

3.6 VEGETATION COMMUNITIES

This section addresses potential impacts to vegetation communities from the Proposed Route and Route Alternatives, during both construction and operations.

3.6.1 Affected Environment

The Project crosses two major ecological zones (see Figures E.10-1 and E.10-2 in Appendix E). Proceeding from east to west, the ecological zones are the Temperate Steppe which grades into the Temperate Mountain System as the route proceeds west across the Continental Divide. The route crosses seven ecoregions. It starts in the east in the Northwestern Great Plains Ecoregion, then crosses the Southern Rockies and Wyoming Basin Ecoregions before entering Idaho. There it crests the Wasatch and Uinta Mountains Ecoregion and Middle Rockies Ecoregion before entering the Northern Basin and Range Ecoregion. The westernmost section of the route lies on the Snake River Plain Ecoregion. Nearly two dozen subregions are crossed in the 1,100 miles traversed by the Proposed Route and Route Alternatives.

Due to the length of the Project, nearly all the vegetation communities present in southern Wyoming and Idaho are crossed. These include expanses of semi-arid shrubland and grassland, irrigated agricultural land (principally in the Snake River Plains), forested mountains, shrub and woodland covered hills, and riparian woodlands and wetlands. Vegetation types crossed by the Project are presented in Section 3.6.1.5. Approximately 47 percent of the vegetation crossed by the Proposed Route and Route Alternatives is natural sagebrush (established native sagebrush communities).

Nearly all the vegetation communities present in the Project area have been modified to some degree by human activities, and about one-third has been modified to an extent that it was mapped as either disturbed vegetation or agriculture for the EIS. Principal activities occurring within the Project area include livestock ranching, oil and gas exploration and development, mining, timber harvest, and agricultural development including both dryland farming and irrigated cropland and pastures.

3.6.1.1 Analysis Area

The Analysis Area used to determine vegetation impacts was defined as a buffer of 250 to 500 feet on either side of the Proposed Route and Route Alternatives centerlines (a 500 to 1,000 feet total, hereafter referred to as “buffer”). This buffer width was variable in that originally vegetation was mapped in a wider buffer, but as Route Alternatives were added with certainty of locale or bound by constraints, the mapped area was reduced to 500 feet. The Analysis Area also includes a buffer of 25 feet (50 feet total) around the centerline of any access road that extends outside of the buffer area. In addition, the Analysis Area includes vegetative mapping of all ancillary facilities (such as laydown yards, fly yards, staging areas) that may occur outside the buffer area. These distances were used because they encompass the area of greatest activity during construction and operations, and any Project-related impacts (changes in size or function) to vegetation would occur within these buffers while allowing for minor route alterations during final design. The Analysis Area for vegetation includes a total of approximately 297,600 acres.

3.6.1.2 Issues to be Analyzed

The following vegetation-related issues were brought up by the public during public scoping (Tetra Tech 2009a), were raised by federal and state agencies during scoping and agency discussions, or must be considered as stipulated by law or regulation:

- How much vegetation would be cleared, and how much would be kept clear or otherwise maintained during operations;
- How quickly the various vegetation communities that are cleared for construction but allowed to regrow during operations would recover from disturbance;
- How much disturbance in sagebrush communities would occur and what the effects would be;
- How much disturbance in native grasslands would occur and what the effects would be;
- Whether old-growth forest stands would be affected, and what measures would be taken to protect this vegetation type; and
- What the effects of construction, operations, and maintenance on fire occurrence, frequency, and severity would be, especially as they relate to important shrub-steppe and forest habitats.

Issues related to special status plants, noxious weeds and invasive plants, and wetlands and riparian areas are discussed in Sections 3.7 – Special Status Plants, 3.8 – Invasive Plant Species, and 3.9 – Wetlands and Riparian Areas, respectively. Effects to agricultural lands and timber production on federal lands are addressed in Sections 3.18 – Agriculture and 3.17 – Land Use and Recreation, respectively.

3.6.1.3 Regulatory Framework

Federal, state, and local agencies manage vegetation for wildlife habitat, public use, watershed protection, livestock forage, and other uses under the authority of various laws, including the Taylor Grazing Act of 1934 as amended, the Federal Land Management and Policy Act of 1976, the Sikes Act, NEPA, the SRBOP, as well as the BLM and Forest Service policies and manuals including BLM rangeland standards and guidelines, Forest Plans and RMPs. In addition, there are laws and regulations for sensitive plant species, and some sensitive vegetative communities (such as wetlands). Laws and regulations related to specific sensitive plant species or communities are discussed in Section 3.7 – Special Status Plants, Section 3.8 – Invasive Plant Species, and Section 3.9 – Wetlands and Riparian Areas.

3.6.1.4 Methods

The primary source of information used for analysis of impacts to vegetation was a detailed remote sensing-based vegetation mapping study conducted specifically for this Project. In addition, information on general vegetation characteristics was obtained from BLM RMPs and Forest Service Forest Plans, other agency publications and databases, published scientific literature, and limited field surveys. The goal of the mapping effort was to identify vegetation types using a combination of GIS-assisted segmentation, aerial imagery interpretation, and limited ground surveys. Details of this vegetation/habitat mapping effort are presented in the *Vegetation and Habitat Baseline*

Technical Report (Tetra Tech 2009b). Vegetation typing and GIS modeling were used to identify habitats for several wildlife species (see Section 3.11 – Special Status Wildlife and Fish). Below is a summary of the steps used during this mapping effort:

- Digital ortho quarter quad tiles of the Project were downloaded from the USDA Farm Service Agency's National Agriculture Imagery Program (NAIP). This program acquires 1-meter resolution digital ortho imagery for agricultural regions in the United States during the summer crop growing season. The program updates their datasets annually by rotating among states or over regions within larger states; therefore, only a portion of the United States is flown each year. NAIP imagery is acquired at a 1-meter ground sample distance with a horizontal accuracy that matches within 6 meters of reference aerial control points, which are used during image inspection. Latest imagery available for Idaho had been flown in 2004 and for Wyoming and Nevada in 2006. This imagery was used for the purposes of initial segmentation.
- Field reconnaissance indicated that relatively small changes had occurred in native vegetation areas subsequent to the acquisition of the aerial imagery described above. To account for these changes, and to capture current vegetation communities, multi-spectral digital aerial imagery with 1-foot resolution was acquired specifically for this Project. Data collection was conducted in three phases. The first two phases were planned to coincide with early spring growth across the Analysis Area. Phase one included the Snake River Plain in Idaho (flown April 28 to May 5, 2008), central and southwest Wyoming (flown June 3 to 15, 2008), and the mountainous areas of southeastern Idaho and southwestern Wyoming (flown July 7 to 11, 2008). Phase two included southern Idaho and southwestern Wyoming (flown September 25 to 28, 2008). The last phase was flown in response to changes in the Proposed Route and Route Alternatives. Phase three included the mountains of southeastern Idaho and southwestern Wyoming (flown October 22 to 24, 2008). A few Project elements were not covered during these Project-specific surveys. Vegetation types in these areas were identified using the NAIP imagery described above.
- A GIS program (SPRING 5.0) was used to segment the NAIP imagery into polygons representing distinct vegetation stands. The initial minimum mapping unit was 0.1 acre and the average polygon size after segmentation was 4.6 acres. Oversegmentation (i.e., when resulting polygons of like pixels were too small or too fragmented) was corrected by using Environmental Systems Research Institute (ESRI) ArcInfo[®] program. This resulted in a minimum mapping unit of 5 acres, which more accurately and consistently identified vegetation types.
- The resultant polygon layer was overlaid on the Project-specific imagery.
- A team of biologists assigned names to each polygon using National Vegetation Classification System (NVCS) vegetation alliances and associations. The NVCS is a hierarchical classification system (Grossman et al. 1998) that defines vegetation associations by species composition, uniform habitat conditions, and uniform physiognomy (i.e., the general characteristic of the landscape such as shrub-steppe or mixed conifer). Biologists also used data obtained from the Landscape Fire and Resource Management Planning Tools Project LANDFIRE

vegetation classification (available Project-wide) as reference or comparison layers (USGS 2006). In the summer of 2009, a similar mapping effort was undertaken to incorporate changes to the Proposed Route and Route Alternatives, following the methodology described above.

- Field sampling was conducted from April through December 2008 and in September and October 2009 to collect quality assessment data (i.e., data to verify mapped vegetation). In the field, transects were run to collect vegetation data at targeted locations for assessment of the accuracy of interpretation of vegetation. This accounted for the original Proposed Route and Route Alternatives, as well as modifications made to the Proposed Route and new Route Alternatives developed in 2009.
- The remote sensing imagery segmentation and interpretation resulted in the identification of 77 vegetation alliances, including 25 shrubland alliances, 18 forest or woodland alliances, 9 developed or disturbed alliances (commercial, CAFO, extractive, recreation, residential, urban, residential, ROW, “other”; not seeded fields used for agriculture or grazing), 4 herbaceous or grassland alliances, 6 agricultural alliances, 5 general wetland or riparian alliances, 4 water types, and 6 other cover types (e.g., rock outcrop and scree). For the EIS analysis, the vegetation alliances were aggregated into general vegetation types. By combining alliances with similar dominants, 11 upland vegetation types (including disturbed shrubland and grassland types), and 1 wetland/riparian vegetation type were identified. In addition, 4 other cover types were identified: agriculture, open water, miscellaneous, and disturbed/developed (see Table 3.6-1 for a description of each).
- For the more detailed wetland analysis, where impacts to specific wetland types must be addressed, wetlands/riparian areas were analyzed in greater detail using aerial photo interpretation of Project-specific imagery and NAIP photography, as well as some field validation. In the summer of 2009, site visits were conducted at 79 locations to verify mapped wetland and riparian features. Wetlands and riparian vegetation were mapped in eight categories (e.g., forest, shrub, herbaceous) and the results were combined with the other vegetation associations in the GIS database (see Section 3.9 – Wetlands and Riparian Areas).
- The results of the vegetation type analyses were incorporated onto maps containing the Proposed Route and Route Alternatives. A quantitative assessment of impacts was then developed with an additional GIS analysis, by overlaying the vegetation type polygons with the footprint of the Project (based on the Project’s preliminary engineering design). The acreage of impacts to vegetation types was determined for both the construction and operations phases of this Project. Construction impacts include all areas that would be disturbed during construction. Operations impacts include all areas that would either be permanently disturbed due to Project facilities (roads, tower structures, etc.) or where disturbance would continue due to Project maintenance. All of the operations impacts would be initiated during construction; therefore, values reported for operations impacts are a subset of the construction disturbances.

