and operation. The temporal scope includes consideration of short-term and long-term effects. Short-term effects cease following an activity of specific duration (such as facility construction) or result in conditions that are capable of being restored to pre-project functionality within a relatively short amount of time. For purposes of this Draft EIS, the timeframe for short-term effects is 3 years, based on a 3-year construction schedule and 6 months for post-construction reclamation. Long-term effects are a result of ongoing activities or impacts that persist for long periods of time. For the purposes of this Draft EIS, it is assumed that long term direct and indirect effects would persist for 50 years which is the initial term of the right-of-way grant. Permanent effects result in a permanent change in condition or function for the resource being addressed. Permanent effects for the B2H Project would be those persisting longer than 50 years.

Table 3-313. Cumulative Impact Analysis Area

Resource	Cumulative Impact Analysis Area	Rationale for Area
Earth Resources		
Soils	Sensitive soil areas (highly erodible, droughty soils, areas of shallow bedrock) within 0.5 mile of the Proposed Action and alternative centerlines and within 50 feet of the centerline of access roads.	Direct and indirect impacts to soils would be restricted to areas within and adjacent to the project disturbed areas.
Minerals Resource Extraction	Areas of active resource extraction for minerals, oil, and gas that are crossed by Proposed Action and alternative centerlines.	Direct and indirect Impacts to mining of minerals and oil and gas extraction operations would be limited to areas crossed by project infrastructure. Effects to the states' mineral and oil and gas industries are discussed in Social and Economic Conditions.
Paleontology	Areas of high (3+) potential fossil yield crossed by the Proposed Action and alternative centerlines and by access roads.	Direct and indirect effects would be limited to the outcrop areas of formations with high potential fossil yield.
Water Resources		
Water Resources and Floodplains	The watersheds (4th level HUCs) of waterbodies crossed by the direct and indirect analysis areas of the Proposed Action and alternative centerlines and by access roads with impacts in or adjacent to the affected waterbody.	Impacts from the project may affect areas lower in the watershed. All projects in the watershed need to be considered for effects on water quality.
Wetlands	Mapped wetland and riparian areas up to 0.5 miles from the Proposed Action or alternatives and within 50 feet of the centerline of access roads.	Direct and indirect impacts to wetlands would occur within or adjacent to the project footprint. No affected wetlands or riparian areas extend farther than 0.5 mile from the project centerlines.
Vegetation Resources		
Vegetation (general)	Areas within 0.5 mile of the Proposed Action and alternative centerlines.	Covers the analysis area for direct and indirect effects to vegetation.
Noxious Weeds	Counties crossed by the Proposed Action and alternative centerlines.	Area in which introduction or spread of invasive plant species from this Project could interact with weeds already present or introduced or spread by other projects. The county is the political unit where weed control is required and regulated.
Vegetation (special status) species)	Areas within 5 miles of the Proposed Action and alternative centerlines.	Covers the analysis area for direct and indirect effects to special status plants.

Resource	Cumulative Impact Analysis Area	Rationale for Area
Wildlife Resources		
Big game wintering and parturition habitat	Mapped extent of herd unit areas of crucial wintering and parturition crossed by the Proposed Action and alternative centerlines and by access roads.	Area of potential critical stress for ungulate populations.
Mammals	Areas within 0.5 miles of the Proposed Action and alternative centerlines and within 50 feet of access road centerlines.	Direct and indirect effects would occur near the project footprint. Potential habitat for affected mammals would be within 0.5 miles of the direct and indirect effects areas.
Amphibians and reptiles, including Columbia spotted frog	Mapped riparian and wetland polygons within 0.5 mile of the Proposed Action and alternative centerlines and access road centerlines.	Potential habitat.
Greater Sage-Grouse	Preliminary Priority Habitat (PPH), Preliminary General Habitat (PGH) and restoration habitat polygons that are crossed by the Proposed Action and alternative centerlines and access roads, plus areas within 11 miles of known Greater Sage-Grouse leks that are located within 5 miles of the Proposed Action and alternative centerlines and access roads.	Areas most recently mapped and published by ODFW and IDFG as crucial to the protection and recovery of Greater Sage-Grouse. This distance is required for cumulative effects analysis by the BLM Instructional Memorandum.
Washington ground squirrel	Areas of suitable habitat within 5 miles of Proposed Action and alternative centerlines and access road centerlines.	Direct and indirect effects would occur near the project footprint. Potential habitat for affected animals would be within 5 miles of the project centerlines.
Migratory birds	Areas within 0.5 mile of the Proposed Action and alternative centerlines.	Reasonable distance beyond which construction or operations of this or other projects is unlikely to disturb nesting birds.
Bald Eagle and Golden Eagle	Known locations of eagle nests and suitable winter roosting habitat within 10 miles of the Proposed Action and alternative centerlines.	Reasonable distance beyond which construction or operation of this or other projects is unlikely to disturb nesting birds.
Fish		
Fish – General, including sensitive, MIS	Sub-basins (4th level HUCs) crossed by the Proposed Action and alternative centerlines and by access roads.	Extent of habitat that could be affected
Middle Columbia River steelhead – ESA threatened	Sub-basins (4th level HUCs) that contain Middle Columbia River steelhead crossed by the Proposed Action and alternative centerlines and access roads.	Extent of Critical Habitat that could be affected
Snake River Basin steelhead – ESA threatened	Sub-basins (4th level HUCs) that contain Snake River Basin steelhead crossed by the Proposed Action and alternative centerlines and access roads.	Extent of Critical Habitat that could be affected

Resource	Cumulative Impact Analysis Area	Rationale for Area
Snake River Chinook, spring/summer run – ESA threatened	Sub-basins (4th level HUCs) that contain spring/summer run Snake River Chinook crossed by the Proposed Action and alternative centerlines and access roads.	Extent of Critical Habitat that could be affected
Bull trout – ESA threatened	Sub-basins (4th level HUCs) that contain bull trout crossed by the Proposed Action and alternative centerlines and access roads.	Extent of Critical Habitat that could be affected
Land Use, Agriculture, Recreation, Transportation		
Agriculture - Irrigated	Irrigated farming areas within 0.5 miles of the Proposed Action and alternative centerlines, access roads and ancillary facilities.	Direct and indirect effects to agricultural operations would occur near the project footprint within the analysis area.
Agriculture – Tree farms	Tree farms within 0.5 miles of the Proposed Action and alternative centerlines, access roads and ancillary facilities	Direct and indirect effects to agricultural operations would occur near the project footprint within the analysis area.
Agriculture – Dairies and CAFOs	Dairies and CAFOs within 0.5 miles of the Proposed Action and alternative centerlines, access roads and ancillary facilities	Direct and indirect effects to agricultural operations would occur near the project footprint within the analysis area.
Agriculture – Dryland farming	Dryland farming areas within 0.5 miles of the Proposed Action and alternative centerlines, access roads and ancillary facilities	Direct and indirect effects to agricultural operations would occur near the project footprint within the analysis area.
Agriculture - Grazing	Grazing areas on private lands within 0.5 miles of the Proposed Action and alternative centerlines, access roads and ancillary facilities; grazing allotments on federal and state lands crossed by the centerlines, access roads and ancillary facilities.	Direct and indirect effects to private lands grazing would occur near the project footprint within the analysis area. Effects to federal and state lands grazing in the context of existing grazing allotments.
Recreation	BLM: Resource Management Plan Areas crossed by the Proposed Action and alternative centerlines and access roads. Forest Service: National Forests crossed by the Proposed Action and alternative centerlines and access roads. State Lands crossed by the Proposed Action and alternative centerlines and access roads. Private: Counties and municipalities crossed by the Proposed Action and alternative centerlines and access roads.	Level at which land use regulations, plans, or authorizations are in effect.
Transportation	Air: Airports within 3 miles of the Proposed Action and alternative centerlines and access roads. Roads: Service areas of roads to be used for B2H project construction and operations.	Airport distance defined by controlled airspace; cumulative effects to traffic on roads in the project area.

Resource	Cumulative Impact Analysis Area	Rationale for Area
Visual Resources		
Visual Resources	Areas within 10 miles from the Proposed Action and alternative centerlines.	Although views can and do extend beyond 10 miles, the 10-mile distance was chosen because it is near the limit of visibility of skylined transmission towers that may be noticeable to casual observers and beyond that the Proposed Action and alternatives would have negligible if any contribution to cumulative visual resources impacts.
Cultural Resources		
Cultural Resources	Area for direct cumulative impact analysis is defined as the 500 ft. transmission line corridor, a 100 ft. corridor centered on existing and new access roads, and a 250 ft. buffer surrounding staging areas, borrow areas, substations, and other construction areas. Area for indirect cumulative impact analysis is defined as five miles on either side of the transmission center line or the visual horizon, whichever is closer, based on the area of potential effects (APE) established in the project programmatic agreement (PA).	Area where direct cumulative impacts associated with use of ROW and/or access roads could occur includes the proposed maximum ROW width (500 feet) and a buffer for direct effects and the area from which this Project could be viewed for visual impacts. Area where indirect cumulative impacts stemming from construction and operation of the facility is defined as the viewshed from historic properties in which setting, feeling and association are key aspects of integrity. The project APE establishes that area.
National Historic Trails		
National Historic Trails	Areas within 10 miles from the Proposed Action and alternative centerlines.	Although views can and do extend beyond 10 miles, the 10-mile distance was chosen because it is near the limit of visibility of skylined transmission towers that may be noticeable to casual observers and beyond that the Proposed Action and alternatives would have negligible if any contribution to cumulative impacts to the National Historic Trails and Study Trails.
Air Quality and Climate Change		
Air Quality and Climate Change	Air quality control regions crossed by the Proposed Action and alternative centerlines and access roads and ancillary facilities.	To provide an understanding of current air quality in Oregon and Idaho, to identify present projects that contribute to air quality degradation and climate change, and to understand how the electric generation carried by the Boardman to Hemingway and other transmission lines, present and proposed, contribute to air quality and climate change issues.

Resource	Cumulative Impact Analysis Area	Rationale for Area
Socioeconomics and Environmental Justice		
Socioeconomics	Counties crossed by Proposed Action and alternative routes; plus cities within 50 miles of the Proposed Action and alternative centerlines. Also, each Census Tract, Block, and Group crossed by project centerlines.	Corresponds with the direct and indirect socioeconomic analysis area and includes the constituent municipalities and potentially affected populations.
Environmental Justice	Counties and Census Block Groups crossed by the Proposed Action and alternative routes.	Corresponds with the direct and indirect environmental justice analysis area.
Public Health and Safety		
Noise	During construction the area is 1,000 feet from construction noise sources. During operation, the areas are the width of the right-of-way.	Areas beyond which no noise from construction or operation of Boardman to Hemingway would be detectable above USEPA recommended levels.
Electrical Environment	The right-of-way width in areas occupied by people (permanently or temporarily, as in recreation sites) crossed by the Proposed Action and alternative centerlines, access roads, and ancillary facilities.	Electrical effects, including magnetic field and stray voltage, do not occur beyond the ROW. Construction and operation of the transmission line may affect the health and safety of people.

3.3.3 Projects or Actions with Potential for Cumulative Effect with the B2H Project

Projects within the resource cumulative effects analysis areas with potential to add to the direct and indirect effects of the B2H Project were considered. Those projects most likely to cause cumulative effects are those that have effects similar to those of the B2H Project since they tend to impact all the same resources across multiple jurisdictions in ways similar to those of the B2H Project. Other projects also affect one or more resources and are considered together with the effects from the B2H Project. For ease of analysis, projects with the potential for cumulative effects are presented in the following categories:

- Agriculture, including dryland farming, irrigated agriculture and grazing;
- Land development for residential, commercial and industrial uses;
- Other transmission lines in or near the B2H Project area;
- Other linear projects in or near the B2H Project area, such as roads, canals and pipelines;
- Energy projects, including windfarms, power generating stations and pipeline projects;
- Resource extraction, including oil, gas, stone and gravel;
- Military operations, including training facilities, easements and military training routes; and
- Forest activities

3.3.3.1 Past and Present Actions

Past and present actions have contributed to the affected environment or the context of the proposed B2H Project. While the sections describing the affected environment (Chapter 3) take these actions or events into consideration in a general way, the list and descriptions below provide additional detail on how past and present actions would have effects on some of the same resources that would be affected by the B2H Project. Table 3-314 lists the types of past and present projects and actions that could create cumulative effects with the B2H Project effects.

Table 3-314. Past and Present Actions

Name of Action	Description	Potential Effects Similar to B2H Project	Segments
Agriculture			
Irrigated and Dryland Farming	Conversion of open lands for crop and pasturage farming	Loss of habitat, alteration of wildfire regimes, increased erosion and sedimentation, new vectors for introduction of noxious weeds	1, 2, 3, 4, 5, 6
Timber Management	Logging, prescribed burns	Habitat alteration, fragmentation, displacement of wildlife species	2, 3

Name of Action	Description	Potential Effects Similar to B2H Project	Segments
Grazing	Expansion of rangeland livestock grazing areas or intensity (additional animals); improved grazing practices and range improvements	Habitat alteration, displacement of wildlife species, damage to sensitive plant species, alteration of wildfire regimes, new vectors for introduction of noxious weeds	1, 2, 3, 4, 5, 6
Land Development			
Expansion of developed areas	Conversion of open lands for residential, commercial and industrial uses	Loss of habitat, alteration of wildfire regimes, increased erosion and sedimentation, new vectors for introduction of noxious weeds	1, 2, 3, 4, 5, 6
Transmission Lines			
High-voltage transmission lines crossed by or parallel to the Proposed Action and alternatives	The transmission lines in the analysis area vary from 69V to 500 kV. Several high-voltage transmission lines carry electricity from hydroelectric generation stations near Boardman, Oregon to interconnection points in Idaho.	Same environmental effects as B2H Project.	1, 2, 3, 4, 5, 6
Roads and Linear Projects			
Interstate highways, U.S. highways, state highways, county roads, and rural roads	The average existing road density in the analysis area is 1.6 miles per square mile.	Habitat fragmentation; limitations on wildlife movement; air quality effects; noise	1, 2, 3, 4, 5, 6
Pipelines	Proposed Action has Twenty six pipeline crossings	Habitat fragmentation, wildlife displacement	1, 2, 3
Energy Projects			
Wind Energy	Nine existing wind energy projects in Morrow, Umatilla, and Union Counties.	Visual impacts, habitat alteration, fragmentation, displacement of wildlife species	1, 2, 3
Generating Stations	PGE Boardman 550 MW coal-fired generating station; PGE Coyote Springs 520 MW natural gas-fired generating station	Air quality, visual impacts, loss of habitat, displacement of wildlife species	1
Resource Extraction			
Quarries and aggregate operations	Ash Grove Cement plant; aggregate borrow pits	Loss of habitat; alteration of wildfire regimes; increased erosion and sedimentation; new vectors for introduction of noxious weeds; noise and dust.	3

Name of Action	Description	Potential Effects Similar to B2H Project	Segments
Mines	Surface and underground mining operations, access roads.	Loss of habitat; alteration of wildfire regimes; increased erosion and sedimentation; new vectors for introduction of noxious weeds; noise; dust; increased vehicle traffic	5
Oil and Gas	Exploration and production oil and gas wells, access roads.	Loss of habitat; alteration of wildfire regimes; increased erosion and sedimentation; new vectors for introduction of noxious weeds; noise; dust; increased vehicle traffic	5
Military Operations			
Naval Weapons System Training Facility Boardman (including avigation easements)	Operation of ranges and facilities; training activities.	Noise, impacts to wildlife and birds	1
Military Training Routes	Military training routes (MTRs) are aerial corridors used military aviation for training flights. The MTRs are individually operated through one of the local military air bases. Aircraft may fly as low as 100–110 feet above ground level within these MTRs in the B2H Project area.	Noise, impacts to birds	1, 5
Forest Activities			
Noxious Weed Management	Vegetation removal, equipment cleaning, seed and plant incineration	Short-term effects include effects to air quality, soils disturbance, noise, temporary displacement of wildlife. Long-term benefits include healthier vegetative communities, improved habitats.	2, 3
Roads and Road Maintenance - Open roads used by the public and closed roads used for administrative purposes only.	Maintenance on open roads occurs as needed to provide continued access and resource protection.	Soil disturbance, temporary wildlife displacement	2, 3
Water Quality and Fisheries Projects	Culvert replacements, large wood placement, riparian fencing, etc.	Short-term effects to water quality, aquatic habitats. Long-term improvements to fisheries	2, 3

Name of Action	Description	Potential Effects Similar to B2H Project	Segments
Forest products vegetation management/improvement, non-forest products vegetation management, commercial thinning, fuels management	A combination of mechanical thinning, slash busting, hand piling/burning, and prescribed burning are used to manage vegetation and fuels.	Short-term effects include effects to air quality, water quality, soils disturbance, noise, temporary displacement of wildlife. Long-term benefits include healthier stands, reduced fire behavior potential and enhance public uses.	2, 3

Existing Agricultural Operations

Agricultural operations in the analysis area for the Proposed Action and alternatives that result in direct and indirect effects similar to those anticipated from the B2H Project include irrigated and dryland farming including tree farming, timber management and grazing.

Irrigated and Dryland Agriculture

Expansion of irrigated and dryland cultivation into new areas can result in habitat destruction, fragmentation, alteration of drainage patterns, increased sedimentation, alteration of wildland fire regimes and new vectors for introduction of noxious weeds. During the period 1973 through 2000, dryland farming areas in the Columbia Plateau Ecoregion, in which Segment 1 of the project area is located, were being converted to irrigated agriculture, although the total area under agricultural production grew only about 0.6 percent during the 1990s (*Status and Trends of Land Change in the Western United States—1973 to 2000*, USGS 2012). Areas of irrigated and dryland agriculture remained essentially stable over the same period in the Blue Mountains Ecoregion (Project Segment 2), the Northern Great Basin Ecoregion (Project Segments 3, 4 and 5), and the Snake River Plain Ecoregion (Project Segment 6) (USGS 2012).

A subset of irrigated agriculture, tree farming, expanded over the study period in the Morrow County area (Project Segment 1) and continues to expand in land coverage, generally replacing pivot irrigated crops rather than converting undisturbed areas. Expansion of cultivated agriculture into undisturbed areas is not expected to contribute to cumulative effects because the rate of such expansion is negligible.

Timber Management

Logging, prescribed burns and other timber management activities can result in habitat alteration, fragmentation, displacement of animal species and other effects similar to those anticipated from the B2H Project. In the Blue Mountains Ecoregion (Project Segments 2 and 3) the most frequent land use and cover conversions during the 1973 to 2000 time period were the mechanical disturbance of forest by logging and rangeland improvement (generally removal of pinion/juniper vegetation to promote conversion to grasslands). The second most common overall conversion was nonmechanical disturbance of forest by fire and to a significantly lesser degree, to insect damage from the Douglas-fir tussock moth, the western spruce budworm and the mountain pine beetle (USGS 2012). Timber

management activities, wildland fire and insect damage could contribute to cumulative effects in the B2H Project area.

Grazing

Rangeland grazing can produce effects including habitat damage, displacement of native animal species, damage to sensitive plant species, alteration of wildfire regimes, new vectors for introduction of noxious weeds and other effects similar to those anticipated from construction and operation of the B2H Project. The areas of rangeland grazing in the B2H Project area did not expand appreciably in the 1973 to 2000 USGS study period, and improving grazing practices and rangeland improvements somewhat improved range conditions during that period (USGS 2012). Expansion of grazing is not anticipated in either the short- or long-terms of the B2H Project. Improved grazing practices and range improvements have reduced impacts to vegetation, soils and water in the analysis area.

Please also see Section 3.2.6 – Agriculture, Land Use, Recreation, and Transportation for additional details of these activities.

Existing Residential, Commercial, and Industrial Developments

The expansion of developed areas can result in destruction of plant and animal habitats, segmentation, increased erosion, alteration of wildfire regimes and other effects similar to those anticipated from construction and operation of the B2H Project. Although population growth in Oregon overall was 20.4% from 2000 to 2010 and overall population growth in Idaho was 28.5% for the same period, growth in the B2H Project area was lower for 2000 to 2010. 2000 to 2010 growth rates for the six counties in the B2H Project area were; Morrow County, 1.6%; Union County, 5.0%; Umatilla County, 7.6%; Baker County, -3.6%; Malheur County, -1.0% and Owyhee County, 8.3%. Growth rates for cities in the B2H Project area were somewhat higher than for the counties with the rates for Boardman, Oregon, 12.8%; La Grande, Oregon, 6.1%; Baker City, Oregon, -0.3%; Ontario, Oregon, 3.5% and Marsing, Idaho, 15.8%. The overall conversion of lands for residential, commercial and industrial land uses during the 1973 to 2000 USGS study period for Project segments 1, 2, 3, 4 and 5 were negligible and somewhat higher but still low for Project Segment 6 (USGS 2012). The cumulative effects of conversion of lands for development purposes in the B2H Project area overall are low.

Please also see Section 3.2.6 – Agriculture, Land Use, Recreation and Transportation for additional details on land development.

Existing Transmission Lines

High-voltage (typically 115-, 230-, 345-, or 500-kV) transmission lines carry electricity long distances and begin and end in substations that serve either generation or load centers. In some cases a formal utility corridor has been designated where these transmission lines cross public lands, but in other cases the lines are recognized as utility crossings not in a corridor.

Major transmission lines in the project area for the B2H Project are shown in Figure 3-70, Figure 3-71, and Figure 3-72.

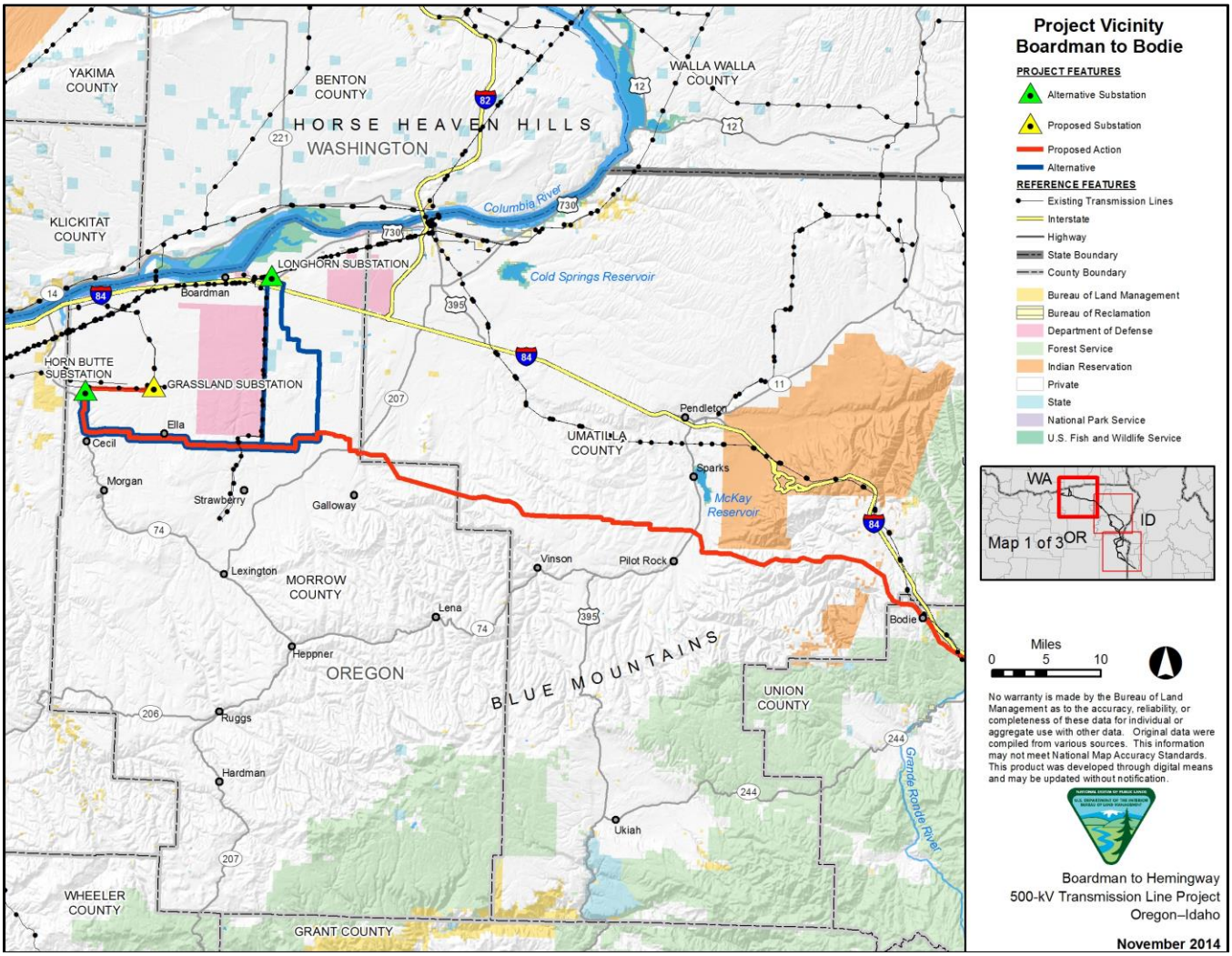

Figure 3-70. Project Vicinity Boardman to Bodie

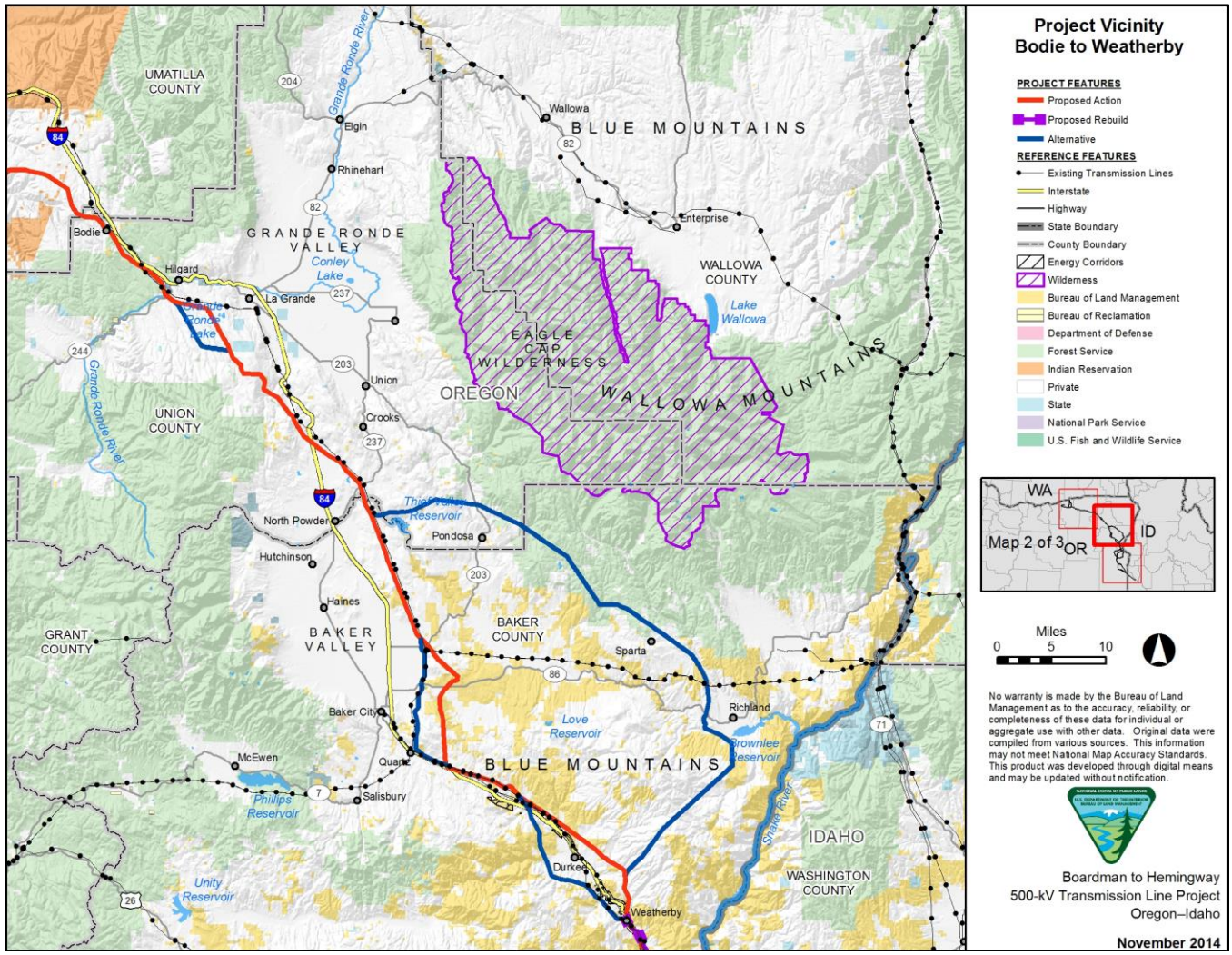

Figure 3-71. Project Vicinity Bodie to Weatherby

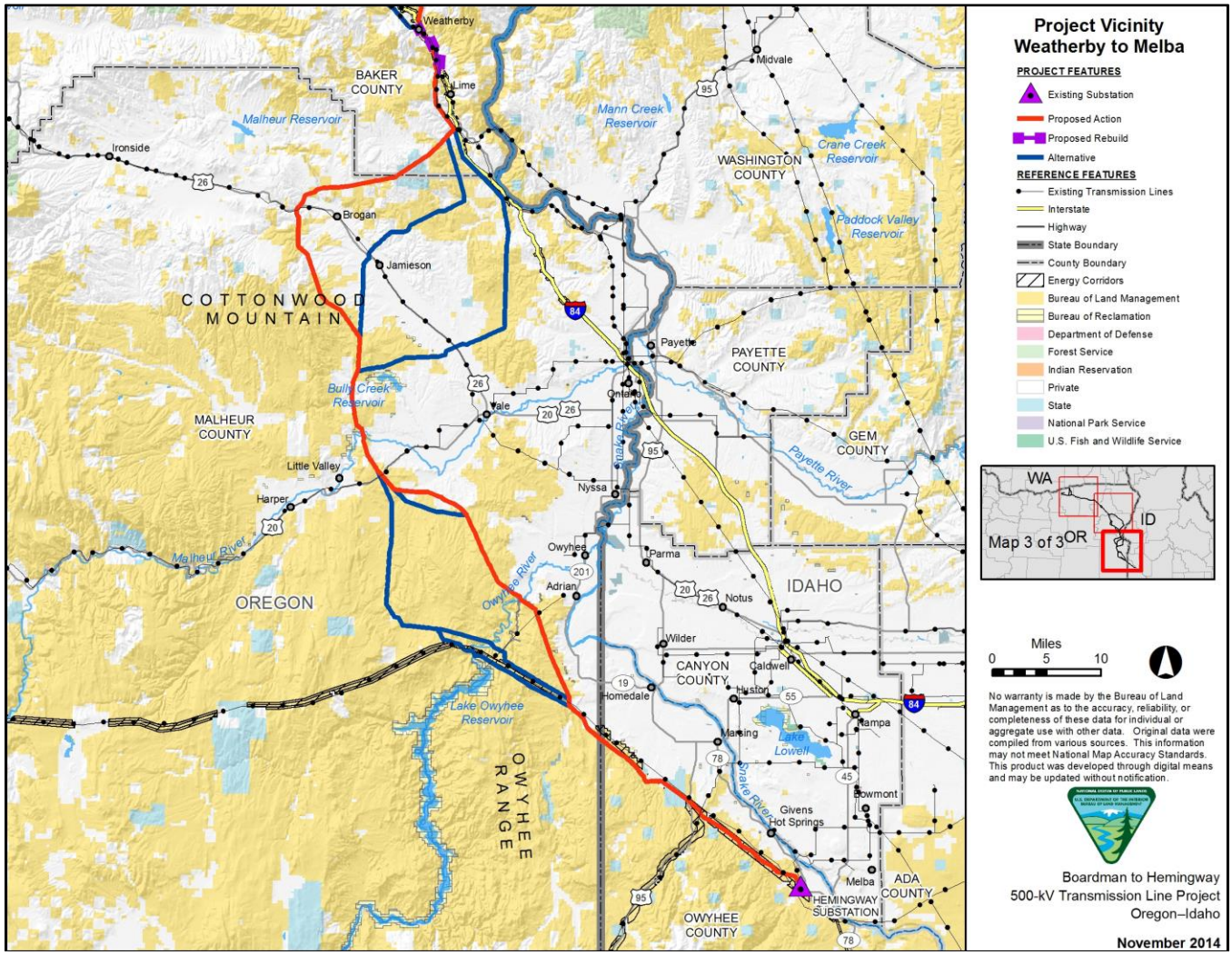

Figure 3-72. Project Vicinity Weatherby to Melba

These transmission lines vary from 69 kV to 500 kV, and have rights-of-way from 100 feet to 250 feet in width. Several of the high-voltage transmission lines carry electricity from the hydroelectric generation stations near Boardman, Oregon to interconnection points in Idaho, where they feed the western grid. These transmission lines have been in service for variable amounts of time, but generally between 20 years and 40 years. The typical effects of high-voltage transmission lines on lands and resources are substantially the same as those for the B2H Project, and include displacement of some land uses in the right-of-way and in the areas between the rights-of-way; noise, electromagnetic and visual impacts; habitat fragmentation and displacement of wildlife; and effects to soils and water resources, with variations due to differing landscapes and the nature of the land use patterns and resources present in each area.

The cumulative effects of existing transmission lines with the effects of the B2H Project relate primarily to the cumulative land disturbing effects of parallel lines or those in close proximity. Although the direct and indirect effects of two proximate transmission lines may be limited to their respective rights of way, the land uses between the rights-of-way may be constrained as a cumulative effect of their proximity. The cumulative effects of existing high-voltage transmission lines that are located within 0.25-mile of the B2H right-of-way on lands and resources between them are considered.

Existing Roads and Pipelines

Roads within the B2H Project area include interstate highway 84 (I-84), U.S. highways, state highways, county roads, and numerous rural roads. The project area is primarily rural with the greatest densities of roads occurring near cities and towns. The average existing road density in the analysis area is 1.6 miles per square mile. Major roads that parallel the B2H Project are of greatest interest for potential cumulative effects because of their linear nature and thus contribution to habitat fragmentation and their potential to inhibit movement by wildlife. Figure 3-70, Figure 3-71, and Figure 3-72 show locations where existing interstate highways, U.S. highways, and state highways parallel or are in close proximity to the Proposed Action and alternative transmission line rights-of-way.

There are also numerous county and other rural roads within the B2H Project area. Existing and project-caused fragmentation was assessed for habitats. Pipeline corridors that parallel the B2H Project are most important for cumulative effects because of their contribution to habitat fragmentation and to land use limitations. The Proposed Action would cross 26 pipelines, and would parallel one natural gas pipeline in the vicinity of La Grande, Oregon.

Existing Energy Projects

In the B2H Project area, the types of energy projects that could have cumulative effects include power generating stations and wind farms.

Generating Stations

The Boardman Coal Plant is a coal-fired power plant in Boardman, Oregon. The facility has a 550 MW capacity and is operated by Portland General Electric. The Coyote Springs project consists of two units

powered by natural gas. Unit 1 has a 240 MW capacity and unit 2 has a 280 MW capacity. The Neal Hot Spring Geothermal Plant is located near Vale, Oregon and generates about 22 MW.

Generating stations have effects to air quality and climate change; visual effects and effects to wildlife and wildlife habitat, particularly migratory and resident birds.

Wind Farms

There are eight wind energy projects in Morrow and Umatilla Counties. These projects have a combined capacity of approximately 500 MW. There is one wind energy project in Union County with a capacity of approximately 60 MW. Wind energy projects are highly visible and have the potential for visual effects that would be cumulative with the effects of the B2H Project. Wind energy projects also have effects to and can displace existing land uses, including agricultural uses, and have effects on wildlife, particularly migratory and resident birds.

Existing Resource Extraction Projects

A number of mining claims; oil, gas and mineral leases; and quarries and gravel pits are located within the cumulative effects analysis area for the Proposed Action and alternatives. Most of these are not currently in active operation and so are not creating direct or indirect environmental effects.

The Proposed Action and alternatives cross several active resource extraction project areas, including the limestone quarry at the Ash Grove Cement plant near Weatherby, Oregon; six active gravel pits; a gold mining reclamation area; and an active gold placer mining area. Effects of resource extraction activities that are potentially cumulative with B2H Project effects include air quality and water quality effects; noise; displacement of wildlife; and vehicle traffic.

Existing Military Operations

In the B2H Project area, existing military operations that could have cumulative effects include the Naval Weapons System Training Facility Boardman and military training routes.

Naval Weapons System Training Facility Boardman

The 47,432 acre Naval Weapons Systems Training Facility Boardman is located in northern Morrow County, Oregon, approximately three miles south of Boardman and 45 miles west of Pendleton. The facility is a detachment activity of Naval Air Station Whidbey Island, Oak Harbor, Washington. Operations at the Naval Weapons System Training Facility Boardman include on-going training and testing and the use of ranges by aircraft from the Naval Air Station Whidbey Island. Since 1906, all bombing and gunnery practice has used non-explosive ordnance for training purposes and high explosive ordnance has not been used. Since the early 1990s, Naval Weapons System Training Facility Boardman has been used by the Navy, Oregon National Guard, and other Services (e.g., Marine Corps, Air Force, and U.S. Air Force Reserve) for a variety of land based and aviation military readiness activities (United States Navy, 2012).

The effects of existing operations at Naval Weapons System Training Facility Boardman that could be cumulative with the B2H Project include noise, effects to air quality and effects to wildlife including Washington ground squirrel and resident and migratory birds.

Military Training Routes

Military training routes (MTRs) are aerial corridors used solely by military aviation for training flights. The routes are the result of a joint venture between the Federal Aviation Administration (FAA) and the Department of Defense (DoD) to provide for high-speed, low-level military activities. MTRs are divided into instrument routes (IR) and visual routes (VR). Each route is identified by either of these 2 letters followed by either 4 digits for routes below 1,500 feet above ground level or 3 digits for routes extending at least 1 leg above 1,500 feet above ground level. IR routes are flown under air-traffic control, while VR routes are not. Each route is defined by a number of geographical coordinates. The MTRs are individually operated through one of the local military air bases. Unless noted on the air navigation chart, aircraft may fly as low as 100–110 feet above ground level in the B2H Project area along these military routes.

The effects of existing military training route operations that could be cumulative with the B2H Project include noise, effects to air quality and effects to wildlife including resident and migratory birds.

Existing Forest Management

Management activities in the Wallowa-Whitman National Forest that could have impacts similar to the B2H Project include vegetation management, noxious weed management, invasive species management, road maintenance, and aquatic habitat improvements. These projects could have short-term effects to soils and erosion; water quality; air quality; noise; and displacement of fish and wildlife. Long-term effects would be improved wildlife and fish habitat health.

3.3.3.2 Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions (RFFAs) are actionse for which there are existing decisions, funding, formal proposals, or which are highly probable. Reasonably foreseeable future actions are not connected to the proposed B2H Project, nor are they part of the alternatives. They are projections being made so that future effects, cumulative and otherwise, can be estimated, as required by NEPA. For example, if the past, present or reasonably foreseeable future action would disturb 50 acres of a habitat in the cumulative effects analysis area, and the Proposed Action or alternative would disturb another 40 acres, the cumulative effect would be to 90 acres of habitat.

Table 3-315 identifies the reasonably foreseeable future actions located in or near the B2H Project area that may have effects to resources in the cumulative effects analysis areas. Following the table are descriptions of the nature and possible effects of each action. These actions are considered in the cumulative effects analysis.