Analysis of ROW clearing and maintenance impact was assessed by GIS by overlaying the vegetation with the ROW width.

- The values reported for operations impacts due to ROW maintenance/clearing may be larger than those reported for construction ROW clearing in some instances (e.g., see Tables D.6-2 and D.6-3). This is because the disturbance footprint necessary to construct tower pads and access roads is larger during construction, compared to the permanent footprint of these same tower pads and access roads during operations. In addition, some disturbances (e.g., fly-yards) would only occur during construction, and these same areas may be later classified as ROW maintenance disturbances during operations if they occurred within the forested ROW. As a result, the areas classified as “ROW disturbances” compared to the areas classified as “project facility disturbances” can be smaller during construction than during operations. For example, as shown in Figure 3.6-1, the total area disturbed during construction and operations is identical within this hypothetical forested area; however, the area that would be classified as ROW maintenance/clearing is smaller during construction than during operations.

3.6.1.5 Existing Conditions

The Proposed Route and its Route Alternatives span more than a thousand miles from 41.6° to 43.4°N latitude and 105.7° to 116.6°W longitude. Elevation, slope, aspect, seasonal temperatures, and annual precipitation exhibit a wide range across the Project area and ultimately support a diversity of ecological units defined by the composition of vegetation.

Table 3.6-1 presents the vegetation types used in this analysis, as well as the sub-communities and species found within each vegetation type. Table D.6-1 in Appendix D presents the number of miles of each vegetation type crossed by the Proposed Route and its Alternatives.

Table 3.6-1. Vegetation Types in Gateway West Analysis Area

Vegetation Type	Segment	Percent of Analysis Area	Sub-Communities ^{1/}	Common Species
Shrubland Natural/Semi-Natural Vegetation				
Sagebrush	All	41.2	Big sagebrush shrubland, big sagebrush shrub herbaceous, mountain big sagebrush shrubland herbaceous, mountain big sagebrush shrubland, Wyoming big sagebrush shrubland, black sagebrush shrubland, low sagebrush shrubland, silver sagebrush shrubland herbaceous	Shrubs: Basin big sagebrush, Wyoming big sagebrush, mountain sagebrush, rubber rabbitbrush, shadscale, green rabbitbrush, antelope bitterbrush, black greasewood, fourwing saltbush Grasses: bluebunch wheatgrass, Sandberg bluegrass, needle-and-thread, Thurber’s needlegrass, squirreltail, western wheatgrass, Idaho fescue, Indian ricegrass Non-native: cheatgrass

Table 3.6-1. Vegetation Types in Gateway West Analysis Area (continued)

Vegetation Type	Segment	Percent of Analysis Area	Sub-Communities ^{1/}	Common Species
Disturbed Sagebrush	All	12.8	Disturbed Wyoming big sagebrush, Basin big sagebrush	Shrubs: Wyoming big sagebrush, Basin big sagebrush, rubber rabbitbrush Grasses: Sandberg bluegrass Non-native: cheatgrass, crested wheatgrass, other species present within big sagebrush and disturbed grassland types
Greasewood	1E, 1W, 2, 3, 4, 7, 8, 9	3.1	Black greasewood shrubland	Shrubs: black greasewood, rubber rabbitbrush, Torrey seablite, shadscale, fourwing saltbush, Gardner saltbush, bud sagebrush Grasses: western wheatgrass, blue grama Non-native: cheatgrass, Japanese brome, sixweeks fescue, tansy mustard, Russian thistle, desert alyssum, halogeton, povertyweed
Saltbush	1E, 2, 3, 4, 7, 8, 9	2.3	Fourwing saltbush shrubland, shadscale saltbush shrubland, spiny hopsage shrubland	Shrubs: fourwing saltbush, shadscale saltbush, spiny hopsage, winterfat, bud sagebrush, black greasewood, rubber rabbitbrush, winterfat, big sagebrush, black sagebrush Grasses: Indian ricegrass, bluebunch wheatgrass, needle-and-thread
Dwarf Shrub	1E, 2, 3, 4	4.4	Dwarf shrubland	Shrubs: little sagebrush, Gardner saltbush, winterfat Grasses: Indian ricegrass, Sandberg bluegrass, western wheatgrass
Other Shrub	1E, 1W, 4, 7, 9	0.7	Saskatoon serviceberry shrubland, curleaf mountain mahogany shrubland and woodland, alder leaf mountain mahogany shrubland, yellow rabbitbrush shrubland, chokecherry shrubland, antelope bitterbrush shrubland	Shrubs: curleaf mountain mahogany, Saskatoon serviceberry, mountain mahogany, chokecherry, yellow rabbitbrush, western snowberry Grasses: western wheatgrass, needle and thread
Grassland				
Disturbed Grassland	All	14.2	Disturbed grassland	Native grass: western wheatgrass, needle-and-thread, purple three-awn, Sandberg bluegrass Non-native: crested wheatgrass, annual brome grasses, intermediate wheatgrass, smooth brome, cheatgrass, and others
Native Grass	1E, 1W, 4, 7, 8, 9	0.4	Streambank wheatgrass-prairie junegrass herbaceous, bluebunch wheatgrass herbaceous	Grasses and grass-like species: streambank wheatgrass, Sandberg bluegrass, bluebunch wheatgrass, needle-and-thread, prairie junegrass, red threeawn, streamside wild rye, western wheatgrass, smallwing sedge, rushes Shrubs: rubber rabbitbrush, green rabbitbrush, big sagebrush Non-native: cheatgrass, alyssum, salsify

Table 3.6-1. Vegetation Types in Gateway West Analysis Area (continued)

Vegetation Type	Segment	Percent of Analysis Area	Sub-Communities ^{1/}	Common Species
Forest and Woodland				
Conifer Forest	1E, 1W, 4, 5, 7	1.5	Douglas-fir forest and woodland, subalpine fir-aspen forest, lodgepole pine forest, limber pine-aspen forest, ponderosa pine forest and woodland, ponderosa pine-aspen forest, upper treeline whitebark and limber pine	Trees: lodgepole pine, Douglas-fir, whitebark pine, limber pine, bigtooth maple, aspen Shrubs: Saskatoon serviceberry, chokecherry, Scouler willow, Rocky Mountain juniper, creeping barberry, gooseberry/ currant
Deciduous Forest	1E, 1W, 4, 5, 7	2.3	Bigtooth maple montane forest, Aspen – Douglas-fir forest, aspen forest, aspen woodland,	Trees: aspen, bigtooth maple, Douglas-fir Shrubs: chokecherry, mountain snowberry, common juniper, Saskatoon serviceberry, big sagebrush, gooseberry/currant, Woods rose Grasses and grass-like species: pinegrass, elk sedge, mountain brome
Juniper	1E, 1W, 2, 4, 5, 7, 9	2.8	Western juniper woodland, Utah juniper woodland, Rocky Mountain juniper woodland	Trees: Utah juniper, Rocky Mountain juniper, western juniper Shrubs: big sagebrush, black sagebrush, fourwing saltbush, shadscale, green rabbitbrush, ephedra, rubber rabbitbrush, broom snakeweed, serviceberry, fringed sage, prickly pear, bitterbrush snowberry Grasses and grass-like species: Indian ricegrass, squirreltail, needle and thread, western wheatgrass, bluebunch wheatgrass, galleta, Sandberg bluegrass, blue grama, junegrass, muttongrass, sedges
Wetland and Riparian	All	1.5	Forested riparian, forested wetland, shrub riparian, shrub wetland, herbaceous wetland, mixed wetland, mixed riparian	Herbaceous emergents: common reed, cattail, bulrush, woolly sedge, Nebraska sedge, creeping spikerush, clustered field sedge, Baltic rush, saltgrass. Shrubs and trees: coyote willow, yellow willow, Woods rose, common chokecherry, black hawthorn, red-osier dogwood, water birch, narrowleaf cottonwood, black cottonwood, peachleaf willow Non-native: Russian olive
Other Cover Types				
Miscellaneous (substrate-dominated)	E, 1W, 2, 4, 5, 7, 8, 9	0.2	Inter-Mountain Basins Cliff and Canyon, Inter-Mountain Basins Volcanic Rock and Cinder Land, Large Eroding Bluffs Sparsely Vegetated, Rock Outcrop Sparsely Vegetated, scree, badlands	Ponderosa pine, lodgepole pine, Indian ricegrass, big sagebrush, sand sagebrush, fourwing saltbush, others
Water	All	0.3	Lake, pond, playa, reservoir, river/stream/ canal	Aquatic plants may be present
Agriculture	All except 3	10.9	Dryland farming, fallow/hay pasture, herbaceous pasture, irrigated farming, orchard, shrub pasture	Crops, non-native grasses and forbs, weeds, shrubs

Table 3.6-1. Vegetation Types in Gateway West Analysis Area (continued)

Vegetation Type	Segment	Percent of Analysis Area	Sub-Communities ^{1/}	Common Species
Disturbed/ Developed (unvegetated by human disturbance)	All except 10	1.4	Barren, burned, commercial, disturbed, extractive, recreation area, residential, ROW, urban	Much of this cover is unvegetated, other parts have landscaped or weedy vegetation, few native species

1/ "Shrubland herbaceous" communities are those with a moderate to dense herbaceous layer; "shrubland" communities without this designation are typically characterized by a sparse herbaceous layer.

Scientific names of plants are provided in Tetra Tech (2009b).

Source: Tetra Tech 2009b; Jankovsky-Jones 2001

Shrubland

Shrubland is the most common vegetation type found within the Analysis Area. It is the dominant type throughout the Wyoming portions of the Analysis Area and is common within Idaho. Major shrub types include sagebrush, disturbed sagebrush, saltbush, and greasewood.

The Sagebrush type is the most widely distributed type of shrubland, occurring on the plains, intermountain basins, and slopes. It occurs in all segments and makes up more than 20 percent of the Analysis Area for all proposed segments except 10. This vegetation type has an overstory of sagebrush and a variable understory of species of grass, forbs, and sub-shrubs. This vegetation type includes eight sagebrush associations that were identified during mapping.

Disturbed sagebrush vegetation is found in the Analysis Area of all segments and is most common in Segments 8 and 9. It includes many of the plant associations of the Wyoming big sagebrush shrubland alliance, some of which are of poorer quality due to recent disturbance.