Table 3-315. Reasonably Foreseeable Future Actions

Name of Action	Type of Action	Description	Footprint	Segment
Portland General Electric Boardman Plant Emissions Controls	Energy	New emissions controls will be installed at the 585-megawatt coal-fired electricity generating plant. The emissions controls are expected to reduce nitrogen oxide emissions by about 50 percent and sulfur dioxide emissions by 75 percent.	In Boardman, Oregon	1
Gas Transmission Northwest Carty Lateral Project	Road and Linear Projects	Gas Transmission Northwest is proposing to construct and operate a natural gas pipeline lateral that would connect to the existing mainline system in Morrow County, Oregon.	Morrow County	1
Umatilla Electric Cooperative Transmission Line	Transmission	Umatilla Electric Cooperative is proposing to construct, maintain, and operate a new 230-kV transmission line between the proposed Longhorn Substation and the Juniper Canyon area. Much of the route would be along the east side of Bombing Range Road and would parallel the existing 30 kV and 115kV distribution lines. The current design calls for a mix of 100-, 70-, and 130-foot structure heights (monopole and H-frame).	Morrow County	1
Longhorn Substation	Energy	Bonneville Power Administration acquired real property to construct transmission facilities, including the proposed 500/230-kV Longhorn Substation. The substation is a potential terminus for the B2H alternatives being evaluated in this EIS. Facilities to be constructed could include a control house; equipment in the fenced yard including circuit breakers, switches, bus tubing and pedestals, substation dead end towers, grounding mat; and a stormwater retention system. A small amount of roadwork would be required to access the site and connect to local county roads. BPA has not made a decision to construct the substation, therefore has not yet finalized plans or a schedule for construction.	33 acres	1
Morrow Flat	Energy	BPA is constructing a 230/115-kV substation called Morrow Flat would be located to the north of Longhorn Substation on the same parcel. A transmission corridor that contains three existing lines— McNary-Jones Canyon 230-kV, McNary-Boardman 230-kV, McNary-Coyote Springs 500-kV would be located between the two proposed substations. Construction has started and is expected to be completed by end of 2015.	20 acres	1
Ella Butte Wind Power Project	Energy	The project is a proposed 52-turbine, 104 MW wind farm. The proposed facility consists of up to 502 MW of nominal electric generating power. A new overhead 230 kV transmission line would connect the facility collector substations to the point of interconnect at the future Stanfield Substation.	Near Ione in Morrow County, Oregon	1

Name of Action	Type of Action	Description	Footprint	Segment
Saddle Butte Wind Park	Energy	The proposed Saddle Butte Wind Park would be a wind energy facility consisting of up to 133 wind turbines and related facility components (including a substation, a field workshop, meteorological towers, access roads, and aboveground and underground transmission lines). The facility would have a peak generating capacity of up to 399 MW with an average generating capacity up to 133 MW. The proposed facility will be in Gilliam and Morrow Counties, approximately 20 miles south of the Columbia River between Eightmile Canyon and State Highway 74. The site boundary consists of 11,793 acres of private lands with 6,455 acres in Gilliam County and 5,338 acres in Morrow County. The applicant intends to connect the facility to the regional transmission system through the Bonneville Power Administration Slatt Substation. The applicant has proposed a single transmission corridor running approximately 19 miles to the Bonneville Power Administration Slatt interconnection facility.	Morrow County and Gilliam County	1
Multi-species Candidate Conservation Agreement— Habitat Conservation	Agreement	The U.S. Fish and Wildlife Service (USFWS) approved a Multi-Species Candidate Conservation Agreement with Assurances with Threemile Canyon Farms, PGE, The Nature Conservancy, and the Oregon Department of Fish and Wildlife on March 16, 2004 (U.S. Fish and Wildlife Service 2011). The agreement is effective for 25 years and provides conservation measures for the Washington ground squirrel, ferruginous hawk, loggerhead shrike, and sage sparrow (covered species) on 93,000 acres near Boardman, Oregon.	Morrow County	1
U.S. Army Umatilla Chemical Depot Base Redevelopment Plan	Military	The Umatilla Chemical Depot (UCD) is located in northern Morrow and Umatilla counties. DoD recommended closure of UCD during the 2005 Base Realignment and Closure round of announcements. The UCD redevelopment plan recommends the following future land uses: • Agriculture–655 acres • Wildlife refuge–5,613 acres • Oregon National Guard military training–7,421 acres • Highway commercial industrial–1,077 acres • Oregon Department of Transportation Interstate corridor–91 acres • Industrial restricted–942 acres • Industrial unrestricted–1,115 acres	17,000 acres	1

Name of Action	Type of Action	Description	Footprint	Segment
U.S. 730 Corridor Refinement Plan (2007);	Road and Linear Projects	The US 730 Corridor Refinement Plan is specifically concerned with the section of US 730 from the east city limits of the City of Irrigon (MP 176.61) to the west city limits of the City of Umatilla (MP 182.54). In 2003, the Oregon Department of Transportation designated this section of US 730 as a Safety Corridor. This section of the highway is currently characterized as having a significant number of private-access driveways, a limited supporting roadway network and a significant amount of high-speed-truck and through traffic. The US 730 Corridor Refinement Plan identifies highway safety improvements along this section of US 730 over the next 20 years. Potential impacts are primarily related to construction of the project and include noise and air pollutant emissions.	Umatilla County	1
Perennial Wind Chaser Station	Energy	Perennial Power proposes to construct and operate up to four natural gas-fired turbines with a nominal generating capacity up to 412 MW. The project will be sited about 3 miles southwest of Hermiston, Oregon, adjacent to the Hermiston Generating Plant in Umatilla County. Power generated at the station would be distributed by a new 17.9-mile, 230 kV transmission line.	20 acres	1
Rackspace Data Center		Rackspace, a data hosting company, has purchased land at the Port of Morrow, near Boardman. The company intends to build a large data center on the site. Plans for the facilities have not been finalized.	99 acres	1
Coal Transfer Station	Resource extraction	The coal transfer station, also known as the Coyote Island Terminal, is a coal export project at the Port of Morrow in Boardman. Ambre Energy, the proponent, would bring up to 8.8 million tons of coal annually by train from Montana and/or Wyoming to Boardman. Ambre Energy would store the coal in covered storage buildings at the Port of Morrow before transferring it to barges using an enclosed conveyor system. The barges would then haul the coal down the Columbia River to Port Westward in Clatskanie and then transfer the coal onto vessels to deliver it to Asia.	72000 Dewey West Lane in Boardman, Oregon	1
Huntington Windfarms	Energy	The proposed site is 4.5 miles northwest of Huntington located off Malheur Lane, Durbin Creek Lane, and Interstate 84. The maximum capacity would be 20 megawatts from 12 turbines.	Baker County	1

Name of Action	Type of Action	Description	Footprint	Segment
Baker Habitat Restoration and Fuels Treatment Projects	Vegetation management	The BLM Vale District BLM would implement a multi-year phased fuels management and habitat restoration project in the Baker Resource Area. The project encompasses approximately 45,000 acres of BLM lands and 1,700 acres of Oregon Department of Fish and Wildlife lands. The project area includes the communities of Auburn, Hereford, and Durkee, Oregon.	46,700 acres; Baker County, 7 to 25 air miles southwest of Baker City	3
District-wide Noxious Weed Treatments	Vegetation management	There is an ongoing interagency effort with the Oregon Department of Agriculture, eastern Oregon counties, and BLM to treats noxious weeds. The effort uses mechanical methods (chainsaws, chaining), manual removal (hand pulling), biocontrol methods (release of insects, or other organisms to interfere with a targeted weed species), directed livestock, and herbicides.	Counties within the BLM Vale District	3,4,5
Mormon Basin Fuels Treatment	Vegetation management	The fuels treatment project is largely focused on juniper reduction in southern Baker County. The project is a joint effort coordinated with BLM, Oregon Watershed Enhancement Board funding, and Oregon Department of Fish and Wildlife habitat management projects.	Southern Baker County	3,4
Malheur Queen Placer	Resource extraction	The project is located on the southern slope of the divide between Willow Creek and Burnt River. The project area is approximately 1.2 miles northwest of Malheur Reservoir, 5.5 miles south of the Burnt River and 47 road miles northwest of Vale in Malheur County, Oregon. The Malheur Queen Placer project mines placer gravel, sand, and silt sized material within and adjacent to two north-northwest-trending perennial stream channels and two intermittent stream channels. The project is a conventional gold placer operation. The operator excavates, sizes, and washes gold-bearing gravels and tailings to extract gold particles. No chemical processing is involved in the operation.	800 acres	4
Neal Hot Springs Geothermal	Energy	The Neal Hot Springs is near Vale, Oregon in Malheur County. The geothermal project consists of three 7.33 net megawatt modules with an annual average of 22 megawatts. On August 1, 2013, U.S. Geothermal Inc. announced that final completion of the project was achieved.	NW of Vale approximately 20 miles	4
Lime Windfarms	Energy	The 3 megawatt wind project is located in Huntington. The estimated annual energy generation is 7,500 to 8,000 Megawatt hours.	Baker County	4

Name of Action	Type of Action	Description	Footprint	Segment
Grassy Mountain Gold	Resource extraction	The project is in planning stages to develop gold resources in northern Malheur County, southwest of Vale. BLM anticipates minimal impact on public lands due to an access road. The proponent anticipates processing facilities to be located on private lands with a relatively small surface footprint.	North Central Malheur County	5
Gateway West Transmission Line	Transmission	Idaho Power and Rocky Mountain Power plan to construct and operate 230 and 500 kV transmission lines from the Windstar substation near Glenrock, Wyoming to the Hemingway substation near Melba, Idaho. The companies anticipate completing phased transmission line segments between 2019 and 2023.	1,000 miles from the Windstar substation near Glenrock, Wyoming to the Hemingway substation near Melba, Idaho	6

Naval Weapons System Training Facility Boardman

Operations at the Naval Weapons System Training Facility Boardman include on-going actions described above and proposed future actions to ensure critical training and testing requirements are met. These proposed future actions include:

- Maintaining baseline training and testing activities at current levels
- Increasing certain training activities from current levels to support the Navy and Oregon National Guard requirements
- Developing ranges and facilities and implementing range enhancements to support training requirements
- Accommodating training requirements associated with force structure changes and introduction of new weapons systems for training

The on-going operations and environmental effects of future actions are being evaluated in a Draft Environmental Impact Statement for Naval Weapons Systems Training Facility Boardman released for public review and comment on September 6, 2012. Two action alternatives are considered in the Draft EIS.

Alternative 1, in addition to accommodating training activities addressed in the No Action Alternative, would support an increase in the types of training activities and the number of training events conducted at Naval Weapons System Training Facility Boardman, accommodate force structure changes, and provide enhancements to training facilities and operations at Naval Weapons System Training Facility Boardman. The range enhancements analyzed under Alternative 1 to meet Navy and Oregon National Guard training requirements would include the construction and operation of a

Multi-Purpose Machine Gun Range, a Digital Multi-Purpose Training Range, an eastern Convoy Live Fire Range, a Demolition Training Range, a Range Operations Control Center and Unmanned Aerial Systems (UAS) Training and Maintenance Facility (housed in a single building) with small airstrip, as well as the designation of a drop zone. An additional Military Operations Area (MOA) to join existing restricted airspace and the existing Boardman MOA in the northeast area of Boardman airspace would be created and would be called the Boardman Northeast MOA. This new training airspace would be 41 square nautical miles and join the current Boardman R-5701A, R-5701B and R-5701C and the existing Boardman MOA. Low-altitude flight tracks would be oriented to facilitate the use of this additional MOA, avoiding existing and planned wind turbines in the vicinity of Naval Weapons System Training Facility Boardman.

Alternative 2 would include all training and range 1 enhancement elements of Alternative 1. In addition, under Alternative 2 three mortar pads would be established, a second (western) Convoy Live Fire Range and a Range Operations Control Center (separate from the UAS Training and Maintenance Facility) would also be constructed.

3.3.3.3 Land Management Plan Revisions

Baker Field Office Draft Resource Management Plan and Environmental Impact Statement

The Baker Field Office Draft Resource Management Plan was released to the public on November 15, 2011. The planning area contains 428,425 acres of BLM-administered lands in portions of Baker, Union, Wallowa, Malheur, Morrow, and Umatilla Counties in Oregon and Asotin County in Washington. When approved, the plan will replace the 1989 BLM Baker Resource Management Plan.

The Draft Resource Management Plan identified Alternative 1 as the preferred alternative. The BLM will continue to refine the preferred alternative through the land use planning and NEPA process until the approved resource management plan and record of decision are signed. While the preferred alternative estimates the approved resource management plan, BLM can adjust the preferred alternative until the approved resource management plan and record of decision are signed.

The preferred alternative emphasizes adaptive management to achieve long-term ecosystem health and resiliency while providing for a variety of resource uses. The BLM would promote management activities that maintain and/or restore ecosystem health and connectivity, with a restoration emphasis on Wyoming big sagebrush and riparian habitats in areas with a degraded condition. Right-of-way development, including transmission lines, would face moderate restrictions.

Southeastern Oregon Resource Management Plan Amendment and Environmental Impact Statement

The planning area for the RMP Amendment covers 6.5 million acres, of which 4.6 million surface acres are managed by BLM. The planning area is bounded on the east by Idaho, on the south by Nevada, on the north by the Vale District's Baker Resource Area, and on the west by the BLM Burns District's

Three Rivers and Andrews Resource Areas and the Malheur National Forest. The purpose of the plan amendment is to analyze a broader range of management alternatives for off-highway vehicle use, livestock grazing, and lands with wilderness characteristics.

Owyhee Field Office Resource Management Plan and Environmental Impact Statement

The planning area would be the Owyhee Field Office in southeastern Idaho. The new resource management plan would revise the existing 1999 RMP. The BLM Director's schedule, as of November 2013, indicates that a land use plan evaluation was prepared in 2013 and another plan evaluation is scheduled for 2018. The RMP revision process would be scheduled based on the completed evaluations.

Oregon Greater Sage-Grouse Draft RMP Amendment/EIS

The BLM is undertaking a large-scale effort to amend or revise RMPs in response to the US Fish and Wildlife Service (USFWS) 12-Month Finding for Petitions to List the Greater Sage-Grouse as Threatened or Endangered (75 Federal Register 13910, March 23, 2010). The planning area consists of approximately 15 million acres of land in Oregon, which includes nearly 10 million acres of Greater Sage-Grouse habitat on BLM-administered lands. When approved, up to eight BLM RMPs guiding management in Oregon will be amended.

The proposed RMP Amendments will identify and incorporate appropriate regulatory mechanisms to conserve, enhance, and restore Greater Sage-Grouse habitat and to eliminate, reduce, or minimize threats to this habitat on BLM-administered lands in Oregon. Proposed amendments to the BLM LUPs would include allowable uses and management actions for select resources and resource uses. Allowable uses are those that are allowed, restricted, or prohibited and may include stipulations. The alternatives identify the range of management actions, restrictions, and constraints that would be placed on allowable uses on BLM-administered lands to conserve, restore, and enhance Greater Sage-Grouse habitat.

In the Draft RMP Amendment/EIS the BLM Preferred Alternative is Alternative D. The primary objective of Alternative D is to maintain or enhance Greater Sage-Grouse habitat to establish a mix of sagebrush classes so as to provide sustainable habitat for the Greater Sage-Grouse. This objective allows for human-caused disturbance (including current on-the-ground disturbance) to cover less than three percent of preliminary priority management areas (PPMA), regardless of ownership; it requires appropriate mitigation for habitat disturbance within PPMA and preliminary general management areas (PGMA). It prioritizes enhancement and restoration of Greater Sage-Grouse habitat in order to maintain and/or increase Greater Sage-Grouse abundance and distribution. It also includes management actions, requirements, and stipulations to meet those objectives that are targeted to the resource issues and challenges specific to eastern Oregon Greater Sage-Grouse. Actions described in Alternative D and all the alternatives would be subject to valid existing rights.

Based on comments on the Draft EIS, the BLM will make the final selection of the RMP Alternative.

Idaho and Southwestern Montana Greater Sage-Grouse Draft Land Use Plan Amendment and EIS

The BLM is undertaking a large-scale effort to amend or revise RMPs with associated Environmental Impact Statements (EISs) in response to the US Fish and Wildlife Service (USFWS) 12-Month Finding for Petitions to List the Greater Sage-Grouse as Threatened or Endangered (75 Federal Register 13910, March 23, 2010). The planning area consists of about 53 million acres of land in Idaho and Southwestern Montana, which includes about 12.7 million acres of BLM-administered lands and 17.4 million acres of National Forest System Lands. There are approximately 9.3 million acres of Greater Sage-Grouse habitat on BLM-administered lands and 1.9 million acres on National Forest System Land. When approved, up to 21 BLM RMPs and 8 U.S. Forest Service Land and Resource Management Plans would be amended.

The Draft Land Use Plan Amendment and EIS identifies a No-Action Alternative and five action alternatives, B, C, D, E, and F. Alternatives D and E have been identified as co-Preferred Alternatives for the purposes of public comment and review. These alternatives each have different strengths that reduce, eliminate or minimize threats to Greater Sage-Grouse and their habitat and the BLM and Forest Service are considering the management guidance described within each of these alternatives as ways to respond to Greater Sage-Grouse threats within the Idaho and Southwestern Montana Sub-Region.

Under Alternative D, the BLM and Forest Service would require no net unmitigated loss of PPMAs instead of a set disturbance cap. New authorizations for the following uses would not be allowed in PPMAs: transmission facilities (greater than 50kV), wind energy testing and development, commercial solar development, commercial geothermal development, nuclear development, oil and gas development, mineral development, airports, and ancillary facilities associated with any of the aforementioned development; paved roads and graded gravel roads, landfills, and hydroelectric projects. Communication sites would be allowed. PGMA would be right-of-way avoidance areas.

Under Alternatives D and E, habitat and population data would be utilized to determine change in habitat or population compared against a 2011 baseline. Adaptive “triggers” would provide a regulatory backstop to prevent further loss and stabilize habitats and populations. The adaptive triggers would reflect dramatic shifts in population or habitat, based on an average over a 3-year period when compared to 2011 values. The triggers would be individually applied within each conservation area which would add an increased level of sensitivity to change. Two types of triggers are defined, and are referred to as hard and soft triggers.

Infrastructure development, including transmission lines and facilities, would be guided by management actions specific to the Greater Sage-Grouse habitat zone within which the infrastructure project is located:

- Core Habitat Zone: New infrastructure generally precluded except for valid existing rights and/or or incremental upgrade and/or capacity increase of existing infrastructure, subject to some limitations. Notwithstanding this general limitation, the Governor’s Alternative provides a limited process for exemptions focusing on ensuring the population objectives for that conservation area are being met.

- Important Habitat Zones: New infrastructure generally permitted subject to certain criteria similar to the best management practices required for proposing a project under the Core Habitat Zone exemption process.
- General Habitat Zone: New infrastructure permitted. No special Greater Sage-Grouse direction.

The Idaho and Southwestern Montana Sub-Regional Greater Sage-Grouse Land Use Plan Amendment and Final Environmental Impact Statement is due to be released and a final decision is expected to be signed in late spring 2015. Implementation of the decision will amend the Owyhee RMP to provide additional conservation measures for Greater Sage-grouse and their habitats.

WALLOWA-WHITMAN NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN

The LRMP for the Wallowa-Whitman National Forest is currently undergoing revision, together with the other forests in the Blue Mountains – the Umatilla and Malheur. The plan represents a revision of the 1990 LRMP. A Draft EIS addressing six alternatives was released to the public in March 2014; a Draft LRMP based on the agency's preferred alternative was also released. The comment period ended August 15, 2014. A Final EIS and Draft Record of Decision are currently anticipated for release during Fall 2015 and final decision is expected Spring 2016. Also pending final approval are the Wallowa-Whitman national Forest Travel Management Plan to govern the forest system of roads designated for motor vehicle use by the public, and the Wallowa-Whitman Invasive Species Record of Decision, which includes an Early Detection Rapid Response (EDRR) strategy for addressing new ground disturbing activities and strategies for preventing the spread of invasive species and the treatment of known sites.

If the decision for the B2H Project is signed prior to the decision approving a revised forest plan, implementation of the project would proceed under the current (1990) LRMP and would require site-specific amendment as described in the Plan Amendments (Section 3.4). If the timing is reversed, the B2H Project decision will need to be compliant with the revised forest plan. Review of land allocations as presented in the Draft LRMP (April 2014) indicates that the Proposed Action would be within proposed MA 5 – Administrative Areas including utility corridors. All of the lands currently designated MA 17 adjacent to the I-84 corridor would be incorporated into the new MA 5. While MA 5 has similar purposes as the current MA 17, the details regarding guidelines and standards are expected to be different.

3.3.4 CUMULATIVE EFFECTS ANALYSIS

The assessment of cumulative effects is presented here for only those resources for which there is a potential for cumulative effects to occur.

3.3.4.1 EARTH RESOURCES

METHODOLOGY

The analysis area for cumulative effects to soils is the same as the analysis area for direct and indirect effects, 0.5 mile on each side of the transmission line centerlines and 50 feet on each side of the

centerlines of access roads. The analysis area for cumulative effects to minerals includes areas of active resource extraction of minerals, oil, and gas that are crossed by transmission line and access road centerlines. The analysis area for cumulative effects to paleontological resources includes areas of high (3+) potential fossil yield crossed by the transmission line centerlines and by access roads.

Cumulative effects to earth resources are described project-wide for the Proposed Action and alternatives because the differences in effects among the alternatives and project segments are small. To the extent notable differences between alternatives or among project segments exist, they are described in the summary of effects discussions for each resource.

Geological Hazards

Geological hazards pose a risk to project infrastructure. Direct and indirect effects of B2H Project activities are not anticipated to exacerbate geologic hazards in the cumulative effects analysis area, and therefore no cumulative effects from geological hazards are anticipated.

Soils

Effects from the B2H Project combined with effects from existing actions and RFFAs could result in surface disturbance that could temporarily increase the rate of soil erosion by water or wind. The cumulative effect of the B2H Project increases with the number of other projects within a localized area.

In most project segments, the cumulative effects to soils and potential for reclamation success of the alternatives are generally similar for all alternatives. There would be minor differences in effects based on the relative lengths and total disturbed areas of the alternatives. For most project segments and alternatives, there are no RFFAs within the cumulative effects analysis area, so cumulative effects would be the same as the direct and indirect effects. Cumulative erosion impacts on soils during construction of the B2H Project would be short-term during the construction period, and would therefore be moderate. With effective reclamation of disturbed areas that are not necessary to project operations, and effective implementation and long-term maintenance of erosion control measures, long-term cumulative effects on soils during project operations would be low in that on-going disturbances would be primarily in areas where soils exhibit low susceptibility to erosion by water or wind.

Segment 1 of the B2H Project area differs from other project segments in the level of existing land use activity and the much larger number of present actions that are currently affecting soil resources and RFFAs that would affect soils. Fourteen of the RFFAs in the B2H Project area are located in Segment 1, and many of those are within the cumulative effects analysis area for soils. To the extent construction or other ground-disturbing activities for present actions and RFFAs coincide with the B2H Project construction period, the short-term cumulative effects to soils could be higher than the direct and indirect effects of the B2H Project. For the purposes of this analysis, it is assumed that all future ground disturbing activities would be subject to applicable regulations and would be performed according to applicable SWPPPs and erosion control measures. Although cumulative effects to soils are expected to be higher in Segment 1 relative to other project segments, the short-term effects are anticipated to be moderate due to some disturbance of land surface where soils exhibit high susceptibility to erosion by

water or wind. Long-term cumulative effects are anticipated to be low, in that on-going disturbances would be primarily in areas where soils exhibit low susceptibility to erosion by water or wind.

MINERALS

The existing Ash Grove Cement Plant is located in the cumulative effects analysis area. Direct and indirect, short-term and long-term effects on mineral resources and extractive activities for the B2H Project as a whole would be low because construction and operation of the B2H Project would not displace mineral operations. No reasonably foreseeable future actions are within the cumulative effects analysis area for minerals. The cumulative effects to mineral extraction would be the same as the direct and indirect effects, low in both the short- and long-terms.

PALEONTOLOGICAL RESOURCES

Direct effects to paleontological resources can result from ground disturbing activities in conjunction with present actions and RFFAs. Indirect effects can result from unauthorized fossil collection in areas made more accessible by project construction and operation activities and new and improved access roads.

The potential for disturbances to paleontological resources are generally similar among the project segments and among the alternatives, with minor variations due to the relative lengths of the alternatives in areas of high potential fossil yield as compared with the Proposed Action. Preconstruction surveys of high PFY areas, successful implementation of the Paleontological Monitoring and Mitigation Plan and Unanticipated Discovery Plan and construction monitoring in areas of high potential for fossil occurrence would result in low short- and long-term direct impacts to paleontological resources. Due to the relatively rare occurrence of areas of high potential fossil yield in the B2H Project area, long-term indirect effects would also be low. There are no reasonably foreseeable ground-disturbing projects in the cumulative effects analysis area for paleontological resources, so cumulative effects would likewise be low.

3.3.4.2 WATER RESOURCES

METHODOLOGY

The geographic area of influence for the analysis of cumulative impacts to water resources is defined as the watersheds (4th level HUCs) of waterbodies crossed by the Proposed Action and alternatives. The area of influence for analysis of cumulative impacts to wetlands is defined as mapped wetland and riparian areas up to 0.5 miles from the Proposed Action or alternatives and within 50 feet of the centerline of access roads. Present actions and reasonably foreseeable future actions (RFFA) within these geographic areas of influence are listed in Table 3-314 and Table 3-315.

The consideration of past actions is reflected in current environmental conditions as described in the affected environment baseline conditions in Section 3.2.2. For this analysis, cumulative impacts to water resources within the geographic area of influence are the combined direct and indirect effects of the RFFAs and present actions plus the direct impacts of the Proposed Action and alternatives. The

contribution of the Proposed Action and alternatives to the water resources cumulative impacts are assessed in terms of disturbance and damage to water resources and wetlands and the potential for increased sedimentation. The specifics of the RFFAs and present actions, such as the footprint, design, alignment, surface disturbance, are not known at this time. The specific number of stream crossings and the proximity of ground disturbance of any present actions or RFFAs are not known. As a result, the contributions of incremental direct and indirect impacts from the present actions or RFFAs to cumulative impacts are more qualitative than quantitative.

The levels of direct, indirect, and cumulative impacts are categorized as high, moderate, or low based on the thresholds defined in Section 3.2.2, Water Resources. If the direct and indirect impacts to water resources were determined to be none or negligible as a result of the Proposed Action or alternatives, there would be no contribution to the cumulative impacts to water resources. Likewise, there would be no contribution to cumulative impacts if there are no direct impacts from RFFAs or present actions within the geographic area of influence.

The evaluation of cumulative impacts to water resources addresses surface water and wetlands. Surface water consideration includes the water quality of streams and surface water drinking water sources areas. Wetlands include emergent, forested, and scrub-shrub wetlands. With effective implementation of design features incorporated as conditions of the ROW grant, adverse effects on groundwater are anticipated to be negligible as a result of the Proposed Action and alternatives. Therefore, there would be no contribution to groundwater cumulative impacts since there are no direct impacts from the Proposed Action and alternatives within the geographic area of influence. Groundwater cumulative impacts are not discussed any further in this section.

The following narrative summarizes the cumulative water resources impacts by segment and alternative. There are no RFFAs associated with impacts to water resources and wetlands in Segments 2 and 3 within the geographic area of influence.

SEGMENT 1 – MORROW-UMATILLA

The Proposed Action and alternatives, RFFAs, and present actions in Segment 1 are within the Middle Columbia-Lake Wallula, Willow, and Umatilla watersheds. The RFFAs within these watersheds would include the Coal Transfer Station, Ella Butte Wind Power Project, Longhorn Substation, Naval Weapons System Training Facility (NWSTF) Boardman, Perennial Wind Chaser Station, Rackspace Data Center, Saddle Butte Wind Park, and U.S. 730 Corridor Refinement Plan. The acres of short- and long-term impacts from the Proposed Action are based on total acres of this alternative in Morrow and Umatilla counties for comparison purposes. The landscape within Segment 1 has been heavily altered by farming practices, land development, and energy projects, with the exception of the eastern portion of the segment where it enters the Blue Mountains ecoregion.

Proposed Action-Surface Water

While the qualitative effects of stream disturbance on water quality would be the same regardless of the alternative, RFFA, or present action, the greater the number of crossings or acres of disturbance of intermittent and perennial streams would likely result in higher exposures to the risk of adverse water

quality effects on surface waters. Construction activities and ground disturbance associated with the Proposed Action, present actions, and RFFAs could result in localized low to moderate direct and indirect short-term impacts to surface water with the potential increase of erosion and sedimentation, with effects extending downstream. These impacts would be minimized but not entirely eliminated by the conditions of the storm water pollution prevent plans and other typical design features. The eight RFFAs may impact approximately 31 streams. The Proposed Action would create approximately 91 stream crossings.

There are no effects to surface water drinking water source areas by the RFFAs because there are no source areas identified in the area where the actions are proposed. Approximately 122 acres of surface water drinking water source areas would be disturbed by the Proposed Action. The potential the effects to surface water drinking water source areas from present actions such as grazing and land development would be considered to be low impact because of the implementation of standard regulatory measures to minimize erosion and sedimentation.

Therefore, the direct and indirect short-term impacts to surface waters from the Proposed Action, present actions, and RFFAs would contribute incrementally to a moderate cumulative impact to surface water resources, due to increase of sedimentation to nearby surface-water resources.

Horn Butte Alternative-Surface Water

The Horn Butte Alternative would have the same effects to surface waters as the Proposed Action except that the Horn Butte Alternative would not impact surface water drinking water sources areas. Therefore, the incremental effect of the construction and operation of Horn Butte Alternative when added to the past, present, and RFFA would be a moderate adverse cumulative impact on surface waters.

Longhorn Alternative – Surface Water

The Longhorn Alternative would cross approximately 74 streams and the eight RFFAs may impact approximately 31 streams. Construction activities and ground disturbance associated with the Longhorn Alternative, present actions, and RFFAs could result in localized moderate direct and indirect short-term impacts to surface water.

There are no effects to surface water drinking water source areas by the RFFAs or the Longhorn Alternative because there are no source areas identified in the area where the actions or the Longhorn Alternative are proposed. The potential the effects to surface water drinking water source areas from present actions such as grazing and land development would be considered to be low impact because of the implementation of standard regulatory measures to minimize erosion and sedimentation.

Therefore, the direct and indirect short-term impacts to surface waters from the Longhorn Alternative, present actions, and RFFAs would contribute incrementally to a moderate adverse cumulative impact to surface water resources, due to increase of sedimentation to nearby surface-water resources.

Longhorn Variation – Surface Water

The Longhorn Variation would have the same effects to surface waters as the Longhorn Alternative. Therefore, the incremental effect of the construction and operation of Longhorn Variation when added to the past, present, and RFFA would be a moderate adverse cumulative impact on surface waters.

Proposed Action - Wetlands

The construction of the Proposed Action would result in moderate short-term (approximately 0.9 acres) and long-term (approximately 0.4 acres) impacts to wetlands. Short-term impacts would be primarily caused by the removal of vegetation and soil disturbance, but would not result in a loss of wetland acreage. The long-term moderate impacts would result in the loss of emergent wetlands and scrub-shrub wetlands in the geographic area of influence in Segment 1. The project components associated with present actions are not known at this time. All but 0.1 acres of the approximately 54.3 acres of wetlands in Morrow and Umatilla counties are on private lands, which may increase the potential for disturbance to the emergent, scrub-shrub, and forested wetlands by development activities. Potential impacts from present actions would likely be similar to the Proposed Action effects. However, the Proposed Action and present actions would be required to comply with the Clean Water Act, which would require any proposed actions to avoid and minimize any impacts to wetlands to the extent feasible as well as providing compensatory mitigation where impacts were unavoidable. With avoidance as feasible and compensatory mitigation where avoidance is not feasible, effects to wetlands are anticipated to be low. The construction of the RFFAs would not result in either short- or long-term impacts because there are no wetlands identified within 500 feet of the future actions within the geographic area of influence in Segment 1. Therefore, the direct and indirect short-term impacts to wetlands from the Proposed Action and present actions would contribute incrementally to a low adverse cumulative impact to wetlands.

Horn Butte Alternative- Wetlands

The construction of the Horn Butte Alternative would result in moderate short-term (approximately 0.4 acres) primarily caused by the removal of vegetation and soil disturbance, but would not result in a loss of wetland acreage. The long-term moderate impacts (approximately 0.3 acres) would result in the loss of emergent wetlands in the geographic area of influence in Segment 1. Potential impacts from present actions would likely be similar to the Proposed Action effects and would be considered to be moderate. However, the Proposed Action and present actions would be required to comply with the Clean Water Act and potential effects to wetlands are anticipated to be low. The construction of the RFFAs would not result in either short- or long-term impacts because there are no wetlands identified within 500 feet of the future actions within the geographic area of influence in Segment 1. Therefore, the direct and indirect short-term impacts to wetlands from the Proposed Action and present actions would contribute incrementally to a low adverse cumulative impact to wetlands.

Longhorn Alternative – Wetlands

The construction of the Longhorn Alternative would result in moderate short-term (approximately 0.8 acres) and long-term (approximately 0.1 acres) impacts to wetlands. Short-term impacts would be

attributed to the removal of vegetation and soil disturbance, but would not result in a loss of wetland acreage. The long-term moderate impacts would result in the loss of emergent wetlands in the geographic area of influence in Segment 1. Potential impacts from present actions would likely be similar to the Proposed Action effects and would be considered to be low because of avoidance or providing compensatory mitigation where impacts were unavoidable in compliance with the Clean Water Act. The construction of the RFFAs would not result in either short- or long-term impacts because there are no wetlands identified within 500 feet of the future actions within the geographic area of influence in Segment 1. Therefore, the direct and indirect short-term impacts to wetlands from the Proposed Action and present actions would contribute incrementally to a low adverse cumulative impact to wetlands.

Longhorn Variation – Wetlands

The construction of the Longhorn Variation would result in no impacts to wetlands. Therefore there would be no incremental contribution to cumulative impact to wetlands from the Longhorn Variation.

Segment 2-Blue Mountains

The Proposed Action, Glass Hill Alternative, and present actions in Segment 2 are within the Umatilla, Upper Grande Ronde, and Powder watersheds. The acres of short- and long-term impacts from the Proposed Action are based on total acres of this alternative in Union County for comparison purposes. There are no identified RFFAs within the geographic area of influence within this segment that would potentially affect water resources or wetlands.

Proposed Action and Glass Hill Alternative-Surface Water

The Proposed Action and Glass Hill Alternative would both cross approximately 24 streams and would likely result in localized low direct and indirect short-term impacts to surface water. There are no effects to surface water drinking water source areas by the Proposed Action or the Glass Hill Alternative because there are no source areas identified in the area where the Proposed Action or the Glass Hill Alternative are proposed. The potential the effects to surface water drinking water source areas from present actions such as grazing and land development would be considered to be low impact because of the implementation of standard regulatory measures to minimize erosion and sedimentation. Therefore, the direct and indirect short-term impacts to surface waters from the Proposed Action and Glass Hill Alternative would contribute incrementally to a low adverse cumulative impact to surface water resources, due to increase of sedimentation to nearby surface-water resources.

Proposed Action -Wetlands

The construction of the Proposed Action would result in moderate short-term (approximately 0.3 acres) and long-term (approximately 0.1 acres) impacts to emergent and scrub-shrub wetlands. The project components associated with present actions are not known at this time. All but 4 percent of the approximately 197.0 acres of wetlands in Union County are on private lands, which may increase the potential for disturbance to the emergent, scrub-shrub, and forested wetlands by development activities. However, the Proposed Action and present actions would be required to comply with the

Clean Water Act and potential effects to wetlands are anticipated to be low as a result of the regulatory process. Therefore, the direct and indirect short-term impacts to wetlands from the Proposed Action and present actions would contribute incrementally to a low adverse cumulative impact to wetlands within the geographic area of influence within Segment 2.

Glass Hill Alternative-Wetlands

The construction of the Glass Hill Alternative would result in no impacts to wetlands. Therefore there would be no incremental contribution to cumulative impact to wetlands from the Glass Hill Alternative.

SEGMENT 3-BAKER VALLEY

The Proposed Action, alternatives, and present actions in Segment 3 are within the Powder and Burnt watersheds. The acres of short- and long-term impacts from the Proposed Action are based on total acres of this alternative in Baker County for comparison purposes. There are no identified RFFAs within the geographic area of influence within this segment that would potentially affect water resources or wetlands.

Proposed Action - Surface Water

Construction activities and ground disturbance associated with the Proposed Action and the present actions could result in localized low to direct and indirect short-term impacts to surface water with the potential increase of erosion and sedimentation, with effects extending downstream. These impacts would be minimized but not entirely eliminated by the conditions of the storm water pollution prevent plans and other typical design features. The Proposed Action would create approximately 42 stream crossings.

There are no effects to surface water drinking water source areas by the Proposed Action because there are no source areas that would be disturbed. The potential the effects to surface water drinking water source areas from present actions such as grazing and land development would be considered to be low impact because of the limited surface water drinking water source areas located within Baker and Union counties.

Therefore, the direct and indirect short-term impacts to surface waters from the Proposed Action and present actions would contribute incrementally to a low adverse cumulative impact to surface water resources.

Flagstaff and Burnt River Mountain Alternatives- Surface Waters

The Flagstaff and Burnt River Mountain alternatives and present actions would have the similar effects to surface waters as the Proposed Action. The Flagstaff and Burnt River Mountain alternatives would create approximately 27 and 32 stream crossings, respectively. Therefore, the incremental effect of the construction and operation of Flagstaff and Burnt River Mountain alternatives when added to the present actions would be a low adverse cumulative impact on surface waters.

Timber Canyon Alternatives – Surface Waters

The Timber Canyon Alternative and present actions could result in localized moderate to direct and indirect short-term impacts to surface water with the potential increase of erosion and sedimentation, with effects extending downstream. The Timber Canyon Alternative would result in approximately 131 stream crossings.

There are no effects to surface water drinking water source areas by the Timber Canyon because there are no source areas that would be disturbed. The potential the effects to surface water drinking water source areas from present actions would be considered to be low impact because of the limited surface water drinking water source areas located within Baker and Union counties.

Therefore, the direct and indirect short-term impacts to surface waters from the Timber Canyon and present actions would contribute incrementally to a moderate adverse cumulative impact to surface water resources, due to greater exposure to the risk of adverse water quality effects on surface waters with over a 100 stream crossings.

Proposed Action - Wetlands

The construction of the Proposed Action would result in moderate short-term (approximately 3.0 acres) and long-term (approximately 3.8 acres) impacts to emergent and scrub-shrub wetlands. The project components associated with present actions are not known at this time. All but 4 percent of the approximately 1,145 acres of wetlands in Baker County are on private lands, which may increase the potential for disturbance to the emergent, scrub-shrub, and forested wetlands from development. Potential impacts from present actions would likely be similar to the Proposed Action. However, the Proposed Action and present actions would be required to comply with the Clean Water Act and potential effects to wetlands are anticipated to be low. Therefore there would be incremental contribution to a low adverse cumulative impact to wetlands from the Proposed Action and present actions within the geographic area of influence within Segment 3.

Flagstaff, Burnt River Mountain, and Timber Canyon Alternatives - Wetlands

The Flagstaff, Burnt River Mountain, and Timber Canyon alternatives would result in moderate short- and high long-term impacts to wetlands. The Flagstaff Alternative would impact approximately 7 acres short-term and 2.9 acres long-term, Burnt River Mountain would impact approximately 7 acres short-term and 3 acres long-term, and Timber Canyon would impact approximately 9 acres and 3 acres. The long-term high impacts would result in the loss of emergent, scrub-shrub, and forested wetlands in the geographic area of influence in Segment 3. Potential impacts from present actions would likely be similar to the alternatives' effects and would be considered to be moderate to high. However, the alternatives and present actions would be required to comply with the Clean Water Act, which would require any proposed actions to avoid and minimize any impacts to wetlands to the extent feasible as well as providing compensatory mitigation where impacts were unavoidable. With avoidance as feasible and compensatory mitigation where avoidance is not feasible, the short-term effects to wetlands are anticipated to be low and the long-term effects to be moderate. Therefore, the direct and indirect short-

term impacts to wetlands from the Flagstaff, Burnt River Mountain, and Timber Canyon alternatives and present actions would contribute incrementally to moderate adverse cumulative impacts to wetlands.

SEGMENT 4-BROGAN AREA

The Proposed Action and alternatives in Segment 4 are within the Bully, Burnt, Brownlee Reservoir, Willow, and Lower Malheur watersheds. The short- and long-term acres of wetlands for the Proposed Action are based on the acres for this alternative in Malheur County for comparison purposes. The RFFAs within these watersheds would include Lime Windfarms, Malheur Queen Placer, and Neal Hot Springs Geothermal. There would be no RFFAs within 0.5-mile of the Proposed Action or alternatives within the wetlands' geographic area of influence in Segment 4.

Proposed Action-Surface Water

The Proposed Action, present actions, and RFFAs could result in localized low direct and indirect short-term impacts to surface water with the potential increase of erosion and sedimentation, with effects extending downstream. The three RFFAs may impact approximately 2 streams and the Proposed Action would create approximately 57 stream crossings. There are no effects to surface water drinking water source areas by the RFFAs or the Proposed Action because there are no source areas identified within the geographic area of influence in Segment 4. The potential the effects to surface water drinking water source areas from present actions such as grazing and land development would be considered to be low impact because of the limited surface water drinking water source areas located within Baker and Malheur counties. Therefore, the direct and indirect short-term impacts to surface waters from the Proposed Action, present actions, and RFFAs would contribute incrementally to a low adverse cumulative impact.

Tub Mountain South and Willow Creek Alternatives-Surface Water

The Tub Mountain South and Willow Creek alternatives would have the similar effects to surface waters as the Proposed Action. The Tub Mountain South Alternative would impact approximately 75 streams and Willow Creek would impact approximately 58 streams. Therefore, the incremental effect of the construction and operation of Tub Mountain South and Willow Creek alternatives when added to the past, present, and RFFAs would be a low adverse cumulative impact on surface waters.

Proposed Action - Wetlands

The construction of the Proposed Action would result in moderate short-term (approximately 3.0 acres) and long-term (approximately1.0 acres) impacts to wetlands. Short-term impacts would be primarily caused by the removal of vegetation and soil disturbance, but would not result in a loss of wetland acreage. The long-term moderate impacts would result in the loss of emergent wetlands and scrub-shrub wetlands. The project components associated with present actions are not known at this time. Sixty-two percent of the approximately 252 acres of wetlands in Malheur County are on private lands, which may increase the potential for disturbance to the emergent, scrub-shrub, and forested wetlands. Potential impacts from present actions would likely be similar to the Proposed Action effects and would be considered to be moderate. However, the Proposed Action and present actions would be required to

comply with the Clean Water Act and potential effects to wetlands are anticipated to be low as a result of the regulatory process. Therefore, the direct and indirect short-term impacts to wetlands from the Proposed Action and present actions would contribute incrementally to a low adverse cumulative impact to wetlands.

Willow Creek and Tub Mountain South Alternatives - Wetlands

The construction of the Willow Creek and Tub Mountain South alternatives would result in low short-term and long-term impacts to emergent, scrub-shrub, and forested wetlands. The Willow Creek Alternative would impact approximately 0.6 acres short-term and 0.2 acres long-term and the Tub Mountain South Alternative would impact approximately 1.5 acres and 1.0 acres. Potential impacts from present actions would likely be similar to the alternatives' effects and would be considered to be low even with compliance with the Clean Water Act because it is unlikely that all impacts can be mitigated completely. Therefore, the direct and indirect short-term impacts to wetlands from the Willow Creek and Tub Mountain South alternatives and present actions would contribute incrementally to low adverse cumulative impacts to wetlands.

Segment 5-Malheur

The Proposed Action, alternatives, present actions, and RFFAs in Segment 5 are within the Lower Malheur, Lower Owyhee, Burnt, and Middle Snake-Succor watersheds. The short- and long-term acres of wetlands for the Proposed Action are based on the acres for this alternative in Malheur County for comparison purposes. The RFFAs within these watersheds would include Huntington Windfarms and Grassy Mountain Gold Mine. There would be no RFFAs within 0.5-mile of the Proposed Action or alternatives within the wetlands' geographic area of influence in Segment 5.

Proposed Action-Surface Water

The Proposed Action, present actions, and RFFAs could result in localized low direct and indirect short-term impacts to surface water with the potential increase of erosion and sedimentation, with effects extending downstream. The two RFFAs may impact approximately 3 streams and the Proposed Action would create approximately 42 stream crossings. There are no effects to surface water drinking water source areas by the RFFAs or the Proposed Action because there are no source areas identified within the geographic area of influence in Segment 5. The potential the effects to surface water drinking water source areas from present actions such as grazing and land development would be considered to be low impact because of the limited surface water drinking water source areas located within Malheur County. Therefore, the direct and indirect short-term impacts to surface waters from the Proposed Action, present actions, and the two RFFAs would contribute incrementally to a low adverse cumulative impact.

Malheur S and Malheur A Alternatives- Surface Waters

The Malheur S and Malheur A alternatives, present actions, and the two RFFAs would have potentially greater effects to surface waters than the Proposed Action. The Malheur S Alternative would impact approximately 65 streams and Malheur A Alternative would impact approximately 64 streams.

Construction activities and ground disturbance associated with the two alternatives, present actions and the two RFFAs could result in localized impacts to surface water with the potential increase of erosion and sedimentation, with effects extending downstream. Therefore, the incremental effect of the construction and operation of Malheur S and Malheur A alternatives when added to the past, present, and RFFAs would be a moderate adverse cumulative impact on surface waters.

Double Mountain Alternative- Surface Waters

The Double Mountain Alternative, present actions, and the two RFFAs would have potentially less effects to surface waters than the Proposed Action. The Double Mountain Alternative would create approximately 12 stream crossings. Therefore, the incremental effect of the Double Mountain Alternative when added to the present actions, Huntington Windfarms, and Grassy Mountain Gold Mine effects would be a low adverse cumulative impact on surface waters.

Proposed Action - Wetlands

The construction of the Proposed Action would result in moderate short-term (approximately 3.0 acres) and long-term (approximately1.0 acres) impacts to wetlands. Short-term impacts would be primarily caused by the removal of vegetation and soil disturbance, but would not result in a loss of wetland acreage. The long-term moderate impacts would result in the loss of emergent wetlands. The project components associated with present actions are not known at this time. Sixty-two percent of the approximately 252 acres of wetlands in Malheur County are on private lands, which may increase the potential for disturbance to the emergent wetlands. Potential impacts from present actions would likely be similar to the Proposed Action effects and would be considered to be moderate. However, the Proposed Action and present actions would be required to comply with the Clean Water Act and potential effects to wetlands are anticipated to be low as a result of the regulatory process. The construction of the two RFFAs would not result in either short- or long-term impacts because there are no wetlands identified within 500 feet of the future actions within the geographic area of influence in Segment 5. Therefore, the direct and indirect short-term impacts to wetlands from the Proposed Action and present actions would contribute incrementally to a low adverse cumulative impact to wetlands.

Malheur S and Malheur A Alternatives- Wetlands

The construction of the Malheur S and Malheur A alternatives would result in low short-term and long-term impacts to emergent and scrub-shrub wetlands. The Malheur S and Malheur A alternatives would each impact approximately 1.0 acres short-term and 0.2 acres long-term. Potential impacts from present actions would likely be similar to the alternatives' effects and would be considered to be low even with compliance with the Clean Water Act because it is unlikely that all impacts can be mitigated completely. Therefore, the direct and indirect short-term impacts to wetlands from the Malheur S and Malheur A alternatives and present actions would contribute incrementally to low adverse cumulative impacts to wetlands.

SEGMENT 6—TREASURE VALLEY

The Proposed Action, present actions, and RFFAs in Segment 6 are within the Middle Snake-Succor watershed. The short- and long-term acres of wetlands for the Proposed Action are based on the acres for this alternative in Owyhee County for comparison purposes The RFFA within this watershed would include the Gateway West transmission line.

Proposed Action-Surface Water

The Proposed Action, present actions, and the Gateway West transmission line could result in localized moderate direct and indirect short-term impacts to surface water with the potential increase of erosion and sedimentation, with effects extending downstream. The Gateway West project may impact approximately 31 streams and the Proposed Action would create approximately 53 stream crossings. There are no known effects to surface water drinking water source areas by the Proposed Action or the Gateway West project because there have been no source areas identified by the state of Idaho. Therefore, the direct and indirect short-term impacts to surface waters from the Proposed Action, present actions, and the two RFFAs would contribute incrementally to a moderate adverse cumulative impact with over 80 streams potentially affected.

Proposed Action-Wetlands

Based on the direct and indirect impacts from the Proposed Action, the Gateway West project, and present action along with the requirements to comply with the Clean Water Act and potential effects to wetlands are anticipated to be low as a result of the regulatory process. Specific information on wetlands in Owhyee County for the geographic area of influence for the cumulative analysis is not available. However, the incremental effects of the Proposed Action along with present actions and the Gateway West project is anticipated to be a low adverse cumulative impact on forested wetlands.

3.3.4.3 VEGETATION

METHODOLOGY

The geographic area of influence for the analysis of cumulative impacts to vegetation resources is defined as the vegetation communities and ethnobotanical resources associated with them that are found within a 0.5 mile buffer on either side of the proposed project center line and within 50 feet of access roads and ancillary facilities. The geographic area of influence for federally listed, candidate and special status species and their suitable habitat are analyzed within 5 miles of the center line of the project. The geographic area of influence for noxious weed species are the counties where known to occur within the counties where the Proposed Action and alternatives would be located. Present actions and reasonably foreseeable future actions (RFFA) within this geographical area of influence were evaluated. The present actions and RFFAs are listed in Table 3-315. These are the actions considered in the cumulative impacts analysis for vegetation resources.

The past actions within the geographic area of influence have contributed to the existing environmental conditions, vegetation community composition, federal and state special status species, and noxious

weed presence and are not separately analyzed as a contributing impact to present actions, RFFA, the Proposed Action, and alternatives to cumulative impacts.

The short-term and long-term effects from implementation of the B2H project would contribute cumulatively to the effects of past, present and reasonably foreseeable future actions in the analysis area to vegetation and noxious weeds. The criteria used to assign a low, moderate, or major level of cumulative impact are consistent with those used to assess direct and indirect impacts in Section 3.2.3 Vegetation. Cumulative impacts are represented in terms of low, moderate, and major based on a qualitative analysis of the RFFAs and present actions proposed or known to occur with the geographic area of influence for each segment. In several cases the cumulative impacts are consistent across vegetation resources for the alternatives within a particular segment. In these instances the alternatives are included in one discussion for the vegetation resource analyzed.

SEGMENT 1 – MORROW - UMATILLA

The Longhorn Substation and Naval Weapons System Training Facility (NWSTF) Boardman are the two RFFAs that would be relevant within the vegetation resources geographical area of influence associated with the Proposed Action and alternatives in Segment 1. The incremental contributions to cumulative impacts of the two RFFAs are discussed below in terms of their impact in conjunction with the Proposed Action and each of the alternatives for Segment 1.

PROPOSED ACTION

Vegetation Communities

The most dominant vegetation communities in Segment 1 are grasslands (including imperiled grasslands) and shrublands. The direct effect determination to these communities was determined to be low with the exception of a moderate residual effect to imperiled grassland communities. The imperiled community type is only within the geographic area of influence in small intermittent locations and does not represent a substantial component of the vegetation communities within the analysis area. The NWSTF Boardman is the only RFFA within the geographic area of influence for the Proposed Action. However, no expansion in the footprint of the facility is proposed and expansion of operations at the facility would not have any impact on the vegetation communities within the geographic area of influence. As a result, there would be no incremental contribution to cumulative impacts associated with the NWSTF Boardman.

The landscape surrounding the Proposed Action has been heavily altered by farming practices, land development, and energy projects, with the exception of the eastern portion of the Proposed Action where it enters the Blue Mountains ecoregion. Therefore, cumulative impact of the construction of the Proposed Action and the existing conditions created by the present actions would result in a low cumulative impact to vegetation communities in Segment 1.

Federally Listed, Candidate Species and Special Status Species

One BLM priority special status species, Laurent's milkvetch, is known to occur in Segment 1. The only documented population occurring within the geographic area of influence is located in western Umatilla County. There are no RFFAs located within the geographic area where this species occurs. Therefore, there would be no incremental contribution to cumulative impacts from RFFAs resulting from the Proposed Action.

Present actions that would have cumulative effects on special status species are primarily irrigated and dry land farming. These actions are not located within the geographic area of influence where the Laurent's milkvetch is known to occur. However, the expansion of present actions into the geographic area of influence would have a moderate cumulative impact to both individuals of the species and suitable habitat due to potential vegetation removal, habitat fragmentation, habitat alteration (loss of natural processes that support vegetation communities), and the potential for noxious weed infestation. Therefore, the cumulative impact to Laurent's milkvetch resulting from the Proposed Action and present actions would be moderate.

Noxious Weeds

The cumulative effects analysis area for noxious weeds includes the county or counties through which the Proposed Action passes. The initial direct and indirect noxious weeds effects of the Proposed Action would be high, but with effective implementation of design features during construction and operations, residual long-term effects would be low. There are currently no fewer than 17 RFFAs within Morrow County with several extending into Umatilla County. Construction of the RFFAs would lead to increased disturbance and opportunity for noxious weed infestations.

The present actions include substantial land and energy development, grazing, and extensive irrigated and dry land farming operations. Ground disturbance from development as well as seed distribution from livestock would have a high direct impact on the potential for distribution of noxious weeds.

Therefore, while the Proposed Action would be a small contributor, the long-term cumulative effects of noxious weeds in the geographic area of influence are considered to be major because of the potential for increased noxious weed infestation would be high.

Ethnobotanical Resources

Effects to ethnobotanical resources are dependent upon the effects to the vegetation communities they are associated with. Cumulative impacts to ethnobotanical resources by the Proposed Action and present actions would be consistent with the determination in the vegetation communities' discussion above.

Horn Butte Alternative

Vegetation Communities

The RFFAs and present actions located within the geographic area of influence for the Horn Butte Alternative are the same as those associated with the Proposed Action. Therefore the incremental

cumulative effects from RFFAs for vegetation communities associated with the Horn Butte Alternative would be consistent with those discussed above for the Proposed Action.

Federally Listed, Candidate Species and Special Status Species

The RFFAs and present actions located within the geographic area of influence for the Horn Butte Alternative are the same as those associated with the Proposed Action. Therefore the cumulative impacts for Laurent's milkvetch associated with the Horn Butte Alternative would be consistent with those discussed above for the Proposed Action.

Noxious Weeds

The RFFAs and present actions located within the geographic area of influence for the Horn Butte Alternative are the same as those associated with the Proposed Action. Therefore the cumulative impacts for noxious weeds associated with the Horn Butte Alternative would be consistent with those discussed above for the Proposed Action.

Ethnobotanical Resources

The RFFAs and present actions located within the geographic area of influence for the Horn Butte Alternative are the same as those associated with the Proposed Action. Therefore the cumulative impacts for ethnobotanical resources associated with the Horn Butte Alternative would be consistent with those discussed above for the Proposed Action.

Longhorn Alternative

Vegetation Communities

As previously discussed the most dominant vegetation communities in Segment 1 are grasslands (including imperiled grasslands) and shrublands. The direct effect determination to these communities was determined to be low with the exception of a moderate residual effect to imperiled grassland communities. As noted in the Proposed Action, the imperiled community type does not represent a substantial component of the vegetation communities within the analysis area. The RFFAs associated with the Longhorn Alternative include the NWSTF Boardman and the Longhorn substation. The Longhorn Substation would create a moderate direct impact because the loss of vegetation would result in vegetation community fragmentation and introduce the potential for vegetation succession by altering the natural processes of the community. Therefore, incremental effects of the Longhorn Substation, Longhorn Alternative, and present actions would result in a moderate cumulative impact on vegetation communities.

Federally Listed, Candidate Species and Special Status Species

The Longhorn Substation and NWSTF Boardman RFFAs are located within the geographic area of influence for the Longhorn Alternative. The present actions within the geographic area of influence are consistent with the Proposed Action. Given the location of the known occurrences of Laurent's milkvetch the cumulative impact on the species is consistent with the Proposed Action.

Noxious Weeds

The RFFAs and present actions located within the geographic area of influence for the Longhorn Alternative are the same as those associated with the Proposed Action. Therefore the cumulative impacts for noxious weeds associated with the Longhorn Alternative would be consistent with those discussed above for the Proposed Action.

Ethnobotanical Resources

The cumulative effects to ethnobotanical resources would be consistent with those described for the vegetation communities associated with the Proposed Action.

Longhorn Variation

Vegetation Communities

As previously discussed the most dominant vegetation communities in Segment 1 are grasslands (including imperiled grasslands) and shrublands. The direct effect determination to these communities was determined to be low with the exception of a moderate residual effect to imperiled grassland communities. As noted in the Proposed Action, the imperiled community type does not represent a substantial component of the vegetation communities within the analysis area.

Similar to the Longhorn Alternative, the two RFFAs associated with the Longhorn Variation are the Longhorn Substation and the NWSTF Boardman projects. The Longhorn Substation would create a moderate direct impact because the loss of vegetation would result in vegetation community fragmentation and introduce the potential for vegetation succession by altering the natural processes of the community. The present actions occurring within the geographic area of influence are consistent with those described for the Proposed Action. Therefore, incremental effects of the Longhorn Substation, Longhorn Variation, and present actions would result in a moderate cumulative impact on vegetation communities.

Federally Listed, Candidate Species and Special Status Species

The Longhorn Substation and NWSTF Boardman RFFAs are located within the geographic area of influence for the Longhorn Variation. The present actions within the geographic area of influence are consistent with the Proposed Action. Given the location of the known occurrences of Laurent's milkvetch, the cumulative impact on the species is consistent with the Proposed Action.

Noxious Weeds

The RFFAs and present actions located within the geographic area of influence for the Longhorn Variation are the same as those associated with the Proposed Action. Therefore the cumulative impacts for noxious weeds associated with the Longhorn Variation would be consistent with those discussed above for the Proposed Action.

Ethnobotanical Resources

The cumulative effects to ethnobotanical resources would be consistent with those described for the vegetation communities associated with the Proposed Action.

Segment 2 – Blue Mountains

There are no identified RFFAs within the geographic area of influence within this segment that would potentially affect vegetation resources. Therefore, there would be no incremental effect contribution from RFFAs within Segment 2 to cumulative impacts to these resources. The direct effects for the Proposed Action and Glass Hill Alternative are consistent across the vegetation resources types, therefore the vegetation resources are not analyzed separately for each alternative.

Present actions in Segment 2 include irrigated and dry land farming, timber management, grazing, land development, transmission lines, roads, and pipelines, wind energy, and various forest management activities. Land development, and wind energy activities in this segment are a minor component of the landscape and do not fall within the geographic area of influence for Segment 2.

Vegetation Communities

The primary vegetation communities within Segment 2 include grasslands, woodlands/forest, shrublands, and agriculture. Present actions including dry land and irrigated farming activities are a minor component of the landscape and fall within the geographic area of influence in one location. The limited distribution of farming activity assessed with the added contribution of the Proposed Action would have a low direct impact on vegetation communities in Segment 2.

Timber management and forest management activities occur within this segment. Woody vegetation clearing associated with timber management as well as clearing of woodland/forest vegetation associated with the Proposed Action and Glass Hill Alternative construction and maintenance would have a high direct impact on imperiled woodland/forest communities and a moderate direct impact on all other woodland/forest and shrubland vegetation communities. The construction and maintenance of the Proposed Action and Glass Hill Alternative require clearing of vegetation in excess of present activities. The vegetation removal coupled with logging and prescribed burns would result in a high direct impact to the vegetation community fragmentation and potential successional changes in community composition.

Expansion of land development, wind energy and generating stations, and roads and pipelines within woodland/forest communities would have a high direct impact due to increased community fragmentation resulting from vegetation removal and potential introduction of noxious weeds to the landscape.

Therefore, both the Proposed Action and Glass Hill Alternative, present actions (primarily timber management), and the potential for expansion of present actions would have a major cumulative effect on vegetation communities in Segment 2.

Federally Listed, Candidate Species and Special Status Species

One federally listed endangered plant, Howell's spectacular thelypody, and two priority BLM special status species, Douglas' clover and Oregon semaphore grass, are analyzed in Segment 2. The direct effect to Howell's spectacular thelypody and Oregon semaphore grass would be low. Incremental impacts from present actions such as grazing, expansion of land development, roads, energy projects, and timber management along with the direct impacts associated with either the Proposed Action or Glass Hill Alternative would result in a moderate cumulative effect on Howell's spectacular thelypody and its suitable habitat.

Oregon semaphore grass is only found in association with the Proposed Action. In addition to potential loss of suitable habitat for this species through vegetation removal associated with expansion of present actions, these actions would increase the potential for invasion of noxious weeds and habitat fragmentation that could result in the loss of suitable habitat in the geographical area of interest. Therefore the Proposed Action and present actions would have a moderate cumulative impact on Oregon semaphore grass.

The direct effects to Douglas' clover by either the Proposed Action or Glass Hill Alternative would be considered moderate. Expansion of present actions and construction of the Proposed Action or Glass Hill Alternative could result in loss of individual plants associated with the expansion of present actions. Impacts to this species resulting from loss of suitable habitat from vegetation removal and potential vegetation community succession would result in a major cumulative impact to Douglas' clover.

Noxious Weeds

Currently 56 noxious weeds are known to occur within the direct effect analysis area in Segment 2. The direct effect of noxious weeds that would occur from construction and operation of the Proposed Action or the Glass Hill Alternative would be low. Ground disturbance associated with expansion of any of the present actions would increase potential for noxious weed infestation within the native vegetation communities in Segment 2. Expansion of present actions within the counties Segment 2 traverses would have a moderate cumulative impact when added with the direct effects from either the Proposed Action or Glass Hill Alternative.

Ethnobotanical Resources

Ethonobotanical resources in Segment 2 are primarily associated with woodland/forest communities. As previously discussed the direct impact to woodland/forest communities resulting from the Proposed Action and Glass Hill Alternative would be high. Therefore, the cumulative impacts to ethnobotanical resources associated with this community would be major.

Segment 3 – Baker Valley

There are no identified RFFAs within the geographic area of influence within this segment that would potentially affect vegetation communities, special status species, or ethnobotanical resources. Therefore, there would be no incremental effect contribution from RFFAs with the Timber Canyon,

Flagstaff Alternative, or Burnt River Mountain alternatives, or the Proposed Action within Segment 3 to cumulative impacts to these resources.

Proposed Action and Flagstaff and Burnt River Mountain Alternatives Vegetation Communities

The present actions within the geographic area of influence occur in association with the Proposed Action and the Flagstaff and Burnt River Mountain alternatives consist primarily of irrigated farming. The farming areas are located primarily to the north and west of Baker City. Potential expansion of the current farming operations in conjunction with the Proposed Action and the Flagstaff and Burnt River Mountain alternatives would have moderate direct impacts to vegetation communities and ethnobotanical resources. Therefore, the Proposed Action and the Flagstaff and Burnt River Mountain alternatives and the potential for expansion of present actions would have a moderate cumulative effect on vegetation communities in Segment 3.

Timber Canyon Alternative

Vegetation Communities

Woody vegetation clearing associated with timber management as well as clearing of woodland/forest vegetation associated with the Timber Canyon Alternative would have a high direct impact on imperiled woodland/forest communities and a moderate direct impact on all other woodland/forest and shrubland vegetation communities. The construction and maintenance of the Timber Canyon Alternative would require the clearing of vegetation in excess of present activities. The vegetation removal coupled with logging and prescribed burns would result in a high level of vegetation community fragmentation and potential successional changes in community composition. Therefore, the Timber Canyon Alternative and the potential for expansion of present actions would have a major cumulative effect on vegetation communities in Segment 3.

Federally Listed, Candidate Species and Special Status Species

There are no known occurrences of federally listed or candidate species within the geographic area of influence for Segment 3, but there are two BLM priority special status species that may occur in this segment. There are no RFFAs within the area of influence therefore there would be no incremental effects on the two special status species, Malheur prince's plume and the Snake River goldenweed.

Vegetation removal activities occurring with timber management and the potential expansion of farming and grazing actions increases the potential for noxious weed infestation and habitat loss and fragmentation. The present actions and potential for expansion of present actions associated with the Proposed Action and the Flagstaff, Burnt River Mountain, and Timber Canyon alternatives would have a moderate cumulative effect on Malheur prince's plume and the Snake River goldenweed.

Noxious Weeds

The High Bar Upper and Lower Pine Creek Mine RFFA is the only RFFA located within the geographic area of influence for noxious weeds. The mine could have some potential to increase noxious weed

invasions in the county by increasing weed presence along access roads and areas of disturbance associated with mine activities. The cumulative impact of the mine and the Proposed Action and the Flagstaff, Burnt River Mountain, and Timber Canyon alternatives would be moderate for the increased potential of noxious weed invasions within the county.

Ethnobotanical Resources

The cumulative impacts to ethnobotanical resources from the Proposed Action and the Flagstaff, Burnt River Mountain, and Timber Canyon alternatives and present actions in Segment 3 would be consistent with those described in the vegetation communities description above.

SEGMENT 4 – BROGAN AREA

There are no identified RFFAs within the geographic area of influence within this segment that would potentially affect vegetation communities, special status species, or ethnobotanical resources. Therefore, there would be no incremental effect contribution from RFFAs with the Willow Creek or Tub Mountain South alternatives, or the Proposed Action within Segment 4 to cumulative impacts to these resources.

Present actions in Segment 4 would primarily include irrigated and dry land farming. The distribution of farming operations in this segment is limited to the river valleys and has likely been developed to the extent possible given topographic limitations. Any further development of agricultural operations would be limited. Therefore there would be no incremental effect contribution from present actions with the Willow Creek or Tub Mountain South alternatives, or the Proposed Action within Segment 4 to cumulative impacts to these resources.

Noxious Weeds

There are four RFFAs within the geographic area of influence for noxious weeds in Segment 4 and two additional actions that involve vegetation management and noxious weed treatment in Baker County. The four RFFAs consist of wind turbine installations, a mining operation, and geothermal operation. These actions together with the construction of the Proposed Action or the Willow Creek or Tub Mountain South alternatives would increase the potential for noxious weed infestation through ground disturbance, transport of noxious weed seeds on vehicles along new access roads, and introduction of noxious weeds to regions of the county not currently infested with some species. The cumulative impact from these actions would be moderate.

SEGMENT 5 – MALHEUR

There are no identified RFFAs within the geographic area of influence within Segment 5 that would potentially affect vegetation communities, special status species, or ethnobotanical resources. Therefore, there would be no incremental effect contribution from the Double Mountain, Malheur S, or Malheur A alternatives, or the Proposed Action within Segment 5 to cumulative impacts to these resources.

Present actions in Segment 5 would primarily include irrigated and dry land farming as this area is remote and only well populated to the east of the Proposed Action. The distribution of farming operations in this segment is limited to the river valleys in the vicinity of Harper, which is outside the geographic area of influence, and has likely been developed to the extent possible given topographic limitations. Therefore, there would be not an incremental effect from present actions to cumulative impacts on vegetation resources in Segment 5.

Noxious Weeds

The Grassy Mountain Gold mine is the only RFFA within the two counties that Segment 5 passes through. As discussed previously, the present actions in the geographic analysis area are limited to certain geographic areas and unlikely to expand. The incremental effect resulting from present actions would be low. The RFFA, present actions, and the Proposed Action or Double Mountain, Malheur S, or Malheur A alternatives would increase the potential for noxious weed infestation through ground disturbance, transport of noxious weed seeds on vehicles along new access roads, and introduction of noxious weeds to regions of the county not currently infested with some species. Therefore, the cumulative impact from these actions would be moderate.

Segment 6 – Treasure Valley

Proposed Action

Vegetation Communities

One RFFA, the Gateway West transmission line, is proposed to originate from the terminus of the Proposed Action. Currently there is no selected route for the Gateway West line and the proposed alternatives would have varying impacts on vegetation communities. The proposed Gateway West alternatives would primarily impact shrubland communities within the geographic area of influence for this resource.. The direct effect on shrubland communities due to the Proposed Action would be low. It would be likely that the Gateway West transmission line would employ the same design and mitigation features to the project as would be applied to the Proposed Action essentially rendering the incremental effect of the Gateway West line an extension of the Proposed Action. The incremental direct effect of both transmission lines on this community type would be low.

Present actions in this area include operation and maintenance of the Hemingway substation as well as irrigated and dry land farming. The area has been developed and topography would likely limit further expansion of farming operations in this area. Therefore cumulative effect of the Proposed Action, the Gateway West transmission line, and present actions on vegetation communities in the geographic area of influence would be low.

Federally Listed, Candidate Species and Special Status Species

There are no federally listed or BLM priority special status species known to occur within the geographic area of influence for Segment 6. Therefore, there would be no cumulative effect of the

Proposed Action, the Gateway West transmission line, and present actions on any federally listed, candidate or special status species in the geographic area of influence.

Noxious Weeds

The Gateway West transmission line would increase the potential for noxious weed infestation through ground disturbance, transport of noxious weed seeds on vehicles along new access roads, and potential introduction of noxious weeds to regions of the county not currently infested with some species. Present actions primarily consisting of farming, land development, and energy development would have a moderate incremental effect with the Proposed Action. The cumulative impact of the Gateway West transmission line, Proposed Action, and present actions (including farming and development) would be moderate for this segment.

Ethnobotanical Resources

Cumulative effects to ethnobotanical resources would be consistent with the effects described for shrubland communities above.

3.3.4.4 Wildlife Resources

Methodology

The geographic area of influence for the analysis of cumulative impacts to wildlife resources is defined in Table 3-313. The analysis area varies based on the wildlife resource analyzed. For example, the analysis area for migratory birds is within 0.5 mile of the Proposed Action and alternatives whereas the analysis area for Washington ground squirrel is defined as areas of suitable habitat within 5 miles of the Proposed Action and alternatives.

Present actions and reasonably foreseeable future actions (RFFA) within the cumulative impacts analysis area were evaluated. The present actions and RFFAs are identified in Table 3-314 and Table 3-315. For this analysis, cumulative impacts for the cumulative impacts analysis area are the combined direct effects of the present actions and RFFAs plus the direct impacts of the Proposed Action and alternatives.

The levels of direct, indirect, and cumulative impacts are described as high, moderate, or low. These cumulative impact levels are based on the thresholds defined in Section 3.2.4, Wildlife Resources. If the direct and indirect impacts to wildlife were considered to be none or negligible as a result of the construction and maintenance of the Proposed Action or alternatives, there would be no contribution to cumulative impacts to wildlife resources. In addition, there would be no cumulative impacts if there would be no direct impacts from present actions and RFFA because either there were no identified actions within the cumulative impact analysis area or the actions would result in negligible or no impacts. RFFAs that occur outside the cumulative impacts analysis areas (Table 3-313) of the Proposed Action and alternatives are not addressed in the analysis.

The past actions within the geographic area of influence have contributed to the existing environmental conditions for wildlife resources and are not appropriate to analyze as a contributing impact to present

actions, RFFA, and the Proposed Action as cumulative impact. The past actions have been addressed in Section 3.2.4 as part of the affected environment and environmental consequences sections.

Reasonably foreseeable future actions in the analysis area that could result in modification of wildlife resources include wildfire management, timber management, agricultural and residential development, and wildlife habitat management. The wildlife habitats most susceptible to change include riparian areas; sagebrush dominated communities; and native grasslands.

Direct, indirect, and cumulative effects to wildlife habitat are the same as Direct, indirect, and cumulative effects to the vegetation communities discussed in Section 3.2.3 and the vegetation section above (Section 3.3.4.3), and are not discussed separately here.

SEGMENT 1 – MORROW - UMATILLA

There are several RFFAs within a 5-mile geographic area of influence associated with the Proposed Action and alternatives in Segment 1. The RFFAs associated with Segment 1 include the Longhorn Substation, Naval Weapons System Training Facility (NWSTF) Boardman, Coal Transfer Station, and Saddle Butte Wind Park. The cumulative impacts of the RFFAs are discussed below in terms of their impact in conjunction with the Proposed Action and each of the alternatives for Segment 1.

PROPOSED ACTION

Federally Proposed, Endangered, Threatened, and Candidate Species

Washington Ground Squirrel

Throughout much of its range, Washington ground squirrel (WGS) are threatened by the establishment and spread of invasive plant species, particularly cheatgrass, which alters 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. Because there would be a permanent loss of primary habitat for the WGS, and there is potential for mortality of individuals from direct and indirect effects, the Proposed Action would result in moderate to high impacts to the WGS. Present actions, including agricultural, residential, and wind power development, along with other forms of development, continue to eliminate WGS habitat in portions of its range. Several RFFAs are located within suitable habitat for the Washington ground squirrel in the geographic area of influence for the Proposed Action in Segment 1, including NWSTF Boardman and Saddle Butte Wind Park. The present actions and the RFFAs would result in high direct impacts to the WGS because of the potential mortality of individuals and loss or modification of primary habitat. Therefore, the incremental effects of the construction and operation of the Proposed Action when added to the past, present, and RFFAs would result in a high cumulative impact to the WGS and its habitat in Segment 1.

Special Status Species

As a result of the Proposed Action, mortality of special status species (without population-level effects), habitat fragmentation, and disturbance during critical or sensitive periods could occur; therefore, the Proposed Action in Segment 1 could result in long-term moderate impacts to special status species. Present actions, including agricultural, residential, and wind power development, along with other forms of development, continue to eliminate or impact habitat for special status species. Several RFFAs are located within suitable habitat for special status species within 5 miles of the Proposed Action in Segment 1, including NWSTF Boardman and Saddle Butte Wind Park. The present actions and the RFFAs would result in moderate direct impacts to the special status species because of the potential mortality of individuals, habitat loss, and disruption of breeding activities. Therefore, the incremental effects of the construction and operation of the Proposed Action when added to the past, present, and RFFAs would result in a moderate cumulative impact to special status species in Segment 1.

Migratory Birds Including Raptors

It is well documented that power lines, communication towers, and wind generation facilities cause both direct and indirect moralities to migratory birds and raptors. Although raptors are known to use transmission towers as nesting substrate and as perches for use during hunting, the Proposed Action will add additional large scale power lines to areas where high densities of transmission lines and wind generation facilities already exist. Project design features associated with the Proposed Action that were created to reduce impacts to Washington ground squirrel, such as perch and nesting site deterrents, would, conversely, decrease nesting and hunting opportunities for raptors. As a result of the Proposed Action, removal or disturbance to nesting sites for migratory birds and raptors could occur, and indirect effects could cause mortality of migratory birds (with no population-level effect); therefore, the Proposed Action in Segment 1 could result in long-term moderate impacts to migratory birds. Present actions, including agricultural, residential, and wind power development, along with other forms of development, continue to eliminate or impact habitat for migratory birds and raptors. No known RFFAs are located within the geographic area of influence for migratory birds (i.e., 0.5 mile from the Proposed Action centerline), though several RFFAs are located within the geographic area of influence for bald and golden eagles (i.e., 10 miles from the Proposed Action centerline). The present actions and the RFFAs would result in moderate direct impacts to the migratory birds including raptors because of the potential mortality of individuals, habitat loss, and disruption of breeding activities. Therefore, the incremental effects of the construction and operation of the Proposed Action when added to the past, present, and RFFAs would result in a moderate cumulative impact to migratory birds and raptors in Segment 1.

Big Game

Modification of elk and mule deer winter range, and disturbance during a critical or sensitive period for these big game species could occur as a result of the Proposed Action; therefore, the Proposed Action in Segment 1 could result in long-term moderate impacts to big game. Present actions, including agricultural, residential, and wind power development, along with other forms of development, continue to eliminate or impact habitat for big game. No RFFAs are located within elk and mule deer winter

range in game management units crossed by Segment 1. Present actions would result in moderate direct impacts to big game because of the potential mortality of individuals, habitat loss, fragmentation, and disruption during a critical or sensitive period. Therefore, the incremental effects of the construction and operation of the Proposed Action when added to the past and present actions would result in a moderate cumulative impact to big game in Segment 1.

Horn Butte Alternative

Federally Proposed, Endangered, Threatened, and Candidate Species

Washington Ground Squirrel

Throughout much of its range, WGS are threatened by the establishment and spread of invasive plant species, particularly cheatgrass, which alters 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. Because there would be a permanent loss of primary habitat for the WGS, and there is potential for mortality of individuals from direct and indirect effects, the Horn Butte Alternative would result in high impacts to the WGS. Present actions, including agricultural, residential, and wind power development, along with other forms of development, continue to eliminate WGS habitat in portions of its range. RFFAs impacting WGS within the geographic area of influence for the Horn Butte Alternative include the Saddle Butte Wind Park. The present actions and the RFFAs would result in high direct impacts to the WGS because of the potential mortality of individuals and loss or modification of primary habitat. Therefore, the incremental effects of the construction and operation of the Horn Butte Alternative when added to the past, present, and RFFAs would result in a high cumulative impact to the WGS and its habitat in Segment 1.

Special Status Species

As a result of the Horn Butte Alternative, mortality of special status species (without population-level effects), habitat fragmentation, and disturbance during critical or sensitive periods could occur; therefore, the Horn Butte Alternative could result in long-term moderate impacts to special status species. Present actions, including agricultural, residential, and wind power development, along with other forms of development, continue to eliminate or impact habitat for special status species. RFFAs impacting special status species within the geographic area of influence for the Horn Butte Alternative include the Saddle Butte Wind Park. The present actions and the RFFAs would result in moderate direct impacts to special status because of the potential mortality of individuals, habitat loss, and disruption of breeding activities. Therefore, the incremental effects of the construction and operation of the Horn Butte Alternative when added to the past, present, and RFFAs would result in a moderate cumulative impact to special status species in Segment 1.

Migratory Birds Including Raptors

The direct and indirect effects to migratory birds and raptors from the Horn Butte Alternative, as well as the RFFAs and present actions located within the geographic area of influence for migratory birds and

raptors for the Horn Butte Alternative are the same as those associated with the Proposed Action. Therefore, the cumulative impacts for migratory birds and raptors associated with the Horn Butte Alternative would be consistent with those discussed above for the Proposed Action.

Big Game

The RFFAs (i.e., none) and present actions located within the geographic area of influence for big game (i.e., elk and mule deer winter range in game management units crossed by Segment 1) for the Horn Butte Alternative are the same as those associated with the Proposed Action. Therefore the cumulative impacts for big game associated with the Horn Butte Alternative would be consistent with those discussed above for the Proposed Action.

Longhorn Alternative

Federally Proposed, Endangered, Threatened, and Candidate Species

Washington Ground Squirrel

Throughout much of its range, WGS are threatened by the establishment and spread of invasive plant species, particularly cheatgrass, which alters 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. Because there would be a permanent loss of primary habitat for the WGS, and there is potential for mortality of individuals from direct and indirect effects, the Longhorn Alternative would result in moderate to high impacts to the WGS. Present actions, including agricultural, residential, and wind power development, along with other forms of development, continue to eliminate WGS habitat in portions of its range. RFFAs impacting WGS within the geographic area of influence for the Longhorn Alternative include the Longhorn Substation, NWSTF Boardman, and the Coal Transfer Station. The present actions and the RFFAs would result in high direct impacts to the WGS because of the potential mortality of individuals and loss or modification of primary habitat. Therefore, the incremental effects of the construction and operation of the Longhorn Alternative when added to the past, present, and RFFAs would result in a high cumulative impact to the WGS and its habitat in Segment 1.

Special Status Species

As a result of the Longhorn Alternative, mortality of special status species (without population-level effects), habitat fragmentation, and disturbance during critical or sensitive periods could occur; therefore, the Longhorn Alternative could result in long-term moderate impacts to special status species. Present actions, including agricultural, residential, and wind power development, along with other forms of development, continue to eliminate or impact habitat for special status species. RFFAs impacting special status species within the geographic area of influence for the Longhorn Alternative include the Longhorn Substation, NWSTF Boardman, and the Coal Transfer Station. The present actions and the RFFAs would result in moderate direct impacts to special status because of the potential mortality of individuals, habitat loss, and disruption of breeding activities. Therefore, the

incremental effects of the construction and operation of the Longhorn Alternative when added to the past, present, and RFFAs would result in a moderate cumulative impact to special status species in Segment 1.

Migratory Birds Including Raptors

The direct and indirect effects to migratory birds and raptors from the Longhorn Alternative, as well as the RFFAs and present actions located within the geographic area of influence for migratory birds and raptors for the Longhorn Alternative are the same as those associated with the Proposed Action. Therefore, the cumulative impacts for migratory birds and raptors associated with the Longhorn Alternative would be consistent with those discussed above for the Proposed Action.

Big Game

The RFFAs (i.e., none) and present actions located within the geographic area of influence for big game (i.e., elk and mule deer winter range in game management units crossed by Segment 1) for the Longhorn Alternative are the same as those associated with the Proposed Action. Therefore the cumulative impacts for big game associated with the Longhorn Alternative would be consistent with those discussed above for the Proposed Action.

Longhorn Variation

Federally Proposed, Endangered, Threatened, and Candidate Species

Washington Ground Squirrel

As with the Longhorn Alternative, RFFAs impacting WGS within the geographic area of influence for the Longhorn Variation include the Longhorn Substation, NWSTF Boardman, and the Coal Transfer Station. Additionally, present actions located within the geographic area of influence for the Longhorn Variation are similar to those associated with the Longhorn Alternative. The cumulative impacts for WGS associated with the Longhorn Variation would be consistent with those discussed above for the Longhorn Alternative.

Special Status Species

As with the Longhorn Alternative, RFFAs impacting special status species within the geographic area of influence for the Longhorn Variation include the Longhorn Substation, NWSTF Boardman, and the Coal Transfer Station. Additionally, present actions located within the geographic area of influence for the Longhorn Variation are similar to those associated with the Longhorn Alternative. The cumulative impacts to special status species associated with the Longhorn Variation would be consistent with those discussed above for the Longhorn Alternative.

Migratory Birds Including Raptors

The direct and indirect effects to migratory birds and raptors from the Longhorn Variation, as well as the RFFAs and present actions located within the geographic area of influence for migratory birds and

raptors for the Longhorn Variation are the same as those associated with the Proposed Action. Therefore, the cumulative impacts for migratory birds and raptors associated with the Longhorn Variation would be consistent with those discussed above for the Proposed Action.

Big Game

The RFFAs (i.e., none) and present actions located within the geographic area of influence for big game (i.e., elk and mule deer winter range in game management units crossed by Segment 1) for the Longhorn Variation are the same as those associated with the Proposed Action. Therefore the cumulative impacts for big game associated with the Longhorn Variation would be consistent with those discussed above for the Proposed Action.

Segment 2 – Blue Mountains

There are no identified RFFAs within the geographic area of influence within this segment that would potentially affect wildlife resources. Therefore, there would be no direct effects and no incremental effect contribution to cumulative impacts from RFFAs for the Glass Hill Alternative or the Proposed Action within Segment 2.

Present actions in Segment 2 include irrigated and dry land farming, timber management, grazing, land development, transmission lines, roads, pipelines, wind energy, and various forest management activities. Land development and wind energy activities in this segment are a minor component of the landscape and do not fall within the geographic area of influence for this segment.

The Present actions analyzed for the Glass Hill Alternative are the same as those analyzed for the Proposed Action, therefore the wildlife resources are not analyzed separately for each alternative in this segment.

Federally Proposed, Endangered, Threatened, and Candidate Species

Greater Sage-Grouse

Greater Sage-Grouse numbers have declined rangewide. 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 invasive species expansion, conifer encroachment, drought, and improper livestock grazing management (Connelly et al. 2004). In accordance with BLM WO IM 2012-043 compensatory mitigation for any Project-related impacts on Greater Sage-Grouse or Greater Sage-Grouse habitats would be provided by the applicant. For the selected route for the Project (i.e., Agency Preferred Alternative), the BLM, USFS, ODFW, IDFG, and USFWS will determine the amount, type, and location of off-site mitigation required to avoid or minimize short- and long-term impacts of the Project on Greater Sage-Grouse (Appendix D and Appendix E). Because there would be fragmentation and modification of habitat for Greater Sage-Grouse from direct and indirect effects, the Proposed Action and the Glass Hill Alternative would result in high impacts to Greater Sage-Grouse. Present actions, including dry land farming, timber management, grazing, transmission lines, roads, and pipelines,

continue to impact Greater Sage-Grouse or eliminate Greater Sage-Grouse habitat in Segment 2. Present actions have resulted in high impacts to the Greater Sage-Grouse because of the loss or fragmentation of habitat, disturbance during sensitive periods, and potential for mortality and lek abandonment. Therefore, the incremental effects of the construction and operation of the Proposed Action and Glass Hill Alternative when added to the past and present actions would result in a high cumulative impact to the Greater Sage-Grouse and its habitat in Segment 2.

A decision on the Proposed Plan from the Oregon Sub-Region Greater Sage-Grouse RMP Amendment EIS planning effort is expected in 2015. The Proposed Plan will implement land use allocations, infrastructure development buffers and limitations, and areal disturbance caps that are intended to conserve and enhance Greater Sage-Grouse populations in Oregon into the foreseeable future.

The analysis of cumulative effects on Greater Sage-Grouse assumes that off-site mitigation required for the Proposed Action and other future projects authorized by BLM that may affect the Baker Greater Sage-Grouse population will be sufficient and effective in maintaining or enhancing habitat for the Baker Greater Sage-Grouse population as required under BLM WO IM 2012-43. Consequently, the cumulative effects of the Proposed Action and Glass Hill Alternative, in addition to past and present actions are not expected to result in diminished Greater Sage-Grouse habitat quality or quantity or result in a decrease in the Baker Greater Sage-Grouse population.

Special Status Species

As a result of the Proposed Action and all alternatives in Segment 2, mortality of special status species (without population-level effects), habitat fragmentation, and disturbance during critical or sensitive periods could occur; therefore, the Proposed Action and all alternatives in Segment 2 could result in long-term moderate impacts to special status species. Present actions, including dry land farming, timber management, grazing, transmission lines, roads, pipelines, and forest management activities, continue to eliminate or impact habitat for special status species. Expansion of land development, wind energy and generating stations, and roads and pipelines would have additional incremental effects to special status species. The present actions would result in moderate direct impacts to the special status species because of the potential mortality of individuals, habitat loss, and disruption of breeding activities. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 2 when added to the past and present actions would result in a moderate cumulative impact to special status species in Segment 2.

Migratory Birds Including Raptors

It is well documented that power lines, communication towers, and wind generation facilities cause both direct and indirect moralities to migratory birds and raptors. Project design features associated with the Proposed Action and all alternatives in Segment 2 that were created to reduce impacts to Greater Sage-Grouse, such as perch and nesting site deterrents, would decrease nesting and hunting opportunities for raptors. As a result of the Proposed Action and all alternatives in Segment 2, removal or disturbance to nesting sites for migratory birds and raptors could occur, and indirect effects could cause mortality of migratory birds (with no population-level effect); therefore, the Proposed Action and all alternatives in Segment 2 could result in long-term moderate impacts to migratory birds. Present

actions, including dry land farming, timber management, grazing, transmission lines, roads, pipelines, and forest management activities, continue to eliminate or impact habitat for migratory birds and raptors. No known RFFAs are located within the geographic area of influence for migratory birds (i.e., 0.5 mile from the Proposed Action and alternative centerlines) or bald and golden eagles (i.e., 10 miles from the Proposed Action and alternative centerlines). The present actions would result in moderate direct impacts to the migratory birds and raptors because of the potential mortality of individuals, habitat loss, and disruption of breeding activities. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 2 when added to the past, present, and RFFAs would result in a moderate cumulative impact to migratory birds and raptors in Segment 2.