The greasewood type is most common in Segments 2, 3, and 4 in Wyoming, but also occurs in Segments 1E, 1W, 7, 8, and 9. This vegetation type includes one association.

The saltbush type occurs along Segments 1E, 2, and 3 in Wyoming, and parts of Segments 7, 8, and 9 in Idaho. It includes three associations. This is the most arid vegetation type within the Analysis Area, occurring in areas with 8 to 10 inches of annual rainfall.

Dwarf shrub consists of arid areas dominated by dwarf shrubs less than one foot in height. Common dominants include sagebrush, Gardner saltbush, and winterfat. This vegetation type is restricted to the Wyoming portions of the Project and occurs on Segments 1E, 2, 3, and 4.

Other shrub communities occur in the mountainous portions of the Analysis Area in Segments 1E, 1W, 4, 5, and 7, but occupy only small areas. The most common types are dominated by mountain mahogany.

Grasslands

Grasslands occur on all segments but are especially abundant on Segments 8, 9, and 10. Nearly all of the grasslands are disturbed or semi-natural plant communities dominated by non-native perennial grass species including crested wheatgrass and intermediate wheatgrass, and weeds such as cheatgrass. The crested wheatgrass and

intermediate wheatgrass stands typically result from revegetation or seeding, while dominance by cheatgrass is a result of disturbance and wildfire and therefore have different management considerations. Some disturbed grasslands are dominated by seral native grass species such as purple threeawn and Sandberg bluegrass.

Native grassland occurs most commonly along Segment 1W(a), where it occupies about 7 percent of the Analysis Area, and less commonly on Segments 1E, 1W, 7, 8, and 9. Most of the native grassland is in the bluebunch wheatgrass association.

Forest and Woodland

Forests are limited in extent and primarily occur in Segments 1E, 1W, 4, 5, and 7 where the Proposed Route and Alternatives cross areas of higher elevation in the Laramie Mountains, the Tump Range, and Commissary Ridge of Wyoming and the Wasatch Range, Portneuf Range, Deep Creek, and Sublette Mountains in Idaho (Appendix E, Figures E.10-1 and E.10-2). Seven deciduous and seven conifer forest and woodland associations were mapped. Deciduous forests occupy about 6 to 8 percent of the Analysis Area along Segments 4 and 5, and 2 to 3 percent along Segments 1E, 1W, and 7. Most of the deciduous forest is dominated by aspen; other species include bigtooth maple, Douglas-fir and other conifers. Conifer forests occupied 2 to 7 percent of the Analysis Area for Segments 1E, 1W, 4, 5, and 7. They are dominated by Douglas-fir, ponderosa pine, and lodgepole pine. Limber and whitebark pine, two species that have recently been added to the Wyoming BLM sensitive species list in 2010, are found at the upper treeline on the mountains along Segment 4 in southwestern Wyoming and eastern Idaho (R. Means, BLM Wyoming State Office, personal communication, September 13, 2010). These species are discussed in Section 3.7 – TES Plants.

Juniper woodlands occur within the Analysis Area in both Idaho and Wyoming, and are most prevalent along Segments 1E, 5, and 7, where they occupy about 6 to 10 percent of the Analysis Area. They also occur in Segments 1E and 1W, 2, 4, and 9. Most of the juniper woodlands are dominated by Utah juniper in Idaho and Rocky Mountain juniper in Wyoming.

Wetland and Riparian Types

Wetlands and riparian vegetation occupy 1 to 3 percent of the Analysis Area for Segments 1E, 1W, 2, 3, and 4, and less than 1 percent for all other segments. The most common type is herbaceous wetland, but shrub and forested wetlands and riparian areas are also present. Wetlands and riparian areas are discussed in more detail in Section 3.9 – Wetlands.

Other Cover Types

Several substrate-dominated natural communities are included under miscellaneous, including cliffs and canyons, sand dunes, and volcanic rocks. Cliffs and canyons are present near Segments 1W, 4, and 9. There are no sand dunes present in the Analysis Area. Volcanic rock and cinder occurs near several segments, but mostly in Segments 1E, 4, and 9.

Other cover types include open water, disturbed/developed areas, and agricultural lands (irrigated and unirrigated). Disturbed/developed covers 1 to 5 percent of all segments. Agricultural lands represent 10 to 50 percent of the Idaho Analysis Area for Segments 5, 7, 8, 9, and 10, but only a small portion of the Analysis Area in Wyoming.

Vegetation Types of Concern

Vegetation types of concern are those that have been identified by land management agencies or by legal requirement because they are uncommon or underprotected. Many of these vegetation types provide habitat for special status plant and animal species. Vegetation types of concern include wetlands and riparian areas (discussed in detail within Section 3.9 – Wetlands and Riparian Areas), cushion plant communities in Wyoming, limber pine and whitebark pine in Wyoming, sand dunes, old-growth forests on NFS lands, and intact sagebrush communities in Idaho. There are no sand dunes or cushion plant communities in the Analysis Area; therefore, they will not be addressed further here. Limber pine and whitebark pine, which have recently been added to the BLM Sensitive Species List in Wyoming, are addressed in Section 3.7 – Special Status Plants. Effects to intact sagebrush communities and old-growth forests are discussed in subsection 3.6.2.2 below.

3.6.2 Direct and Indirect Effects

This section is organized to present effects to vegetation from construction, operations, and decommissioning of the proposed Project. Route Alternatives are analyzed in detail below in Section 3.6.2.3. There is a Design Variation involving use of two single-circuit structures proposed by the Proponents for Segments 2, 3, and 4 (see Section 2.2 for details), which is analyzed below in Section 3.6.2.4 and a Structure Variation that is analyzed in Section 3.6.2.5. The Proponents have also proposed a Schedule Variation, analyzed in Section 3.6.2.6, in which one of the two single circuits to be constructed in Segments 2, 3, and 4 and a portion of Segment 1W would be built on an extended schedule with construction beginning approximately 2.5 years after completion of the initial construction.

Mitigation measures or EPMs are presented in detail within this section only if it is the first time they have been discussed in Chapter 3; all other measures are referenced or summarized. A comprehensive list of all Proponent-proposed EPMs and Agency-required mitigation measures can be found in Table 2.7-1 of Chapter 2.

3.6.2.1 No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to vegetation would occur, but changes in vegetation would continue as a result of natural conditions (including but not limited to fire, flooding, and extreme weather conditions) and existing and future development (including but not limited to, oil and gas exploration/development, coal and trona mining, and residential development) within the Analysis Area. Changes to vegetation from other existing and future developments would generally be similar to that which may occur from the proposed Project, including disturbance and loss of vegetation during construction.

3.6.2.2 Effects Common to All Action Alternatives

Construction

The proposed Project would directly affect vegetation communities through the temporary trampling of herbaceous vegetation, the partial removal of aboveground plant cover, and the complete removal of vegetation due to construction of the transmission line and associated aboveground structures, access roads, temporary work spaces, and other project facilities. Vegetation removal can have a variety of effects on vegetation communities ranging from changes in community structure and composition to alteration of soil moisture or nutrient regimes. The degree of impact depends on the type and amount of vegetation affected, and the rate at which vegetation would regenerate after construction. Ultimately, these direct and indirect effects can reduce or change the functional qualities of vegetation including wildlife habitat (described in Section 3.10 – General Wildlife and Fish) and livestock forage (grazing impacts are discussed in Section 3.16 – Water Resources). To put Project-related disturbance in context, on a landscape scale, the total removal or alteration of vegetation under the Proposed Action during construction would comprise a small proportion of the total acres of vegetation mapped within the Analysis Area: 5.3 percent of shrubland, 12.5 percent of forest/woodland, 3.3 percent of wetland/riparian, 6.0 percent of grassland, and 5.6 percent of other cover types.

Direct and Indirect Effects on Vegetation Communities

Overstory vegetation, whether in a forest or shrubland community, physically protects understory plants, stabilizes the soil, and provides vertical structure adding diversity to the plant community. Removal of this vegetation shifts the community into an earlier successional stage, changing both its structure (reducing vertical structure) as well as the dominant species. Removal of mature forest by the Project would create a new forest succession pattern through conversion to a younger, less complex (i.e., fewer canopy levels) forest. Additionally, tree clearing opens the forest canopy, creating growing conditions that favor shade-intolerant species. The presence of a mature forest canopy also influences microclimate conditions such as soil moisture and temperature, which can be altered when overstory shading is reduced.

Sagebrush vegetation, due to its deep taproot and shallow, diffuse root system also provides an important function in soil moisture and nutrient regime; therefore, the removal of this vegetation alters the soil moisture content and nutrient availability for surrounding plants. The characteristic tap root and shallow, diffuse root system of sagebrush species brings deep soil moisture to the surface, facilitating nutrient uptake and microbial activity and providing normally unavailable moisture to neighboring plants (Caldwell and Richards 1989 as cited in MFWP 2010). The root system also adds to the soil organic material, developing both the shallow and deep soil profiles (Daubenmire 1970 as cited in MFWP 2010). For these reasons, mature sagebrush are often associated with well developed grass and forb understories, particularly in areas with proper grazing management practices. Thus, the removal of sagebrush and shrubland vegetation by the Project may alter growing conditions for other plants.