Big Game

Modification of elk and mule deer winter range, and disturbance during a critical or sensitive period for these big game species could occur as a result of the Proposed Action and Glass Hill Alternative in Segment 2; therefore, the Proposed Action and Glass Hill Alternative Segment 2 could result in long-term moderate impacts to big game. Present actions, including dry land farming, timber management, grazing, transmission lines, roads, pipelines, and forest management activities, continue to eliminate or impact habitat for big game. No RFFAs are located within elk and mule deer winter range in game management units crossed by Segment 2. Present actions would result in moderate direct impacts to big game because of the potential mortality of individuals, habitat loss, fragmentation, and disruption during a critical or sensitive period. Therefore, the incremental effects of the construction and operation of the Proposed Action or Glass Hill Alternative when added to the past and present actions would result in a moderate cumulative impact to big game in Segment 2.

Segment 3 – Baker Valley

There are no identified RFFAs within the geographic area of influence within this segment that would potentially affect wildlife resources. Therefore, there would be no cumulative impacts from RFFAs and no incremental effect contribution from the Flagstaff Alternative, Burnt River Mountain Alternative, or the Proposed Action within Segment 3. Present actions in Segment 3 are identified in Table 3-314. The Present actions analyzed are the same for the Proposed Action and all alternatives, therefore the wildlife resources are not analyzed separately for each alternative in this segment.

Federally Proposed, Endangered, Threatened, and Candidate Species

Greater Sage-Grouse

Greater Sage-Grouse numbers have declined rangewide. 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 invasive species expansion, conifer encroachment, drought, and improper livestock grazing management (Connelly et al. 2004). In accordance with BLM WO IM 2012-043 compensatory mitigation for any Project-related impacts on Greater Sage-Grouse or Greater Sage-Grouse habitats would be provided by the applicant. For the selected route for the Project (i.e., Agency Preferred

Alternative), the BLM, USFS, ODFW, IDFG, and USFWS will determine the amount, type, and location of off-site mitigation required to avoid or minimize short- and long-term impacts of the Project on Greater Sage-Grouse (Appendix D and Appendix E). Because there would be fragmentation and modification of habitat for Greater Sage-Grouse, and there is potential for direct mortality of individuals and lek abandonment from direct and indirect effects, the Proposed Action and all alternatives in Segment 3 would result in high impacts to Greater Sage-Grouse. Present actions, including irrigated farming, grazing, and timber management, continue to impact Greater Sage-Grouse or eliminate Greater Sage-Grouse habitat in Segment 3. Present actions have resulted in high impacts to the Greater Sage-Grouse because of the loss or fragmentation of habitat, disturbance during sensitive periods, and potential for mortality and lek abandonment. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 3 when added to the past and present actions would result in a high cumulative impact to the Greater Sage-Grouse and its habitat in Segment 3.

A decision on the Proposed Plan from the Oregon Sub-Region Greater Sage-Grouse RMP Amendment EIS planning effort is expected in 2015. The Proposed Plan will implement land use allocations, infrastructure development buffers and limitations, and areal disturbance caps that are intended to conserve and enhance Greater Sage-Grouse populations in Oregon into the foreseeable future.

The analysis of cumulative effects on Greater Sage-Grouse assumes that off-site mitigation required for the Proposed Action and all alternatives in Segment 3 and other future projects authorized by BLM that may affect the Baker Greater Sage-Grouse population will be sufficient and effective in maintaining or enhancing habitat for the Baker Greater Sage-Grouse population as required under BLM WO IM 2012-43. Consequently, the cumulative effects of the Proposed Action and all alternatives in Segment 3, in addition to past and present actions are not expected to result in diminished Greater Sage-Grouse habitat quality or quantity or result in a decrease in the Baker Greater Sage-Grouse population.

Special Status Species

As a result of the Proposed Action and all alternatives in Segment 3, mortality of special status species (without population-level effects), habitat fragmentation, and disturbance during critical or sensitive periods could occur; therefore, the Proposed Action and all alternatives in Segment 3 could result in long-term moderate impacts to special status species. Present actions, including irrigated farming, grazing, and timber management, continue to eliminate or impact habitat for special status species in Segment 3. Vegetation removal activities occurring with timber management and the potential expansion of farming and grazing actions increases the potential for noxious weed infestation and habitat loss and fragmentation for special status species. The present actions would result in moderate direct impacts to the special status species because of the potential mortality of individuals, habitat loss, and disruption of breeding activities. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 3 when added to the past and present actions would result in a moderate cumulative impact to special status species in Segment 3.

Migratory Birds Including Raptors

It is well documented that power lines, communication towers, and wind generation facilities cause both direct and indirect moralities to migratory birds and raptors. Project design features associated with the Proposed Action and all alternatives in Segment 3 that were created to reduce impacts to Greater Sage-Grouse, such as perch and nesting site deterrents, would decrease nesting and hunting opportunities for raptors. As a result of the Proposed Action and all alternatives in Segment 3, removal or disturbance to nesting sites for migratory birds and raptors could occur, and indirect effects could cause mortality of migratory birds (with no population-level effect); therefore, the Proposed Action and all alternatives in Segment 3 could result in long-term moderate impacts to migratory birds. Present actions, including irrigated farming, grazing, and timber management, continue to eliminate or impact habitat for migratory birds and raptors. No known RFFAs are located within the geographic area of influence for migratory birds (i.e., 0.5 mile from the Proposed Action and alternative centerlines) or bald and golden eagles (i.e., 10 miles from the Proposed Action and alternative centerlines). The present actions would result in moderate direct impacts to the migratory birds and raptors because of the potential mortality of individuals, habitat loss, and disruption of breeding activities. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 3 when added to the past, present, and RFFAs would result in a moderate cumulative impact to migratory birds and raptors in Segment 3.

USFS Management Indicator Species

The Proposed Action and Timber Canyon Alternative would result in moderate impacts to management indicator species because individuals may be impacted (e.g., increased predation due to introduction of predatory perches, habitat loss, snag removal, disturbance during breeding), but would not result in a population- or species-level effect. Present actions within the geographic area of influence for management indicator species includes mostly irrigated farming and grazing for the Proposed Action and timber management activities along the Timber Canyon Alternative. Farming practices occurring within the geographic area of analysis have the potential to expand in the future, although to a limited extent given the topographic limitations in the locations of these routes. No RFFAs are located within management indicator species habitat within the geographic areas of influence for the Proposed Action and Timber Canyon Alternative. Present actions have resulted in habitat loss and fragmentation for management indicator species but not to a population- or species-level effect; therefore, present actions have resulted in moderate direct effects to management indicator species. Therefore, the incremental effects of the construction and operation of the Proposed Action and Timber Canyon Alternative when added to the past, present, and RFFAs would result in a moderate cumulative impact to management indicator species.

Big Game

Modification of big game winter range and disturbance during a critical or sensitive period for elk, mule deer, and bighorn sheep could occur as a result of the Proposed Action and all alternatives (Burnt River Mountain Alternative only for bighorn sheep) in Segment 3; therefore, the Proposed Action and all alternatives in Segment 3 could result in long-term moderate impacts to big game. Present actions,

including irrigated farming, grazing, and timber management, continue to eliminate or impact habitat for big game. No RFFAs are located within elk and mule deer winter range or occupied bighorn sheep habitat in game management units crossed by Segment 3. Present actions would result in moderate direct impacts to big game because of habitat loss, fragmentation, and disruption during a critical or sensitive period. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 3 when added to the past and present actions would result in a moderate cumulative impact to big game in Segment 3.

SEGMENT 4 – BROGAN AREA

There are no identified RFFAs within the geographic area of influence within this segment that would potentially affect wildlife resources. Therefore, there would be no cumulative impacts from RFFAs and no incremental effect contribution from the Willow Creek Alternative, Tub Mountain Alternative, Proposed Rebuild, or the Proposed Action within Segment 4.

Present actions in Segment 4 would primarily include irrigated and dry land farming. The distribution of farming operations in this segment is limited to the river valleys and has likely been developed to the extent possible given topographic limitations. Any further development of agricultural operations would be limited. The Present actions analyzed are the same for the Proposed Action and all alternatives, therefore the wildlife resources are not analyzed separately for each alternative in this segment.

Federally Proposed, Endangered, Threatened, and Candidate Species

Greater Sage-Grouse

Greater Sage-Grouse numbers have declined rangewide. 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 invasive species expansion, conifer encroachment, drought, and improper livestock grazing management (Connelly et al. 2004). In accordance with BLM WO IM 2012-043 compensatory mitigation for any Project-related impacts on Greater Sage-Grouse or Greater Sage-Grouse habitats would be provided by the applicant. For the selected route for the Project (i.e., Agency Preferred Alternative), the BLM, USFS, ODFW, IDFG, and USFWS will determine the amount, type, and location of off-site mitigation required to avoid or minimize short- and long-term impacts of the Project on Greater Sage-Grouse (Appendix D and Appendix E). Because there would be fragmentation and modification of habitat for Greater Sage-Grouse, and there is potential for mortality of individuals from indirect effects, the Proposed Action and all alternatives in Segment 4 would result in high impacts to Greater Sage-Grouse. Present actions, including mostly irrigated and dry land farming, continue to impact Greater Sage-Grouse or eliminate Greater Sage-Grouse habitat in Segment 4. Present actions have resulted in high impacts to the Greater Sage-Grouse because of the loss or fragmentation of habitat, disturbance during sensitive periods, and potential for mortality. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 4 when added to the past and present actions would result in a high cumulative impact to the Greater Sage-Grouse and its habitat in Segment 4.

A decision on the Proposed Plan from the Oregon Sub-Region Greater Sage-Grouse RMP Amendment EIS planning effort is expected in 2015. The Proposed Plan will implement land use allocations, infrastructure development buffers and limitations, and areal disturbance caps that are intended to conserve and enhance Greater Sage-Grouse populations in Oregon into the foreseeable future.

The analysis of cumulative effects on Greater Sage-Grouse assumes that off-site mitigation required for the Proposed Action and all alternatives in Segment 4 and other future projects authorized by BLM that may affect the Northern Great Basin Greater Sage-Grouse population will be sufficient and effective in maintaining or enhancing habitat for the Northern Great Basin Greater Sage-Grouse population as required under BLM WO IM 2012-43. Consequently, the cumulative effects of the Proposed Action and all alternatives in Segment 4, in addition to past and present actions are not expected to result in diminished Greater Sage-Grouse habitat quality or quantity or result in a decrease in the Northern Great Basin Greater Sage-Grouse population.

Special Status Species

As a result of the Proposed Action and all alternatives in Segment 4, mortality of special status species (without population-level effects), habitat fragmentation, and disturbance during critical or sensitive periods could occur; therefore, the Proposed Action and all alternatives in Segment 4 could result in long-term moderate impacts to special status species. Present actions, including mostly irrigated and dry land farming, continue to eliminate or impact habitat for special status species in Segment 4. The present actions have resulted in moderate direct impacts to special status species because of the loss and fragmentation of habitat. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 4 when added to the past and present actions would result in a moderate cumulative impact to special status species in Segment 4.

Migratory Birds Including Raptors

It is well documented that power lines, communication towers, and wind generation facilities cause both direct and indirect moralities to migratory birds and raptors. Project design features associated with the Proposed Action and all alternatives in Segment 4 that were created to reduce impacts to Greater Sage-Grouse, such as perch and nesting site deterrents, would decrease nesting and hunting opportunities for raptors. As a result of the Proposed Action and all alternatives in Segment 4, removal or disturbance to nesting sites for migratory birds and raptors could occur, and indirect effects could cause mortality of migratory birds (with no population-level effect); therefore, the Proposed Action and all alternatives in Segment 4 could result in long-term moderate impacts to migratory birds. Present actions, including mostly irrigated and dry land farming, continue to eliminate or impact habitat for migratory birds and raptors. No known RFFAs are located within the geographic area of influence for migratory birds (i.e., 0.5 mile from the Proposed Action and alternative centerlines) or bald and golden eagles (i.e., 10 miles from the Proposed Action and alternative centerlines). Present actions would result in moderate direct impacts to the migratory birds and raptors because of the loss and fragmentation of habitat. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 4 when added to the past, present, and RFFAs would result in a moderate cumulative impact to migratory birds and raptors in Segment 4.

Big Game

Modification of big game winter range and disturbance during a critical or sensitive period for elk, mule deer, and pronghorn could occur as a result of the Proposed Action and all alternatives in Segment 4; therefore, the Proposed Action and all alternatives in Segment 4 could result in long-term moderate impacts to big game. Present actions, including mostly irrigated and dry land farming, continue to eliminate or impact habitat for big game. No RFFAs are located within elk, mule deer, and pronghorn winter range or occupied bighorn sheep habitat in game management units crossed by Segment 4. Present actions would result in moderate direct impacts to big game because of the loss and fragmentation of habitat. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 4 when added to the past and present actions would result in a moderate cumulative impact to big game in Segment 4.

SEGMENT 5 – MALHEUR

One RFFA occurs within the vicinity of Segment 5 in Malheur County, the Grassy Mountain Gold Mine. Present actions in Segment 5 would primarily include irrigated and dry land farming as this area is remote and only well-populated farther east of the Proposed Action. Agricultural lands occur within the geographic area of influence for the Proposed Action and all alternatives in Segment 5, though the acreage of agricultural lands present is much larger for the Proposed Action compared to all other alternatives.

Federally Proposed, Endangered, Threatened, and Candidate Species

Columbia Spotted Frog

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 nonnative species (e.g., bullfrog) and possibly climate change (NatureServe 2010). Because there could be direct mortality and a permanent loss of habitat, the Proposed Action and all alternatives in Segment 5 would result in high impacts to the Columbia spotted frog. Present actions, including irrigated and dry land farming, continue to impact Columbia spotted frog or eliminate Columbia spotted frog habitat. One RFFA, the Grassy Mountain Gold Mine, would be located within the geographic area of influence for the Malheur S Alternative only. The present and the Grassy Mountain Gold Mine would result in high direct impacts to the Columbia spotted frog because of the potential mortality of individuals and loss or modification of habitat. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 5 when added to the past, present, and the Grassy Mountain Gold Mine would result in a high cumulative impact to the Columbia spotted frog and its habitat in Segment 5. Wetland mitigation measures and project design criteria should aid in reducing cumulative impacts over time.

Greater Sage-Grouse

Greater Sage-Grouse numbers have declined rangewide. 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 invasive species expansion, conifer encroachment, drought, and improper livestock grazing management (Connelly et al. 2004). In accordance with BLM WO IM 2012-043 compensatory mitigation for any Project-related impacts on Greater Sage-Grouse or Greater Sage-Grouse habitats would be provided by the applicant. For the selected route for the Project (i.e., Agency Preferred Alternative), the BLM, USFS, ODFW, IDFG, and USFWS will determine the amount, type, and location of off-site mitigation required to avoid or minimize short- and long-term impacts of the Project on Greater Sage-Grouse (Appendix D and Appendix E). Because there would be fragmentation and modification of habitat for Greater Sage-Grouse, and there is potential for mortality of individuals from indirect effects, the Proposed Action and all alternatives in Segment 5 would result in high impacts to Greater Sage-Grouse. Present actions, including irrigated and dry land farming, continue to impact Greater Sage-Grouse or eliminate Greater Sage-Grouse habitat. One RFFA, the Grassy Mountain Gold Mine, would be located within the geographic area of influence for the Malheur S Alternative. This gold mine is located in PGH. The construction and operation of the gold mine would result in impacts to the Greater Sage-Grouse, including habitat loss, loss of PGH, fragmentation, and disturbance during sensitive periods. The present actions and the RFFA would result in high direct impacts to Greater Sage-Grouse because of the loss or fragmentation of habitat, disturbance during sensitive periods, and potential for mortality. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 5 when added to the past and present actions and the Grassy Mountain Gold Mine would result in a high cumulative impact to the Greater Sage-Grouse and its habitat in Segment 5.

A decision on the Proposed Plan from the Oregon Sub-Region Greater Sage-Grouse RMP Amendment EIS planning effort is expected in 2015. The Proposed Plan will implement land use allocations, infrastructure development buffers and limitations, and areal disturbance caps that are intended to conserve and enhance Greater Sage-Grouse populations in Oregon into the foreseeable future.

The analysis of cumulative effects on Greater Sage-Grouse assumes that off-site mitigation required for the Proposed Action and all alternatives in Segment 5 and other future projects authorized by BLM that may affect the Northern Great Basin Greater Sage-Grouse population will be sufficient and effective in maintaining or enhancing habitat for the Northern Great Basin Greater Sage-Grouse population as required under BLM WO IM 2012-43. Consequently, the cumulative effects of the Proposed Action and all alternatives in Segment 5, in addition to past, present, and the Grassy Mountain Gold Mine, are not expected to result in diminished Greater Sage-Grouse habitat quality or quantity or result in a decrease in the Northern Great Basin Greater Sage-Grouse population.

Special Status Species

As a result of the Proposed Action and all alternatives in Segment 5, mortality of special status species (without population-level effects), habitat fragmentation, and disturbance during critical or sensitive periods could occur; therefore, the Proposed Action and all alternatives in Segment 5 could result in long-term moderate impacts to special status species. Present actions, including irrigated and dry land farming, continue to eliminate or impact habitat for special status species. There is one RFFA, the Grassy Mountain Gold Mine, in Segment 5; it is located within the geographic area of influence for the

Malheur S Alternative only. Due to the gold mine in the analysis area for the Malheur S Alternative and the large acreage of agricultural lands in the analysis area for the Proposed Action, there would be more cumulative impacts to special status species from the Proposed Action and the Malheur S Alternative compared to a lower level of cumulative impacts to special status species in the analysis areas for the Double Mountain and Malheur A alternatives. The present actions and the RFFAs would result in moderate direct impacts to the special status species because of the potential mortality of individuals, habitat loss and fragmentation, and disturbance during sensitive periods. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 5 when added to the past and present actions and the Grassy Mountain Gold Mine would result in a moderate cumulative impact to special status species in Segment 5.

Migratory Birds Including Raptors

It is well documented that power lines, communication towers, and wind generation facilities cause both direct and indirect moralities to migratory birds and raptors. Project design features associated with the Proposed Action and all alternatives in Segment 5 that were created to reduce impacts to Greater Sage-Grouse, such as perch and nesting site deterrents, would decrease nesting and hunting opportunities for raptors. As a result of the Proposed Action and all alternatives in Segment 5, removal or disturbance to nesting sites for migratory birds and raptors could occur, and indirect effects could cause mortality of migratory birds (with no population-level effect); therefore, the Proposed Action and all alternatives in Segment 5 could result in long-term moderate impacts to migratory birds. Present actions, including irrigated and dry land farming, continue to eliminate or impact habitat for migratory birds and raptors. There are no RFFAs in the geographic area of influence for the Proposed Action and all alternatives for migratory birds. However, there is one RFFA in Segment 5, the Grassy Mountain Gold Mine, located within the geographic area of influence for bald and golden eagles, associated with the Malheur S Alternative only. Due to the gold mine in the analysis area for the Malheur S Alternative and the large acreage of agricultural lands in the analysis area for the Proposed Action, there would be more cumulative impacts to eagles from the Proposed Action and the Malheur S Alternative compared to a lower level of cumulative impacts to eagles in the analysis areas for the Double Mountain and Malheur A alternatives. Present and RFFA would result in moderate direct impacts to the migratory birds and raptors because of the loss and fragmentation of habitat. Therefore, the incremental effects of the construction and operation of the Proposed Action and all alternatives in Segment 5 when added to the past and present actions and the Grassy Mountain Gold Mine would result in a moderate cumulative impact to migratory birds and raptors in Segment 5.

Big Game

Modification of mule deer and pronghorn winter range and disturbance during a critical or sensitive period for these big game species could occur as a result of the Proposed Action and all alternatives in Segment 5; therefore, the Proposed Action and all alternatives in Segment 5 could result in long-term moderate impacts to big game. Present actions, including irrigated and dry land farming, continue to eliminate or impact habitat for big game. No RFFAs are located within mule deer and pronghorn winter range in game management units crossed by Segment 5. Present actions would result in moderate direct impacts to big game because of the loss and fragmentation of habitat. Therefore, the incremental

effects of the construction and operation of the Proposed Action and all alternatives in Segment 5 when added to the past and present actions would result in a moderate cumulative impact to big game in Segment 5.

SEGMENT 6 – TREASURE VALLEY

One RFFA occurs within the vicinity of Segment 6, the Gateway West transmission line.

Present actions in this area include operation and maintenance of the Hemingway substation as well as irrigated and dry land farming. The area surrounding the Proposed Action geographic area of influence has been developed and topography will likely limit further expansion of farming operations in this area. The incremental contribution to cumulative effects of present actions would be low.

Federally Proposed, Endangered, Threatened, and Candidate Species

Columbia Spotted Frog

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 nonnative species (e.g., bullfrog) and possibly climate change (NatureServe 2010). Because there could be direct mortality and a permanent loss of habitat, the Proposed Action in Segment 6 would result in high impacts to the Columbia spotted frog. Present actions, including operation and maintenance of the Hemingway substation as well as irrigated and dry land farming, continue to impact Columbia spotted frog or eliminate Columbia spotted frog habitat. One RFFA, the Gateway West transmission line, would be located within the geographic area of influence for the Proposed Action. The present and RFFAs would result in high direct impacts to the Columbia spotted frog because of the potential mortality of individuals and loss or modification of habitat. Therefore, the incremental effects of the construction and operation of the Proposed Action in Segment 6 when added to the past, present, and RFFAs would result in a high cumulative impact to the Columbia spotted frog and its habitat in Segment 6. Wetland mitigation measures and project design criteria should aid in reducing cumulative impacts over time.

Greater Sage-Grouse

Greater Sage-Grouse numbers have declined rangewide. 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 invasive species expansion, conifer encroachment, drought, and improper livestock grazing management (Connelly et al. 2004). In accordance with BLM WO IM 2012-043 compensatory mitigation for any Project-related impacts on Greater Sage-Grouse or Greater Sage-Grouse habitats would be provided by the applicant. For the selected route for the Project (i.e., Agency Preferred Alternative), the BLM, USFS, ODFW, IDFG, and USFWS will determine the amount, type, and location of off-site mitigation required to avoid or minimize short- and long-term impacts of the Project on Greater Sage-Grouse (Appendix D and Appendix E). Because there would be a permanent loss of habitat for Greater Sage-Grouse, the Proposed Action in Segment 6 would result in high impacts to

Greater Sage-Grouse. Present actions, including operation and maintenance of the Hemingway substation as well as irrigated and dry land farming, continue to impact Greater Sage-Grouse or eliminate Greater Sage-Grouse habitat. There is one RFFA, the Gateway West transmission line, in Segment 6. The present actions and the Gateway West transmission line would result in high direct impacts to Greater Sage-Grouse because of the loss or fragmentation of habitat. Therefore, the incremental effects of the construction and operation of the Proposed Action in Segment 6 when added to the past and present actions and the Gateway West transmission line would result in a high cumulative impact to the Greater Sage-Grouse and its habitat in Segment 6.

The analysis of cumulative effects on Greater Sage-Grouse assumes that off-site mitigation required for the Proposed Action in Segment 6 and other future projects authorized by BLM that may affect the Northern Great Basin Greater Sage-Grouse population will be sufficient and effective in maintaining or enhancing habitat for the Northern Great Basin Greater Sage-Grouse population as required under BLM WO IM 2012-43. Consequently, the cumulative effects of the Proposed Action in Segment 6, in addition to past, present, and the Gateway West transmission line, are not expected to result in diminished Greater Sage-Grouse habitat quality or quantity or result in a decrease in the Northern Great Basin Greater Sage-Grouse population.

Special Status Species

As a result of the Proposed Action in Segment 6, mortality of special status species (without population-level effects), habitat fragmentation, and disturbance during critical or sensitive periods could occur; therefore, the Proposed Action in Segment 6 could result in long-term moderate impacts to special status species. Present actions, including operation and maintenance of the Hemingway substation as well as irrigated and dry land farming, continue to eliminate or impact habitat for special status species. There is one RFFA, the Gateway West transmission line, in Segment 6. The Gateway West alternatives would primarily impact special status species utilizing shrubland habitat within the geographic area of influence for the Proposed Action. One of the three Gateway West alternatives would traverse agricultural lands outside the geographic area of influence for the Proposed Action. The present actions and the Gateway West transmission line would result in moderate direct impacts to special status species because of the potential mortality of individuals, habitat loss, and disruption of breeding activities. Therefore, the incremental effects of the construction and operation of the Proposed Action in Segment 6 when added to the past, present, and RFFAs would result in a moderate cumulative impact to special status species in Segment 6.

Present actions within the geographic area of influence for special status species in Segment 6 include operation and maintenance of the Hemingway substation as well as irrigated and dry land farming. The conversion of habitat for farming has resulted in habitat loss and fragmentation for special status species. The Gateway West alternatives would primarily impact special status species utilizing shrubland habitat within the geographic area of influence for the Proposed Action. One of the three Gateway West alternatives would traverse agricultural lands outside the geographic area of influence for the Proposed Action. Therefore the cumulative impact to special status species in the geographic area of influence for the Proposed Action when added to present actions and the RFFA in Segment 6 would be moderate over the short term and long term.

Migratory Birds Including Raptors

It is well documented that power lines, communication towers, and wind generation facilities cause both direct and indirect moralities to migratory birds and raptors. Project design features associated with the Proposed Action in Segment 6 that were created to reduce impacts to Greater Sage-Grouse, such as perch and nesting site deterrents, would decrease nesting and hunting opportunities for raptors. As a result of the Proposed Action in Segment 6, removal or disturbance to nesting sites for migratory birds and raptors could occur, and indirect effects could cause mortality of migratory birds (with no population-level effect); therefore, the Proposed Action in Segment 6 could result in long-term moderate impacts to migratory birds including raptors. Present actions, including operation and maintenance of the Hemingway substation as well as irrigated and dry land farming, continue to eliminate or impact habitat for migratory birds and raptors. The Gateway West alternatives would primarily impact migratory birds that utilize shrubland habitat. Present and RFFAs would result in moderate direct impacts to the migratory birds including raptors because of the potential mortality of individuals, habitat loss, and disruption of breeding activities. Therefore, the incremental effects of the construction and operation of the Proposed Action in Segment 6 when added to the past, present, and RFFAs would result in a moderate cumulative impact to migratory birds and raptors in Segment 6.

Big Game

Modification of mule deer and pronghorn winter range and bighorn sheep population management units, and disturbance during a critical or sensitive period for these big game species could occur as a result of the Proposed Action in Segment 6; therefore, the Proposed Action in Segment 6 could result in long-term moderate impacts to big game. Present actions, including operation and maintenance of the Hemingway substation as well as irrigated and dry land farming, continue to eliminate or impact habitat for big game. The Gateway West transmission line would cross within pronghorn winter range in game management units. Present actions and the Gateway West transmission line would result in moderate direct impacts to big game because of the potential mortality of individuals, habitat loss, fragmentation, and disruption during a critical or sensitive period. Therefore, the incremental effects of the construction and operation of the Proposed Action in Segment 6 when added to the Gateway West transmission line and present actions would result in a moderate cumulative impact to big game in Segment 6.

Summary of Cumulative Effects

The intensity of cumulative effects to wildlife is the same for the Proposed Action and all alternatives so no distinction is made between alternatives or among Project Segments. The summary of long-term cumulative effects to wildlife is provided in Table 3-316.

Table 3-316. Cumulative Effects on Wildlife

Resource	Type of Impact	Analysis Area	Cumulative Effect
Columbia spotted frog	Mortality, soil erosion, sedimentation, habitat modification, fragmentation	Mapped riparian and wetland polygons within 0.5 mile of the Proposed Action and alternative centerlines and access road centerlines.	Moderate
Greater Sage-Grouse	Mortality, noise disturbance, human presence, disruption of breeding & foraging behaviors, habitat loss & modification, fragmentation, predation	Preliminary Priority Habitat (PPH), Preliminary General Habitat (PGH) and restoration habitat polygons that are crossed by the Proposed Action and alternative centerlines and access roads, plus areas within 11 miles of known Greater Sage-Grouse leks that are located within 5 miles of the Proposed Action and alternative centerlines and access roads.	High
Washington ground squirrel	Mortality, noise disturbance, human presence, habitat loss & modification, predation	Areas of suitable habitat within 0.5 mile of Proposed Action and alternative centerlines and 50 feet from access road centerlines.	High
Special status species	Mortality, noise disturbance, human presence, disruption of breeding & foraging behavior, habitat loss & modification, fragmentation and loss of connectivity	Areas of suitable habitat within 0.5 mile of Proposed Action and alternative centerlines and 50 feet from access road centerlines.	Moderate
Management indicator species	Mortality, noise disturbance, human presence, disruption of breeding & foraging behavior, habitat loss & modification, fragmentation and loss of connectivity	Areas of suitable habitat within 0.5 mile of Proposed Action and alternative centerlines and 50 feet from access road centerlines.	Moderate

Resource	Type of Impact	Analysis Area	Cumulative Effect
Migratory birds including raptors	Mortality, noise disturbance, human presence, disruption of foraging behavior, habitat loss & modification, fragmentation	Areas within 0.5 mile of the Proposed Action and alternative centerlines. Known locations of eagle nests and suitable winter roosting habitat within 10 miles of the Proposed Action and alternative centerlines.	Moderate
Big game (elk, mule deer, bighorn sheep, pronghorn)	Mortality, noise disturbance, human presence, disruption of foraging behavior, habitat loss & modification, fragmentation and loss of connectivity	Mapped extent of herd unit areas of crucial wintering and parturition crossed by the Proposed Action and alternative centerlines and by access roads.	Moderate

3.3.4.5 Fish Resources

Methodology

The geographic area of influence for the analysis of cumulative impacts to the fish species and their habitat is defined as the sub-basins (4th level HUCs) that would be crossed by the Proposed Action and alternatives. Any present actions and reasonably foreseeable future actions (RFFA) within this geographic area of influence was evaluated. The present actions and RFFAs are listed in Table 3-314 and Table 3-315. These are the actions considered in the fish resource cumulative analysis.

The consideration of past actions is reflected in current environmental conditions as established in the affected environment baseline conditions. For this analysis cumulative fisheries impacts for the geographic area of influence are the combined direct effects of the present and RFFAs plus the direct impacts of the Proposed Action and alternatives. The contribution to fisheries cumulative impacts by the Proposed Action and alternatives are assessed in terms of the temporary displacement of fish species, potential mortality of the fish species under consideration, disturbance to species during critical periods, and loss or modification of habitat. Each of the alternatives is evaluated using the similar criteria as the direct impact methodology with some modification. The specifics of the present actions and RFFAs (such as the building configuration, layout of turbines, design features, alignment of transmission lines, amount of vegetation removal, and location and type of road crossings) of the project components associated with the actions are not known at this time, which results in a more qualitative than quantitative assessment of cumulative impacts. The specific number of road stream crossings and the proximity of ground disturbance of any present or RFFAs are not known.

The levels of direct and cumulative impacts are categorized as high, moderate, or low impact based on the same thresholds as defined in the fisheries section (Section 3.2.5). If the direct impacts to fisheries resources were considered to be none or negligible as a result of the construction and maintenance of the Proposed Action or alternatives, there would be no contribution to cumulative impacts to fisheries resources. In addition, there would be no cumulative impacts if there would be no direct impacts from present and RFFA because there were no identified actions within the geographic area of influence.

The following narrative summarizes the cumulative fish resources impacts by segment and alternative with the exception of the impacts that would encompass multiple segments because of their physical location. There are no RFFAs or present actions to associate with impacts to fish resources in Segments 2 and 3 so the respective sections of the Proposed Action as well as the Flagstaff, Glass Hill, Timber Canyon, and Burnt River Mountain alternatives would not contribute to cumulative impacts.

SEGMENT 1—MORROW-UMATILLA

The Proposed Action and alternatives in Segment 1 are within the Middle Columbia-Lake Wallula, Willow, and Umatilla watersheds. Table 3-317 provides the estimated number of streams potentially effected as well as whether or not the Proposed Action, alternatives, or the RFFAs would potentially be present within 1,000 feet of listed or sensitive fish species.

Table 3-317. Reasonably Foreseeable Future Actions, Proposed Action, Horn Butte, Longhorn Alternative, and Longhorn Variation within the Geographic Area of Influence for Cumulative Impact for Fish Resources in Segment 1

Name of Action	Watershed	Estimated Number of Streams Potentially Effected	Listed or Sensitive Fish-Species Potentially Present at or within 1,000 feet
Coal Transfer Station	Middle Columbia-Lake Wallula	0	Yes
Ella Butte Wind Power Project	Willow	1	None
Longhorn Substation	Middle Columbia-Lake Wallula	0	Yes
Naval Weapons System Training Facility Boardman	Middle Columbia-Lake Wallula	1	None
Perennial Wind Chaser Station	Umatilla	1	None
Rackspace Data Center	Middle Columbia-Lake Wallula	0	Yes
Saddle Butte Wind Park	Willow	27	None
U.S. 730 Corridor Refinement Plan (2007);	Middle Columbia-Lake Wallula	1	Yes

Name of Action	Watershed	Estimated Number of Streams Potentially Effected	Listed or Sensitive Fish-Species Potentially Present at or within 1,000 feet
Proposed Action	Middle Columbia-Lake Wallula, Willow, and Umatilla	91	Yes
Horn Butte	Middle Columbia-Lake Wallula and Willow,	91	Yes
Longhorn Alternative	Middle Columbia-Lake Wallula and Umatilla	74	Yes
Longhorn Variation	Middle Columbia-Lake Wallula and Umatilla	74	Yes

Proposed Action

The Proposed Action in Segment 1 would have low to moderate direct effects to Middle Columbia River steelhead and designated critical habitat in addition to low indirect effect to coho salmon essential fish habitat. There could also be moderate direct and indirect effects to sensitive fish species and habitats due to the quantity of streams potentially affected by the Proposed Action. This may result in the mortality of listed species as well as for sensitive and other non-listed fish because of the modification of the habitat during construction. Similarly, there would be moderate direct and indirect effects associated with the RFFAs in Segment 1, with the potential to disturb 31 streams and low to moderate direct effects to Middle Columbia River steelhead and indirect effects to the essential fish habitat for the coho salmon. The RFFAs may also result in the mortality of listed, sensitive and other non-listed fish species because of the modification of the habitat during construction of the various projects. The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would be a moderate adverse cumulative impact on fish resources within the Proposed Action's geographic area of influence.

Horn Butte Alternative

The Horn Butte Alternative would have the same effects to sensitive fish species and habitats as the Proposed Action. Therefore, the incremental effect of the construction and operation of Horn Butte Alternative when added to the past, present, and RFFA would be a moderate adverse cumulative impact on fish resources.

Longhorn Alternative

The Longhorn Alternative would have the similar effects to sensitive fish species and habitats as the Proposed Action. Therefore, the incremental effect of the construction and operation of Longhorn Alternative when added to the past, present, and RFFA would be a moderate adverse cumulative impact on fish resources.

Longhorn Variation

The Longhorn Variation would have the similar effects to sensitive fish species and habitats as the Proposed Action. Therefore, the incremental effect of the construction and operation of Longhorn Variation when added to the past, present, and RFFA would be a moderate adverse cumulative impact on fish resources.

Segment 4—Brogan Area

The Proposed Action and alternatives in Segment 4 are within the Bully, Burnt, Brownlee Reservoir, Willow, and Lower Malheur watersheds. Table 3-318 summarizes the cumulative impacts to fish species and habitats in Segment 4. There is no designated critical habitat or Essential Fish Habitat present in the watersheds within Segment 4.

Table 3-318. Reasonably Foreseeable Future Actions, Proposed Action, Horn Butte, Longhorn Alternative, and Longhorn Variation within the Geographic Area of Influence for Cumulative Impact for Fish Resources in Segment 4

Name of Action	Watershed	Estimated Number of Streams Potentially Effected	Listed or Sensitive Fish-Species Present at or within 1,000 feet
Lime Windfarms	Burnt/Brownlee Reservoir	0	None
Malheur Queen Placer	Willow	2	None
Neal Hot Springs Geothermal	Bully	0	None
Proposed Action	Bully, Burnt, Brownlee Reservoir, Willow, and Lower Malheur	57	Yes
Tub Mountain South	Bully, Burnt, Brownlee Reservoir, Willow, and Lower Malheur	25	Yes
Willow Creek Alternative	Burnt, Brownlee Reservoir, Willow, and Lower Malheur	14	Yes

Proposed Action

The streams in Segment 4 are not known to support anadromous fish species. Redband trout, a sensitive species, are known to occur at one stream crossing in the Durbin Creek watershed. Short-term direct and indirect construction effects to redband trout for the Proposed Action in Segment 4 would be moderate, due to the potential for mortality, but localized and limited in duration to the construction period. Direct and indirect short-term construction effects of the Proposed Action to general fish species and habitats would be low, because of temporary displacement and the potential for inadvertent mortality of non-sensitive species Indirect long-term effects from operations would be

low in that disturbance would be localized, temporary and infrequent (several maintenance trips per year). There would be a negligible effect associated with the RFFAs in Segment 4, with the potential to disturb two streams and no potential impacts to federally listed or sensitive species. The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would be a moderate adverse cumulative impact on fish resources within the geographic area of influence.

Tub Mountain South Alternative

The Tub Mountain South Alternative would have 25 stream crossings. Similar to the Proposed Action, these effected streams not known to support anadromous fish populations. Direct and indirect short-term construction effects of the Tub Mountain South Alternative to general fish species and habitats would be low, because of temporary displacement and the potential for inadvertent mortality of non-sensitive species. Short-term direct and indirect construction effects to redband trout for the Tub Mountain South Alternative would be moderate, due to the potential for mortality, but localized and limited in duration to the construction period. Long-term indirect effects of project operations would be low in that disturbance would be localized, temporary and infrequent (several maintenance trips per year). There would be negligible effects associated with the RFFAs in Segment 4, with the potential to disturb two streams and no potential impacts to federally listed or sensitive species. The incremental effect of the construction and operation of the Tub Mountain South Alternative when added to the past, present, and RFFA would be a moderate adverse cumulative impact on fish resources within the geographic area of influence.

Willow Creek Alternative

The streams that Willow Creek Alternative would cross are not known to support anadromous fish populations; however, resident fish (redband trout) are known to occur at or near four of the proposed crossings within the Durbin Creek-Burnt River and Benson Creek watersheds. Direct and indirect short-term construction effects of the Willow Creek Alternative to general fish species and habitats would be low, because of temporary displacement and the potential for inadvertent mortality of non-sensitive species Indirect long-term effects from operations would be low in that disturbance would be localized, temporary and infrequent (several maintenance trips per year). There would be a negligible effect associated with the RFFAs in Segment 4, with the potential to disturb two streams and no potential impacts to federally listed or sensitive species. The incremental effect of the construction and operation of the Willow Creek Alternative when added to the past, present, and RFFA would be a low adverse cumulative impact on fish resources within the geographic area of influence.

Segment 5—Malheur

The Proposed Action, alternatives, present actions, and RFFAs in Segment 5 are within the Lower Malheur, Lower Owyhee, Burnt, and Middle Snake-Succor watersheds. Table 3-319 summarizes the cumulative impacts to fish species and habitats in this segment. There is no designated critical habitat or Essential Fish Habitat present in the watersheds within Segment 5.

Table 3-319. Reasonably Foreseeable Future Actions, Proposed Action, Horn Butte, Longhorn Alternative, and Longhorn Variation within the Geographic Area of Influence for Cumulative Impact for Fish Resources in Segment 5

Name of Action	Watershed	Estimated Number of Streams Potentially Effected	Listed or Sensitive Fish-Species Present at or within 1,000 feet
Grassy Mountain Gold	Lower Malheur	3	None
Huntington Windfarms	Burnt	0	None
Proposed Action	Lower Malheur, Lower Owyhee and Middle Snake-Succor	42	Yes
Malheur S	Lower Malheur, Lower Owyhee and Middle Snake-Succor	65	Yes
Malheur A	Lower Malheur, Lower Owyhee and Middle Snake-Succor	64	Yes
Double Mountain	Lower Malheur	12	None

PROPOSED ACTION

Direct and indirect short-term construction effects of the Proposed Action to general fish species and habitats in Segment 5 would be low, because of temporary displacement and the potential for inadvertent mortality of non-sensitive species Indirect long-term effects from operations would be low in that disturbance would be localized, temporary and infrequent (several maintenance trips per year).. Short-term direct and indirect construction effects to redband trout for the Proposed Action in Segment 5 would be moderate, due to the potential for mortality, but localized and limited in duration to the construction period. Long-term indirect effects of project operations would be low in that disturbance would be localized, temporary and infrequent (several maintenance trips per year). There would be a negligible effect associated with the RFFAs in Segment 5, with the potential to disturb three streams and no potential impacts to federally listed or sensitive species. The incremental effect of the construction and operation of the Proposed when added to the past, present, and RFFA would be a moderate adverse cumulative impact on fish resources within the geographic area of influence.

Malheur S Alternative

The Malheur S Alternative would have the similar effects to sensitive fish species and habitats as the Proposed Action. Therefore, the incremental effect of the construction and operation of Malheur S Alternative when added to the past, present, and RFFA would be a moderate adverse cumulative impact on fish resources.

Malheur A Alternative

The Malheur A Alternative would have the similar effects to sensitive fish species and habitats as the Proposed Action. Therefore, the incremental effect of the construction and operation of Malheur A Alternative when added to the past, present, and RFFA would be a moderate adverse cumulative impact on fish resources.

Double Mountain Alternative

The Double Mountain Alternative would have 12 stream crossings. The streams in the analysis area for this alternative are not known to support any resident or anadromous fish populations. Direct and indirect short-term construction effects of the Double Mountain Alternative to general fish species and habitats would be low, because of temporary displacement and the potential for inadvertent mortality of non-sensitive species Indirect long-term effects from operations would be low in that disturbance would be localized, temporary and infrequent (several maintenance trips per year). There would be a negligible effect associated with the RFFAs in Segment 5, with the potential to disturb three streams and no potential impacts to federally listed or sensitive species. The incremental effect of the construction and operation of the Proposed when added to the past, present, and RFFA would be a low adverse cumulative impact on fish resources within the geographic area of influence.

SEGMENT 6—TREASURE VALLEY SEGMENT

The Proposed Action, present actions, and RFFAs in Segment 6 are within the Middle Snake-Succor watershed. Table 3-320 summarizes the cumulative impacts to fish species and habitats in this segment. There is no designated critical habitat or Essential Fish Habitat present in the Middle Snake-Succor watershed within Segment 6.