Indirectly, vegetation removal can increase the potential for invasive plants and the introduction and spread of noxious weeds (Levine et al. 2002; addressed in detail in Section 3.8 – Invasive Plant Species). Non-native plant invasions have the potential to

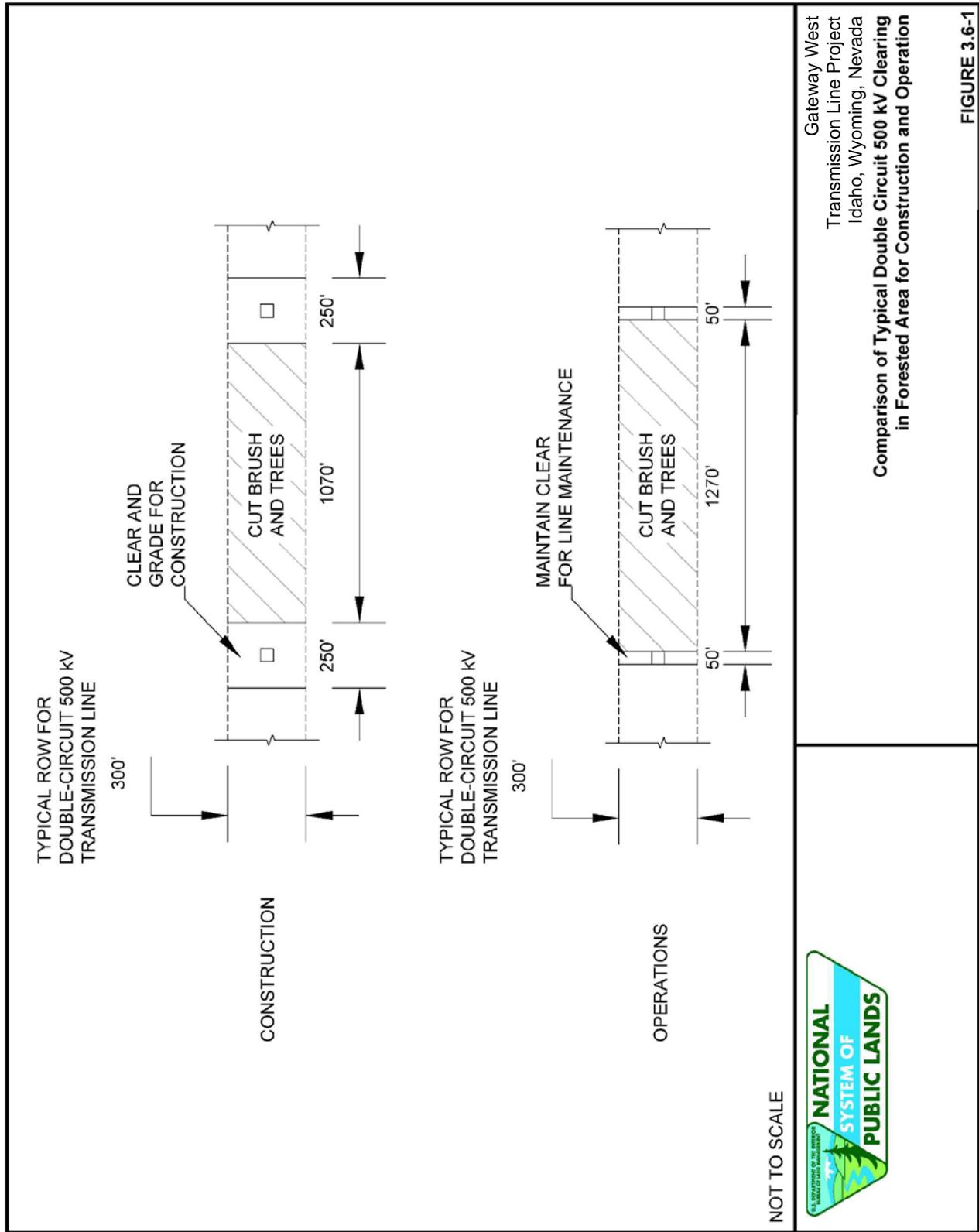
change the composition and diversity of native plants through competition, by altering the natural fire regime, and by altering other ecosystem processes (e.g., nitrogen cycling). Non-native plants such as cheatgrass create a more continuous fuel bed than their native bunchgrass counterparts, resulting in a dramatic increase in fire frequency and intensity. This has resulted in a substantial loss of native shrubland and grasslands throughout the western United States (Levine et al. 2002). The Project would incorporate standard BMPs and proposed EPMs (described below) for minimizing the potential for introduction and spread of noxious weeds (see additional discussion in Section 3.8 – Invasive Plant Species and the Framework Reclamation Plan for Construction Activities included in Appendix C-2). Thus under the Proposed Action and all Action Alternatives, increases in noxious weeds would be minimized.

Indirectly, removal of protective vegetation would also expose soil to potential wind and water erosion. This can result in further loss of soil and vegetation, as well as increase sediment input to water resources. However, with implementation of the Project SWPPP, erosion and sedimentation effects on vegetation would be temporary and limited to the construction period under the Proposed Action and all Action Alternatives. Proposed EPMs and BMPs (as defined in Sections 2.8 and 2.12, respectively) aimed at minimizing the effects of erosion caused by vegetation removal are discussed in detail in Section 3.15 – Soils and Section 3.16 – Water Resources.

Finally, there would also be indirect effects resulting from the fragmentation of connected vegetation types. Fragmentation refers to the breaking up of contiguous areas of vegetation into smaller patches, which results in the creation of habitat edges (areas where two or more vegetation types meet) along the ROW. Edge areas have different microclimatic conditions and structure, which may lead to different species composition than interior area. Due to their greater height and structural complexity, edge effects would be the most drastic in forest and woodland vegetation communities compared to shrubland or grassland communities. Fragmentation and the loss of landscape connectivity can also impact wildlife. A detailed fragmentation analysis is provided in Section 3.10 – General Wildlife and Fish.

Extent and Duration of Effects to Vegetation

The direct and indirect effects of a transmission line crossing shrub-steppe and other low vegetation are generally minor, beyond the localized impacts of structure installation and the construction of roads and other facilities, because the surrounding vegetation is low-growing (i.e., the existing low-growing vegetation would be maintained, thus minimizing changes to vegetation community structure or composition and other functional values). However, in forested areas, in addition to the effects of roads and structures, the entire ROW would be cleared of trees tall enough to endanger the line. Therefore, in forested environments, due to the removal of this vertical structure, there would be greater changes in vegetation community structure and composition than in non-forested environments. Construction clearing limits in forested environments are illustrated in Figure 3.6-1. Chapter 2 provides a detailed description of the construction ROW, access roads, and other Project facilities.



After construction, the portions of the structure pad not needed for normal transmission line maintenance, including fire and personnel safety clearance zones, would be restored to approximate their pre-construction conditions and would be reseeded with a weed-free seed mix. The recovery of vegetation following reclamation would vary by plant community type desired following construction (i.e., low-growing vegetation maintained in the ROW for safety). Grasslands and herbaceous wetlands would generally recover within 5 to 7 years. Shrublands may require 30 to 50 years, and forested and woodland areas could take 50 to 100 years to reach mature conditions. Sites with naturally sparse vegetation, saline or alkaline soils, high erosion potential, or shallow soils may be difficult to restore and may require special techniques or repeated revegetation efforts. The vegetative communities that reestablish after construction may differ from pre-construction conditions if soils are modified during construction due to compaction or by breaking up of hardpans.

Measures to Minimize Effects to Vegetation

To minimize direct and indirect effects of vegetation removal under all alternatives, the Proponents have proposed a Framework Reclamation Plan for Construction Activities (Appendix C-2) that provides procedures for pre-construction treatment of noxious weeds and invasive plants, weed prevention and control, topsoil treatment, ROW restoration (recontouring, decompaction, and cleanup), stabilization of disturbed areas to minimize erosion and runoff, seedbed preparation, seeding methods, preliminary seed mixes, road reclamation, monitoring, and remedial actions. This plan would be implemented under the Proposed Action and all Alternatives. Reclamation efforts would be scheduled for late fall to early winter where feasible and permitted to facilitate seed establishment when snow and rainfall are more likely. A detailed reclamation schedule would be prepared as part of the Project Reclamation Plan for each segment. Project-specific seed mixes would be developed in consultation with the land manager or landowner.

Reclamation actions would meet short- and long-term reclamation objectives by (pertinent EPMs included in the Framework Reclamation Plan for Construction Activities are referenced):

- Using proper soil management techniques, including stripping, stockpiling, and reapplying topsoil material at temporarily disturbed areas of active cropland to restore soil horizons and establish surface conditions that would allow for rapid reestablishment of the productivity of agricultural crops and rangelands. Establishing stable soil surface and drainage conditions, which would minimize surface erosion and sedimentation (REC-16 through REC-22 in the Framework Reclamation Plan).
- Conducting pre-construction weed surveys, applying pre-construction weed control measures where appropriate, controlling weed introduction and spread during construction, and conducting post-construction weed monitoring and control activities where needed (REC-1 through REC-15 in the Framework Reclamation Plan).
- Revegetating disturbed areas with plant species and weed-free seed mixes adapted to site conditions to establish long-term, productive, self-maintaining plant communities to blend in with existing land uses; and concurrently minimize

the chances for noxious and invasive weed establishment (REC-13 through REC-17 in the Framework Reclamation Plan).

- Reestablishing topography to blend in with the surrounding landscape (REC-19 through REC-21 in the Framework Reclamation Plan).
- Monitoring for a minimum of 3 years following construction to ensure the achievement of both short-term and long-term reclamation goals (WEED-4).
- Minimizing temporary construction impacts along the route by limiting the temporary construction ROW width to avoid impacts to native soil and vegetation, where practical and safe.

The Agencies have identified the following mitigation measures that would reduce construction effects on vegetation on lands managed by the BLM and/or the Forest Service:

- VEG-1 The Proponents shall consult with each appropriate local land management agency (Forest Service and BLM) office or landowner to determine appropriate seed mix for revegetation. Also see WEED-1.
- VEG-2 During construction, blading of native plant communities should be minimized, consistent with safe construction practices. Where feasible, shrubs should be cut at or near ground level to facilitate regrowth after construction. The footprint of construction and operations facilities should be kept to the minimum necessary.
- VEG-3 Where feasible, locate new access roads to minimize the number of trees removed during construction.
- VEG-4 In areas where revegetation would be completed, topsoil salvage and replacement should be used for areas larger than 1 acre where soils would be disturbed during construction. In areas where revegetation would be completed, topsoil salvage will be used in all areas of cut or fill in order to facilitate revegetation.

In addition, in specific sensitive areas (such as VRM Class II and areas near NHT trails), the access road used for construction will be restored and an alternative access route for operations designated (mitigation measure VIS-9; see Section 3.2 – Visual Resources).

Given the dry climate, that construction would occur during the summer when the weather is hot and dry, and the vegetation present in the vicinity of the ROW, the potential for fire is relatively high. To minimize the potential for wildfires, state and federal fire prevention requirements would be followed. Fire prevention measures would include enforcing red flag warnings, providing "fire behavior" training to all pertinent personnel, keeping vehicles on or within designated roads or work areas, and providing fire suppression equipment and emergency notification numbers. All construction personnel would also be trained in wildfire risk and prevention and adequate fire suppression equipment would be maintained with each construction crew. Fire prevention measures have been developed (refer to Table 2.7-1), which outline the responsibilities of Project personnel for prevention and suppression of fires and define minimum fire prevention and suppression measures that would be used during Project

construction. The Proponents would inspect the transmission line for fire hazards and require that work vehicles carry appropriate fire prevention tools and equipment. Implementing these measures would reduce the risk of fire under all alternatives.

The Agencies have identified the following mitigation measures related to fire prevention and control for lands managed by the BLM and/or the Forest Service:

- VEG-5 The Proponents' employees and contractors will employ typical practices to prevent fire during construction and operation including brush clearing prior to work, stationing a water truck at the job site to keep the ground and vegetation moist in extreme fire conditions, enforcing red flag warnings, providing training to all pertinent personnel, keeping vehicles on designated roads and within work areas, and providing fire suppression and emergency notification numbers at each construction site. Brush clearing will be limited to the construction ROW.

Operations

During operations, long-term vegetation loss would occur in association with the ROW, where only low-growing vegetation would be maintained, and with permanent structures, where vegetation would be completely removed. Permanent structures include the transmission tower pads and maintenance areas, the substations, the regeneration stations, and permanent access roads. Roads developed specifically for this Project that are identified by the Proponents as no longer necessary would be reclaimed as specified in the Reclamation, Revegetation, and Weed Management Plan. Operations ROW clearing limits in forested environments are illustrated above in Figure 3.6-1.

Maintenance of the ROW under the Proposed Action and all Action Alternatives would involve the use of Integrated Vegetation Management to establish sustainable plant communities on the ROW that are compatible with the electric facilities (i.e., stable, low-growing plant ecotypes that reduce fire risk and maintain safe access to the line and associated facilities). Thus all alternatives would involve some level of site conversion in areas where vegetation management would involve removing tall-growing shrub and tree species and other obstructions near structures. (See descriptions of border and wire zones in the following paragraphs.) Vegetation management practices are outlined in Appendix C-4 and in Appendix B. Integrated Vegetation Management may involve use of manual control methods, mechanical control methods, chemical controls, biological controls, or cultural controls, such as taking advantage of seed banks of native, compatible species.

Under Integrated Vegetation Management, the ROW would be divided into two zones, each with different levels of vegetation maintenance (Figure 3.6-2). Approximately half of the ROW would fall in each zone, as shown on the following illustration. Descriptions of the zones are provided below:

- **The wire zone.** A linear zone under the wires, and extending 10 feet beyond them, would have all trees removed, except where terrain is such that there would be more than 50 feet between the tree tops and the conductors. This may occur where conductors span a valley or canyon,

- **The border zone.** A zone on each side of the wire zone to the edge of the ROW, which would be maintained to exclude vegetation more than 25 feet tall. Where terrain is such that the conductors span a valley or canyon, the border zone would be maintained to prevent trees from growing up that could fall or drop branches onto the conductors at maturity.

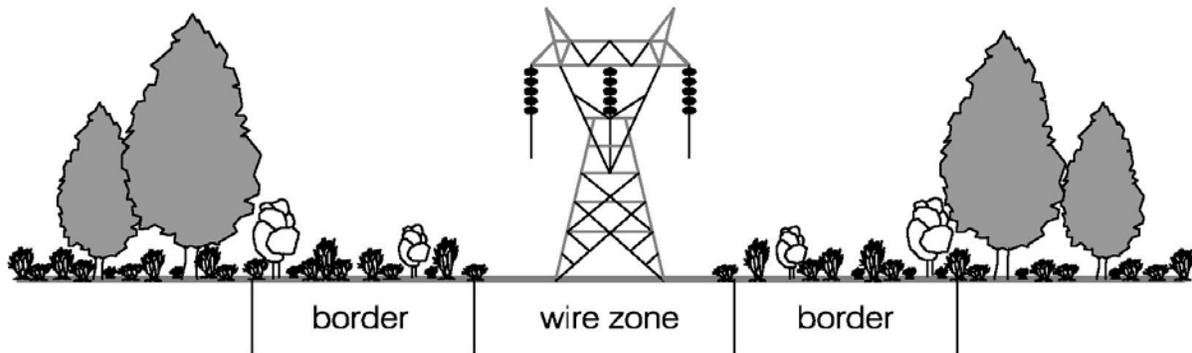


Figure 3.6-2. ROW Integrated Vegetation Management Zones

Vegetation management would be conducted every 3 to 10 years, depending on conditions such as topography, vegetation types and growth rates, and the potential for vegetation to interfere with safe operation of the line prior to the next clearing cycle. Forested vegetation types (conifer forest, deciduous forest, juniper, forested wetland and riparian; approximately 30 percent of the areas requiring maintenance) would undergo vegetation management on a regular cycle. Other vegetation types would require minimal vegetation management in either the wire zone or border zone during operation because the natural or existing managed vegetation does not grow tall enough to present a hazard to the safe operation of the transmission line. Additional information about Integrated Vegetation Management is provided in the Revised Plan for Operations, Maintenance and Emergency Response in Appendix C-4.

While access roads constructed for the Project would be allowed and encouraged to revegetate, the vegetation (grass and shrubs) would be kept low because maintenance and inspection personnel would need to access the towers periodically during the life of the Project. For normal maintenance, an 8-foot-wide portion would be used and vehicles would drive directly over the vegetation. The full width of the access road would be used for access by larger vehicles during non-routine maintenance.

Other ROW maintenance activities would consist of ground inspections, live line maintenance, and grading or repair of access roads and work areas. These activities could result in increased risk of fire or introduction and spread of noxious weeds. The Revised Plan for Operations, Maintenance and Emergency Response in Appendix C-4 includes specific measures that would reduce impacts to vegetation during operation under all alternatives, including noxious weed control and fire protection.

The Agencies have identified the following mitigation measures related to vegetation management during Project operations for lands managed by the BLM and/or the Forest Service:

- VEG-6 The Reclamation, Revegetation, and Weed Management Plan must provide a site-specific plan for access road and ROW vegetation management in areas where removal of trees is proposed. The site-specific plan must include tree removal, slash disposal plans, and BMPs to avoid erosion and sedimentation of watercourses or wetlands. This plan must be submitted to each applicable land management agency for approval prior to clearing.
- VEG-7 Herbicide use must conform to the existing types and application methods approved by those land-managing agencies. The Reclamation, Revegetation, and Weed Management Plan must specify where herbicides would be used, what types would be used, and what application methods would be used. The plan must be in conformance with regulations regarding herbicide use from the land-managing agency or county in which herbicide use is proposed.
- VEG-8 Prior to the start of construction and maintenance activities, all contractor vehicles and equipment (including personal protective equipment) shall be cleaned of soil and debris capable of transporting invasive plant seeds or other propagates. All vehicles and equipment shall be inspected by Agency-approved inspectors and certified as weed free by agency-approved personnel, in order to ensure they have been cleaned properly. The final Reclamation, Revegetation, and Weed Management Plan will include the location of all cleaning stations, how materials cleaned from vehicles at these stations would be either captured or treated so that cleaning station locations would not also become infected, and who would confirm/certify that vehicles leaving cleaning stations and/or entering construction sites are free of invasive plant materials.
- VEG-9 Agency staff will approve weed-free straw or other erosion control on federal lands prior to application.
- VEG-10 Agency staff will approve tree seedlings planted in decommissioned roadbeds and other temporarily disturbed areas on federal lands to assure seedlings are matched to site conditions.
- VEG-11 The Proponents will consult with appropriate Forest Service staff to identify the top soil layer on NFS lands.
- VEG-12 Post-construction monitoring and treatment of invasive plants on closed roads and fly yards shall continue for at least 3 years. If after 3 years post-construction conditions are not equivalent or better than pre-construction conditions, monitoring and treatment will continue until these conditions are met.
- VEG-13 The Proponents will meet Wyoming State Forest Practices Act requirements and apply Region 4 BMPs for timber removal operations on the Medicine Bow-Routt NFs and meet Idaho State Forest Practices Act

requirements and apply Region 2 BMPs for timber removal operations on the Caribou-Targhee and Sawtooth NFs.

- VEG-14 Where the route would be visible on timbered slopes on lands managed by the Kemmerer FO, allow tree removal only at structure locations and where required for safety rather than from the entire ROW in order to prevent a linear feature on the landscape from clear-cutting trees. Vegetation removal requirements will consider Appendix A, Key Standards Relating to Electric System Reliability and Safety, of the MOU with the Edison Electric Institute (2006).

Decommissioning

Decommissioning activities would restore vegetation within the Project footprint. Project facilities would be removed at the end of the operational life of the transmission line. Structures and foundations would be removed to below ground surface. In order to complete decommissioning, impacts similar to the initial construction disturbance would be expected. Roads would be widened to accommodate the large cranes and heavy equipment needed to dismantle and remove the steel towers, regeneration stations, and substations. Staging areas would be needed to temporarily store decommissioned materials, and some further disassembly would be expected at the staging areas before the materials were hauled away for recycling or disposal. After towers and conductors were removed from the ROW, heavy equipment would restore contours to the extent feasible. Disturbed areas would be reseeded with a weed-free seed mix. Where feasible and in coordination with the land-managing agency or landowner, roads would be recontoured to match adjacent areas, and would be ripped to facilitate revegetation where required. Recovery times for vegetation would be similar to those previously described for recovery from temporary construction activities but could be longer depending on the amount of compaction. Decompaction may be necessary for successful reclamation. Mitigation measure AGRI-11, found in Section 3.18 – Agriculture, provides for this activity prior to reseeded after decommissioning. Forest type-appropriate tree species would be replanted if there is not adequate natural regeneration. Additional details concerning decommissioning are provided in Section 2.7.4.

Effects to Vegetation on Federal Lands

Table 3.6-2 summarizes construction and operations effects to vegetation on federal lands under the Proposed Action. Tables D.6-5 and D.6-6 in Appendix D summarize effects to vegetation on federal lands from construction and operations of the Project, respectively, by proposed and alternative transmission line segments.