Table 3-320. Reasonably Foreseeable Future Actions, Proposed Action, Horn Butte, Longhorn Alternative, and Longhorn Variation within the Geographic Area of Influence for Cumulative Impact for Fish Resources in Segment 6

Name of Action	Sub-basin (4th level HUC)	Estimated Number of Streams Potentially Effected	Listed or Sensitive Fish-Species Present at or within 1,000 feet
Gateway West Transmission Line	Middle Snake-Succor	31	None
Proposed Action	Middle Snake-Succor	53	Yes

PROPOSED ACTION

Of the 53 stream crossings that the Proposed Action would cross, these streams are not known to support anadromous fish species. Redband trout are known to occur at three stream crossings. Short-term direct and indirect construction effects to redband trout for the Proposed Action would be moderate, due to the potential for mortality, but localized and limited in duration to the construction period. Direct and indirect short-term construction effects of the Proposed Action to general fish species

and habitats in Segment 6 would be low, because of temporary displacement and the potential for inadvertent mortality of non-sensitive species Long-term indirect effects of project operations would be low in that disturbance would be localized, temporary and infrequent (several maintenance trips per year). There would be a low direct and indirect effect associated with the RFFA in Segment 6, with the potential to disturb 31 streams and no potential impacts to federally listed or sensitive species. The incremental effect of the construction and operation of the Proposed when added to the past, present, and RFFA would be a moderate adverse cumulative impact on fish resources within the geographic area of influence.

3.3.4.6 Land Use, Agriculture, Recreation and Transportation

Methodology

The cumulative impacts analysis area for land use, agriculture, recreation and transportation is the area within 0.5 miles of the Proposed Action and alternative centerlines, and within 50 feet of the access roads and ancillary facilities (Table 3-313). Present actions and reasonably foreseeable future actions (RFFA) within the cumulative impacts analysis area were evaluated for effects similar to those for the Proposed Action and alternatives. The present actions and RFFAs are identified in Table 3-314 and Table 3-315. For this analysis, cumulative impacts for the cumulative impacts analysis area are the combined direct and indirect effects of the present actions and RFFAs plus the direct and indirect impacts of the Proposed Action and alternatives.

The levels of cumulative impacts are described as high, moderate, or low. These cumulative impact levels are based on the thresholds defined in the Land Use, Agriculture, Recreation, and Transportation section (Section 3.2.6). If the direct and indirect impacts to were considered to be none or negligible as a result of the construction and maintenance of the Proposed Action or alternatives, there would be no contribution to cumulative impacts to land use, agriculture, recreation, and transportation. In addition, there would be no cumulative impacts if there would be no direct or indirect impacts from present actions and RFFAs because either there were no identified actions within the cumulative impact analysis area or the actions would result in negligible or no impacts. RFFAs and present actions that occur outside the cumulative impacts analysis area of 0.5 mile of the Proposed Action and alternative centerlines are not addressed in the cumulative analysis.

Land Use and Agriculture

Segment 1 - Morrow - Umatilla

The majority of the land in Segment 1 is privately owned. Nearly 99 percent of county zoning in the analysis area is zoned for agricultural uses with 90 percent of the land area zoned for Exclusive Farm Use.

The RFFAs within the cumulative impact analysis area are the Umatilla Electric Cooperative transmission line, Bonneville Power Administration’s Longhorn Substation, the Morrow Flat Substation

and the expansion of operations at the Naval Weapons System Training Facility Boardman. The transmission line and substation are in the cumulative impact analysis area for the Longhorn Alternative and Longhorn Variation but not in the analysis area for the Proposed Action and Horn Butte Alternative. The footprint of the substation would be approximately 33 acres. The footprint of the transmission line would depend on the final design of the alignment. The Naval Weapons System Training Facility Boardman is with the analysis area of the Proposed Action, Horn Butte Alternative, Longhorn Alternative, and Longhorn Variation.

Proposed Action- Land Use

The direct and indirect effects to land uses from the Proposed Action were determined to be low because the effects would not preclude the use of the area for agricultural, grazing and resource development uses. The only RFFA within the cumulative impact analysis area for the Proposed Action is the expansion of operations at the Naval Weapons System Training Facility Boardman. The expansion of operations is not proposed to increase the footprint of the facility. Increased operations would not incrementally contribute to direct impacts to land use. The present actions within the cumulative impact analysis area of the Proposed Action include agricultural use, land development, and energy projects. The incremental effect of the Proposed Action when combined with the existing conditions associated with the present actions would result in a low cumulative impact to land use.

Horn Butte Alternative- Land Use

The direct effects to land uses property from the Horn Butte Alternative were determined to be low in the context of overall area land uses. The only RFFA within the cumulative impact analysis area for the Horn Butte Alternative is the expansion of operations at the Naval Weapons System Training Facility Boardman. Similar to the Proposed Action, there would not be any incremental contribution to cumulative impacts associated with the Naval Weapons System Training Facility Boardman. Therefore, the incremental effect of the Horn Butte Alternative when combined with present actions related to agricultural use, land development, and energy projects would result in a low cumulative impact to land use.

Longhorn Alternative – Land Use

The direct effects to land uses from the Longhorn Alternative were determined to be low in the context of overall area land uses. The RFFAs associated with the Longhorn Alternative analysis area include the Naval Weapons System Training Facility Boardman, the Umatilla Electric Cooperative transmission line, the Morrow Flat Substation and the Bonneville Power Administration's Longhorn Substation. Similar to the Proposed Action, increased operations at the Naval Weapons System Training Facility Boardman without expansion of the existing footprint would not incrementally contribute to impacts to land use so there would be no cumulative impact associated with the facility. Since agricultural use is the primary land use in the analysis area for the Longhorn Alternative, the transmission line and substation would likely preclude agricultural uses within the associated right-of-way and footprint. The footprint of the substations would be approximately 33 acres and the footprint and alignment of the transmission line is not known. The impact from the transmission line and substation facilities would incrementally contribute to moderate direct impacts to land use within the cumulative impact analysis

area. The anticipated disturbance of the transmission line and substations combined with the direct impacts created by the Longhorn Alternative would result in a moderate cumulative impact.

Longhorn Variation - Land Use

The cumulative effects to land use for the analysis area for the Longhorn Variation would be the same as those associated with the Longhorn Alternative.

Proposed Action - Agriculture

The direct effects to agricultural lands from the Proposed Action were determined to have a low impact on agricultural operations. The only RFFA within the cumulative impact analysis area for the Proposed Action is the expansion of operations at the Naval Weapons System Training Facility Boardman. The expansion of operations is not proposed to increase the footprint of the facility and would not incrementally contribute to impacts to agricultural operations. Therefore, there would be no incremental contribution to cumulative impact associated with the facility. The present actions within the cumulative impact analysis area of the Proposed Action include agricultural use, land development, and energy projects. The incremental effect of the Proposed Action when combined with the existing conditions associated with the present actions would result in a low cumulative impact to agricultural use.

Horn Butte Alternative - Agriculture

The direct effects to agricultural operations from the Horn Butte Alternative were determined to be low in the context of the scale of agricultural activity in the analysis area. The only RFFA within the cumulative impact analysis area for the Horn Butte Alternative is the expansion of operations at the Naval Weapons System Training Facility Boardman. Similar to the Proposed Action, there would not be incremental contribution to land use cumulative impacts associated with the Naval Weapons System Training Facility Boardman. Therefore, the incremental effect of the Horn Butte Alternative when combined with existing agricultural use, land development, and energy projects would result in a low cumulative impact to agricultural operations.

Longhorn Alternative - Agriculture

The direct effects to private property from the Longhorn Alternative were determined to be moderate due to the long-term removal of tree crops in the right-of-way. The RFFAs associated with the Longhorn Alternative analysis area include the Naval Weapons System Training Facility Boardman, the Umatilla Electric Cooperative transmission line, the Morrow Flat Substation and the Bonneville Power Administration's Longhorn Substation. Similar to the Proposed Action, increased operations at the Naval Weapons System Training Facility Boardman without expansion of the existing footprint would not incrementally contribute to impacts to agricultural operations and as a result, there would be no incremental contribution to land use cumulative impacts associated with the facility. The moderate direct and indirect impacts from the transmission line and substation facilities would incrementally contribute to conversion of agricultural lands to other uses. These developments would likely preclude agricultural uses, specifically the tree crops within the associated right-of-way and footprint. The footprint of the substations would be approximately 33 acres and the footprint and alignment of the

transmission line is not known. Therefore, the anticipated disturbance of the transmission line and substations combined with the incremental contribution of the direct impacts from the Longhorn Alternative would result in a moderate cumulative impact.

Longhorn Variation - Agriculture

The direct effects to agricultural operations from the Longhorn Variation were determined to be low in the context of the scale of agricultural activity in the analysis area. Similar to the Proposed Action, there would not be any incremental contribution to cumulative impacts associated with the Naval Weapons System Training Facility Boardman. The cumulative effects to agricultural operations from the Umatilla Electric Cooperative transmission line, the Morrow Flat Substation and the Longhorn Substation would be consistent with those associated with the Longhorn Alternative. Therefore, the conversion of agricultural lands to other uses would result in a moderate cumulative impact.

Segment 2 - Blue Mountains

The majority of the land in Segment 2 is privately owned. County zoning in the analysis area is nearly 100 percent agricultural with timber harvesting an important land use. About 72 percent of the agricultural lands are irrigated and 22 percent are dry farmed.

In Segment 2, there are no identified RFFAs within the cumulative impact analysis area. As a result, the cumulative effects would be limited to past and present actions and the incremental contribution from the Proposed Action and Glass Hill Alternative. The past and present actions in this area include irrigated and dry land farming, timber management, grazing, land development, transmission lines, roads, and pipelines, wind energy, and various forest management activities. Land development and wind energy activities in Segment 2 are a minor component in general and are not within the cumulative impact analysis area for this segment.

Proposed Action - Land Use

The direct and indirect effects to land uses from the Proposed Action were determined to be low because the effects would not preclude the use of the area for agricultural, grazing and resource development uses. The present actions would contribute negligible to low changes in land uses in the analysis area. As a result, the Proposed Action combined with the incremental effect of present actions in the area would result in low cumulative impacts.

Glass Hill Alternative – Land Use

The direct effect to land uses from the Glass Hill Alternative was determined to be low in the context of overall land uses. Similar to the Proposed Action, the incremental effect of present actions combined with the impacts associated with the Glass Hill Alternative would result in low cumulative impacts.

Proposed Action - Agriculture

The direct and indirect effects to agricultural lands from the Proposed Action were determined to have a low impact on agricultural operations. The present actions would contribute negligible to low changes to

agricultural operations. As a result, the impacts associated with the Proposed Action when combined with the incremental effects from present actions would have a low cumulative impact.

Glass Hill Alternative - Agriculture

The direct and indirect effects from the Glass Hill Alternative were determined to be low. Similar to the Proposed Action, the incremental effect of present actions combined with the impacts associated with the Glass Hill Alternative would result in low cumulative impacts.

SEGMENT 3 – BAKER VALLEY

Approximately 72 percent of lands in Segment 3 are private and 24 percent are managed by BLM. County zoning in the analysis area is about 87 percent agricultural and about 13 percent forest and timber or grazing zones.

In Segment 3, there are no identified RFFAs within the cumulative impact analysis area. As a result, the cumulative effects would be limited to past and present actions and the incremental contribution of the Proposed Action. The past and present actions in this area include agricultural use, timber management, grazing, mineral extraction and forest management activities.

Proposed Action - Land Use

The direct effect to land uses from the Proposed Action was determined to be low because the effects would not preclude the use of the area for grazing, timber management, and resource development uses. The present actions would contribute negligible to low changes in land uses in the analysis area. Therefore, the Proposed Action combined with the incremental effect of present actions in the area would result in low cumulative impacts.

Flagstaff and Timber Canyon Alternatives – Land Use

Similar to the Proposed Action, the direct effects from the Flagstaff, Burnt River Mountain, and Timber Canyon alternatives on land use would be low because the effects would not preclude existing uses in the area. The present actions would contribute negligible to low changes in land uses in the analysis area. Therefore, the incremental effect of present actions combined with the impacts associated with these alternatives would result in low cumulative impacts.

Burnt River Mountain Alternative – Land Use

For the Burnt River Mountain Alternative, the mineral quarrying operation that supports the Ash Grove Cement plant near Weatherby, Oregon is within the cumulative effects analysis area. While the effects to land use caused by the Burnt River Mountain Alternative would be low, the cumulative land use effects in the Weatherby area would be high due to the long-term displacement of other land uses.

Proposed Action - Agriculture

The direct effects to agricultural lands from the Proposed Action and incremental impacts from present actions were determined to have a low impact and negligible to low impacts, respectively on agricultural

operations. Therefore, the Proposed Action when combined with the incremental effects from present actions would have a low cumulative impact.

Flagstaff, Burnt River Mountain, and Timber Canyon Alternatives – Agriculture

The direct effects from the Flagstaff, Burnt River Mountain, and Timber Canyon alternatives on agricultural operations would be the same as the Proposed Action. Therefore, the incremental effect of the low to negligible impacts from present actions combined with the impacts associated with these alternatives would result in low cumulative impacts.

Segment 4 – Brogan Area

Approximately 50 percent of the lands in Segment 4 are private and 47 percent are managed by BLM. Agricultural land use is approximately 12 percent of the cumulative impact analysis area with 82 percent being irrigated agricultural lands. County zoning is nearly 100 percent agricultural.

In Segment 4, there are no identified RFFAs within the cumulative impact analysis area for the Proposed Action or the Tub Mountain South Alternative. The Huntington Windfarms project, located 4.5 miles northwest of Huntington, Oregon may be within the cumulative effects analysis area for the Willow Creek Alternative, depending on final configuration. The past and present actions in this area include agricultural use, grazing, and land development.

Proposed Action - Land Use

The direct and indirect effects to land uses from the Proposed Action were determined to be low because the effects would not preclude the use of the area for agricultural use, grazing, and land development. The present actions would contribute negligible to low changes in land uses in the analysis area. Therefore, the Proposed Action combined with the incremental effect of present actions in the area would result in low cumulative impacts.

Tub Mountain South Alternative - Land Use

Similar to the Proposed Action, the direct and indirect effects from the Tub Mountain South Alternative on land use would be low because the effects would not preclude existing uses in the area. The present actions would contribute negligible to low changes in land uses in the analysis area. Therefore, the incremental effect of present actions combined with the impacts associated with the Tub Mountain South Alternative would result in low cumulative impacts.

Willow Creek Alternative - Land Use

Similar to the Proposed Action, the direct and indirect effects from the Willow Creek Alternative on land use would be low because the effects would not preclude existing uses in the area. The present actions and the proposed Huntington Windfarms project would contribute negligible to low changes in land uses in the analysis area. Therefore, the incremental effect of present actions combined with the impacts associated with the windfarm and the Willow Creek Alternative would result in low cumulative impacts.

Proposed Action - Agriculture

The direct and indirect effects to agricultural lands from the Proposed Action and incremental impacts from present actions were determined to have a low impact and negligible to low impacts, respectively, on agricultural operations. Therefore, the Proposed Action when combined with the incremental effects from present actions would have a low cumulative impact.

Willow Creek and Tub Mountain South Alternatives - Agriculture

The direct and indirect effects from the Willow Creek and Tub Mountain South alternatives on agricultural operations would be the same as the Proposed Action. Therefore, the incremental effect of the low to negligible impacts from present actions combined with the impacts associated with the Willow Creek and Tub Mountain South alternatives would result in low cumulative impacts.

SEGMENT 5 - MALHEUR

Approximately 33 percent of the lands in Segment 5 are private and 65 percent are managed by BLM. Of the cultivated agricultural lands, approximately 23 percent are irrigated and 62 percent are dry farmed.

In Segment 5, there are no identified RFFAs within the cumulative impact analysis area. As a result, the cumulative effects would be limited to past and present actions and the incremental contribution of the Proposed Action.

Proposed Action - Land Use

The direct and indirect effects to land uses from the Proposed Action were determined to be low because the effects would not preclude the use of the area for agriculture, grazing, and resource development uses. The present actions would contribute negligible to low changes in land uses in the analysis area. Therefore, the Proposed Action combined with the incremental effect of present actions in the area would result in low cumulative impacts.

Malheur S, Malheur A, and the Double Mountain Alternatives – Land Use

Similar to the Proposed Action, the direct and indirect effects from the Malheur S, Malheur A, and Double Mountain alternatives on land use would be low because the effects would not preclude existing uses in the area. The present actions would contribute negligible to low changes in land uses in the analysis area. Therefore, the incremental effect of present actions combined with the impacts associated with the Malheur S, Malheur A, and Double Mountain alternatives would result in low cumulative impacts.

Proposed Action - Agriculture

The direct and indirect effects to agricultural lands from the Proposed Action and incremental impacts from present actions were determined to have a low impact and negligible to low impacts, respectively, on agricultural operations. Therefore, the Proposed Action when combined with the incremental effects from present actions would have a low cumulative impact.

Malheur S, Malheur A, and the Double Mountain Alternatives – Agriculture

The direct and indirect effects from the Malheur S, Malheur A, and Double Mountain alternatives on agricultural operations would be the same as the Proposed Action. Therefore, the incremental effect of the low to negligible impacts from present actions combined with the impacts associated with the Malheur S, Malheur A, and Double Mountain alternatives would result in low cumulative impacts.

SEGMENT 6 – TREASURE VALLEY

Approximately 8 percent of lands in Segment 6 are private and 77 percent are managed by BLM. Of the cultivated agricultural lands, approximately 87 percent are irrigated.

A present action within the cumulative effects analysis area is the Hemingway Substation. The RFFA within the cumulative impact analysis area is the Gateway West transmission line. The Gateway West transmission line is proposed to originate from the Hemingway Substation, the terminus of the B2H Project. The transmission line would contribute to surface disturbance within the cumulative impact analysis area. During construction, surface disturbance would be similar to the effects described for the B2H Project. Following construction, surface disturbance would be reduced to the transmission line right-of-way.

Proposed Action - Land Use

The direct and indirect effects to land use from the Proposed Action were determined to be low because the effects would not preclude the use of the area for agriculture, grazing, and resource development uses. The Hemingway Substation and Gateway West transmission line have contributed, and would incrementally contribute to conversion of agricultural lands to other uses and would limit or preclude land uses within the rights-of-way for these projects, resulting in a moderate direct impact to land use. Therefore, the anticipated disturbance of the substation and transmission line combined with the Proposed Action would result in a moderate cumulative impact to land use.

Proposed Action - Agriculture

The direct and indirect effects to agricultural lands from the Proposed Action and incremental impacts from present actions were determined to have a low impact and negligible to low impacts, respectively on agricultural operations. The Hemingway Substation and Gateway West transmission line would incrementally contribute to conversion of agricultural lands to other uses and would limit or preclude agricultural operations within the right-of-way. The moderate direct impact from the substation and transmission line would incrementally contribute to conversion of agricultural lands to other uses. The impact of the substation and transmission line on agricultural operations combined with the Proposed Action would result in moderate cumulative impacts.

RECREATION

METHODOLOGY

The recreation cumulative effects analysis areas for lands managed by the BLM are Resource Management Plan areas crossed by the Proposed Action and alternative centerlines and access roads.

For lands managed by the USFS, the recreation cumulative effects analysis areas are National Forest land crossed by the Proposed Action and alternative centerlines and access roads. The cumulative effects analysis area for state lands includes all state-owned parcels crossed by the Proposed Action and alternative centerlines and access roads. For private lands, the cumulative effects analysis area includes all counties crossed by the Proposed Action and alternative centerlines and access roads.

The cumulative effects to recreation are described for the Proposed Action and alternatives over the entire B2H project area and are not described by segment.

Cumulative Effects Common to All Alternatives

The Proposed Action and alternatives would create both short- and long-term direct and indirect impacts to recreation resources. The short-term impacts would include localized and temporary disruptions to activities such as hunting, intermittent access delays, and/or increase noise levels during construction. Long-term impacts would primarily occur where the new right-of-way for project components would encroach upon recreation areas. Indirect impacts would stem from unauthorized OHV use during and after construction is complete that could result in trampling of vegetation, displacement of and wildlife, and soil compaction. With the exception of the Timber Canyon Alternative, direct and indirect impacts from the Proposed Action and all of the alternatives would range from low to moderate short-term impacts and low long-term impacts to recreation resources. Due the higher recreation use areas in the Wallowa-Whitman National Forest crossed by the Timber Canyon Alternative, the effects to recreation caused by construction and operation of this alternative would range from low to moderate short- and long-term cumulative impacts to recreation resources.

The present actions and RFFAs located in the cumulative impact analysis area for recreation resource are listed in Table 3-314 and Table 3-315. The levels of direct and cumulative impacts are categorized as high, moderate, or low impact based on the same thresholds as defined in recreation resources (Section 3.2.6.11). The greater concentration of the RFFAs would be located in Morrow and Umatilla counties with the remainder in Baker and Malheur counties in Oregon and Owyhee County, Idaho. These future proposed actions would create localized, short-term, negligible direct and indirect impacts during construction and operation, because there would be temporary displacement and disruption of recreation activities in areas with limited recreation and public interest areas near these RFFAs. There are no RFFAs within the Wallowa –Whitman Forest. Therefore, the incremental effect of the construction and operation of the Proposed Action and alternatives, with the exception of the Timber Canyon Alternative, when added to the past, present, and RFFAs would result in a negligible to low recreation resources cumulative impact. The incremental effect of the construction and operation of the Timber Canyon Alternative when added to the past, present, and RFFAs would result in low to moderate cumulative impacts to recreation resources.

TRANSPORTATION

METHODOLOGY

The cumulative effects analysis area for roads includes the service areas of all roads to be used for B2H Project construction and operations. The cumulative effects analysis area for air transportation includes effects to all airports within 3 miles of the Proposed Action and alternative centerlines and access roads.

The cumulative effects to transportation are described for the Proposed Action and alternatives over the entire B2H project area and are not described by segment.

CUMULATIVE EFFECTS COMMON TO ALL ALTERNATIVES

The past and present actions and RFFAs in the cumulative impact analysis area would contribute incrementally to cumulative impacts to transportation resources. While the transportation requirements for the present actions and RFFAs are unknown, the projects would likely increase traffic on transportation infrastructure including public, private, BLM, USFS, and county or other agency roads. The effects of RFFAs that are located in the same areas served by the transportation infrastructure to be used by the Proposed Action and alternatives would also incrementally contribute to cumulative impacts to transportation facilities in the analysis area. The level of impact would depend on the timing of the construction of the RFFA projects. However it would be unlikely that the Proposed Action and all of the RFFAs would be built at the same time. The direct and indirect effects of the Proposed Action and alternatives would be low and would. The incremental effect of the construction and operation of this project when added to the past, present and RFFAs would result in low cumulative impacts to transportation resources.

3.3.4.7 VISUAL RESOURCES

The discussion of cumulative effects to visual resources is a much more detailed discussion than for other resources primarily because of the very large cumulative effects analysis area (ten miles from the project centerline) and the size of project structures compared to the surrounding built environment (see also Appendix H for supporting data).

METHODOLOGY

The geographic area of influence for the analysis of cumulative impacts to visual resources is defined as the viewshed within a 10-mile distance of the Proposed Action and alternatives. Any present actions and reasonably foreseeable future actions (RFFA) within this geographic area of influence was evaluated. The present actions and RFFAs are listed in Table 3-315 and are described above. These are the actions considered in the visual resource cumulative analysis. Although views can and do extend beyond 10 miles, the 10-mile distance was chosen because it is near the limit of visibility of skylined transmission towers that may be noticeable to casual observers and beyond that the Proposed Action and alternatives would have negligible if any contribution to cumulative visual resources impacts (Sullivan, et.al, 2014).

The individual effects of all past actions to determine the present effects of past action would not be useful to predict the cumulative visual effects of the Proposed Action or alternatives. The consideration of past actions is reflected in current visual environmental conditions as established in the affected environment baseline conditions. For this analysis cumulative visual resources impacts for the geographic area of influence are the combined direct effects of the present and RFFAs plus the direct impacts of the Proposed Action and alternatives. The contribution to visual resources cumulative impacts by the Proposed Action and alternatives are assessed in terms of the magnitude of change in scenic quality and landscape character in addition to the effect of the scale/spatial relationship of the actions from sensitive viewing platforms and special management areas.

The results reported in Appendix B.7 are used to evaluate the contribution of the Proposed Action and alternatives to the incremental effects. Each of the alternatives is evaluated using the same criteria as the direct impact methodology with some modifications. The modifications include looking at the potential from a more qualitative approach and not separating the foreground from the middleground impacts. The visibility conditions, quantification of view, and angle of observations from the sensitive viewing platforms and Special Management Areas of the RFFA are not evaluated because the specifics (such as the height, building configuration, layout of turbines, design features, alignment of transmission lines, and transmission tower types) of the project components associated with the actions are not known at this time.

Unless otherwise noted the middleground level of direct impact created by the Proposed Action and alternatives was used to determine the level of cumulative impacts when considered with the present actions and RFFAs. The levels of direct and cumulative impacts are categorized as high, moderate, or low impact based on the same thresholds as defined in the visual resources (Section 3.2.7). If the direct impacts to scenic quality, landscape character, and sensitive viewers were considered to be none or negligible as a result of the construction and maintenance of the Proposed Action or alternatives, there would be no contribution to visual resources cumulative impacts. In addition, there would be no cumulative impacts if there would be no direct impacts would result from the construction and operation of present and RFFAs because either there were no identified actions within the geographic area of influence or the actions would result in negligible or no impacts. The level of contribution to cumulative impacts by the Proposed Action and alternatives are defined as minor (measured by a low direct impact created by the Proposed Action or alternative) or major (moderate or high direct impacts created by the Proposed Action or alternative).

The following narrative summarizes the cumulative visual resources impacts by segment and alternative with the exception of the impacts to views from linear viewing platforms for the Proposed Action. Views from any linear platforms that would to seen from the various portions of the Proposed Action used for comparison purposes are provided by segment. Unless otherwise noted, only those contributions of the Proposed Action and alternatives to the cumulative impact that would be considered high are noted in the summary. There would be no cumulative visual resources impacts associated with the Glass Hill or Timber Canyon alternatives because there are no notable present or RFFA with the alternative’s geographical area of influence. Therefore, these two alternatives are not included in the analysis of cumulative impacts

Proposed Action - Linear Viewing Platform

Of the 22 linear platforms that would have views of the Proposed Action, only the Blue Mountain Scenic Byway, Grand Tour Route, Oregon National Historic Trail (NHT), Snake River Canyon Scenic Byway, Snake River-Mormon Basin Back Country Byway, Oregon State Highway 74,and the Western Heritage Historic Byway would also have views of RFFAs. The RFFAs would introduce features in the landscape that would be visually prominent in the landscape and would create moderate direct impacts to views from the Blue Mountain Scenic Byway, Oregon NHT, and Oregon State Highway 74. The Proposed Action when added to the past, present, and RFFAs would have a moderate cumulative impact from these three linear platforms within the Proposed Action's geographic area of influence. The contribution of the Proposed Action to the cumulative visual resource impact would be minor in terms of scale because of the low direct impacts to the views from the Blue Mountain Scenic Byway, Oregon NHT, and Oregon State Highway 74 platforms.

The RFFAs would introduce features in the landscape that would be visually prominent in the landscape and would create low direct impacts to views from the Grand Tour Route, Snake River Canyon Scenic Byway, Snake River-Mormon Basin Back Country Byway, and Western Heritage Historic Byway. The Proposed Action when added to the past, present, and RFFAs would have a low cumulative impact from Grand Tour Route, Snake River Canyon Scenic Byway, and Western Heritage Historic Byway platforms within the Proposed Action's geographic area of influence. The contribution of the Proposed Action to the cumulative visual resource impact would be minor in terms of scale because of the low direct impacts to the views from the Blue Mountain Scenic Byway, Oregon NHT, and Oregon State Highway 74 platforms. The Proposed Action when added to the past, present, and RFFAs would have a moderate cumulative impact from Snake River-Mormon Basin Back Country Byway because of the moderate direct impacts that would be created by the Proposed Action.

Segment 1-Morrow-Umatilla

The majority of the Segment 1 is currently developed with predominately agricultural land uses. The most notable existing cultural modifications (built features in the landscape) are two wind energy facilities with a total of approximately 40 turbines and the coal-fired electricity generating Portland General Electric Boardman Plant with its 656-foot stack and associated transmission lines. The visibility of the future wind energy facilities, such as the Saddle Butte Wind Park, would depend on the configuration and layout of the wind turbines. Other RFFAs within this portion of the area of influence would include the Umatilla Electric Cooperative Transmission Line, the Bonneville Power Administration's Longhorn Substation, and the Coyote Island Terminal Coal Transfer Station.

Proposed Action Scenic Quality

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would be a high cumulative impact on scenic quality in the Willow Creek (BA-002) Visual Analysis Unit (VAU), a moderate cumulative impact in the Longhorn (BA-003), Butter Creek (BA-004), Mattock (BA-005), and Willow Creek (CE-002) VAUs, and a low cumulative impact in the Longhorn (CE-003) within the Proposed Action's geographic area of influence. The Proposed Action

would have a major contribution to cumulative visual resource impacts in the Willow Creek (BA-002) VAU because of the moderate direct impacts to the magnitude of change in scenic quality within the Proposed Action's geographic area of influence.

Proposed Action - Landscape Character

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would create a high cumulative magnitude of change in the landscape character in the Willow Creek (BA-002), Longhorn (BA-003), and Butter Creek (BA-004) VAUs and a low cumulative magnitude of change in the landscape character in the Longhorn (CE-003) and Willow Creek (CE-002) VAUs within the Proposed Action's geographic area of influence. The contribution of the Proposed Action to the cumulative visual resource impact would be major in the Willow Creek (BA-002), Longhorn (BA-003), and Butter Creek (BA-004) VAUs because of the high direct magnitude of change in landscape character within the Proposed Action's geographic area of influence.

Proposed Action - Stationary Viewing Platforms

The majority of the cumulative impacts to views from stationary platforms would occur where the future wind farms would be constructed and operated, specifically in Segment 1.The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFAs would have a low cumulative impact in terms of scale on the views from Northern Terminus— Boardman Generating Plant (2-10), Boardman Research Natural Area— Bombing Range Road (2-17), and Boardman Conservation Area— Tower Road South (2-18) stationary viewing platforms, a moderate cumulative impact on views from the Boardman Conservation Area— Immigrant Lane (2-15), and a high cumulative impact on views from Oregon Trail Fourmile Canyon Interpretive Site (1-5) within the Proposed Action's geographic area of influence.

The contribution of the Proposed Action to the cumulative impact on views from the Boardman Conservation Area— Immigrant Lane (2-15), Butter Creek Junction (2-20), and Well Spring Oregon Trail Site (2-22) stationary platforms would be major within the Proposed Action's geographic area of influence.

Proposed Action - Special Management Areas

There are no special management areas impacted by this portion of the geographic area of influence for this portion of the Proposed Action.

Horn Butte Alternative - Scenic Quality

The incremental effect of the construction and operation of the Horn Butte Alternative when added to the past, present, and RFFA would be low cumulative impact on the overall scenic quality in the Longhorn (CE-003) VAU, moderate within the Coombs (BA-006) and Willow Creek (CE-002) VAUs, and high on the overall scenic quality within the Willow Creek (BA-002), Longhorn (BA-003), and Butter Creek (BA-004) VAUs within the geographic area of influence. Within the Willow Creek (BA-002) and the Longhorn (BA-003) VAUs, the Horn Butte Alternative would have a moderate direct impact on

scenic quality and therefore, the contribution of the Horn Butte Alternative to the cumulative visual resource impact would be major.

Horn Butte Alternative - Landscape Character

The incremental effect of the construction and operation of the Horn Butte Alternative when added to the past, present, and RFFA would be a low cumulative magnitude of change to the landscape character within the Willow Creek (CE-002) and Longhorn (CE-003) VAUs, moderate within the Willow Creek (BA-002) VAU, and a high cumulative magnitude of change to the landscape character within the Coombs (BA-006), Longhorn (BA-003), and Butter Creek (BA-004) VAUs within the geographic area of influence. The contribution of the Horn Butte Alternative to the cumulative magnitude of change to landscape character would be major in the Willow Creek (BA-002) and Longhorn (BA-003) VAUs because the direct magnitude of change in landscape character would be moderate and high, respectively.

Horn Butte Alternative - Stationary Viewing Platform

The incremental effect of the construction and operation of the Horn Butte Alternative when added to the past, present, and RFFA would result in a high cumulative impact in terms of scale on the views from Oregon Trail Fourmile Canyon Interpretive Site (1-5), Lindsay Prairie Preserve (2-16), Butter Creek Junction (2-20), and the Well Spring Oregon Trail Site (2-22) stationary platforms. There would be a moderate cumulative impact on views from the Boardman Conservation Area— Immigrant Lane (2-15) stationary platform and low cumulative impact on views from the Northern Terminus— Boardman Generating Plant (2-10) and Boardman Research Natural Area— Bombing Range Road (2-17) stationary platforms. For the viewers at the Lindsay Prairie Preserve (2-16) stationary platform, the contribution of the Horn Butte Alternative to the cumulative impact would be minor. From the Boardman Conservation Area— Immigrant Lane (2-15) and Well Spring Oregon Trail Site (2-22) stationary platforms the contribution would be major.

Horn Butte Alternative - Linear Viewing Platform

The incremental effect of the construction and operation of the Horn Butte Alternative when added to the past, present, and RFFA would result in a moderate cumulative impact in terms of scale when viewed along the Blue Mountain Scenic Byway/State Highway 74. The contribution of the Horn Butte Alternative to the cumulative impact in terms of scale would be minor from the perspective of Blue Mountain Scenic Byway/State Highway 74 linear platform, because the direct impact that would be created by the scale of this alternative would be low when viewed from this platform.

The incremental effect of the construction and operation of the Horn Butte Alternative when added to the past, present, and RFFA would result in a high cumulative impact in terms of scale when viewed along the Oregon NHT. The contribution of the Horn Butte Alternative to the cumulative impact in terms of scale would be major because there would be moderate direct impact to views from the Oregon NHT.

Horn Butte Alternative - Special Management Areas

There are no special management areas impacted by this portion of the geographic area of influence for the Horn Butte Alternative.

Longhorn Alternative - Scenic Quality

The incremental effect of the construction and operation of the Longhorn Alternative when added to the past, present, and RFFAs would result in a moderate cumulative impact on scenic quality within the Longhorn (BA-003), Butter Creek (BA-004), and Coombs (BA-006) VAUs. There would be minor contribution of the Longhorn Alternative to the cumulative impact on scenic quality within the geographic area of influence.

Longhorn Alternative - Landscape Character

The incremental effect of the construction and operation of the Longhorn Alternative when added to the past, present, and RFFA would be a high cumulative magnitude of change to the landscape character within Longhorn (BA-003) VAU and a moderate cumulative magnitude of change within Butter Creek (BA-004) and Coombs (BA-006) VAUs.. The contribution of the Longhorn Alternative to the cumulative magnitude of change to landscape character would be major in the Longhorn (BA-003) VAU because of the direct impact to the magnitude of change in landscape character would be high.

Longhorn Alternative - Stationary Viewing Platform

The incremental effect of the construction and operation of the Longhorn Alternative when added to the past, present, and RFFA would create a low cumulative impact in terms of scale when viewed from the Butter Creek Junction (2-20) and Wilson Lane Southeast (2-23) stationary platforms. The contribution of the Longhorn Alternative to the cumulative impact in terms of scale would be none for the Butter Junction (2-20) and minor at the Wilson Lane Southeast (2-23) stationary platform.

Longhorn Alternative - Linear Viewing Platform

The incremental effect of the construction and operation of the Longhorn Alternative when added to the past, present, and RFFAs would result in a low cumulative impact in terms of scale when viewed along I-84. There would be a minor contribution to the cumulative impact in terms of scale from I-84 because of the low direct impact from the Longhorn Alternative. The visual resources cumulative impacts on sensitive viewers from Oregon NHT would be the same as the Horn Butte Alternative.

Longhorn Alternative - Special Management Areas

There are no special management areas impacted by this portion of the geographic area of influence for the Longhorn Alternative.

Longhorn Variation - Scenic Quality

The same five VAUs are associated with the Longhorn Variation as the Longhorn Alternative. The cumulative impacts on scenic quality would be the same as the Longhorn Alternative. The contribution

to cumulative impacts by the Longhorn Variation would also be the same for four out of the five VAUs. The exception would be within the Butter Creek (BA-004) VAU, there would be no contribution by the Longhorn Variation because of the negligible direct impacts.

Longhorn Variation - Landscape Character

The same five VAUs are associated with the Longhorn Variation as the Longhorn Alternative. The cumulative magnitude of change to the landscape character would be the same as the Longhorn Alternative.

Longhorn Variation - Stationary Viewing Platforms

The incremental effect of the construction and operation of the Longhorn Variation when added to the past, present, and RFFAs would result in a moderate cumulative impact in terms of scale to the views from the Boardman Research Natural Area-Bombing Range Road (2-17). The contribution of the Longhorn Variation to the cumulative impacts in terms of visual contrast would be major for the Boardman Research Natural Area-Bombing Range Road (2-17) and Wilson Lane Southeast (2-23) stationary platforms because there would be moderate direct impacts.

Longhorn Variation - Linear Viewing Platform

The visual resources cumulative impacts on sensitive viewers from I-84, Oregon NHT, and the Lewis and Clark Trail Scenic Byway/National Historic Trail in Washington would be the similar to the Longhorn Alternative.

Longhorn Variation - Special Management Areas

There are no special management areas impacted by this portion of the geographic area of influence for the Longhorn Variation.

Section of Proposed Action Equivalent to the Horn Butte Alternative, Longhorn Alternative, and Longhorn Variation - Scenic Quality

The incremental effect of the construction and operation of this section of the Proposed Action when added to the past, present, and RFFAs would be a low cumulative impact on the overall scenic quality within the Longhorn (CE-003) VAU, moderate within the Longhorn (BA-003), Butter Creek (BA-004), and Willow Creek (CE-002) VAUs, and high within the Willow Creek (BA-002),. For the Willow Creek (BA-002) and the Longhorn (BA-003), the Horn Butte Alternative would have a moderate direct impact on scenic quality and therefore, the contribution of the Horn Butte Alternative to the cumulative visual resource impact would be major.

Section of Proposed Action Equivalent to the Horn Butte Alternative, Longhorn Alternative, and Longhorn Variation - Landscape Character

The incremental effect of the construction and operation of this section of the Proposed Action when added to the past, present, and RFFAs would be a low cumulative magnitude of change to the

landscape character within Willow Creek (CE-002) and Longhorn (CE-003) VAUs, a moderate cumulative magnitude of change in landscape character within the Butter Creek (BA-004) VAU, and a high cumulative magnitude of change in landscape character within Longhorn (BA-003), and Willow Creek (BA-002) VAUs. The contribution of this portion of the Proposed Action to the cumulative magnitude of change in the landscape character would be major in the Willow Creek (BA-002) and Longhorn (BA-003) VAUs because the direct magnitude of change in landscape character would be high and moderate, respectively.

Section of Proposed Action Equivalent to the Horn Butte Alternative, Longhorn Alternative, and Longhorn Variation - Stationary Viewing Platforms

The visual resources cumulative impacts on views from the eight stationary platforms would be the same as the Horn Butte Alternative as well as the contribution to cumulative impacts by this portion of the Proposed Action.

Section of Proposed Action Equivalent to the Horn Butte Alternative, Longhorn Alternative, and Longhorn Variation - Linear Viewing Platforms

The visual resources cumulative impacts on views from the three linear platforms would be the same as the Horn Butte Alternative as well as the contribution to cumulative impacts by this portion of the Proposed Action.

Section of Proposed Action Equivalent to the Horn Butte Alternative, Longhorn Alternative, and Longhorn Variation - Special Management Areas

There are no special management areas impacted by this portion of the geographic area of influence for this section of the Proposed Action.

Segment 2—Blue Mountains

There are no identified RFFAs within the geographic area of influence within this segment that would potentially affect visual resources. Therefore, there would be no cumulative impacts and no incremental effect contribution from the Glass Hill Alternative or the Proposed Action within Segment 2.

Segment 3—Baker Valley

Land use in this segment is dominated by agriculture, rangeland, and forested areas. Baker and Durkee valleys are located north and south from Baker City, respectively, are both intensively farmed areas in the county. The most notable existing cultural modifications are the communities of Baker City, Durkee, Haines, Huntington, Keating, Lime, New Bridge, and Richland and the associated agricultural land use. The construction of the approximately 14 wind turbines associated with the future Huntington and Lime wind energy facilities would physically occur within the Segment 4-Brogan Area. However,

the visibility of the future wind energy facilities would extend beyond the segment boundaries and depending on the configuration and layout of the wind turbines would potentially be visible within Segment 3.

The Blue and Wallowa Foothills (BA-014) VAU encompasses areas within both Segments 3 and 4. Potential impacts that would be created by the Proposed Action are described in Segment 3 and are not repeated in Segment 4. Similarly, the Juniper and Sugarloaf Mountains (BA-025) and Caribou Bar (BA-027) VAUs include areas also within both Segment 3 and Segment 4. Any potential impacts to the Juniper and Sugarloaf Mountains (BA-025) and Caribou Bar (BA-027) VAUs that would be created by the Proposed Action are addressed in Segment 3 and not repeated in Segment 4.

Proposed Action - Scenic Quality

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would have a low and moderate cumulative impact on the overall scenic quality in the Blue and Wallowa Foothills (BA-014) VAU, respectively, within the Proposed Action's geographic area of influence. The contribution of the Proposed Action to the cumulative visual resource impact would be a major contribution in Blue and Wallowa Foothills (BA-014) VAU because of the moderate direct impacts within the Proposed Action's geographic area of influence.

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would have a low cumulative impact on the overall scenic quality in the Juniper and Sugarloaf Mountains (BA-025) and Caribou Bar (BA-027) VAUs within the Proposed Action's geographic area of influence in Segment 3. The contribution of the Proposed Action to the cumulative visual resource impact would be minor because the low direct impacts to the magnitude of change in scenic quality within the Proposed Action's geographic area of influence.

Proposed Action Landscape Character

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would have a high cumulative magnitude of change to landscape character within the Blue and Wallowa Foothills (BA-014) VAU within the Proposed Action's geographic area of influence. The contribution of the Proposed Action to the cumulative magnitude of change in the landscape character would be major because the high direct magnitude of change in the landscape character within the Blue and Wallowa Foothills (BA-014) VAU within the Proposed Action's geographic area of influence.

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would have a high cumulative magnitude of change in the landscape character in the Juniper and Sugarloaf Mountains (BA-025) VAU within the Proposed Action's geographic area of influence. The contribution of the Proposed Action to the cumulative magnitude of change to the landscape character would be high because there would be high direct magnitude of change in landscape character within the Juniper and Sugarloaf Mountains (BA-025) VAU within the Proposed Action's geographic area of influence.

Proposed Action - Stationary Viewing Platforms

There would be no stationary or linear viewing platforms affected by RFFAs in Segment 3 within the geographic area of influence for this portion of the Proposed Action.