Table 3.6-2. Impacts (acres) to Vegetation on Federal Lands under the Proposed Action (continued)

Land Ownership	Shrubland ^{1/}	Forest/ Woodland ^{2/}		Wetland/ Riparian		Grassland	Other Cover Types ^{4/}	Total Impacts ^{5/}
	Const. Fac. ^{3/}	Const./ Op. Fac.	ROW	Const./ Op. Fac.	ROW	Const. Fac.	Const. Fac.	
Construction								
BLM	4,689	268	547	20	<1	1,645	162	7,332
Forest Service	61	117	261	2	2	–	4	745
Caribou-Targhee NF	22	90	221	1	1	–	4	339
Medicine Bow-Routt NFs	40	26	39	<1	<1	–	<1	107
Sawtooth NF	–	–	–	–	–	–	–	–
Bureau of Reclamation	50	–	–	<1	–	3	<1	54
Military Reservation/Corps of Engineers	2	–	–	–	–	2	–	4
National Park Service	–	–	–	–	–	<1	–	<1
Operations								
BLM	825	50	704	4	<1	212	38	1,833
Forest Service	12	29	328	<1	2	–	2	373
Caribou-Targhee NF	4	21	278	<1	1	–	2	307
Medicine Bow-Routt NFs	7	8	50	<1	<1	–	<1	67
Sawtooth NF	–	–	–	–	–	–	–	–
Bureau of Reclamation	12	–	–	<1	–	1	<1	14
Military Reservation/Corps of Engineers	1	–	–	–	–	<1	–	2
National Park Service	–	–	–	–	–	<1	–	<1

1/ "Shrublands" include sagebrush, saltbush, greasewood, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Const./Op. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing.

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

Impacts to Mature and Old-growth Forest

The Forest Service requested that impacts to old-growth forest be addressed by national forest crossed by the Project. Old-growth forests are ecosystems distinguished by old trees and related structural features such as tree size, amount of large dead woody material, number of canopy layers, species composition, and ecosystem function (Hamilton 1993). Available vegetation data were obtained from the Sawtooth, Medicine Bow-Routt, and Caribou NFs to determine whether the Project crosses areas of mature or old-growth forest. In all cases data were limited in that only the Medicine Bow-Routt NFs had a GIS layer indicating forest successional stages. For the Sawtooth NF a broad scale vegetation layer was provided by the Forest which included data on tree size, canopy cover, and cover type. Using the Forest Service Region 4 definition for old-growth (Hamilton 1993), it was possible to identify if these were mature or old-growth conifer forest stands.

Approximately 311 acres of forest/woodland vegetation would be impacted by the Project on the Caribou-Targhee NF under the Proposed Action along Segment 4, of which 40 acres are conifer, 235 acres are deciduous, and 36 acres are juniper woodland. Of these, 38 acres of conifer forest, 227 acres of deciduous forest, and 35 acres of juniper woodland would be permanently impacted during operation (Proposed Route for Segment 4). Roughly 95 percent of these acres consist of mature forest (Beck 2010). The landscape outside of the ROW is also dominated by mature forest (Forest Service 2003a) and has similar species composition. At the 5th code HUC scale, the acreage of mature forest impacted by the Project would be well below the maximum allowable by the Caribou Forest Plan Vegetation Standard 2 and should not prevent the Forest Service from meeting the requirements of maintaining at least 20 percent of the forest in mature and old age classes. To ensure compliance with their Forest Plan, the Montpelier Ranger District of the Caribou-Targhee NF requested that a field study be conducted to verify whether or not forest stands crossed by the Project along Segment 4, and identified as having characteristics suggestive of old-growth during an initial qualitative assessment using Project vegetation mapping and aerial photography, consisted of old-growth. In response, a field study was conducted in July 2010, using Forest Service Region 4 Common Stand Exam (CSE)/Quick Plot protocol, to determine if four stands crossed by the Project met the Region 4 definition of old-growth (as required in Vegetation Standard 3 of the Caribou Forest Plan) in terms of tree size, age, and density. Results of this field study indicated that none of the forest stands crossed by the Project meet the minimum definitions of old-growth (Tetra Tech 2010a). Compliance with related standards and guidelines is discussed below.

The Project would impact 50 acres of mature forest during construction and 42 acres during operations on the Medicine Bow-Routt NFs along Proposed Routes for Segments 1E, 1W(a), and 1W(c); Alternative 1E-C would impact 1.7 acres during construction and 1.5 acres during operations. However, neither the Proposed Route nor its Route Alternatives cross areas defined as old-growth forest. Additionally, no tree removal would occur on slopes greater than 40 percent, in accordance with Medicine Bow Forest Plan standards.

Likewise, on the Sawtooth NF, which is not crossed by the Proposed Route, Alternatives 7H, 7I, and 7J would cross forested vegetation. Route Alternatives 7H, 7I, and 7J would impact 45 acres, 15 acres, and 15 acres of mature forest during construction, respectively. Approximately 40 acres, 11 acres, and 11 acres of mature forest would be impacted by Route Alternatives 7H, 7I, and 7J during operations, respectively. GIS data from the Sawtooth NF do not include information on forest age class or seral stage. Based on aerial photo interpretation, these forest areas do not appear to possess characteristics of old-growth.

On the Medicine Bow-Routt and Caribou-Targhee NFs, where the ROW passes through the forest/woodland habitat type, the edges of the ROW would be “feathered,” or cut so that the edge of the ROW is not straight, to reduce visual effects. This would be accomplished by removing some larger trees farther into the forest than the standard width of the ROW. In areas where feathering would occur, impacts to forest/woodland vegetation would increase by approximately 15 percent on these forests, above that reported in the tables below and in Appendix D (Tables D.6-2 through D.6-6). Feathering would be a one-time vegetation treatment, and this type of ROW edge would

not be maintained throughout Project operations. An impact to the forest/woodland vegetation from feathering would be to convert the forest to an earlier successional stage due to the removal of the largest trees.

Impacts to Suitable Timberlands

Approximately 221 acres of forest would be within the ROW on the Caribou-Targhee NF. Merchantable timber would be cut and yarded to landings where the logs would be loaded on to trucks and hauled to market. Unmerchantable logs would be stored along the edge of the ROW for later use in site restoration. Ground-based logging equipment would be used to harvest the majority of the logs. Approximately 36 acres of mature conifer forest within the ROW are on slopes greater than 40 percent. The Caribou Forest Plan does not permit ground-based logging equipment to be used on slopes greater than 40 percent. Helicopters would be used to harvest these areas.

Approximately 5 acres of forest on slopes greater than 40 percent would be harvested and removed by helicopter in Section 3, Township 12 South, Range 42 East. This timber could be flown to the proposed fly yard near Forest Road 20138. Approximately 4 acres in Section 3, Township 12 South, 8 acres in Section 6, Township 12 South, Range 42 East, and 6 acres in Section 2, Township 12 South, Range 41 East could be flown to landings adjacent to roads on relatively flat areas within the ROW. The largest concentration of timber on slopes greater than 40 percent, approximately 13 acres, is in Section 1, Township 12 South, Range 41 East. This timber could be flown the proposed fly yard just east of Forest Road 20444.

The Project crosses areas mapped as being suitable for commercial management activities on the BLM Pocatello FO. However, according to the BLM, these mapped areas in many cases are based on 50-year old stand inventories and have been affected by bark beetle infestation, and are thus no longer representative of current commercial forest conditions (Swan 2010). However, on the Pocatello FO there are two upcoming salvage sale areas, scheduled for summer 2011. One is approximately 59 acres, located approximately 0.5 mile north of Route Alternative 5A. The other is approximately 56 acres and is crossed by Route Alternatives 7B and 5B. Route Alternative 7B would impact approximately 0.3 acre of conifer forest in this area, and Route Alternative 5B would impact 5.2 acres. Given that under both alternatives less than 10 percent of the salvage sale would be impacted, no appreciable reduction in the timber base would occur. In addition, roads constructed by the Project (one would pass through the salvage sale area) would provide the BLM with access to these areas, which would off-set any loss of timber acreage.

The BLM Pocatello FO has also identified four other potential areas in the Deep Creek Mountains where commercial forestry activities will be a future focus (Swan 2010). These are broad areas ranging in size from roughly 4,950 acres to 10, 320 acres in which commercial forest projects would be considered. Four transmission line segment traverse these areas and would require clearing of conifer forest including Segment 5 (13 acres), Alternative 5A (70 acres), Proposed Segment 7 (25 acres), and Alternative 7A (73 acres), including acreage disturbed for facilities as well as within the cleared ROW.

The Kemmerer FO has identified three ongoing or foreseeable commercial timber projects that coincide with the Project footprint. These projects include:

- **Proposed Aspen Front KFO**—Removal of competing subalpine fir from aspen stands and salvage of dead lodgepole pine (planning process)
- **Proposed Commissary White Bark Sanitation Project**—Removal of competing subalpine fir from whitebark pine stands (planning process)
- **Proposed Wheat Creek Aspen Treatment**—Removal of competing subalpine fir from aspen stands (pre-planning process)

The BLM expressed concern that Project-related timber removal could reduce revenue potential from sale of associated forest products. The proposed Aspen Front Project is crossed by Segment 4 (conifer removal: 54 acres construction, 53 acres operations) and Alternative 4F (conifer removal: 26 acres construction, 25 acres operations). The proposed Commissary White Bark Sanitation Project and the proposed Wheat Creek Aspen Treatment Project would be crossed by Segment 4, which would result in the clearing of 1 acres of conifer forest during construction and operations within each of these projects.

Prior to Project construction, a timber cruise would be performed on portions of the ROW that overlap BLM and Forest Service timbered areas to determine the volume of the timber before it is cut. The price of the timber would be negotiated according to 43 CFR Part 5402.0-6. Payment to Treasury would be made, or the sale of the timber would be complete, before the trees are cut.