Proposed Action- Special Management Areas

There are not RFFA projects that would have views of the Powder River ACEC. Therefore, there would be no visual resources cumulative impacts to casual viewers from this ACEC within the geographic area of influence of the Proposed Action.

Burnt River Alternative- Scenic Quality

The incremental effect of the construction and operation of the Burnt River Alternative when added to the past, present, and RFFA would result in a low cumulative impact on the overall scenic quality within this alternative's geographic area of influence. There would be no contribution of the Burnt River Alternative to the cumulative visual resource impact because there would be negligible direct impacts to scenic quality.

Burnt River Alternative- Landscape Character

The incremental effect of the construction and operation of the Burnt River Alternative when added to the past, present, and RFFA would be a moderate cumulative magnitude of change to the landscape character within the Blue and Wallowa Foothills (BA-014) VAU and a high cumulative magnitude of change within the Juniper and Sugarloaf Mountains (BA-025) VAU within this alternative's geographic area of influence. The contribution of the Burnt River Alternative to the cumulative magnitude of change in the landscape character would be major within the Blue and Wallowa Foothills (BA-014) and Juniper and Sugarloaf Mountains (BA-025) VAUs because the direct magnitude of change in landscape character would be moderate and high, respectively.

Burnt River Alternative- Stationary and Linear Viewing Platforms

There would be no direct impacts from the present and RFFA projects to views from the four stationary platforms within Segment 3. Therefore, there would be no visual resources cumulative impacts to views from these platforms within the geographic area of influence of the Burnt River Alternative.

There would be no or negligible direct impacts from the present and RFFA projects to views from the five linear viewing platforms within Segment 3. Therefore, there would be no visual resources cumulative impacts to views from these platforms within the geographic area of influence of the Burnt River Alternative.

Burnt River Alternative- Special Management Areas

There would be negligible direct impacts from the present and RFFA projects to views from the Oregon Trail ACEC. Therefore, there would be no visual resources cumulative impacts to casual viewers from this ACEC within the geographic area of influence of the Burnt River Alternative.

Section of Proposed Action Equivalent to the Burnt River Alternative – Scenic Quality

The incremental effect of the construction and operation of this section of the Proposed Action when added to the past, present, and RFFA would be a low cumulative impact on the overall scenic quality within the Juniper and Sugarloaf Mountains (BA-025) and Caribou Bar (BA-027) VAUs and a moderate cumulative impact within the Blue and Wallowa Foothills (BA-014) VAU. This section of the Proposed Action contribution to the cumulative visual resource impact would be major within the Blue and Wallowa Foothills (BA-014) VAU because there would be moderate direct impacts to scenic quality within this VAU and a minor contribution to cumulative impacts within the Juniper and Sugarloaf Mountains (BA-025), and Caribou Bar (BA-027) VAUs.

Section of Proposed Action Equivalent to the Burnt River Alternative – Landscape Character

The incremental effect of the construction and operation of this section of the Proposed Action when added to the past, present, and RFFA would be a high cumulative magnitude of change to the landscape character within the Blue and Wallowa Foothills (BA-014) and Juniper and Sugarloaf Mountains (BA-025) VAUs. The contribution of this segment of the Proposed Action to the cumulative magnitude of change to landscape character would be major in the Blue and Wallowa Foothills (BA-014) and Juniper and Sugarloaf Mountains (BA-025) VAUs because of the high direct magnitude of change in the landscape character.

Section of Proposed Action Equivalent to the Burnt River Alternative – Stationary and Linear Viewing Platforms

There would be no direct impacts from the present and RFFA projects on views from the four stationary platforms within this section of the Proposed Action. Therefore, there would be no visual resource cumulative impacts on the views from these platforms within the geographic area of influence of this section of the Proposed Action.

There would be no or negligible direct impacts from the present and RFFA projects on views from the five linear platforms. Therefore, there would be no visual resources cumulative impacts on views from these platforms within the geographic area of influence of this section of the Proposed Action.

Section of Proposed Action Equivalent to the Burnt River Alternative – Special Management Areas

There would be negligible direct impacts from the present and RFFA projects on views from the Oregon Trail ACEC. Therefore, there would be no visual resources cumulative impacts to casual viewers from this ACEC within the geographic area of influence this section of the Proposed Action.

Segment 4-Brogan Area

The land use within the Brogan Segment is currently primarily undeveloped land and agricultural land uses along the major creeks/rivers. The most notable existing cultural modifications are the rural

communities of Vale, Jamieson, and Brogan, the existing Malheur Queen Placer Mine in north-central Malheur County, and the Neal Hot Springs Geothermal facility northwest of Vale. With the construction of the future Huntington and Lime Windfarms, there would be approximately 14 wind turbines added to the landscape. The visibility of the future wind energy facilities would depend on the configuration and layout of the wind turbines.

The Juniper and Sugarloaf Mountains (BA-025) VAU includes both Segment 3-Baker Valley and Segment 4. Any potential impacts to the Juniper and Sugarloaf Mountains (BA-025) VAU that would be created by the Proposed Action are addressed in Segment 3 and not repeated in Segment 4.

Proposed Action - Scenic Quality

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would have a low cumulative impact on the overall scenic quality in the Cow Valley Butte (MA-007), Becker Creek (MA-009), and Gum Creek (MA-012) VAUs within the Proposed Action's geographic area of influence. The contribution of the Proposed Action to the cumulative visual resource impact would be none/minor.

Proposed Action - Landscape Character

There would be no direct impacts from the present and RFFA projects on landscape character within the VAUs encompassing the Proposed Action's geographic area of influence in this segment. Therefore, there would be no cumulative magnitude of change to landscape character within these VAUs.

Proposed Action - Stationary Viewing Platforms

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would have a low cumulative impact in terms of scale on the views from the Lands with Wilderness Characteristic Inventory Unit #OR-035-016 (5-59) stationary platform and a moderate impact on views from the Steck Park BLM Recreation Site (7-6) stationary platform within the Proposed Action's geographic area of influence. The contribution of the Proposed Action to the cumulative visual resource impact in terms of scale would be none.

Proposed Action – Special Management Areas

There would be negligible direct impacts from the present and RFFA projects to views from the Oregon Trail- Birch Creek and Tub Mountain ACECs. Therefore, there would be no visual resources cumulative impacts to casual viewers from these two ACECs within the geographic area of influence from the Proposed Action.

Willow Creek Alternative – Scenic Quality

The incremental effect of the construction and operation of the Willow Creek Alternative when added to the past, present, and RFFA would result in a low cumulative impact on the overall scenic quality in the Blue and Wallowa Foothills (BA-014), Juniper and Sugarloaf Mountains (BA-05/FR-025), Caribou Bar

(BA-027), Becker Creek (MA-009), Gum Creek (MA-012), Hope Butte (MA-038), Treasure Valley (MA-039), Moore Hollow (MA-040), and Danger Point (MA-119) VAUs. The Willow Creek Alternative's contribution to the cumulative visual resource impact would be minor for the Blue and Wallowa Foothills (BA-014), Juniper and Sugarloaf Mountains (BA-025), Caribou Bar (BA-027), Gum Creek (MA-012), Hope Butte (MA-038), Treasure Valley (MA-039), and Moore Hollow (MA-040), VAUs because there would be low direct impacts to scenic quality within these VAUs. This alternative's contribution to cumulative impacts would be none for Juniper and Sugarloaf Mountains (FR-025), Becker Creek (MA-009), and Danger Point (MA-119) VAUs because there would be negligible direct impacts from the Willow Creek Alternative to these VAUs.

Willow Creek Alternative – Landscape Character

The incremental effect of the construction and operation of the Willow Creek Alternative when added to the past, present, and RFFA would be a high cumulative magnitude of change in landscape character within the geographic area of influence for Blue and Wallowa Foothills (BA-014) VAU and low cumulative magnitude of change within the Juniper and Sugarloaf Mountains (BA-025) VAU. The contribution of the Willow Creek Alternative to the cumulative magnitude of change in landscape character would be major within the Blue and Wallowa Foothills (BA-014) VAU because of the high direct magnitude of change in landscape character.

Willow Creek Alternative – Stationary and Linear Viewing Platforms

The incremental effect of the construction and operation of the Willow Creek River Alternative when added to the past, present, and RFFA would be a low cumulative impacts to views from the Steck Park BLM Recreation Site and the Oregon Trail ACEC Birch Creek stationary platforms. Willow Creek Alternative's contribution to the cumulative visual resource impact would be none because there would be negligible to no direct impacts to views from these two stationary platforms.

The incremental effect of the construction and operation of the Willow Creek Alternative when added to the past, present, and RFFA would result in a low cumulative impact in terms of scale when viewed along from I-84, the Oregon National Historic Trail, and the Snake River-Mormon Basin Back Country Byway linear platforms. The contribution of the Willow Creek Alternative to the cumulative visual resource impact would be none to minor, because the direct impact that would be created by the scale of this alternative would also create low contrast from the view from these linear platforms.

Willow Creek Alternative – Special Management Areas

There would be negligible direct impacts from the present and RFFA projects to views from the Oregon Trail- Birch Creek and Tub Mountain ACECs. Therefore, there would be no visual resources cumulative impacts to casual viewers from these two ACECs within the geographic area of influence from the Willow Creek Alternative.

Section of Proposed Action Equivalent to the Willow Creek Alternative – Scenic Quality

The incremental effect of the construction and operation of this section of the Proposed Action when added to the past, present, and RFFA would result in a low cumulative impact on the overall scenic quality in the, Juniper and Sugarloaf Mountains (BA-05/FR-025), Caribou Bar (BA-027), Cow Valley (MA-016), Becker Creek (MA-009), Gum Creek (MA-012), and Moore Hollow (MA-040) VAUs and a moderate cumulative impact in the Blue Wallowa Foothills VAU (BA-014). Contribution to the cumulative visual resource impact would be major for Blue and Wallowa Foothills (BA-014) VAU because there would be moderate direct impacts to scenic quality within this VAU.

Section of Proposed Action Equivalent to the Willow Creek Alternative – Landscape Character

The incremental effect of the construction and operation of this section of the Proposed Action when added to the past, present, and RFFA would be a high cumulative magnitude of change to the landscape character within the geographic area of influence for Blue and Wallowa Foothills (BA-014) VAU and a low cumulative magnitude of change to landscape character within the Juniper and Sugarloaf Mountains (BA-025) VAU. The contribution of this section of the Proposed Action to the cumulative magnitude of change to the landscape character would be major in the Blue and Wallowa Foothills (BA-014) VAU because of the direct magnitude of change in landscape character would be high.

Section of Proposed Action Equivalent to the Willow Creek Alternative – Stationary and Linear Viewing Platforms

The incremental effect of the construction and operation of this section of the Proposed Action when added to the past, present, and RFFA would be a low cumulative impacts to views from the Steck Park BLM Recreation Site (7-6) stationary platform. This section of the Proposed Action's contribution to the cumulative visual resource impact to views would be none because there would be negligible direct impacts to views from this stationary platform.

The visual resources cumulative impacts on sensitive viewers from the I-84, Oregon National Historic Trail, the Snake River-Mormon Basin Back Country Byway, and US 26 linear platforms would be the same as the Willow Creek Alternative.

Section of Proposed Action Equivalent to the Willow Creek Alternative – Special Management Areas

There are no special management areas impacted by this section of the geographic area of influence for the Proposed Action.

Tub Mountain South Alternative- Scenic Quality

The incremental effect of the construction and operation of the Tub Mountain South Alternative when added to the past, present, and RFFA would result in a low cumulative impact on the overall scenic

quality impact on scenic quality in the Blue and Wallowa Foothills (BA-014), Juniper and Sugarloaf Mountains (BA-025), and Caribou Bar (BA-027) VAUs. The Tub Mountain South Alternative's contribution to the cumulative visual resource impact would be minor because there would be low direct impacts to scenic quality within these VAUs within the geographic area of influence of the Tub Mountain South Alternative.

Tub Mountain South Alternative- Landscape Character

The incremental effect of the construction and operation of the Tub Mountain South Alternative when added to the past, present, and RFFA would be a high cumulative magnitude of change to the landscape character within the Blue and Wallowa Foothills (BA-014) VAU and a low cumulative magnitude of change to landscape character for the Juniper and Sugarloaf Mountains (BA-025) VAU. The contribution of the Tub Mountain South Alternative to the cumulative magnitude of change to the landscape character would be major in the Blue and Wallowa Foothills (BA-014) VAU because of the direct magnitude of change in landscape character would be high.

Tub Mountain South Alternative- Stationary Viewing Platforms

The incremental effect of the construction and operation of the Tub Mountain South Alternative when added to the past, present, and RFFA would be low cumulative impacts to views from the Steck Park BLM Recreation Site (7-6) stationary platform. Tub Mountain South Alternative's contribution to the cumulative visual resource impact to the casual viewers at the Steck Park BLM Recreation Site (7-6) would be none because there would be no direct impacts to views from this stationary platform.

Tub Mountain South Alternative- Linear Viewing Platforms

The incremental effect of the construction and operation of the Tub Mountain South Alternative when added to the past, present, and RFFA would result in a low cumulative impact in terms of scale when viewed along from I-84, the Oregon NHT, and the Snake River-Mormon Basin Back Country Byway linear platforms. The contribution of the Tub Mountain South Alternative to the cumulative visual resource impact would be minor because the direct impact that would be created by the scale of this alternative would also create low contrast from the view from these linear platforms.

Tub Mountain South Alternative- Special Management Areas

There would be negligible direct impacts from the present and RFFA projects to views from the Oregon Trail- Birch Creek and Tub Mountain ACECs. Therefore, there would be no visual resources cumulative impacts to casual viewers from these two ACECs within the geographic area of influence from the Tub Mountain South Alternative.

Section of Proposed Action Equivalent to the Tub Mountain South Alternative - Scenic Quality

The incremental effect of the construction and operation of this section of the Proposed Action when added to the past, present, and RFFA would result in a low cumulative impact on the overall scenic quality impact within the Juniper and Sugarloaf Mountains (BA-025), Caribou Bar (BA-027), Cow Valley

Butte (MA-007), Becker Creek (MA-009), and Gum Creek (MA-12) VAUs and a moderate cumulative impact within the Blue and Wallowa Foothills (BA-014) VAU. The contribution to cumulative impact would be major within the Blue and Wallowa Foothills (BA-014) VAU and none within the Cow Valley Butte (MA-007) VAU because of the moderate and negligible direct impacts, respectively.

Section of Proposed Action Equivalent to the Tub Mountain South Alternative - Landscape Character

The incremental effect of the construction and operation of this section of the Proposed Action when added to the past, present, and RFFA would be a high cumulative magnitude of change to the landscape character within the geographic area of influence for Blue and Wallowa Foothills (BA-014) VAU and a low cumulative magnitude of change within the Juniper and Sugarloaf Mountains (BA-025) VAU. The contribution of this section of the Proposed Action to the cumulative magnitude of change to the landscape character would be major within the Blue and Wallowa Foothills (BA-014) VAU because of the direct magnitude of change in landscape character would be high.

Section of Proposed Action Equivalent to the Tub Mountain South Alternative - Stationary Viewing Platforms)

The incremental effect of the construction and operation of this segment of this segment of the Proposed Action's when added to the past, present, and RFFA would be a low cumulative impact to views from the Steck Park BLM Recreation Site (7-6) stationary platform. This segment of the Proposed Action's contribution to the cumulative visual resource impact to views from the Steck Park BLM Recreation Site (7-6) would be none because there would be no direct impacts to views from this stationary platform.

Section of Proposed Action Equivalent to the Tub Mountain South Alternative - Linear Viewing Platforms

The visual resources cumulative impacts on the views from I-84, Oregon NHT, and the Snake River-Mormon Basin Back Country Byway linear platforms would be the same as the Tub Mountain South Alternative.

Section of Proposed Action Equivalent to the Tub Mountain South Alternative - Special Management Areas

There are no special management areas impacted by the geographic area of influence for this section of the Proposed Action.

Segment 5—Malheur

The Malheur Segment is predominately undeveloped with the exception of the portion of the geographic area of influence near the communities of Adrian and Vale and the agricultural lands associated with the Owyhee and Snake rivers. Other notable cultural modifications include the Owyhee

Dam. To date the Grassy Mountain Gold Mine southwest of Vale has been identified as a RFFA, however no information on the specific amount of surface disturbance is currently available.

Proposed Action - Scenic Quality

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would result in a low cumulative impact on the overall scenic quality impact in the Sourdough Basin (MA-041) VAU. The Proposed Action's contribution to the cumulative visual resource impact would be minor for the Sourdough Basin (MA-041) VAU because there would be low direct impact to scenic quality within this VAU from the Proposed Action.

Proposed Action - Landscape Character

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would result in a low cumulative magnitude of change to the landscape character in the Sourdough Basin (MA-041) VAU. The Proposed Action's contribution to the cumulative visual resource impact would be major for the Sourdough Basin (MA-41) VAU because there would be a high magnitude of change in the landscape character within this VAU from the Proposed Action.

Proposed Action - Stationary and Linear Viewing Platforms

There would be no potential impacts on views from stationary or linear platforms from past, present, or RFFAs and therefore there would be no cumulative impacts.

Proposed Action - Special Management Areas

There are no special management areas impacted by this portion of the geographic area of influence for the Proposed Action.

Double Mountain Alternative -Scenic Quality

The incremental effect of the construction and operation of the Double Mountain Alternative when added to the past, present, and RFFA would result in a low cumulative impact on the overall scenic quality impact in the Sourdough Basin (MA-041) VAU. The Double Mountain Alternative's contribution to the cumulative visual resource impact would be none for the Sourdough Basin (MA-041) VAU because there would be negligible direct impacts to scenic quality within this VAU within this alternative's geographic area of influence.

Double Mountain Alternative -Landscape Character

The incremental effect of the construction and operation of the Double Mountain Alternative when added to the past, present, and RFFA would be a high cumulative magnitude of change to the landscape character within the geographic area of influence of this alternative. The contribution of the Double Mountain Alternative to the cumulative magnitude of change to the landscape character would be major within the Sourdough Basin (MA-041) VAU because of the direct magnitude of change in landscape character would be high.

Double Mountain Alternative -Stationary and Linear Viewing Platforms

There would be no direct impacts from the present and RFFA projects to views from the three stationary or one (U.S. Highway 20) linear platforms. Therefore, there would be no visual resources cumulative impacts to views from these platforms within the geographic area of influence of the Double Mountain Alternative.

Double Mountain Alternative -Special Management Areas

There are no special management areas impacted by the Double Mountain Alternative.

Section of Proposed Action Equivalent to the Double Mountain Alternative - Scenic Quality

The incremental effect of the construction and operation of this section of the Proposed Action when added to the past, present, and RFFA would result in a low cumulative impact on the overall scenic quality impact in the Sourdough Basin (MA-041) VAU. This segment of the Proposed Action's contribution to the cumulative visual resource impact would be minor for the Sourdough Basin (MA-041) VAU because there would be low direct impact to scenic quality within this VAU from this section of the Proposed Action.

Section of Proposed Action Equivalent to the Double Mountain Alternative - Landscape Character

The magnitude of change to the existing landscape character in terms of cumulative impacts from this section of the Proposed Action would be the same as the Double Mountain Alternative as well as the contribution of this section of the Proposed Action to cumulative impacts to landscape character.

Section of Proposed Action Equivalent to the Double Mountain Alternative - Stationary and Linear Viewing Platforms

The visual resources cumulative impacts on views from the three stationary platforms and the U.S. Highway 20 linear platform would be the same as the Double Mountain Alternative.

Section of Proposed Action Equivalent to the Double Mountain Alternative - Special Management Areas

There are no special management areas impacted by this portion of the geographic area of influence for this section of the Proposed Action.

Malheur S Alternative - Scenic Quality

The incremental effect of the construction and operation of the Malheur S Alternative when added to the past, present, and RFFA would result in a moderate cumulative impact on the overall scenic quality impact within the Sourdough Basin (MA-041) VAU. The Malheur S Alternative's contribution to the

cumulative visual resource impact would be major for the Sourdough Basin (MA-041) VAU because there would be high direct impacts to scenic quality within this VAU.

Malheur S Alternative - Landscape Character

The magnitude of change to the existing landscape character in terms of cumulative impacts from the Malheur S Alternative would be the same as the Double Mountain Alternative.

Malheur S Alternative - Stationary and Linear Viewing Platforms

The incremental effect of the construction and operation of the Malheur S Alternative's when added to the past, present, and RFFA would be a moderate cumulative impact to views from the Double Mountain Wilderness Characteristics Inventory Unit- Negro Rock Creek Middle (8-93) stationary platform. The Malheur S Alternative's contribution to the cumulative visual resource impact to views from the Double Mountain Wilderness Characteristics Inventory Unit- Negro Rock Creek Middle (8-93) would be minor because there would be low direct impacts to views from this stationary platform.

There would be no direct impacts from the present and RFFA projects to views from the five linear platforms. Therefore, there would be no visual resources cumulative impacts to casual viewers from these platforms within the geographic area of influence of the Malheur S Alternative.

Malheur S Alternative - Special Management Areas

There would be no direct impacts from the future Grassy Mountain Gold Mine to views from the four SMAs. Therefore, there would be no visual resources cumulative impacts to casual viewers from these four SMAs within the geographic area of influence from the Malheur S Alternative.

Malheur Alternative A Alternative - Scenic Quality

The incremental effect of the construction and operation of the Malheur A Alternative when added to the past, present, and RFFA would result in a low cumulative impact on the overall scenic quality impact within the Sourdough Basin (MA-041) VAU. The Malheur S Alternative's contribution to the cumulative visual resource impact would be none for the Sourdough Basin (MA-041) VAU because there would be negligible direct impacts to scenic quality within this VAU.

Malheur Alternative A Alternative - Landscape Character

The magnitude of change to the existing landscape character in terms of cumulative impacts from the Malheur A Alternative would be the same as the Malheur S Alternative.

Malheur Alternative A Alternative - Stationary and Linear Viewing Platforms

The visual resources cumulative impacts on views from the Double Mountain Wilderness Characteristics Inventory Unit- Negro Rock Creek Middle (8-93) stationary platform would be the same as the Malheur S Alternative.

There would be no direct impacts from the present and RFFA projects to views from the five linear platforms. Therefore, there would be no visual resources cumulative impacts on views from these platforms within the geographic area of influence of the Malheur A Alternative.

Malheur Alternative A Alternative - Special Management Area

There would be no direct impacts from the future Grassy Mountain Gold Mine to views from the four SMAs. Therefore, there would be no visual resources cumulative impacts to casual viewers from these four SMAs within the geographic area of influence from the Malheur A Alternative.

Section of Proposed Action Equivalent to the Malheur S and Malheur A Alternatives - Scenic Quality

The visual resources cumulative impacts on scenic quality on Sourdough Basin (MA-041) VAU would be the same as the Malheur A Alternative.

Section of Proposed Action Equivalent to the Malheur S and Malheur A Alternatives - Landscape Character

There would be no direct impacts from the present and RFFA projects landscape character in the 14 VAUs. Therefore, there would be no cumulative impacts to the landscape character from these VAUs within the geographic area of influence of this section of the Proposed Action.

Section of Proposed Action Equivalent to the Malheur S and Malheur A Alternatives - Stationary and Linear Viewing Platforms

The visual resources cumulative impacts on views from 12 stationary and 5 linear platforms would have no impact from future RFFAs within the geographic area of influence for this section of the Proposed Action.

Section of Proposed Action Equivalent to the Malheur S and Malheur A Alternatives - Special Management Areas

There would be no direct impacts from the future Grassy Mountain Gold Mine to views from the Owyhee Below the Dam ACEC. Therefore, there would be no visual resources cumulative impacts to views from this SMA within the geographic area of influence from this section of the Proposed Action.

Segment 6—Treasure Valley

Proposed Action - Scenic Quality

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would have a low cumulative impact on the overall scenic quality in the Hidden Valley (FR-030), Willow Spring (OW-006) and Treasure Valley (OW-019) VAUs within the Proposed Action’s geographic area of influence. The contribution of the Proposed Action to the

cumulative visual resource impact would be none/minor within the Proposed Action's geographic area of influence

Proposed Action - Landscape Character

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would have a moderate cumulative magnitude of change in the landscape character in the Willow Spring (OW-006) and a high cumulative magnitude of change in the landscape character in the Treasure Valley (OW-019) VAU within the Proposed Action's geographic area of influence. The contribution of the Proposed Action to the cumulative magnitude of change would be a major contribution within the Willow Spring (OW-006) and Treasure Valley (OW-019) VAUs within the Proposed Action's geographic area of influence because of the moderate and high direct impacts, respectively.

Proposed Action - Stationary Viewing Platforms

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would have a low cumulative impact in terms of scale on views from the Snake River Overlook-Pump Road (10-17), Map Rock Campground (10-19), Givens Hot Springs Campground (12-4), Hemingway Butte Trailhead Off-highway Vehicle Recreation Site (12-5), China Ditch Road Rural Residential Area (12-13), Wilson Creek Trailhead and Wayside (12-21/12-22), and Eastern Terminus— Wilson Cemetery (12-23) stationary platforms within the Proposed Action's geographic area of influence. The contribution of the Proposed Action to the cumulative visual resource impact in terms of scale would be none/minor from the stationary platforms.

Proposed Action - Linear Viewing Platform

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would have a low cumulative impact in terms of scale on the views from the Snake River Canyon Scenic Byway and Western Heritage Historic Byway linear platforms within the Proposed Action's geographic area of influence. The contribution of the Proposed Action to the cumulative visual resource impact would be none/minor in terms of scale.

Proposed Action – Special Management Areas

There are no special management areas impacted by this portion of the geographic area of influence for this section of the Proposed Action.

Baker Field Office Draft Resource Management Plan and Environmental Impact Statement VRM

As previously noted, the Baker Field Office Draft Resource Management Plan was released to the public on November 15, 2011. When approved, the plan will replace the 1989 BLM Baker Resource Management Plan. The Draft Resource Management Plan identified Alternative 1 as the preferred alternative. The BLM will continue to refine the preferred alternative through the land use planning and NEPA process until the approved resource management plan and record of decision are signed. While

the preferred alternative estimates the approved resource management plan, BLM can adjust the preferred alternative until the approved resource management plan and record of decision are signed.

Currently, of the 428,425 acres within the planning area of the RMP, lands classified as VRM Class I is 4 percent, Class II 33 percent, Class III 13 percent, and Class IV 49 percent. In Alternative 1, the proposed VRM Classes would be reclassified to VRM Class I would remain 4 percent, Class II 56 percent, Class III 33 percent, and Class IV 6 percent. Based on these proposed VRM Class designations, Table 3-321, Table 3-322, Table 3-323, Table 3-324, and Table 3-325 identify the noncompliance by KOPs for the Proposed Action and alternatives for the Baker Field Office under Alternative 1 of the Draft Resource Management Plan.

Table 3-321. Proposed BLM Baker Field Office Draft Resource Management Plan Alternative 1 Compliance by Key Observation Point—Proposed Action

KOP Number and Name	VRM Class	BLM Acres Visible	Contrast Rating	Compliance
5-25a Oregon Trail ACEC - National Historic Oregon Trail Interpretive Center (Flagstaff Hill Trail, South) (Baker Field Office)	II III IV	86 0 0	Moderate	Does not meet N/A N/A
5-25b Oregon Trail ACEC - National Historic Oregon Trail Interpretive Center (Flagstaff Hill Trail, North) (Baker Field Office)	II III IV	42 0 0	Moderate	Does not meet N/A N/A
5-25d Oregon Trail ACEC - National Historic Oregon Trail Interpretive Center (Main Building) (Baker Field Office)	II III IV	1 0 0	Moderate	Does not meet N/A N/A
5-25e Oregon Trail ACEC - National Historic Oregon Trail Interpretive Center (Wagon Encampment) (Baker Field Office)	II III IV	86 0 0	Moderate	Does not meet N/A N/A
5-33 Oregon Trail Ruts Interpretive Site (Baker Field Office)	II III IV	56 0 0	Strong	Does not meet N/A N/A
5-60 NHOTIC Entrance SH 86 (Baker Field Office)	II III IV	57 0 0	Strong	Does not meet N/A N/A
5-84 Virtue Flat OHV Area (Baker Field Office)	II III IV	107 0 0	Strong	Does not meet N/A N/A

KOP Number and Name	VRM Class	BLM Acres Visible	Contrast Rating	Compliance
Total Acres of Noncompliance	II III IV	435 0 0		

Table Abbreviations: KOP = key observation point; N/A = not applicable; VRM = Visual Resource Management.

Table 3-322. Proposed BLM Baker Field Office Draft Resource Management Plan Alternative 1 Compliance by Key Observation Point—Section of the Proposed Action Equivalent to the Flagstaff Alternative

KOP Number and Name	VRM Class	BLM Acres Visible	Contrast Rating	Compliance
5-25b Oregon Trail ACEC - National Historic Oregon Trail Interpretive Center (Flagstaff Hill Trail, North) (Baker Field Office)	II III IV	42 0 0	Moderate	Does not meet N/A N/A
5-25e Oregon Trail ACEC - National Historic Oregon Trail Interpretive Center (Wagon Encampment) (Baker Field Office)	II III IV	86 0 0	Moderate	Does not meet N/A N/A
5-60 NHOTIC Entrance SH 86 (Baker Field Office)	II III IV	57 0 0	Strong	Does not meet N/A N/A
5-84 Virtue Flat OHV Area (Baker Field Office)	II III IV	107 0 0	Strong	Does not meet N/A N/A
Total Acres of Noncompliance	II III IV	292 0 0		

Table Abbreviations: KOP = key observation point; N/A = not applicable; VRM = Visual Resource Management.

Table 3-323. Proposed BLM Baker Field Office Draft Resource Management Plan Alternative 1 Compliance by Key Observation Point—Burnt River Mountain Alternative

KOP Number and Name	VRM Class	BLM Acres Visible	Contrast Rating	Compliance
5-82 Durkee Community (Baker Field Office)	II III IV	47 0 0	Moderate	Does not meet N/A N/A
Total Acres of Noncompliance	II III IV	47 0 0		

Table Abbreviations: KOP = key observation point; N/A = not applicable; VRM = Visual Resource Management.

Table 3-324. Proposed BLM Baker Field Office Draft Resource Management Plan Alternative 1 Compliance by Key Observation Point—Section of the Proposed Action Equivalent to the Timber Canyon Alternative

KOP Number and Name	VRM Class	BLM Acres Visible	Contrast Rating	Compliance
5-25a Oregon Trail ACEC - National Historic Oregon Trail Interpretive Center (Flagstaff Hill Trail, South) (Baker Field Office)	II III IV	86 0 0	Moderate	Does not meet N/A N/A
5-25b Oregon Trail ACEC - National Historic Oregon Trail Interpretive Center (Flagstaff Hill Trail, North) (Baker Field Office)	II III IV	42 0 0	Moderate	Does not meet N/A N/A
5-25e Oregon Trail ACEC - National Historic Oregon Trail Interpretive Center (Wagon Encampment) (Baker Field Office)	II III IV	86 0 0	Moderate	Does not meet N/A N/A
5-33 Oregon Trail Ruts Interpretive Site (Baker Field Office)	II III IV	56 0 0	Moderate	Does not meet N/A N/A
5-60 NHOTIC Entrance SH 86 (Baker Field Office)	II III IV	57 0 0	Strong	Does not meet N/A N/A
5-84 Virtue Flat OHV Area (Baker Field Office)	II III IV	107 0 0	Strong	Does not meet N/A N/A
Total Acres of Noncompliance	II III IV	434 0 0		

Table Abbreviations: KOP = key observation point; N/A = not applicable; VRM = Visual Resource Management.

Table 3-325. Summary of Noncompliance with Draft Resource Management Plan Proposed VRM Class Objectives for BLM Baker Field Office

BLM Field Office	Alternative	VRM Class II Noncompliance (acres)	VRM Class III Noncompliance (acres)
Baker	Proposed Action	435	0
	Burnt River Mountain	47	0

3.3.4.8 Cultural Resources

Methodology

The cumulative effects analysis area for direct cumulative effects to cultural resources is defined as the 500 ft. transmission line right-of-way, a 100 ft. corridor centered on existing and new access roads, and a 250 ft. buffer surrounding staging areas, borrow areas, substations, and other construction areas. The analysis area for indirect cumulative effects to cultural resources is the area within five miles on either side of the transmission center line or the visual horizon, whichever is closer, based on the area of potential effects (APE) established in the project programmatic agreement (PA).

The cumulative effects to cultural resources are presented for the Proposed Action and the alternatives as a whole, rather than on a Project Segment basis. The RFFAs that could contribute to cumulative effects are shown in Table 3-326 and are identified by alternatives

Cumulative Effects Common to All Alternatives

Cumulative effects to cultural resources associated with the construction and operation of the B2H Project are common to the Proposed Action and all alternatives. Consulting parties to the Section 106 process, including Tribes, have indicated a concern that construction of infrastructure in undeveloped areas could result in indirect effects, such as increased public access and recreational activity in these areas. Increased access may amplify the potential for looting of archaeological sites and damage to other resources such as trails, markers, and historic structures. Consulting parties to Section 106 have also referenced the potential for new ROW and various reasonably foreseeable future actions to provide for the eventual collocation of utilities within or adjacent to the Boardman to Hemingway Transmission Line. This could further degrade the integrity of setting and increase visual impacts to cultural and historical resources within the indirect area of potential effects.

Anticipated cumulative effects from the reasonably foreseeable future actions will not be equivalent for all of the proposed, anticipated, or possible projects listed above. Many of these reasonably foreseeable future actions will or may occur well outside the area for indirect cumulative impact analysis for cultural resources, defined as five miles on either side of the transmission center line or the visual horizon, whichever is closer. Twenty-two reasonably foreseeable future actions (along with the various BLM management initiatives) are anticipated to overlap the area for indirect cumulative impact analysis for cultural resources. These actions include possible construction of the facilities listed in Table 3-326.

Table 3-326. Reasonably Foreseeable Future Actions that Overlap the Area for Indirect Cumulative Impact for Cultural Resources

Reasonably Foreseeable Future Action	Affiliated Route(s)
Longhorn Substation	Longhorn Alternative, Longhorn Variation
Perennial Wind Chaser Station (proposed transmission line only)	Longhorn Alternative, Longhorn Variation Alternative
Portland General Electric Boardman Plant Emissions Controls	Proposed Action, Horn Butte Alternative

Reasonably Foreseeable Future Action	Affiliated Route(s)
Umatilla Electric Cooperative Transmission Line	Proposed Action, Horn Butte Alternative
Gas Transmission Northwest Carty Lateral Project	Proposed Action, Horn Butte Alternative
Saddle Butte Wind Park	Proposed Action, Horn Butte Alternative
Rackspace Data Center	Longhorn Alternative, Longhorn Variation
High Bar/Upper and Lower Pine Creek Placer Mining Project	Proposed, Burnt River Alternative
Neal Hot Springs Geothermal	Proposed Action, Tub Mountain South
Grassy Mountain Gold Mine	Malheur A Alternative
Coal Transfer Station	Longhorn Alternative, Longhorn Variation Alternative
Huntington Windfarms	Proposed Action, Tub Mountain Alternative, Willow Creek Alternative
Lime Windfarms	Proposed Action, Tub Mountain Alternative, Willow Creek Alternative
Naval Weapons System Training Facility Boardman	Proposed Action, Horn Butte Alternative, Longhorn Alternative, Longhorn Variation Alternative
Gateway West Transmission Line	Proposed Action
Multi-species Candidate Conservation Agreement— Habitat Conservation	Longhorn Alternative, Longhorn Variation
Baker Habitat Restoration and Fuels Treatment Projects	Proposed Action, Flagstaff Alternative
Mormon Basin Fuels Treatment	Proposed Action, Timber Canyon Alternative, Burnt River Alternative, Willow Creek Alternative, Tub Mountain South Alternative

Several of these projects, including several transmission lines, overlap the proposed 500-foot analysis area for the B2H Project. Construction, operation, and maintenance of these projects could present cumulative direct impacts to cultural resources identified within the analysis area for direct effects for the B2H Project. These reasonably foreseeable future actions are not anticipated to produce cumulative impacts to cultural resources within the indirect cumulative impact analysis for cultural resources.

Consultation with NPS, OCTA, and OHTAC indicates concern with direct and indirect impacts of the project to trails in the B2H project area, especially segments of the Oregon NHT and Lewis and Clark NHT. Government to government consultation with Tribes indicates concern with direct and indirect impacts of the project construction to archaeological resources, features of the built environment, cultural landscapes, and plant and animal species- all of which are considered important cultural resources. The Tribes have also indicated that electrification of the environment will also have the adverse effect of accelerating degradation of traditional cultural practices or inhibiting access to traditional cultural places. Through ethnographic study, tribal members have indicated that they consider areas spanned by power lines to have negative impacts on spiritual activities that are important to maintaining personal, family, and community health and wellbeing, as well as education of

young tribal members in key aspects of traditional practices. The Tribes have indicated that they believe that the adverse impacts to these resources would be common to the Proposed Action and all alternatives.

3.3.4.9 National Historic Trails

Methodology

The geographic area of influence for the analysis of cumulative impacts to the Oregon and Lewis and Clark National Historic Trails and Study Trails (Goodale's and Meeks) is defined as the viewshed within a 10-mile distance of the centerlines of the Proposed Action and alternatives. All present actions and RFFAs within this geographic area of influence with effects that could be cumulative with the effects of the Proposed Action and alternatives were evaluated. The present actions and RFFAs are listed in Table 3-315.

The individual effects of all past actions to determine the present effects of past action would not be useful to predict the cumulative visual effects of the Proposed Action or alternatives. The consideration of past actions is reflected in current National Historic Trail (NHT)/Study Trail conditions as established in the affected environment baseline conditions. For this analysis, cumulative NHT/Study Trail impacts for the geographic area of influence are the combined direct effects of the present and RFFAs plus the direct impacts of the Proposed Action and alternatives. The contribution to NHT/Study Trail cumulative impacts by the Proposed Action and alternatives are assessed in terms of the effect of the scale/spatial relationship of the actions from these sensitive linear viewing platforms.

Each of the alternatives is evaluated using the same criteria as the direct impact methodology with some modifications (refer to Section 3. 2.9.5). The modifications include looking at the potential from a more qualitative approach and not separating the foreground from the middleground impacts, where applicable. The visibility conditions, quantification of view, and angle of observations from the viewing platforms of the RFFA are not evaluated because the specifics (such as the height, building configuration, layout of turbines, design features, alignment of transmission lines, and transmission tower types) of the project components associated with the actions are not known at this time.

Unless otherwise noted, the middleground level of direct impact created by the Proposed Action and alternatives was used to determine the level of cumulative impacts when considered with the present actions and RFFA. The levels of direct and cumulative impacts are categorized as high, moderate, or low impact based on the same thresholds as defined in Section 3.2.9.5. If the direct impacts to sensitive viewers were considered to be none or negligible as a result of the construction and maintenance of the Proposed Action or alternatives, there would be no contribution to cumulative impacts. In addition, there would be no cumulative impacts if there would be no direct impacts from present and RFFA because either there were no identified actions within the geographic area of influence or the actions would result in negligible or no impacts. The level of contribution to cumulative impacts by the Proposed Action and alternatives are defined as minor (measured by a low direct impact created by the Proposed Action or alternative) or major (moderate or high direct impacts created by the Proposed Action or alternative).

The following narrative summarizes the cumulative visual resources impacts by segment and alternative (see also Appendix H for supporting data). The cumulative impacts to these geographic areas are discussed before the Proposed Action and alternatives by segment. There would be no cumulative visual resources impacts associated with the alternatives in Segment 2 because there are no notable RFFAs with the alternative's geographical area of influence. In addition, geographic areas are not included in the summary narrative if no cumulative impacts are anticipated.

Proposed Action

The incremental effect of the construction and operation of the Proposed Action when added to the past, present, and RFFA would have a moderate cumulative impact in terms of scale on views from the Oregon NHT within the Proposed Action's geographic area of influence. The contribution of the Proposed Action to the cumulative visual resource impact would be minor in terms of scale because of the low direct impacts to the views from the Oregon NHT linear platform within the Proposed Action's geographic area of influence.

For the Goodale's Cutoff and Meet Cutoff Study Trails there would be no direct impact from past, present, and RFFA within the Proposed Action's geographic area of influence. Therefore, there would be no cumulative impact to the two study trails.

Alternatives

Segment 1-Morrow-Umatilla

The incremental effect of the construction and operation of the Longhorn and Horn Butte alternatives, Longhorn Variation and the equivalent sections the Proposed Action when added to the past, present, and RFFA would each result in a high cumulative impact in terms of scale and contrast when viewed along the Oregon NHT. The contribution of the Longhorn and Horn Butte alternatives, Longhorn Variation and the equivalent sections the Proposed Action to the cumulative impact in terms of scale and contrast would be major because there would be moderate direct impacts to views from the Oregon National Historic Trail with each of the alternatives.

For the Lewis and Clark Trail National Historic Trail, the incremental effect of the construction and operation of the Longhorn Variation and Longhorn Alternative when added to the past, present, and RFFA would not result in any cumulative impacts. Therefore there would be no contribution by these two alternatives to cumulative impacts,

Segment2-Blue Mountains

There are no identified RFFAs within the geographic area of influence within this segment that would potentially affect NHT/Study Trail resources. Therefore, there would be no cumulative impacts associated with the Glass Hill Alternative or the equivalent section of the Proposed Action within Segment 2.

Segment 3-Baker Valley

Land use in this segment is dominated by agriculture, rangeland, and forested areas. Baker and Durkee valleys are located north and south from Baker City, respectively, are both intensively farmed areas in the county. The most notable existing cultural modifications are the communities of Baker City, Durkee, Haines, Huntington, Keating, Lime, New Bridge, and Richland and the associated agricultural land use. The construction of the approximately 14 wind turbines associated with the future Huntington and Lime wind energy facilities would physically occur within the Segment 4-Brogan Area. However, the visibility of the future wind energy facilities would extend beyond the segment boundaries and depending on the configuration and layout of the wind turbines would potentially be visible within Segment 3. Other RFFAs within Segment 3 would include the High Bar/Upper and Lower Pine Creek Placer Mining Project east of Hereford that would disturb up to 250 acres for mineral extraction.

There would be negligible direct impacts from the present and RFFA projects to views from the Oregon NHT within Segment 3. Therefore, there would be no visual resources cumulative impacts to views from this linear platform within the geographic areas of influence of the Burnt River Alternative or the equivalent section of the Proposed Action.

Segment 4-Brogan Area

The land use within the Brogan Segment is currently primarily undeveloped land and agricultural land uses along the major creeks/rivers. The most notable existing cultural modifications are the rural communities of Vale, Jamieson, and Brogan, the existing Malheur Queen Placer Mine in north-central Malheur County, and the Neal Hot Springs Geothermal facility northwest of Vale. With the construction of the future Huntington and Lime Windfarms, there would be approximately 14 wind turbines added to the landscape. The visibility of the future wind energy facilities would depend on the configuration and layout of the wind turbines.