Plan Amendments

There are several plan amendments, listed in Appendix F, that do not directly apply to vegetation but would impact vegetation if implemented. These include:

- Amendments necessary to reclassify BLM VRM classes or Forest Service Land Use Designations to allow construction of the Project due to nonconformance with visual resource standards. Specific amendments would be required under the Casper RMP (Proposed Routes for Segments 1E, 1W[a,c], and Alternative 1E-C), Rawlins RMP (Alternative 1E-B), Kemmerer RMP (Alternatives 4B, 4C, 4D, and 4E), Malad MFP (Alternative 5D), Cassia RMP (Alternatives 7E, 7H, 7I, and 7J), Twin Falls MFP (Alternatives 7I and 7J), Jarbidge RMP (Proposed Routes for Segments 8 and 9, Alternatives 8A, 9B, 9D), Bennett Hills/Timmerman Hills (Proposed Route for Segment 8), and SRBOP RMP (Proposed Route for Segment 8, Alternative 8E, 9D, 9F, 9G, and 9H).
- Amendments to standards that limit utilities to existing facilities and locations. Specific amendments would be required under the Malad MFP (Proposed Route for Segment 5, Alternative 5A and 5B, Proposed Route for Segment 7, and Alternatives 7A and 7B), Cassia RMP (Proposed Route for Segment 7), Twin Falls MFP (Proposed Route for Segment 9, Alternative 9A, and Alternatives 7I and 7J), and SRBOP RMP (Proposed Route for Segments 8 and 9, and Alternatives 8D, 8E, 9D, 9E, 9F, 9G, and 9H).
- Amendments to allow a single-use exemption for a visually altering action without changing the VRM or for construction in an otherwise restricted area. Specific

amendments for the former circumstance would be required under the Casper RMP (Proposed Route for Segments 1E, 1W[a,c], and Alternative 1E-C), Rawlins RMP (Proposed Route for Segments 1E and 2, and Alternative 1E-B), Green River RMP (Proposed Route for Segment 4), Kemmerer RMP (Proposed Route for Segment 4, and Alternatives 4A, 4C, 4D 4F, 4D, 4E), Malad MFP (Proposed Route for Segments 5 and 7), Cassia RMP (Alternatives 7I and 7J), Twin Falls MFP (Proposed Route for Segment 8), Medicine Bow Forest Plan (Proposed Route Segments 1E and 1W[a,c], and Alternative 1E-C), Caribou Forest Plan (Proposed Route Segment 4), and Sawtooth Forest Plan (Alternatives 7H, 7I, and 7J). Specific amendments for the latter circumstance would be required under the Kemmerer RMP (Proposed Route for Segment 4 and Alternatives 4A through 4F), Malad MFP (Proposed Route for Segments 5 and 7), Twin Falls MFP (Proposed Route Segment 9), Jarbidge RMP (Proposed Route for Segment 9, Alternative 9B, Proposed Route for Segment 8, and Alternative 8A), SRBOP (Proposed Route for Segments 8 and 9, Alternative 8E, and Alternatives 9D through 9H). Sawtooth Forest Plan (Alternatives 7H and 7I), and Caribou Forest Plan (Proposed Route for Segment 4).

- Amendments to allow construction in the habitat of a special status wildlife species, including the goshawk nesting and foraging areas, sage-grouse breeding areas, raptor nests, and wetland habitat for the boreal toad, wood frog, and northern leopard frog. Specific amendments would be required under the Medicine Bow Forest Plan (Proposed Route for Segments 1E and 1W [a,c] and Alternative 1E-C), Caribou Forest Plan (Proposed Route for Segment 4), and Green River RMP (Proposed Route for Segments 3 and 4 and Alternatives 4B-4E).

Amendments associated with BLM VRM classification and Forest Service Land Use Designations would result in the disturbance to or removal of vegetation within the ROW and associated indirect effects (invasive species, fire risk, fragmentation). The Project would have the greatest effect on forest/woodland vegetation where tree removal would result in conversion of the vegetation to an earlier successional stage, and would be maintained within the ROW during operations. In shrubland and other low-growing vegetation types, vegetation would regrow within the ROW after construction. These effects are described in detail above and acres of vegetation impacted along the various segments are provided below in Section 3.6.2.3. Additional vegetation impacts could occur if future projects are permitted and built within these newly reclassified areas. This cumulative effect is discussed in Chapter 4. The amendments for single-use exemptions due to incompliance for visual resource standards or for development in otherwise restricted areas would have similar effects to the VRM reclassification amendments, except that there would be no long-term indirect effect of other projects being proposed in the same area.

Amendments to standards that limit utilities to existing facilities and locations would also result in the disturbance to or removal of vegetation and associated impacts. Impacts to vegetation along the segments where these amendments would be required are also described below in Section 3.6.2.3. In these circumstances, vegetation removal would increase the level of fragmentation because development would occur outside of existing facilities, creating new disturbance.

Amendments to allow construction within a goshawk nesting and foraging area, within raptor nest buffers, and within habitat for the boreal toad, wood frog, and northern leopard frog may result in removal of forest and wetland vegetation within the ROW, respectively. Impacts to these vegetation types along the segments where these amendments would be required are described below in Section 3.6.2.3.

There are standards and guidelines related to restoration of disturbed areas and weed control in multiple land use management plans. Amendments were not proposed for these measures, because the EPMs described above, within the following discussions of impacts by segments, and listed in Section 3.6.3 as well as in Table 2.7-1 would ensure Project conformance with these standards. For example, Decision 003 of the Casper RMP requires “appropriate mitigation measures to minimize impacts to vegetative resources” where surface disturbance or development occurs. Mitigation measure VEG-2 requires minimizing disturbance footprints and restoration of Project areas using native vegetation.

3.6.2.3 Proposed Route and Alternatives by Segment

It is assumed that the direct and indirect effects of the construction and operations of the proposed Project area discussed above are proportional to the acres of land affected during construction and operations. Table D.6-2 in Appendix D contains the anticipated disturbance from construction for the Proposed Route and each of the Route Alternatives. Table D.6-3 in Appendix D provides a summary of impacts resulting from operation and maintenance for the Proposed Route and each of the Route Alternatives. Route Alternatives are compared to the portion of the Proposed Route that starts and ends at the same nodes as the Route Alternative (referred to as the “comparison portion of the Proposed Route”). Based on the vegetation-related issues identified during public scoping (see Section 3.6.1.2 above), the Alternatives discussion below focuses on impacts to sagebrush/shrubland, forest, and grassland. These are major vegetation types important to many of the special status plant and wildlife species addressed in Sections 3.7 – Special Status Plants and 3.11 – Special Status Fish and Wildlife, respectively.

Segment 1E

Segment 1E, as proposed, would link the Windstar and Aeolus Substations in south-central Wyoming with a 100.6-mile 230-kV single-circuit transmission line. Twenty acres of the expansion of Windstar and Aeolus Substations and 0.5 acre for one regeneration site are attributed to Segment 1E. Alternative 1E-A is a 16.1-mile alternative along the north end of Segment 1E, which was the Proponents’ initial proposal before moving the Proposed Route at the suggestion of local landowners to avoid the more settled area around Glenrock. Alternative 1E-B is 21.4 miles longer than the Proposed Route but is being considered by the Proponents because it would avoid a Wyoming-designated sage-grouse core area to the east. The BLM has required the consideration of Alternative 1E-C, which parallels the Segment 1W 230-kV lines into the Aeolus Substation (see Appendix A, Figure A-2).

Segment 1E crosses an area of predominantly sagebrush, dwarf sagebrush, and juniper, with smaller components of forest and woodland and wetland/riparian vegetation (Table D.6-1 in Appendix D). Alternative 1E-A and its comparison portion of

the Proposed Route cross an area primarily consisting of disturbed grassland and sagebrush, while Alternative 1E-B and its comparison portion mostly cross sagebrush and dwarf sagebrush. Alternative 1E-C and its comparison portion of the Proposed Route cross natural sagebrush with smaller components of forest and woodland and wetland/riparian vegetation.

Construction

The impacts from construction of Segment 1E and its alternatives are presented in Table 3.6-3. Construction of the Proposed Route and clearing of the ROW along Segment 1E would directly affect 1,292 acres for construction of the transmission line, a majority of which (65 percent) is shrubland. As noted above, none of the forested acreage crossed by Segment 1E or its alternatives is classified as old growth.

Table 3.6-3. Comparison of Construction-related Vegetation Impacts (acres) for Segment 1E Proposed Route and Alternatives 1E-A, 1E-B, and 1E-C

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Const. Fac. ^{3/}	Const. Fac.	ROW	Const. Fac.	ROW	Const. Fac.	Const. Fac.	
Proposed 1E – Total Length	844.7	124.0	194.4	8.9	2.2	71.2	46.8	1,292.3
Proposed – Comparison Portion for Alternative 1E-A	126.0	† ^{6/}	† ^{6/}	0.1	1.3	70.4	16.9	214.7
Alternative 1E-A	52.6	0.7	0.6	1.8	2.5	51.9	17.7	127.7
Proposed – Comparison Portion for Alternative 1E-B	370.3	5.7	9.5	2.9	–	0.1	14.0	402.5
Alternative 1E-B	633.2	36.5	47.9	4.3	–	41.6	13.4	776.9
Proposed – Comparison Portion for Alternative 1E-C	680.8	112.2	177.8	8.8	0.9	0.8	29.5	1,010.8
Alternative 1E-C	284.4	13.9	24.7	2.7	0.2	† ^{6/}	10.1	336.0

1/ "Shrublands" include sagebrush, saltbush, greasewood, disturbed shrub, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Const. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Indicates only a trace amount of impact (i.e., <0.1 acre)

The Proposed Route as well as Alternative 1E-C would impact vegetation within the Medicine Bow-Routt NFs. See Table D.6-5 for the acres of vegetation types impacted on federally managed lands.

Alternative 1E-A would result in less total disturbance than the comparison portion of the Proposed Route, but would affect more acres of wetland/riparian vegetation. The comparison portion of the Proposed Route would have a greater effect on natural sagebrush than Alternative 1E-A (Appendix Table D.6-2).

Alternative 1E-B is longer than the comparison portion of the Proposed Route and would therefore have a greater effect on vegetation during construction. Both segments

primarily would disturb shrubland vegetation, primarily consisting of natural sagebrush (Table D.6-2 in Appendix D).

Alternative 1E-C would result in approximately a third of the disturbance resulting from the comparison portion of the Proposed Route (Table 3.6-3). The comparison portion of the Proposed Route would also affect more sensitive vegetation types (forest and woodland, wetland/riparian, and natural sagebrush) than Alternative 1E-C.

Operations

The impacts from operations of Segment 1E and its alternatives are presented in Table 3.6-4. During operations of the proposed Project along Segment 1E, about 480 acres would be permanently affected through clearing for operations facilities or vegetation maintenance within the ROW. Approximately half of the operations impacts would occur in forest and woodlands because of vegetation height management in the ROW.