The incremental effect of the construction and operation of the Willow Creek Alternative and the equivalent section of the Proposed Action when added to the past, present, and RFFA would result in low cumulative impacts in terms of scale and contrast when viewed along from the Oregon NHT. The contribution of the Willow Creek Alternative and the Proposed Action to the cumulative visual resource impact would be none, because the direct impact that would be created by the scale of this alternative would create negligible contrast from the view from this linear platform.

There would be negligible direct impacts from the present and RFFA projects to views from the Goodale's Cutoff Study Trail within Segment 4. Therefore, there would be no visual resources cumulative impacts to views from this linear platform within the geographic areas of influence of the Willow Creek Alternative.

The incremental effect of the construction and operation of the Tub Mountain South Alternative when added to the past, present, and RFFA would result in a low cumulative impact in terms of scale when viewed along the Oregon NHT. The contribution of the Tub Mountain South Alternative to the cumulative visual resource impact would be minor because the direct impact that would be created by the scale and contrast of this alternative would also create low contrast from the view from these linear

platforms. The cumulative impact and contribution to the cumulative along the Oregon NHT would be the same for the equivalent section of the Proposed Action's geographic area of influence in Segment 4.

There would be negligible direct impacts from the present and RFFA projects to views from Goodale's Cutoff Study Trail. Therefore, there would be no visual resources cumulative impacts to views from these platforms within the geographic area of influence of the Tub Mountain South Alternative.

There would be no direct impacts from the present and RFFA projects to views from Meek Cutoff Study Trail. Therefore, there would be no visual resources cumulative impacts to views from these platforms within the geographic area of influence of the equivalent section of the Proposed Action.

.SEGMENT 5-MALHEUR

There would be no direct impacts from the present and RFFA projects to views from the Meek Cutoff Study Trail or Oregon NHT. Therefore, there would be no visual resources cumulative impacts to casual viewers from these platforms within the geographic areas of influence of the Malheur S and Malheur A alternatives or the equivalent section of the Proposed Action.

SEGMENT 6—TREASURE VALLEY

There would be no cumulative impacts with regard to NHT/Study Trail resources within Segment 6 because there are no NHT/Study Trail segments that would have views of the alternatives in this area. The cumulative impacts associated with the Proposed Action's geographic area of influence on the Oregon NHT are described prior to the segment descriptions in this section of the document.

3.3.4.10 AIR QUALITY AND CLIMATE CHANGE

METHODOLOGY

The cumulative effects analysis area for air quality is air quality control regions crossed by the Proposed Action and alternative centerlines and access roads and ancillary facilities. The analysis area for climate change is the counties through which the Proposed Action and alternatives would pass. These analysis areas were selected to provide an understanding of current air quality in Oregon and Idaho, to identify present projects that contribute to air quality degradation and climate change, and to understand how the electric generation carried by the Boardman to Hemingway and other transmission lines, present and proposed, contribute to air quality and climate change issues.

Cumulative effects to air quality would be common to all alternatives and across all Project Segments.

CUMULATIVE EFFECTS COMMON TO ALL ALTERNATIVES

Past and present actions (Table 3-314) have contributed to the current air quality conditions. Direct and indirect effects of emissions sources from reasonably foreseeable future actions (Table 3-315) within the analysis area would contribute to cumulative impacts to air quality and climate change. Emission sources would include construction activities, ground excavation, land clearing, vehicle emissions,

fugitive dust, and stationary source emissions from operation and maintenance activities. These emissions would result in minor and temporary effects on air quality in the immediate vicinity. Furthermore, the reduction in coal-related emissions from the planned improvements to the Boardman Plant would help to offset the emissions from the B2H Project.

Emissions resulting from reasonably foreseeable future projects would be designed, managed, and planned consistent with air quality laws, rules, regulations, and attainment plans established by EPA, Oregon Department of Environmental Quality, and Idaho Department of Environmental Quality. Cumulative effects to air quality and climate change would be low.

3.3.4.11 Social and Economic Conditions

Methodology

The analysis area for cumulative socioeconomic effects includes the counties crossed by Proposed Action and alternative routes; plus cities within 50 miles of the Proposed Action and alternative centerlines. The analysis area also includes each Census Tract, Block, and Group crossed by Proposed Action and alternative centerlines. The analysis area corresponds with the direct and indirect socioeconomic analysis area and includes the constituent municipalities and potentially affected populations. For environmental justice, the cumulative effects analysis area includes counties and Census Block Groups crossed by the Proposed Action and alternative centerlines. The cumulative effects analysis area corresponds with the direct and indirect environmental justice analysis area.

Cumulative Effects Common to All Alternatives

The construction of the B2H project combined with the past and present actions (Table 3-314) and reasonably foreseeable future actions (Table 3-315) could affect the population, temporary housing, and the economy. Reasonably foreseeable future actions could cumulatively result in a short-term increase in population due to temporary workers. Section 3.2.11 projects a population increase of 243 people related to the construction of segment 1 and 251 people related to construction of segment 2. This population increase represents a 0.2 percent increase of the population in Morrow, Umatilla, Union, and Baker counties and a 0.4 percent increase of the population in Baker, Malheur, and Owyhee counties. Increased population numbers due to reasonably foreseeable future actions are not available. Overlapping construction schedules of the B2H project and reasonably foreseeable future actions could magnify the cumulative effect, particularly in the area of spread 1, if other large projects are under construction at the same time. However, based on the population increases for the B2H project, the increases in population would be short-term and low.

The short-term increase of temporary workers with other reasonably foreseeable future construction projects that coincide with the B2H Project, could result in shortages in housing for temporary construction workers. These shortages would depend on actual construction schedules and demand from other sectors of the economy such as travel and tourism. Based on the supply of local housing and lodging, the cumulative effects would be localized, short-term, and low and would not cumulative add to the long-term housing demand.

Project-related expenditures, employment, and construction-related earnings from the B2H Project would have a positive impact on the local economy and employment for the duration of construction. These impacts would be increased if other reasonably foreseeable future construction activities coincide with the Project. The resulting cumulative effects would be positive and short-term. Long-term economic impacts from the B2H Project would be associated with operation and maintenance-related expenditures on materials and supplies. These economic impacts would be small, especially when compared to the construction-related impacts, and the incremental addition of these impacts to other ongoing and reasonably foreseeable projects would be low.

3.3.4.12 Public Health and Safety

Methodology

The cumulative effects analysis are for noise during construction is the area 1,000 feet from construction noise sources. During operation, the cumulative effects analysis area is the 250 foot right-of-way. These analysis areas are areas beyond which no noise from construction or operation of Boardman to Hemingway would be detectable above USEPA recommended levels. The cumulative effect s analysis area for electro-magnetic effects is the 250 foot right-of-way in areas occupied by people (permanently or temporarily, as in recreation sites) crossed by the Proposed Action and alternative centerlines, access roads, and ancillary facilities. This analysis area is identified because electrical effects, including magnetic field and stray voltage, do not occur beyond the right-of-way width.

Cumulative impacts to public health and safety would be common to all alternatives.

Cumulative Effects Common to All Alternatives

Noise impacts of the B2H Project would occur primarily during the construction phase. The timing of RFFAs in the cumulative effects analysis area for noise is not known at this time. If other noise-generating projects were to occur during construction of the B2H Project, there could be cumulative noise effects locally in the area of construction. In areas where the B2H Project would be adjacent to other existing or RFFA transmission lines, the combined noise could be locally higher as a result of cumulative effects.

Energizing the transmission lines creates electromagnetic fields that would vary hourly, daily, and seasonally based on line loading and environmental factors. The modeled electromagnetic fields described in Section 3.2.12 are within the established standards. Where existing transmission lines are in close proximity to the B2H Project, cumulative effects of locally higher electromagnetic effects could occur. No other RFFA generators of electromagnetic fields are within the cumulative effects analysis area (the 250 foot Right-of-way). As a result, overall cumulative effects are anticipated to be low.

3.3.5 Irreversible and Irretrievable Commitment of Resources

Resources committed to the project would be material and nonmaterial including financial resources. Irreversible commitment of resources for the purposes of this section mean that those resources once

committed would continue to be committed during the life of the project. Irretrievable commitment of resources means that those resources used, consumed, destroyed, or degraded during construction, operation, or maintenance could not be retrieved for future use. Irreversible and irretrievable commitments of resources are summarized in Table 3-327.

Table 3-327. Irreversible and Irretrievable Commitment of Resources

Resource	Type of Commitment/ Reason for Commitment	Irreversible	Irretrievable
Earth Resources	• Soil loss and erosion • Aggregate • Construction activities	No	Construction phase
Water Resources	• Water • Construction materials	Yes	Yes, during the construction phase
Vegetation Resources	• Disturbance to and/or loss of vegetation • Construction and operation	Yes	Yes, throughout the project life
Wildlife Resources	• Disturbance to and/or loss of habitat and wildlife species • Construction and operation	Yes	Yes, throughout the project life
Fish Resources	• Disturbance to and/or loss of habitat and fish species • Construction and operation	Yes	Yes, throughout the project life
Land Use, Agriculture, Recreation, and Transportation	• Disturbance to agricultural operations • Conversion of land use from agricultural to development • Increased access along new roads • Construction and operation	Yes	Yes, throughout the project life
Visual Resources	• Degradation of scenic quality • Change in landscape character • Degradation of views from sensitive platforms • Construction and operation	Yes	Yes, throughout the project life
Cultural Resources	• Disturbance or removal of sites • Access roads leading to increased vandalism • Construction and operation	Yes	Yes, throughout the project life
National Historic Trails	• Degradation of National Trail historic and cultural setting • Degradation of National Trail views from sensitive platforms • Degradation of National Trail historic and cultural resources • Construction and operation	Yes	Yes, throughout the project life
Air Quality and Climate Change	• Combustion emissions • Fugitive dust emissions • Construction and operations	No	No

Resource	Type of Commitment/ Reason for Commitment	Irreversible	Irretrievable
Socioeconomics and Environmental Justice	• Increased regional and local employment • Increased procurement of materials and equipment • Increased economic activity • Construction and operations	Yes	Yes, throughout the project life
Public Health and Safety	• Increased noise levels during construction • Increased electric and magnetic fields • Construction and operation	Yes	Yes, throughout the project life

3.4 PLAN AMENDMENTS

3.4.1 INTRODUCTION

As described in Chapter 1, actions approved or authorized by the federal land-managing agencies must conform to current land use plans for the lands they administer (43 CFR 1610.5-3 [BLM] and 36 CFR 214 [USFS]). A land use plan amendment may be necessary in order to consider a proposed action that may result in a change in the scope of resource uses or a change in the decisions of the approved land use plan.

Some aspects of the Proposed Action and alternatives do not conform to current management direction in one or more of the relevant land use plans. For some specific portions of the Project along the alternatives, where avoidance was not possible, or where application of all feasible mitigation measures was determined through project-specific analysis to be insufficient to bring the Project into conformance with the administering federal agency's land-use plan, a Land Use Plan amendment would be required to amend decisions in the land use plans to accommodate the Project. Land use plan amendments would be required to allow approval of the B2H Project.

The Proposed Action and alternatives would cross BLM-administered lands managed under the Baker Resource Management Plan (RMP) in Oregon (BLM 1989), the Southeastern Oregon (SEORMP) in Oregon (BLM 2002), and the Owyhee RMP in Idaho (BLM 1999) and would also cross National Forest System lands managed under the Wallowa-Whitman National Forest Land and Resource Management Plan (LRMP) (USFS 1990). The current management direction for each plan, a description of the plan provisions that would need to be amended and a description of the effects of the amendment are described in this section.

Planning issues and criteria are based on input from BLM, the public, other federal agencies, state government, local government, and Tribal governments. Chapter 1 contains a detailed list of issues identified through public scoping. Below is a subset of issues relevant to the plan amendments.

- What effects will the project have on conservation and special-designation lands like areas of critical environmental concern or suitable wild and scenic rivers?
- What forest plan and RMP amendments will be needed?
- How would the project affect designated scenic byways?
- Does the project conform to existing federal visual resource management objectives?

3.4.2 PLAN CONFORMANCE

Aspects of the Proposed Action and alternatives do not conform to current management direction in three of the applicable land use plans; the BLM Baker RMP, the BLM SEORMP and the USFS Wallowa-Whitman National Forest LRMP. Most of the land use plan amendments needed to bring the Project alternatives into conformance would be limited to specific portions of the 250-feet right-of-way and the boundaries of ancillary facilities. In this case, the planning area boundaries are limited to the proposed 250-feet right-of-way on lands administered by the relevant BLM field office or USFS.

Instances where the B2H Project is not in conformance with applicable land use plans or objectives include:

- BLM visual resource management classifications
- USFS visual quality objectives
- USFS Eastside Screens – Interim Wildlife Management

3.4.2.1 BLM Baker Resource Management Plan

The Baker RMP/Record of Decision (BLM 1989) provides direction for managing public lands under the jurisdiction of the Vale District Office within the Baker Resource Area. The Baker RMP planning area encompasses approximately 428,425 acres bordered by the Snake River to the east, the southern portion of Asotin County in Washington and the Columbia River to the north, and by Gilliam, Wheeler, Grant, and Malheur counties in Oregon to the west and south. The plan includes provisions to protect or enhance cultural resources, soil, water, botanical resources, visual resources, recreational opportunities, and other resources.

Visual Resources Management

Visual resources in the Baker RMP planning area have been classified according to BLM's Visual Resource Management (VRM) criteria. These criteria include scenic quality, visual sensitivity, and viewing distance and have resulted in four VRM classifications. Each VRM classification defines management objectives and the degree of visual change that will be acceptable within a landscape.

The Baker RMP includes management direction for VRM Class II, III, and IV lands. These VRM Classes are identified on Map 5 and listed in Table 10 in the Baker RMP. BLM management direction for the VRM classes is:

- Class I - The objective of this classification is to preserve the existing character of the landscape. This class provides for natural ecological changes, and it allows limited management activity. The level of change should be very low and must not attract attention. Class I is assigned to those areas where a management decision has been made to preserve a natural landscape. This includes areas such as wilderness, the wild sections of NWSR's, and other congressionally and administratively designated areas.
- Class II -The objective of this classification is to retain the existing character of the landscape. The level of change to landscape characteristics should be low. Management activities may be seen but should not attract the attention of a casual observer. Any changes must conform to the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. This class represents the minimum level of VRM for WSA's.
- Class III - The objective of Class III is to partially retain the existing character of the landscape. Moderate levels of change are acceptable. Management activities may attract attention but should not dominate the view of a casual observer. Changes should conform to the basic elements of the predominant natural features of the characteristic landscape.
- Class IV - The objective of Class IV is to provide for management activities that require major modification of the landscape. These management activities may dominate the view and

become the focus of viewer attention. However, every effort should be made to minimize the impact of these projects by carefully locating activities, minimizing disturbance, and designing the projects to conform to the characteristic landscape.

Purpose and Need to Amend the BLM Baker Resource Management Plan

Because of the visual contrast, the Proposed Action would not be in conformance with VRM Class III objectives established in the RMP for the area near the National Historic Oregon Trail Interpretive Center near Baker, Oregon. The VRM class designations and the 250-foot Proposed Action right-of-way that are not in conformance are shown in red in Figure 3-73. The purpose of the RMP amendment would be to modify the Baker RMP regarding visual resource management in order to grant a right-of-way for the Proposed Action across BLM-administered lands managed under the Baker RMP.

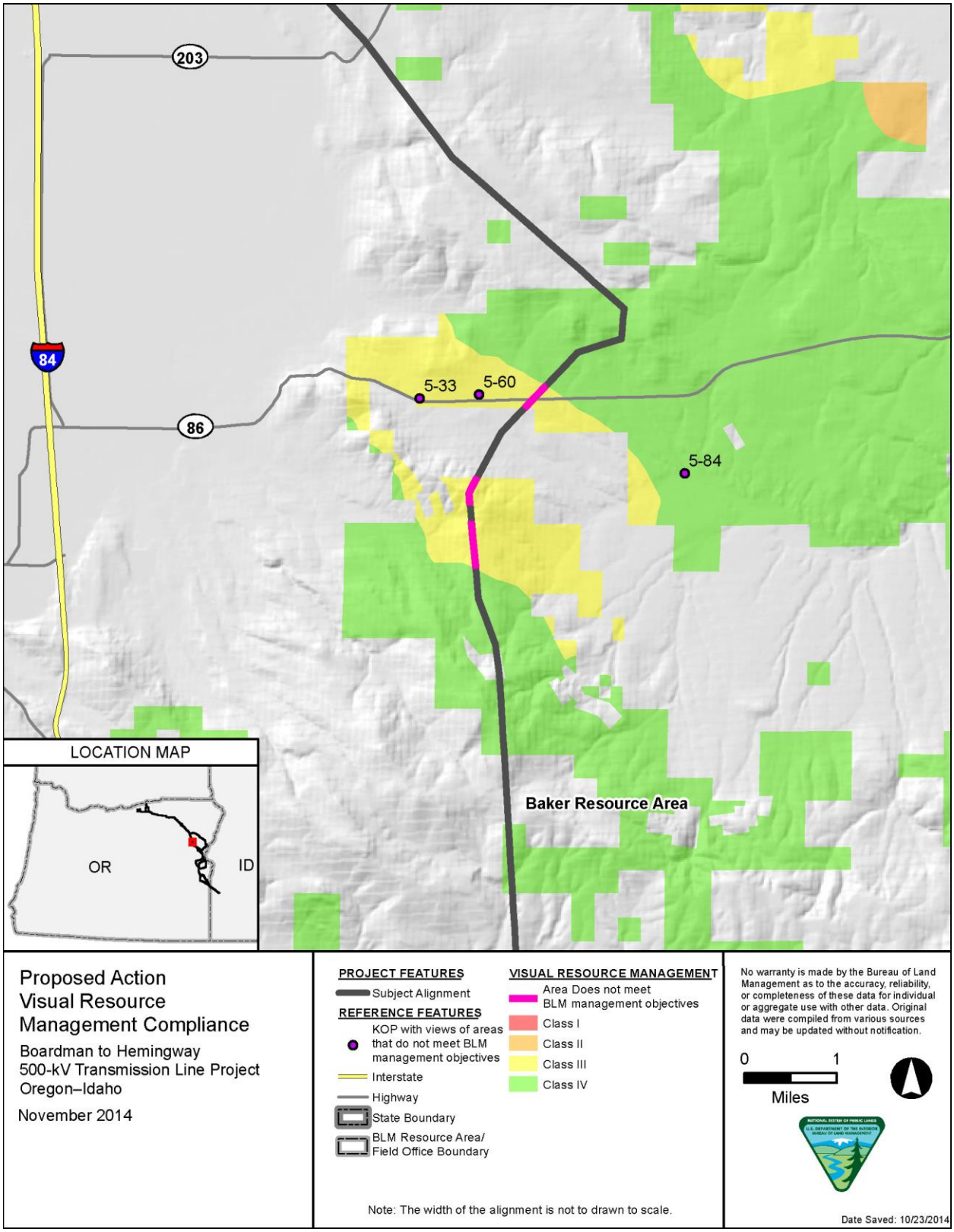

Figure 3-73. Proposed Action Visual Resource Management Compliance

Description of Potential Plan Amendment

In order to authorize the Proposed Action, the Baker RMP would need to be amended at the Visual Resources section beginning on page 49 to add the following language:

> "The portion of the 250-feet-wide right-of-way for the Boardman to Hemingway Transmission Project within VRM Class III lands in the vicinity of the National Historic Oregon Trail Interpretive Center located in portions of:
>
> - Township 9S, Range 41E, Sections 4 and 5 from project mileposts 156.0 and 156.3 (approximately 0.3 miles),
> - Township 9S, Range 41E, Section 8 from project mileposts 157.3 to 157.6 (approximately 0.3 miles), and
> - Township 9S, Range 41E, Section 17 from project mileposts 157.8 to 158.2 (approximately 0.4 miles)
>
> would be amended to VRM Class IV (a total of approximately 70 acres) for only those portions of the Project that would still exceed acceptable levels of change within the VRM Class III areas after application of all feasible measures to reduce impacts on visual resources is exhausted."

Effects

In areas where the visual resources classification is changed from Class III to Class IV, an amendment would result in the area being managed at a lower protection level. Amending the land use plan would result in 70 less acres in VRM Class III and 70 more acres in VRM Class IV (currently there are approximately 276,425 acres of Class III/IV).

The following components of the Visual Resource Inventory (VRI) are located within the Project area boundary: Scenic Quality Rating Units: 70 acres of Class B lands; Sensitivity Level Rating Units: 70 acres of high sensitivity lands; Distance Zones: 70 acres in the Background distance zone; VRI Class: 70 acres of VRI Class II lands.

Amending a portion of the VRM Class designation from VRM Class III to VRM Class IV would allow changes to the characteristic landscape to increase from needing to partially retain landscape character to accept instead, major modification of the landscape character. Management activities that under the existing VRM Class could attract attention but not dominate the view would be allowed to dominate the view and be a major focus of viewer attention. The change of current planning direction would result in, but not be limited to, the allowance of the Project.

3.4.2.2 BLM Southeastern Oregon Resource Management Plan

The Southeastern Oregon RMP (BLM 2002) provides direction for managing public lands within the Malheur and Jordan Resource Areas of the BLM Vale District. The Southeastern Oregon RMP planning

area covers approximately 4.6 million acres of BLM-administered land mainly located in Malheur County, with some lands in Grant and Harney counties. The planning area is bounded on the east by Idaho, on the south by Nevada, on the north by the Vale District's Baker Resource Area, and on the west by the BLM Burns District's Three Rivers and Andrews Resource Areas. Most of the public land is contiguous, with some scattered or isolated parcels.

Visual Resources Management

Visual resources in the Southeastern Oregon RMP are managed with the same VRM classifications and management direction as described for the Baker RMP. Visual management objectives and management actions in the Southeastern Oregon RMP are as follows:

> "Objective: Manage public land actions and activities in a manner to be consistent with visual resource management (VRM) class objectives.
>
> Management Actions: Public lands within the planning area will be managed as depicted on Map VRM. Table 12 shows VRM classifications. Visual resources in ACEC's will be managed as displayed in Table 13. WSA's, managed in accordance with current policy, will be managed under VRM Class I, subject to any change to current policy. Upon congressional designation of wilderness, any area congressionally released from further wilderness consideration will be managed under VRM Class II, unless inventory shows it to be Class I. Management of the Main, West Little, and North Fork Owyhee NWSR's and administratively suitable study rivers with a tentative wild classification will be managed as VRM Class I. The corridor of the South Fork Indian Creek study river in MRA will be managed as VRM Class II. Manage as VRM Class III, when needed, those administrative sites, recreation sites, and other specific sites requiring developed support facilities to meet public health and safety requirements or to enhance approved resource based recreation use opportunities."

Purpose and Need to Amend the BLM Southeastern Oregon Resource Management Plan

The BLM's land use planning regulations at 43 CFR 1610.5-5 state, "an amendment shall be initiated by the need to consider a Proposed Action that may result in a change in the scope of resources uses or a change in the terms, conditions, and decisions of the approved plan."

Because of the visual contrast produced by the project, after the application of appropriate selective mitigation measures the visual effects of the following areas would not be compliant with the Visual Resource Management Class for these areas. The Tub Mountain South Alternative would not be in conformance with VRM Class III objectives established in the RMP for areas near segments of the National Historic Oregon Trail ACEC (Figure 3-74 and Figure 3-75). The Proposed Action would not be in conformance with VRM Class II objectives established for the suitable Owyhee River Below the Dam Wild and Scenic River Segment. The Malheur A and Malheur S Alternatives would not be in conformance with Class II objectives established for the Owyhee River Below the Dam ACEC and the suitable Owyhee River Below the Dam Wild and Scenic River Segment.

The VRM class designations and the areas of the 250 foot Proposed Action and Malheur S and Malheur A Alternatives rights-of-way that are not in conformance with the VRM classifications are shown on Figure 3-76, Figure 3-77, and Figure 3-78. The purpose of the RMP amendment would be to modify the Southeastern Oregon RMP regarding visual resources management in order to grant a right-of-way for the Proposed Action, the Tub Mountain South Alternative, the Malheur S Alternative, or the Malheur A Alternative across BLM-administered lands managed under the Southeastern Oregon RMP.

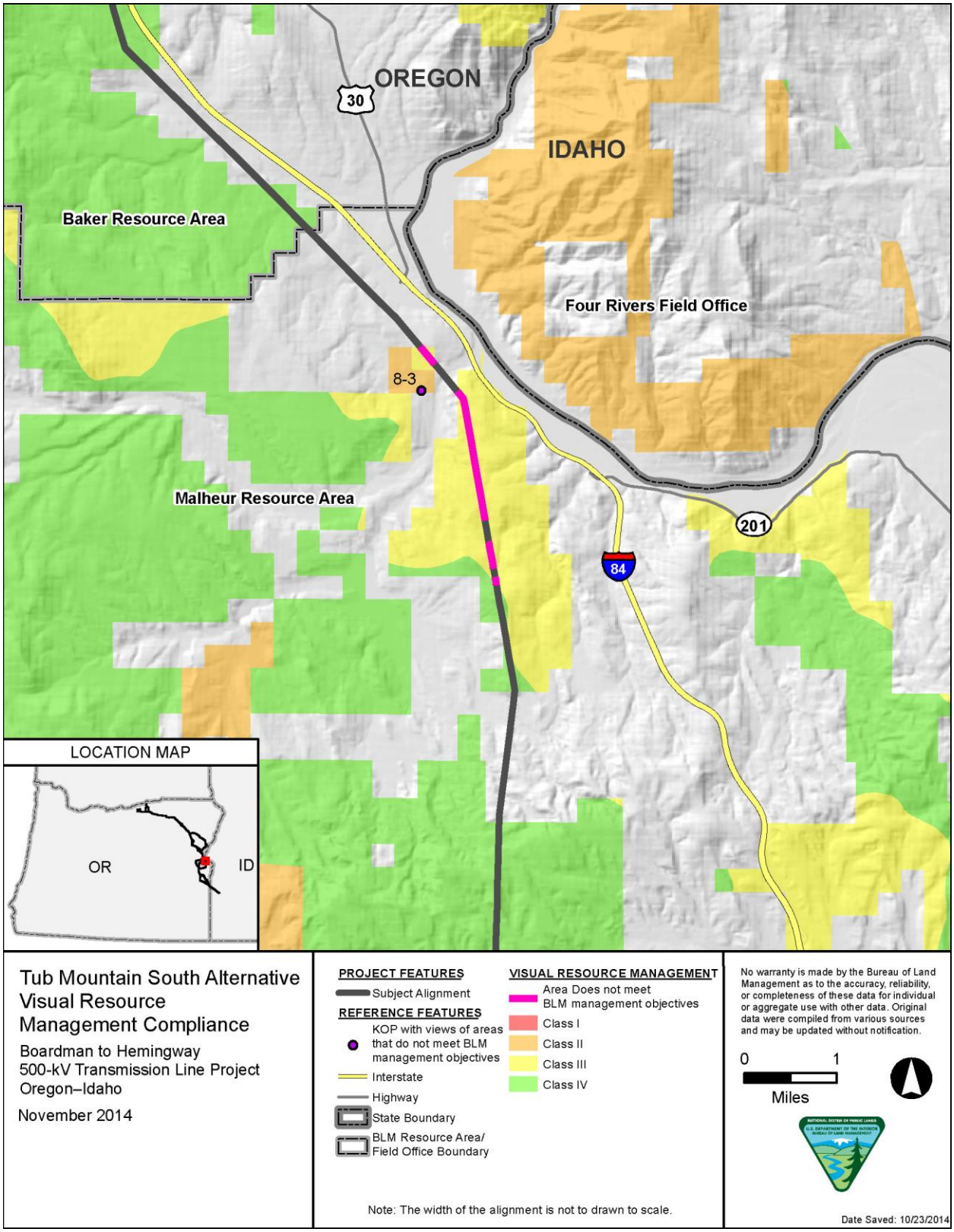

Figure 3-74. Tub Mountain South Alternative Visual Resource Compliance

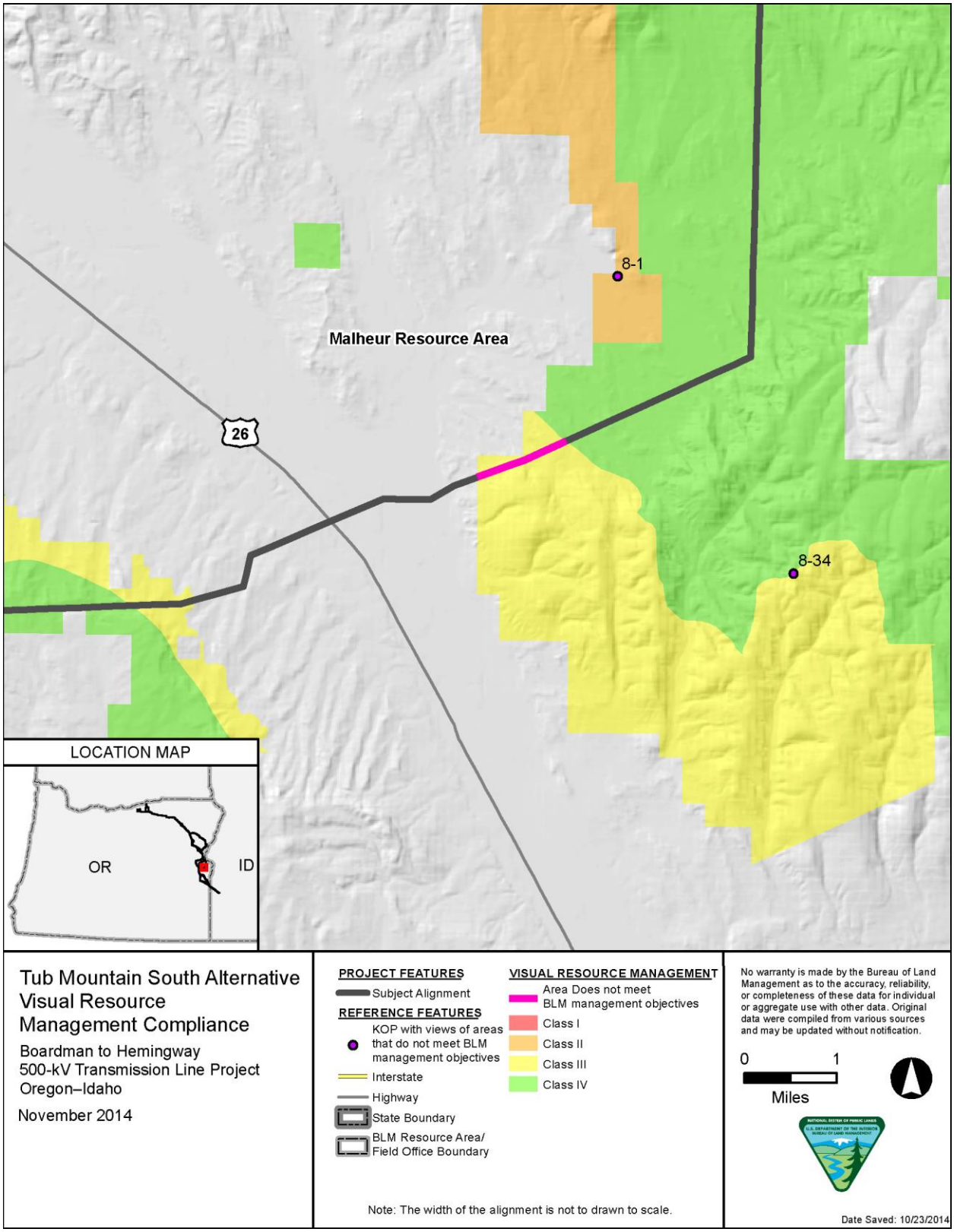

Figure 3-75. Tub Mountain South Alternative Visual Resource Compliance

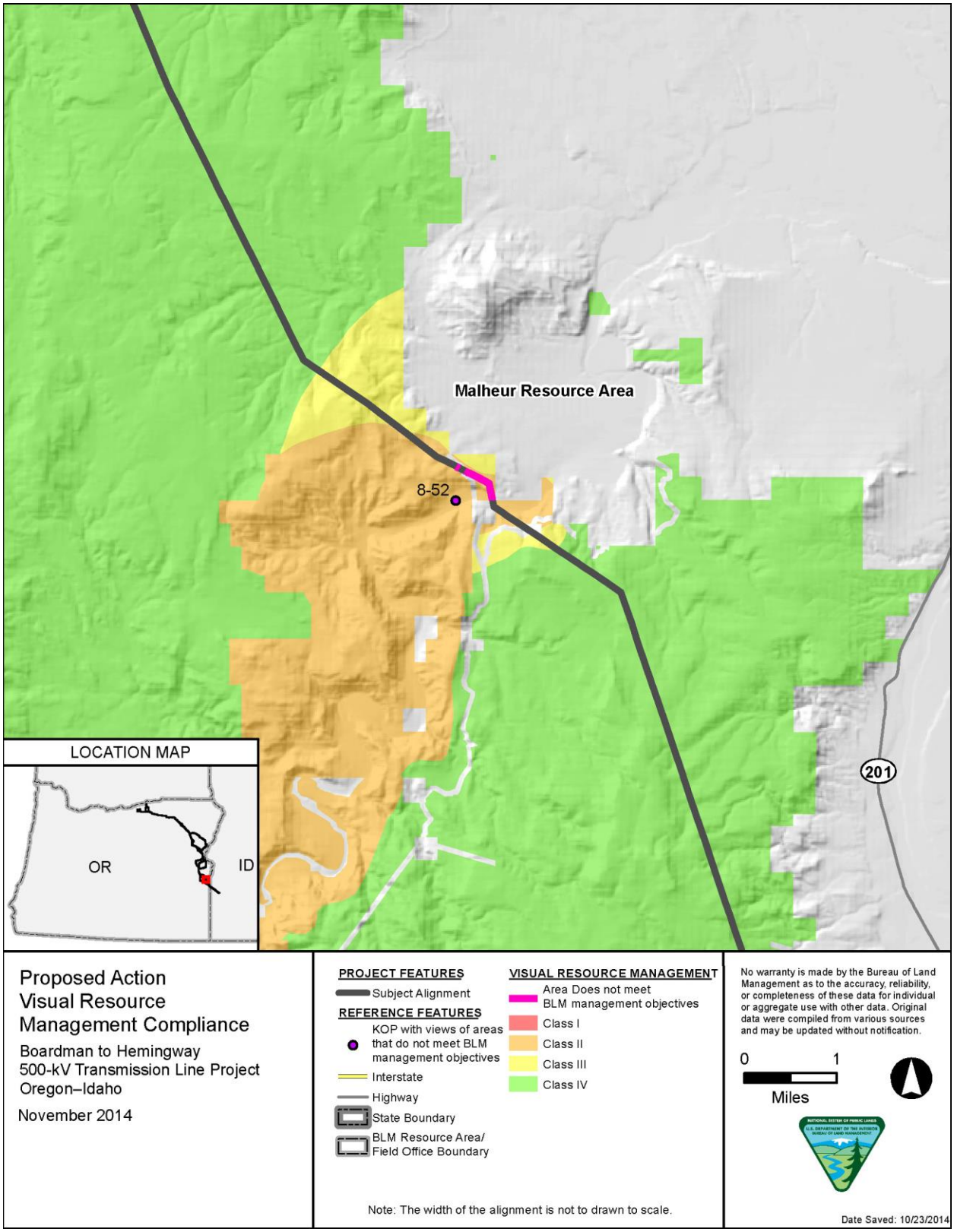

Figure 3-76. Proposed Action Visual Resource Management Compliance

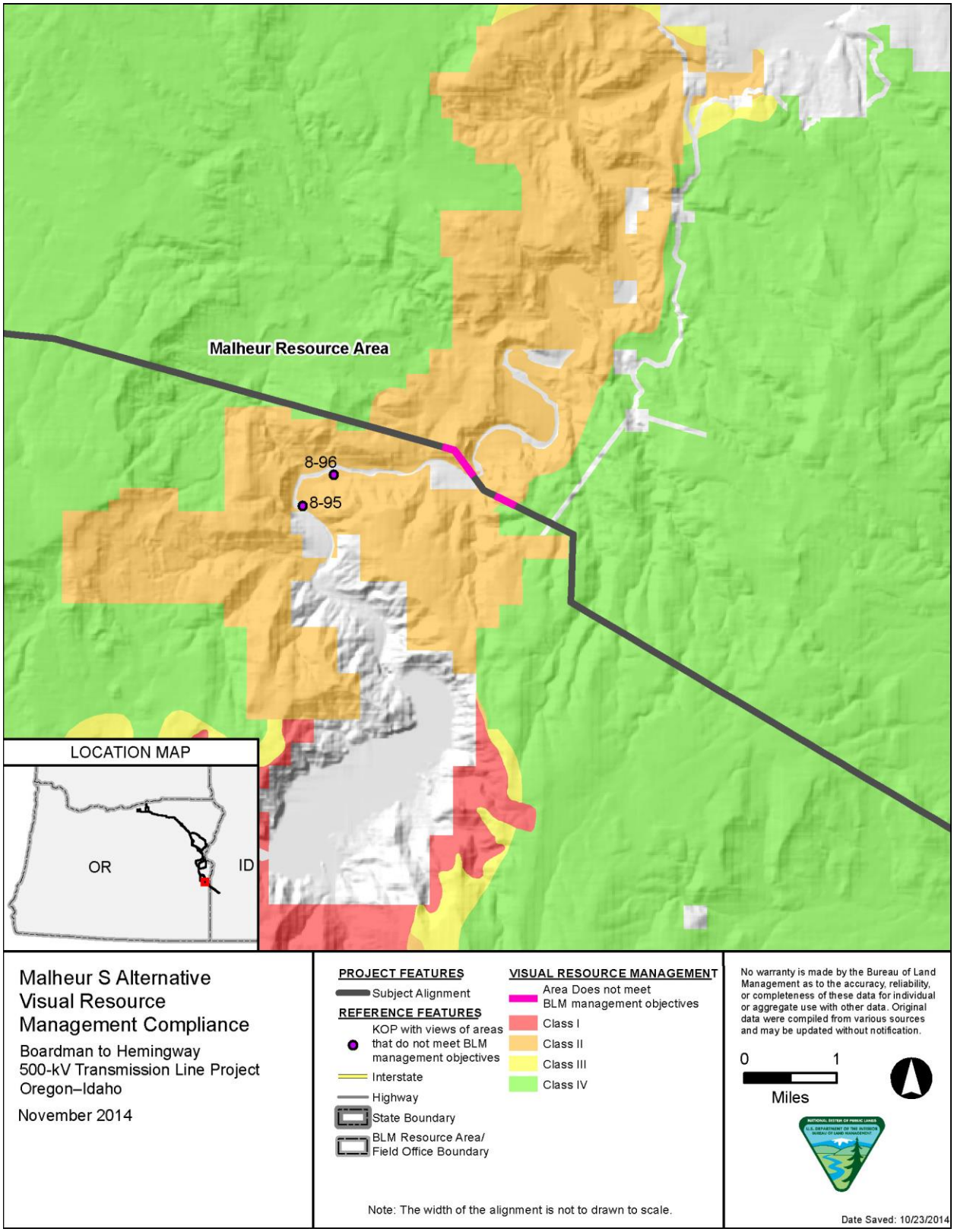

Figure 3-77. Malheur S Alternative Visual Resource Management Compliance

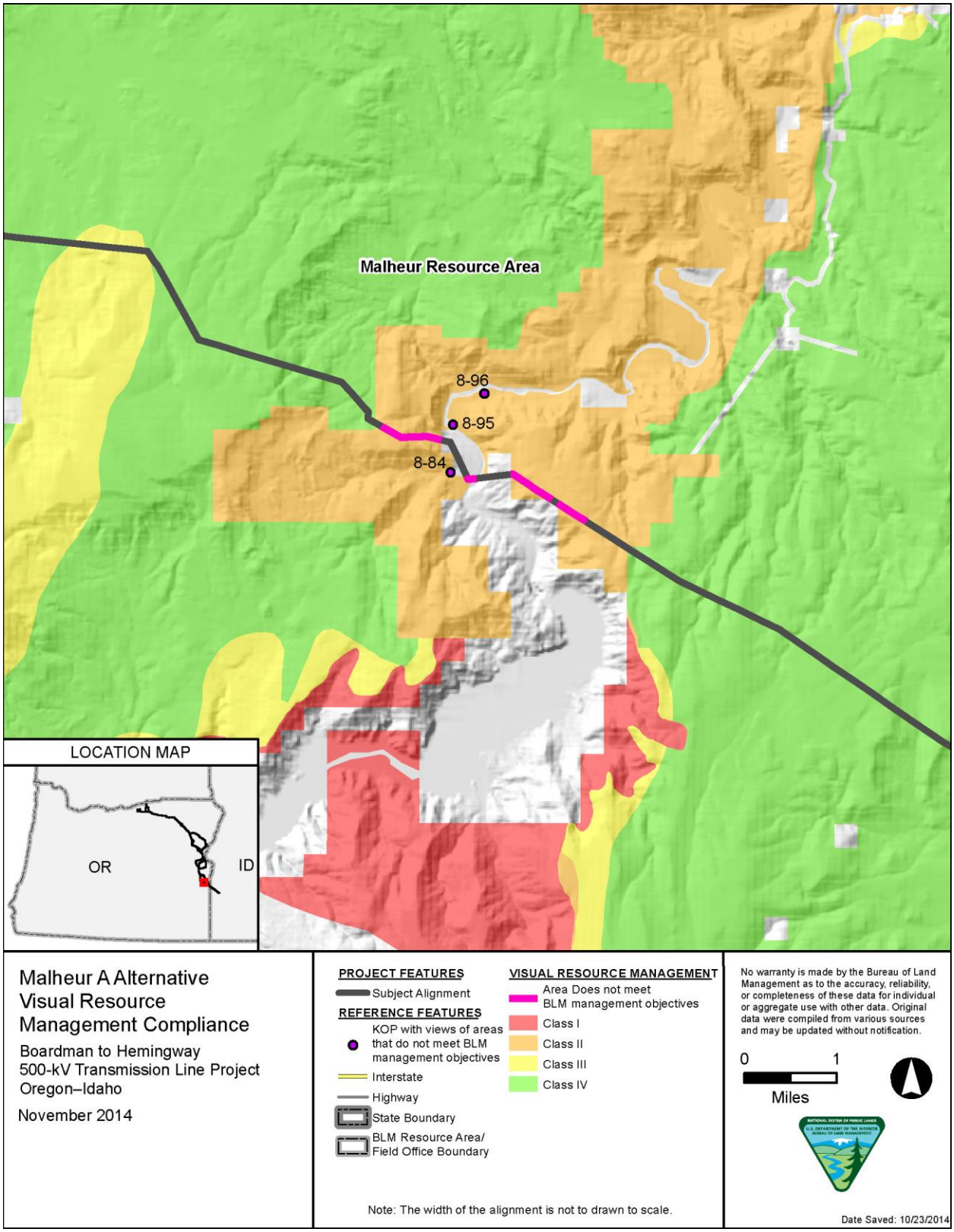

Figure 3-78. Malheur A Alternative Visual Resource Management Compliance

DESCRIPTION OF POTENTIAL PLAN AMENDMENT

PROPOSED ACTION

For the Proposed Action the Southeastern Oregon RMP would need to be amended at the Visual Resources section beginning on page 67 to add the following language:

> "The portion of the 250-feet-wide right-of-way for the Boardman to Hemingway Transmission Project within VRM Class II lands in the Owyhee River Below the Dam ACEC located in portions of:
>
> - Township 21S, Range 45E, section 14 from project mileposts 261.1 to 261.2 (approximately 0.1 miles) and from project mileposts 261.3 to 261.7 (approximately 0.4 miles)
>
> would be amended to VRM Class IV (a total of approximately 15 acres) for only those portions of the Project that would still exceed acceptable levels of change within the VRM Class II areas after application of all feasible measures to reduce impacts on visual resources is exhausted."

TUB MOUNTAIN SOUTH ALTERNATIVE

For the Tub Mountain South Alternative the Southeastern Oregon RMP would need to be amended at the Visual Resources section beginning on page 67 to add the following language:

> "The portion of the 250-feet-wide right-of-way for the Boardman to Hemingway Transmission Project within VRM Class III lands in the vicinity of the National Historic Oregon Trail ACEC located in portions of:
>
> - Township 15S, Range 45E, Section 9 from project mileposts 7.3 to 7.5 (approximately 0.2 miles),
> - Township 15S, Range 45E, Sections 16, 21, and 22 from project mileposts 8.0 to 9.3 (approximately 1.3 miles),
> - Township 15S, Range 45E, Section 22 from project mileposts 9.6 to 9.9 (approximately 0.3 miles),
> - Township 15S, Range 45E, Section 27 from project mileposts 10.1 to 10.2 (approximately 0.1 mile), and
> - Township 17S, Range 45E, Sections 18 and 19 from project mileposts 22.3 to 23.2 (approximately 0.9 miles)
>
> would be amended to VRM Class IV (a total of approximately 112 acres) for only those portions of the Project that would still exceed acceptable levels of change within the VRM

Class III areas after application of all feasible measures to reduce impacts on visual resources is exhausted."

Malheur S Alternative

For the Malheur S Alternative the Southeastern Oregon RMP would need to be amended at the Visual Resources section beginning on page 67 to add the following language:

"The portion of the 250-feet-wide right-of-way for the Boardman to Hemingway Transmission Project within VRM Class II lands in the Owyhee River Below the Dam ACEC located in portions of:

- Township 22S, Range 45E, Section 9 from project mileposts 23.4 to 23.9 (approximately 0.5 miles) and from project mileposts 24.2 to 24.4 (approximately 0.4 miles)

would be amended to VRM Class IV (a total of approximately 23 acres) for only those portions of the Project that would still exceed acceptable levels of change within the VRM Class II areas after application of all feasible measures to reduce impacts on visual resources is exhausted."

Malheur A Alternative

For the Malheur A Alternative the Southeastern Oregon RMP would need to be amended at the Visual Resources section beginning on page 67 to add the following language:

"The portion of the 250-feet-wide right-of-way for the Boardman to Hemingway Transmission Project within VRM Class II lands in the Owyhee River Below the Dam ACEC located in portions of:

- Township 22S, Range 44E, Section 12 and Township 22S, Range 45E, Section 7 from project mileposts 21.8 to 22.5 (approximately 0.7 miles)
- Township 22S, Range 45E, Section 18 from project mileposts 23.0 to 23.1 (approximately 0.1 mile)
- Township 22S, Range 45E, Section 17 from project mileposts 23.5 to 24.0 (approximately 0.5 miles)
- Township 22S, Range 45E, Section 16 and 17 from project mileposts 24.1 to 24.5 (approximately 0.4 miles)

would be amended to VRM Class IV (a total of approximately 79 acres) for only those portions of the Project that would still exceed acceptable levels of change within the VRM Class II areas after application of all feasible measures to reduce impacts on visual resources is exhausted."

EFFECTS

In areas where the visual resources classification is changed from Class II or III to Class IV, an amendment would result in the area being managed at a lower protection level.

PROPOSED ACTION

Amending the land-use plan would result in the following change 15 fewer acres of VRM II (currently 144,403 acres) and 15 more VRM Class IV (currently 1,365,457 acres).

The following components of the VRI are located within the Project area boundary: Scenic Quality Rating Units: 15 acres of Class B lands; Sensitivity Level Rating Units: 4 acres of high sensitivity lands and 11 acres of medium sensitivity lands; Distance Zones: 15 acres in the foreground-middleground distance zone; VRI Class: 4 acres of VRI Class II lands and 11 acres of VRI Class III.

Amending a portion of the VRM Class designation from VRM Class II to VRM Class IV would allow changes to the characteristic landscape to increase from needing to retain landscape character to accept instead, major modification of the landscape character. Management activities that under the existing VRM Class could attract attention but not dominate the view would be allowed to dominate the view and be a major focus of viewer attention. The change of current planning direction would result in, but not be limited to, the allowance of the Project.

TUB MOUNTAIN SOUTH ALTERNATIVE

Amending the land-use plan would result in the following change 112 fewer acres of VRM III (currently 199,078 acres) and 112 more VRM Class IV (currently 1,365,457acres).

The following components of the VRI are located within the Project area boundary: Scenic Quality Rating Units: 112 acres of Class C lands; Sensitivity Level Rating Units: 46 acres of medium sensitivity lands and 66 acres of low sensitivity lands; Distance Zones: 106 acres in the foreground-middleground distance zone and 6 acres in the seldom seen distance zone; VRI Class: 112 acres of VRI Class IV lands.

Amending a portion of the VRM Class designation from VRM Class III to VRM Class IV would allow changes to the characteristic landscape to increase from needing to partially retain landscape character to accept instead, major modification of the landscape character. Management activities that under the existing VRM Class could attract attention but not dominate the view would be allowed to dominate the view and be a major focus of viewer attention. The change of current planning direction would result in, but not be limited to, the allowance of the Project.

MALHEUR S ALTERNATIVE

Amending the land-use plan would result in the following change 23 fewer acres of VRM II (currently 144,078 acres) and 23 more VRM Class IV (currently 1,365,457 acres).

The following components of the VRI are located within the Project area boundary: Scenic Quality Rating Units: 23 acres of Class A lands; Sensitivity Level Rating Units: 23 acres of high sensitivity

lands; Distance Zones: 23 acres in the foreground-middleground distance zone; VRI Class: 23 acres of VRI Class II lands.

Amending a portion of the VRM Class designation from VRM Class II to VRM Class IV would allow changes to the characteristic landscape to increase from needing to retain landscape character to accept instead, major modification of the landscape character. Management activities that under the existing VRM Class could attract attention but not dominate the view would be allowed to dominate the view and be a major focus of viewer attention. The change of current planning direction would result in, but not be limited to, the allowance of the Project.

Malheur A Alternative

Amending the land-use plan would result in the following change 79 fewer acres of VRM II (currently 144,403 acres) and 79 more VRM Class IV (currently 1,365,457 acres).

The following components of the VRI are located within the Project area boundary: Scenic Quality Rating Units: 54 acres of Class A lands and 25 acres of Class B lands; Sensitivity Level Rating Units: 79 acres of high sensitivity lands; Distance Zones: 79 acres in the foreground-middleground distance zone; VRI Class: 79 acres of VRI Class II lands.

Amending a portion of the VRM Class designation from VRM Class II to VRM Class IV would allow changes to the characteristic landscape to increase from needing to retain landscape character to accept instead, major modification of the landscape character. Management activities that under the existing VRM Class could attract attention but not dominate the view would be allowed to dominate the view and be a major focus of viewer attention. The change of current planning direction would result in, but not be limited to, the allowance of the Project.

3.4.2.3 Wallowa-Whitman National Forest Land and Resource Management Plan

The 1990 Wallowa-Whitman National Forest LRMP was prepared, analyzed and approved under the agency's original planning rule established in 1982. The agency's current planning rule was published in the *Federal Register* in April 2012 (77 FR 21162; USFS 2012) and updates Part 219 of Title 36 of the Code of Federal Regulations. The 2012 planning rule allows for a transition period through June 2015, during which forest plan amendments can be reviewed and approved under the old or new rule. The responsible official has the discretion to determine whether and how to amend the LRMP. Under either planning rule, amendment of the LRMP would require a decision signed by the USFS Supervisor.

Given that the anticipated date for the B2H final decision coincides with the end of the transition period to the 2012 planning rule, the USFS responsible official for the B2H Project recommends that the need for potential amendments related to the project be assessed following the provisions of the 2012 Rule. This will ensure that possible amendments are properly analyzed (i.e., the appropriate planning rule is followed) even if the project decision were to be delayed beyond June 2015.

The site-specific information necessary to evaluate the need for LRMP amendments with certainty is not yet available. Therefore, the evaluation of forest plan consistency and discussion of needed amendments is based on assumptions developed from available information for the Proposed Action and the Timber Canyon Alternative. A final evaluation of compliance will be made prior to completion of the Final EIS for the B2H Project. Until additional site-specific details are available, especially pertaining to the final locations of access roads and lands used during construction (such as fly-away zones, storage areas and fueling areas), the assumptions stated will be used to determine compliance with the LRMP and the potential need for an amendment.

Every project and activity must be evaluated for consistency with applicable plan components, following direction at 36 CFR 219.15. A project or activity approval document (in this case, the EIS and the ROD to be signed by the Forest Supervisor) must describe how the project or activity is consistent (36 CFR 219.15(a)). Compliance with applicable forest-wide plan standards and with specific management allocations must be reviewed. The 1990 LRMP includes only “standards and guidelines” which are interpreted to be standards (36 CFR 219.15(d)). If a proposed project or activity would not be consistent with the plan, the following adjustments must be considered to resolve the inconsistency: 1) the Proposed Action must be changed and/or mitigated so as to comply with all applicable plan components, 2) the activity may not be approved, or 3) a plan amendment is required to add, modify, or remove one or more plan components. Plans may be amended at the same time with the approval of the project or activity so that it will be consistent with the plan as amended (36 CFR 219.15(c)(4)).

Management Area Allocation

Proposed Action

The Proposed Action would cross USFS lands administered by the Wallowa-Whitman National Forest for approximately 5.9 miles in Segment 2. This segment of the Proposed Action, over the Blue Mountains, lies within a utility corridor designated in the Wallowa-Whitman LRMP. The corridor is allocated to MA 17 - Power Transportation Facility Retention. It contains an existing electrical transmission line. Approximately 110 acres of USFS lands are included within the 250-foot right-of-way, access roads and ancillary facilities, all within MA-17. Maps of the Proposed Action and alternatives showing conformance with USFS VQO classifications are located in Appendix B.7.

The proposed project is appropriate given this allocation.

Timber Canyon Alternative

The Timber Canyon Alternative would not conform with USFS plan direction for the current applicable MA. Because of the level of non-conformance, if the Timber Canyon Alternative were selected, the USFS would reallocate the affected 344 acres to MA-17 – Power Transportation Facility Retention to facilitate construction of the project. This reallocation of 5 MAs would represent a reduction in the forest-wide acres to less than one percent. The direction for management of MA 17 (described above) would apply to these 344 acres for the duration of the authorization for the project.

Visual Resource Management

USDA Agriculture Handbook 478 describes visual quality objectives (VQO) for the management of USFS lands. VQO designations are based on a 1991 visual resource inventory; outcomes of the inventory are reflected in GIS coverages. The VQO designations applied to USFS lands are the following:

- Preservation - allows only natural ecological changes
- Retention - allows management activities which are not visually evident
- Partial Retention - allows management activities which are visually subordinate to the characteristic visual landscape.
- Modification - allows management activities that may visually dominate the original characteristic visual landscape, but when vegetation and land forms are altered, which must use the form, line, color, texture and/or scale of that landscape for its visual characteristics.
- Maximum Modification - allows vegetation and land form altering management activities that dominate the characteristic visual landscape in the foreground and middleground but which have the same visual characteristics as the surrounding area when seen as background.

Proposed Action

The VQO designation along the I-84 corridor and within MA 17 is identified as Partial Retention. The current LRMP direction, with regard to Partial Retention objectives provides:

- Page 4-43: Partial Retention Foreground and Retention Middleground - In partial retention foreground and retention middleground, the area regenerated per decade should not exceed 9percent or be less than 5percent of the suitable forest land within any viewshed. The maximum seen area disturbed at any one time should not exceed 14percent of any viewshed. Limit regeneration unit size to that which meets partial retention and desired character including consideration of future entries and regrowth. The approximate range of sizes to accomplish this is ½ to 2 acres in the immediate foreground (less than 500 feet) and 3 to 5 acres in the foreground greater than 500 feet from the road or trail. Target size tree in foreground is 26 inches where biologically feasible.
- Page 4-44: Partial Retention Middleground - In partial retention middlegrounds, the area regenerated per decade should range between 8 and 10 percent. Limit maximum regeneration unit size to 10 acres. Maximum area disturbed at any one time should not exceed 20percent.

Purpose and Need to Amend the USFS Wallowa-Whitman National Forest LRMP

The proposed transmission line would not comply with the Partial Retention VQO, as shown in Figure 3-79. Assuming that final engineering and design of Proposed Action facilities are not able to meet Partial Retention management objectives, an amendment to the Wallowa-Whitman LRMP would be needed to change the VQO classification to Modification to accommodate the transmission line and other related activities, at least where any facilities or long-term impacts are visible from I-84.

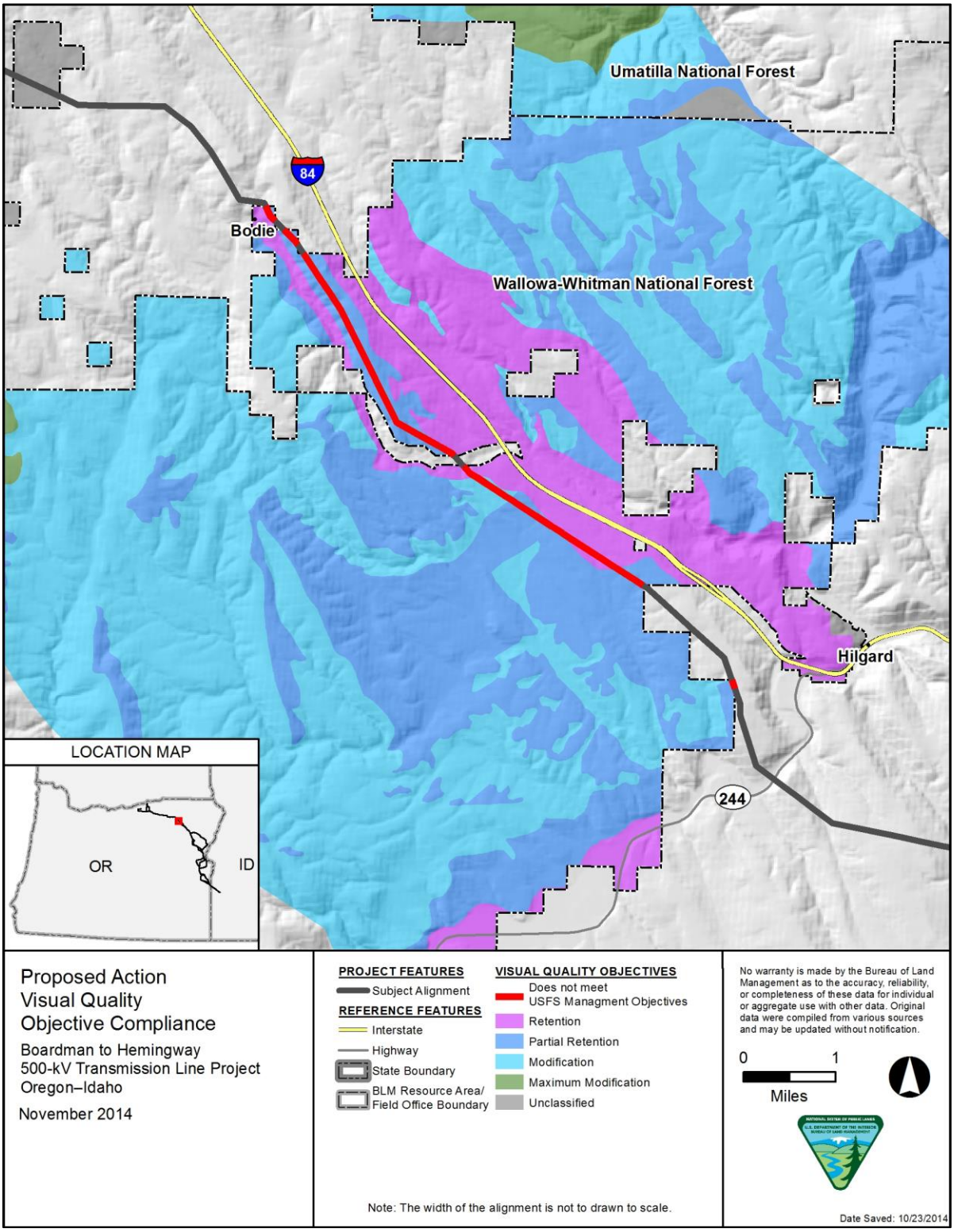

Figure 3-79. Proposed Action Visual Quality Objective Compliance

Description of Potential Plan Amendment

For the purposes of constructing, operating, and maintaining the B2H transmission line; the VQO for 110 acres located within the Proposed Action right-of-way would be re-designated from Partial Retention to Modification.

Effects

Re-designation of the VQO from Partial Retention to Modification would allow for more visually intrusive projects to be located in the redesignated 110 acres.

Timber Canyon Alternative

The Timber Canyon Alternative would cross USFS for approximately 19.6 miles. Approximately 344 acres of USFS lands would be affected by the proposed 250-foot right-of-way, access roads and ancillary facilities. These lands are currently allocated to five MAs:

- MA 1 – Timber Production Emphasis (LRMP pages 4-56 to 60) - 139 acres
- MA 3 – Wildlife/Timber (LRMP pages 4-60 to 63) - 139 acres
- MA 15 – Old-Growth Preservation (LRMP pages 4-89 to 4-91) - less than1 acre
- MA 16 – Administrative and Recreation Site Retention (LRMP pages 4-91 to 4-93) – less than 1 acre
- MA 1w – (LRMP ROD page 10) - 65 acres

Much of the Timber Canyon Alternative crosses VQO Partial Retention and Modification areas in visual assessment unit BA-013. The Timber Canyon Alternative project facilities would not be in compliance with these current visual quality objectives. If the Timber Canyon Alternative were selected, the responsible official has recommended assessment of a LRMP amendment to reallocate the right-of-way for this project to MA 17. A final evaluation of compliance will need to be made prior to completion of the Final EIS for the B2H Project.

Purpose and Need to Amend the USFS Wallowa-Whitman National Forest LRMP

The VQO designation for MA 17 is identified as Partial Retention. The Timber Canyon Alternative would not conform to either the existing VQO designations in the existing five MAs or to the Partial Retention designation for MA 17 if that reallocation were approved, as shown in Figure 3-80 and Figure 3-81. The proposed transmission line would not comply with this VQO and a project-specific plan amendment to the LRMP would be needed to approve the Timber Canyon Alternative.

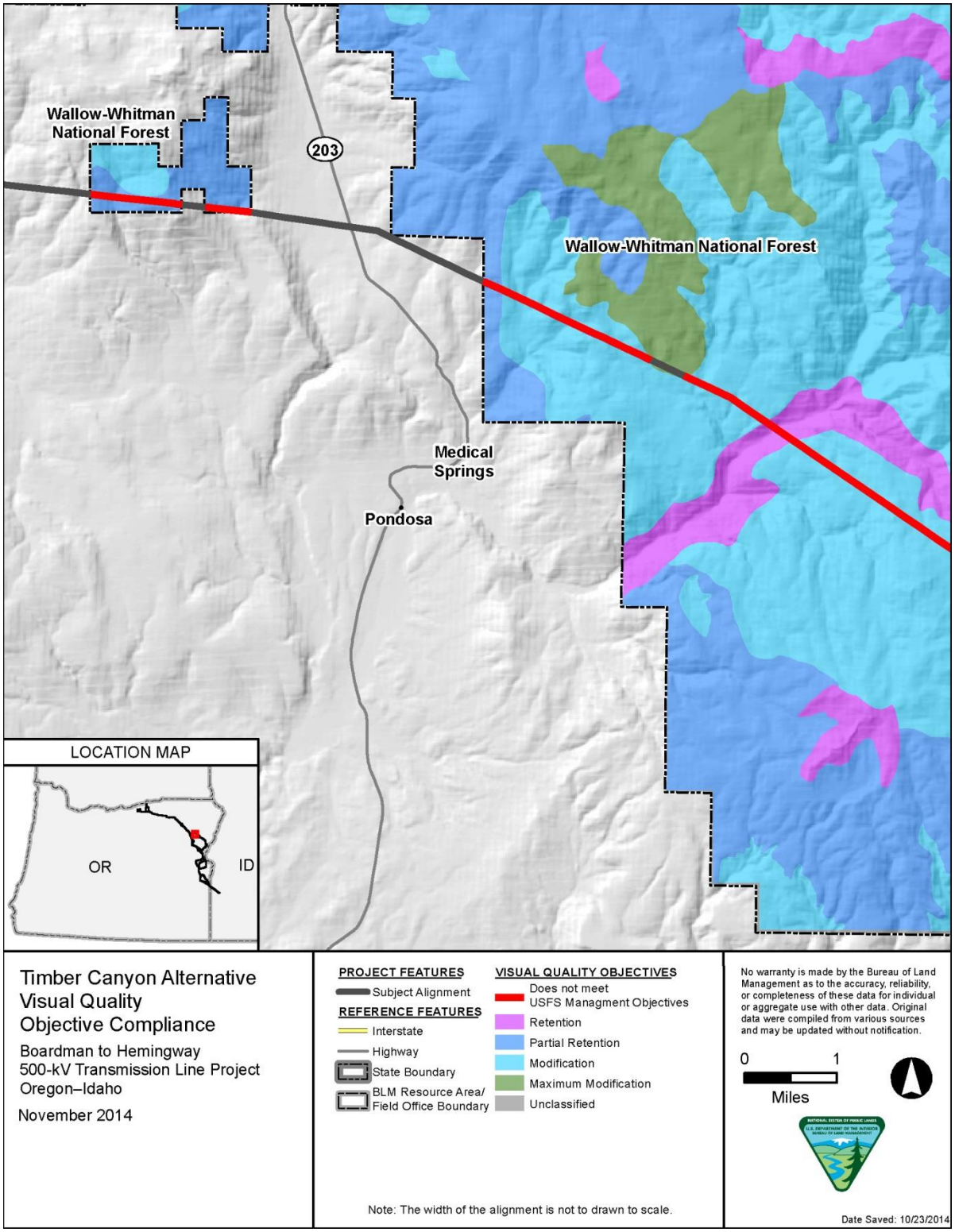

Figure 3-80. Timber Canyon Alternative Visual Quality Objective Compliance

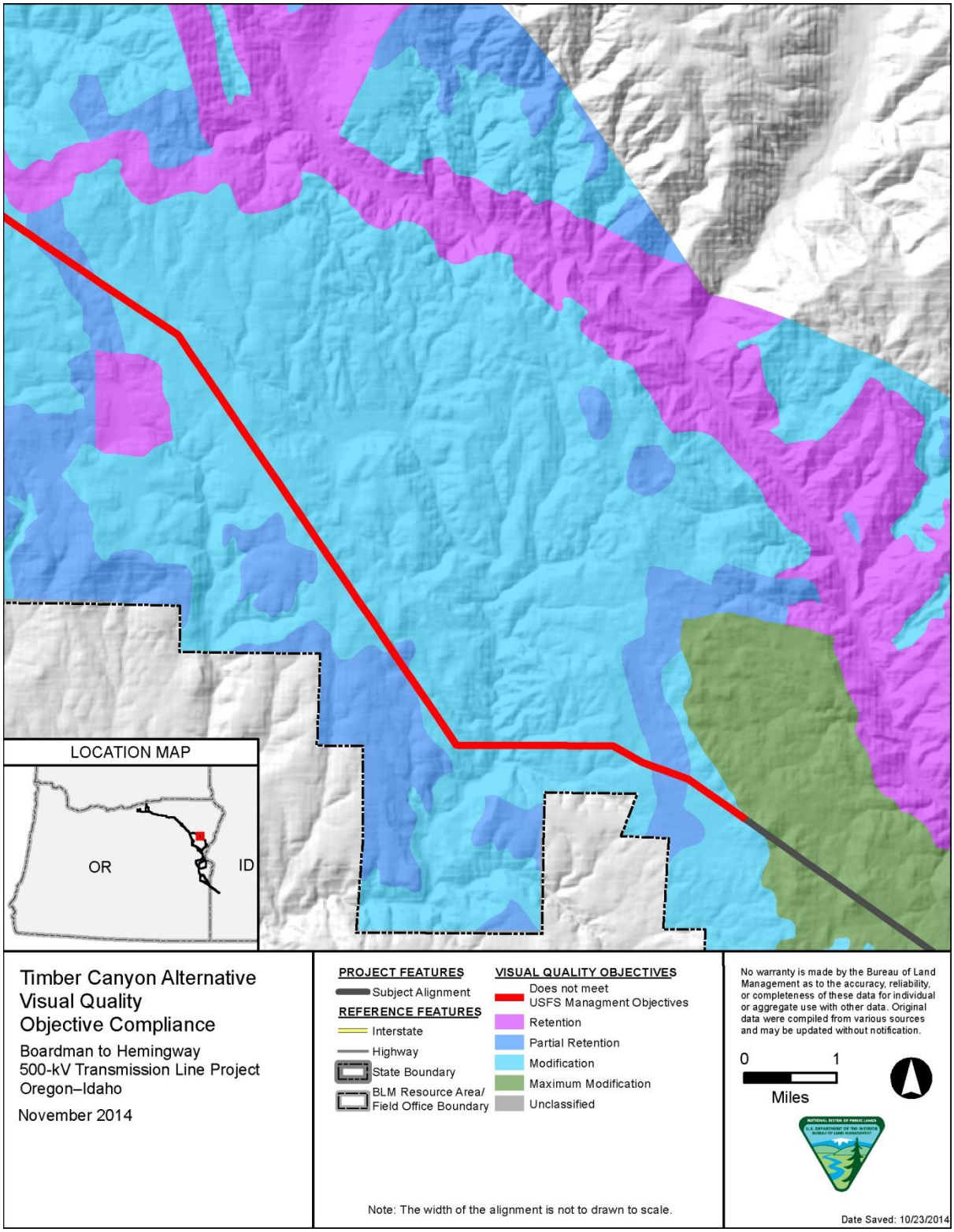

Figure 3-81. Timber Canyon Alternative Visual Quality Objective Compliance

Description of Potential Plan Amendment

The 344 acres of National Forest System Lands that would be within the disturbance footprint of the 250-foot right-of-way, access roads and ancillary facilities would be reallocated from the five current MAs designations to MA 17. For the purposes of constructing, operating, and maintaining the B2H transmission line, the VQO for the 344 acres of reallocated MA 17 would be re-classified from Partial Retention to Maximum Modification.

Effects

Reallocation of the existing Management Areas to MA 17 and re-designation of the applicable VQO from current designations to Maximum Modification would not allow for additional transmission line projects to be located on USFS lands. The effects of reallocation of lands to MAs is discussed in Section 3.2.6, Land Use and Agriculture.

Eastside Screens

In 1995, a Decision Notice for the "Revised Continuation of Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales" amended nine forest plans in Region 6, including the Wallowa-Whitman. This is referred to as Regional Forester's Amendment #2 (RF-2), and the direction is commonly known as "Eastside Screens." The direction applies to the design and preparation of all timber sales on eastside forests, except personal use firewood sales, post and poles sales, sales to protect health and safety, and sales to modify vegetation within recreation special use areas.

There are two potential scenarios for application of the standards in Eastside Screens, referred to as Scenarios A and B. Screens stipulates that patterns of timber stand structure within proposed timber sales and associated watersheds be characterized and compared to the historic range of variability, and the appropriate scenario (A or B) is determined based upon whether or not the amount and type of late and old structure (LOS) falls below historic range of variability. Planning must then follow the set of standards for the appropriate scenario.

The Eastside Screens focuses on potential impacts of timber sales on riparian habitat, historical vegetation patterns and wildlife habitat connectivity. It requires the analysis of historic range of variability and prohibits the cutting of trees with a 21 inch diameter at breast height (dbh) and larger.

The Wallowa-Whitman LRMP, including specific direction for MA 17 and the details of RF-2, indicates that project-related timber removal would be subject to Eastside Screens direction, with a single exception related to snags (LRMP page 4-45, 7b). Direction for MA 17 indicates the intent to actively manage timber resources so as to contribute to the regulated timber harvest and to the allowable sale quantity. Removal of timber by the applicant or any party working in their behalf would be considered sale of timber and therefore subject to the requirements of Eastside Screens. Additionally, none of the exempted timber sale types are expected to apply to the B2H Project.

Proposed Action

While most guidance in RF-2 (Eastside Screens) would be met by the Proposed Action, non-conformance with a prohibition on harvest of large trees and requirements to move timber stand structure toward late and old structure would require project-specific LRMP amendments for the Proposed Action. All of the applicable standards are wildlife standards applicable to watersheds with existing conditions for late and old structure stands below the historic range of variability; this situation is identified as Scenario A in the Eastside Screens. Review of historic range of variability analyses performed for other projects in watersheds intersected by the Proposed Action confirms that Scenario A represents the existing condition, i.e. late and old structure in some biophysical environments falls below historic range of variability.

The Eastside Screens direction of the current LRMP provide for three management standards:

- Maintain all remnant late and old seral and/or structural live trees greater than 21 inch dbh that currently exist within stands proposed for harvest activities;
- Manipulate vegetative structure that does not meet late and old conditions in a manner that moves it towards these conditions as appropriate to meet historic range of variability;
- Maintain open, park-like stand conditions where this condition occurred historically. Manipulate vegetation in a manner to encourage the development and maintenance of large diameter, open canopy structure.

All trees within the right-of-way would need to be cut, with only minor exceptions (for example, where the line spans a draw and is adequately elevated above the trees). Data for stands in the analysis area for the Proposed Action show less than one acre of late and old stands would be affected and there is a potential need to remove trees 21inch dbh and larger in forested stands to accommodate construction of the project facilities and access roads and provide required clearance beneath the transmission line. In this event, the harvest of large trees could not be avoided and manipulation of vegetative structure to move it toward historic range of variability could not be accomplished. A project-specific LRMP amendment to allow the harvest would be required in order to authorize the Proposed Action.

Purpose and Need to Amend the USFS Wallowa-Whitman National Forest Land and Resource Management Plan

The Proposed Action would not meet the standards and the Eastside Screens direction of the LRMP would need to be amended to generally provide:

- Authorization to harvest remnant late and old seral and/or structural live trees greater than 21inch dbh the duration of the authorization;
- Authorization to manipulate vegetative structure that does not meet LOS in a manner that does not move it towards LOS for the duration of the authorization;
- Authorization to manipulate vegetation in a manner that does not maintain open, park-like stand conditions, and does not encourage the development and maintenance of large diameter, open canopy structure for the duration of the authorization.

DESCRIPTION OF POTENTIAL PLAN AMENDMENT

Interim Wildlife Standard Scenario A – No Net Loss of LOS

Patterns of stand structure by biophysical group, compared to the HRV within the Proposed Action right-of-way and associated watersheds for the Proposed Action fit Scenario A. One or both LOS stages fall below HRV. Under Scenario A there should be no net loss of LOS from that biophysical environment. However, implementation of the project would require removal of all trees from an estimated 0.8 acres of LOS, resulting in a small loss of LOS acres.

The current LRMP direction provides:

> Scenario A – If either ONE or BOTH of the LOS stages FALLS BELOW HRV in a particular biophysical environment, there should be NO NET LOSS of LOS from that biophysical environment. DO NOT ALLOW timber sale harvest activities to occur within LOS stages that are BELOW HRV.

The LRMP direction would need to be amended to provide:

> Scenario A – Allow timber sale harvest activities to occur within LOS stages such that a net loss of LOS will occur, to accommodate construction of the transmission line facilities, access roads, and to provide required clearance underneath the line during construction and as required for operation and maintenance for the duration of the authorization.

Interim Wildlife Standard – Treatment outside of LOS – Maintain Large Trees

There are two potential scenarios for application of the wildlife standard (referred to as Scenarios A & B), but both require that live large trees (equal to or larger than 21inch dbh) be maintained within stands proposed for harvest. Based upon review of data for stands intersected by the right-of-way for the Proposed Action, it is anticipated that trees 21inch dbh and larger would need to be removed to accommodate construction of the transmission line facilities and access roads and to provide required clearance beneath the line. A plan amendment would be necessary for harvest of trees 21inches dbh and greater.

The current LRMP direction provides:

> 2a) Maintain all remnant late and old seral and/or structural live trees greater than 21 inch dbh that currently exist within stands proposed for harvest activities.

The LRMP direction would need to be amended to provide:

> 2a) Remnant late and old seral and/or structural live trees greater than 21 inch dbh within the B2H transmission right-of-way corridor may be removed to accommodate construction of the transmission line facilities, access roads, and to provide required clearance beneath the line during construction and as required for operation and maintenance for the duration of the authorization.

Interim Wildlife Standards – Treatment outside of LOS – Move Structure toward LOS and Maintain Open, Park-Like Stand Conditions

Review of the Revised POD indicates that all trees beneath the line would need to be cut, with only minor exceptions (for example, where the line spans a draw and is adequately elevated above the trees). Moving the stand structure toward LOS would not occur and a project-specific plan amendment would be needed. The current LRMP direction provides:

> 2b) Manipulate vegetative structure that does not meet late and old structural (LOS) conditions in a manner that moves it towards these conditions as appropriate to meet HRV.
>
> 2c) Maintain open, parklike stand conditions where this condition occurred historically. Manipulate vegetation in a manner to encourage the development and maintenance of large diameter, open canopy structure. (While understory removal is allowed, some amount of seedlings, saplings, and poles need to be maintained for the development of future stands).

The LRMP direction would need to be amended to provide:

> 2b) Vegetative structures within the transmission right-of-way corridors in MA17 only, will not be manipulated to move it toward LOS conditions in order to accommodate construction of the transmission line facilities, access roads, and to provide required clearance underneath the line.
>
> 2c) Vegetation within the transmission right-of-way corridors in MA17 only, will be managed to accommodate construction of the transmission line facilities, access roads, and to provide required clearance underneath the line. With a few exceptions vegetation within these corridors will not encourage the development and maintenance of large diameter, open canopy structure.

Effects

The effects of amending the Eastside Screens direction of the Wallowa-Whitman LRMP would include the potential for removal of trees larger than 21inch dbh that would not otherwise be removed with the resulting effects to forest habitat within the 110 acres located in the Proposed Action right-of-way and ancillary facilities footprints. More detail on the effects of amending the Eastside Screens direction is provided in Section 3.2.6.

Timber Canyon Alternative

While most guidance in RF #2 (Eastside Screens) would be met by the Timber Canyon Alternative, non-conformance with a prohibition on harvest of large trees and requirements to move timber stand structure toward late and old structure (LOS) would require project-specific LRMP amendments for the Alternative. All of the applicable standards are wildlife standards applicable to watersheds with existing conditions for late and old structure stands (LOS) below the historic range of variability (HRV); this situation is identified as Scenario A in the Eastside Screens. Review of HRV analyses performed for

other projects in watersheds intersected by the Timber Canyon Alternative confirms that Scenario A represents the existing condition, i.e. LOS in some biophysical environments falls below HRV.

The Eastside screens direction of the current LRMP provides:

- Maintain all remnant late and old seral (LOS) and/or structural live trees greater than 21 dbh that currently exist within stands proposed for harvest activities;
- Manipulate vegetative structure that does not meet LOS conditions in a manner that moves it towards these conditions as appropriate to meet HRV;
- Maintain open, park-like stand conditions where this condition occurred historically. Manipulate vegetation in a manner to encourage the development and maintenance of large diameter, open canopy structure.

All trees in the right-of-way would need to be removed, with only minor exceptions (for example, where the line spans a draw and is adequately elevated above the trees). Based upon review of data for stands intersected by the ROW, access roads and ancillary facilities for this route show an estimated 75 acres of LOS would be affected and that trees 21inch dbh and larger would need to be removed to accommodate construction of the transmission line facilities and access roads and to provide required clearance beneath the line.

Purpose and Need to Amend the USFS Wallowa-Whitman National Forest Land and Resource Management Plan

The Timber Canyon Alternative would not meet the Eastside Screens standards and B2H Project-specific plan amendments to the LRMP would be necessary in order to authorize the Timber Canyon Alternative. The Eastside Screens direction of the LRMP would need to be amended for the 344 acres of National Forest System lands affected by the Timber Canyon Alternative to generally provide:

- Authorization to harvest remnant late and old seral and/or structural live trees greater than 21inch dbh the duration of the authorization;
- Authorization to manipulate vegetative structure that does not meet LOS in a manner that does not move it towards LOS for the duration of the authorization;
- Authorization to manipulate vegetation in a manner that does not maintain open, park-like stand conditions, and does not encourage the development and maintenance of large diameter, open canopy structure for the duration of the authorization.

Description of Potential Plan Amendment

Wildlife standards Scenario A – treatment within LOS

Current LRMP Direction:

> Scenario A – If either ONE or BOTH of the LOS stages FALLS BELOW HRV in a particular biophysical environment, there should be NO NET LOSS of LOS from that biophysical

environment. DO NOT ALLOW timber sale harvest activities to occur within LOS stages that re BELOW HRV.

Amended LRMP Direction:

Scenario A – For purposes of constructing, operating and maintaining the Boardman to Hemingway Transmission Line, allow timber sale harvest activities to occur within LOS stages such that a net loss of LOS will occur for the duration of the authorization.

Wildlife standards Scenario A – treatment outside LOS (#2 a, b, c)

Current LRMP Direction:

2a) Maintain all remnant late and old seral (LOS) and/or structural live trees > 21inch dbh that currently exist within stands proposed for harvest activities;

2b) Manipulate vegetative structure that does not meet LOS conditions, in a manner that moves it towards these conditions as appropriate to meet HRV;

2c) Maintain open, park-like stand conditions where this condition occurred historically. Manipulate vegetation in a manner to encourage the development and maintenance of large diameter, open canopy structure.

Amended LRMP Direction:

2a) For purposes of constructing, operating and maintaining the Boardman to Hemingway Transmission Line, remnant late and old seral and/or structural live trees > 21inch dbh may be removed for the duration of the authorization;

2b) For purposes of constructing, operating and maintaining the Boardman to Hemingway Transmission Line, vegetative structure that does not meet LOS may be manipulated in in a manner that does not move it towards LOS for the duration of the authorization;

2c) For purposes of constructing, operating and maintaining the Boardman to Hemingway Transmission Line, open, park-like stand conditions need not be maintained. Vegetation may be manipulated in a manner that does not encourage the development and maintenance of large diameter, open canopy structure for the duration of the authorization.

Effects

If an LRMP amendment is deemed to be warranted, management direction for the 250-foot right-of-way, access roads and ancillary facilities for the Timber Canyon Alternative (344 acres) would be changed from Management Areas 1, 1w, 3, 15 and 16 to Management Area 17 (Power Transportation Facility Retention). This area would not be available for future development to transport gas, oil, or electricity.

The effects of amending the Eastside Screens direction of the Wallowa-Whitman LRMP would include the potential for removal of trees larger than 21inch dbh that would not otherwise be removed with the resulting effects to forest habitat within the 344 acres located in the Timber Canyon Alternative right-of-way and ancillary facilities footprints.

3.4.3 Summary of Effects

3.4.3.1 BLM Resource Management Plans

For the Proposed Action, the Baker RMP would need to be amended to reclassify approximately 70 acres of VRM Class III to VRM Class IV, which represents reclassification of less than 0.1 percent of the current VRM Class III lands in the Baker RMP planning area. The Southeastern Oregon RMP would also need to be amended for the Proposed Action to reclassify approximately 15 acres from VRM Class II to VRM Class IV, which represents reclassification of 15 acres out of 144,403 acres of VRM Class II in the Malheur Resource Area.

For the alternatives, the Southeastern Oregon RMP would need to be amended to reclassify approximately 112 acres of VRM Class III to VRM Class IV in order to approve the Tub Mountain South Alternative, out of 199,078 acres of VRM Class III in the Malheur Resource Area. The Southeastern Oregon RMP would also need to be amended to reclassify 23 acres or 79 acres of VRM Class II to VRM Class IV to approve either the Malheur S or Malheur A Alternatives, out of 144,403 acres of current VRM Class II in the Malheur Resource Area.

Although B2H Project and potential future effects to the visual resources at the locations of the amendments would be noticeable, the RMP amendments necessary for approval of the Proposed Action or any of the alternatives would have very low long-term overall effects on the visual resources or visual resource management in either the Baker or Southeastern Oregon RMPs.

3.4.3.2 Wallowa-Whitman Land and Resource Management Plan

In order to authorize the Proposed Action, the Wallowa-Whitman National Forest LRMP would need to be amended to re-designate 110 acres of VQO Partial Retention to VQO Modification. The location of the re-designations would be in an existing utility corridor through the Blue Mountains generally paralleling I-84 and which includes an existing transmission line. Although re-designation could allow for more visually intrusive projects in the area, the existing visual intrusions and the relatively small area of redesignation would make the overall effects to visual resources and visual resource management in the forest long-term but low.

To authorize the Timber Canyon Alternative, the Wallowa-Whitman National Forest LRMP would likely be amended to reallocate approximately 344 acres of National Forest System from five Management Area allocations to Management Area 17 and to re-designate VQO designations of Partial Retention and Modification to Maximum Modification. This would represent a reduction in the forest-wide acres allocated to the five MA allocations of less than 1 percent.

Although the visual effects of the Proposed Action and Timber Canyon Alternative would be noticeable near the areas of the LRMP amendments, the overall effect to visual resources and forest management would be long-term but low.