Alternative 1E-A and the comparison portion of the Proposed Route would have comparable permanent impacts (54 and 45 acres, respectively). However, Alternative 1E-A would permanently affect more wetland/riparian vegetation than the Proposed Route. Alternative 1E-B, which covers over twice as much acreage, would permanently affect more overall vegetation types than the comparison portion of the Proposed Route (211 acres and 99 acres, respectively). Due to its greater length, it crosses more juniper forest (Table D.6-1 in Appendix D) and therefore requires more acres of vegetation maintenance in forest/woodland areas. Alternative 1E-C is shorter than the

Table 3.6-4. Operations and Maintenance Vegetation Impacts (acres) for Segment 1E Proposed Route and Alternatives 1E-A, 1E-B, and 1E-C

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Op. Fac. ^{3/}	Op. Fac.	ROW	Op. Fac.	ROW	Op. Fac.	Op. Fac.	
Proposed 1E Total Length	206.7	38.2	241.7	2.2	2.3	20.3	15.6	479.8
Proposed – Comparison Portion for Alternative 1E-A	25.7	–	–	t ^{6/}	1.3	20.1	5.2	53.6
Alternative 1E-A	14.8	t ^{6/}	0.6	0.4	3.0	18.0	5.4	44.8
Proposed – Comparison Portion for Alternative 1E-B	83.1	1.8	9.5	0.8	–	–	4.8	99.2
Alternative 1E-B	136.3	12.5	59.1	0.6	–	11.2	3.5	211.4
Proposed – Comparison Portion for Alternative 1E-C	170.0	35.0	220.5	2.2	1.0	0.2	10.2	395.2
Alternative 1E-C	84.6	3.5	31.9	0.8	7.2	–	3.6	116.8

1/ "Shrublands" include sagebrush, saltbush, greasewood, disturbed shrub, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Op. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

comparison portion of the Proposed Route, and therefore would permanently disturb about a third of the vegetation that would be affected by the Proposed Route. Alternative 1E-C results in less maintenance of forest/woodland areas for the ROW and fewer permanent impacts to shrublands; however, Alternative 1E-C would permanently remove or alter more wetland/riparian vegetation (Table D.6-4).

Segment 1W

Segment 1W is composed of two parts, Segment 1W(a) and 1W(c), both of which would consist of a new 230-kV line for part of their length and a reconstruction of an existing 230-kV line for the remaining part. Segment 1W(a) would be about 76.5 miles long, and would extend from the Windstar Substation to the Aeolus Substation. Segment 1W(c) would be about 70.6 miles long, and would extend from the Dave Johnston Power Plant to the Aeolus Substation. Alternative 1W-A is a 16.2-mile alternative located near the town of Glenrock, which was the Proponents’ initial proposal before moving the Proposed Route at the suggestion of local landowners in order to avoid the more settled area around Glenrock. Twenty acres of the proposed expansion at the Windstar and Aeolus Substations are attributed to Segment 1W(a) and 3 acres of the expansion at the Heward Substation and 17 acres of the expansion at the Windstar and Aeolus Substations are attributed to Segment 1W(c). There are no Route Alternatives proposed south of that point (see Appendix A, Figure A-2).

The Proposed Routes for Segments 1W(a) and 1W(c), the two single-circuit lines, would cross sagebrush for a majority of their lengths (Table D.6-1 in Appendix D). Alternative 1W-A primarily crosses disturbed grassland and natural sagebrush whereas the comparison portion of the Proposed Route primarily crosses natural sagebrush and grassland vegetation (Table D.6-2 in Appendix D).

Construction

The impacts from construction of Segment 1W and its alternatives are presented in Table 3.6-5. Construction of the Proposed Route and clearing of the ROW along Segment 1W would directly affect 1,553 acres (1W[a] and 1W[c] combined) for installation of the transmission line, a majority of which (over 70 percent) is shrubland.

Table 3.6-5. Comparison of Construction-related Vegetation Impacts (acres) for Segment 1W Proposed Routes and Alternative 1W-A

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Const. Fac. ^{3/}	Const. Fac.	ROW	Const. Fac.	ROW	Const. Fac.	Const. Fac.	
Proposed 1W(a) Total Length	479.4	26.4	48.2	6.5	0.4	88.8	20.1	671.5
Proposed – Comparison Portion for Alternative 1W-A	115.5	0.3	1.8	0.7	–	82.3	11.3	212.2
Alternative 1W-A	46.7	0.1	0.2	1.6	3.4	73.1	14.8	140.0
Proposed 1W(c) Total Length	641.3	38.9	61.4	9.1	3.2	100.5	27.2	882.0

1/ "Shrublands" include sagebrush, saltbush, greasewood, and dwarf shrub.
 2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.
 3/ Const. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing
 4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).
 5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

The Proposed Route would impact vegetation within the Medicine Bow-Routt NFs. See Table D.6-5 for the acres of vegetation types impacted on federally managed lands.

Alternative 1W-A would result in approximately one-third less vegetation disturbance than the comparison portion of the Proposed Route. Alternative 1W-A would require less forest clearing but more disturbance to wetland/riparian areas. Alternative 1W-A would also affect less natural vegetation (e.g., natural sagebrush and native grassland; Table D.6-2 in Appendix D) than the comparison portion of the Proposed Route.

Operations

Table 3.6-6 presents operations impacts associated with Segment 1W and its alternative. During operations of the proposed Project along Segment 1W, approximately 465 acres of vegetation would be permanently affected by Project features (Segments 1W[a] and 1W[c] combined), of which approximately 326 acres would be cleared for operations facilities and 138 acres of vegetation, located between structures along the ROW, would be maintained in early seral stage.

Alternative 1W-A and the comparison portion of the Proposed Route would permanently affect a comparable total amount of vegetation (44 acres and 49 acres, respectively), primarily consisting of shrubland and grassland. Alternative 1W-A would result in a greater permanent reduction in wetland/riparian communities than the Proposed Route (Table 3.6-6).

Table 3.6-6. Comparison of Operations and Maintenance Vegetation Impacts (acres) for Segment 1W Proposed Routes and Alternatives 1W-A

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Op. Fac. ^{3/}	Op. Fac.	ROW	Op. Fac.	ROW		Op. Fac.	
Proposed 1W(a) Total Length	140.5	7.1	59.5	2.1	0.4	22.2	10.5	242.3
Proposed – Comparison Portion for Alternative 1W-A	24.6	0.1	2.0	0.3	–	17.0	5.1	49.1
Alternative 1W-A	11.9	t ^{6/}	0.2	0.4	4.0	22.1	5.4	44.0
Proposed 1W(c) Total Length	115.9	8.8	77.1	1.8	3.9	11.9	5.9	225.2

1/ "Shrublands" include sagebrush, saltbush, greasewood, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Op. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

Segment 2

Segment 2, as proposed, would link the Aeolus and Creston Substations in southeast Wyoming with two 500-kV circuits on one structure. One circuit would be operated at 230 kV during the initial phase of the Project. Its total proposed length is 96.7 miles. Fifty-two acres of the expansion of the Aeolus Substation and the construction of the Creston Substation and 0.5 acre for one regeneration site are attributed to Segment 2. There are three Route Alternatives, two of which are near the community of Fort Fred Steele. Alternative 2A, at 28.4 miles long, is being considered by the BLM because it

remains in the WWE corridor nearer the town and the state historic site. Alternative 2B, at 6.2 miles, is closer to the community than the comparison portion of the Proposed Route and was the initially proposed route before the Proponents responded to local suggestions and relocated the Proposed Route farther to the south. Alternative 2C is a 24.4-mile alternative located north of Hanna, Wyoming. It is being evaluated at the recommendation of the Wyoming Governor’s office to follow a utility corridor approved by that office for minimizing effects to sage-grouse (see Appendix A, Figure A-3). Proposed Segment 2 and its alternatives cross an area primarily consisting of sagebrush, disturbed sagebrush, dwarf shrub, and greasewood.

Construction

The impacts from construction of Segment 2 and its alternatives are presented in Table 3.6-7. Construction of the Proposed Route and clearing of the ROW along Segment 2 would directly affect 1,550 acres for installation of the transmission line, a majority of which (93 percent) is shrubland. Because this segment crosses low-growing vegetation, most of the construction disturbance is related to the installation of Project facilities rather than vegetation removal for the ROW.

Alternative 2A would impact more vegetation than the comparison portion of the Proposed Route.

Table 3.6-7. Comparison of Construction-related Vegetation Impacts (acres) for Segment 2 Proposed Route and Alternatives 2A, 2B, and 2C

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Const. Fac. ^{3/}	Const. Fac.	ROW	Const. Fac.	ROW	Const. Fac.	Const. Fac.	
Proposed Segment 2 – Total Length	1,438.9	1.6	5.9	9.5	0.2	34.1	59.9	1,550.1
Proposed – Comparison Portion for Alternative 2A	387.8	–	–	3.1	0.2	t ^{6/}	6.5	97.8
Alternative 2A	425.4	–	–	5.7	4.6	–	14.2	450.4
Proposed – Comparison Portion for Alternative 2B	101.2	–	–	0.1	–	t ^{6/}	3.1	104.4
Alternative 2B	73.2	–	–	2.5	3.4	–	3.8	83.0
Proposed – Comparison Portion for Alternative 2C	326.4	–	–	1.5	0.2	32.8	7.8	369.0
Alternative 2C	306.7	–	–	0.1	–	0.7	14.6	322.1

1/ "Shrublands" include sagebrush, saltbush, greasewood, disturbed shrub, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Const. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

Alternative 2B would result in comparable amounts of vegetation disturbance, primarily consisting of shrublands. However, Alternative 2B would have a greater effect on wetland/riparian communities than the comparable portion of the Proposed Route.

Alternative 2C and the comparison portion of the Proposed Route would affect a comparable amount of vegetation, consisting primarily of shrubland.

Operations

Operations impacts to vegetation along Segment 2 and its alternatives are presented in Table 3.6-8. During operations of the proposed Project along Segment 2, approximately 408 acres of vegetation would be permanently affected by Project features, of which 99 percent would be cleared for operations facilities.

Alternative 2A and the comparison portion of the Proposed Route would permanently affect a comparable amount of vegetation (95 acres and 74 acres, respectively). However, Alternative 2A would result in greater permanent reduction in wetland/riparian vegetation than the comparison portion of the Proposed Route. Alternative 2B and the comparison portion of the Proposed Route would also have similar permanent effects to vegetation, with greater reduction in wetland/riparian vegetation occurring under Alternative 2B. Alternative 2C and the comparison portion of the Proposed Route would also impact a similar amount of vegetation during operations, most of which would be shrubland along both routes.

Table 3.6-8. Comparison of Operations and Maintenance Vegetation Impacts (acres) for Segment 2 Proposed Route and Alternatives 2A, 2B, and 2C

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Op. Fac. ^{3/}	Op. Fac.	ROW	Op. Fac.	ROW	Op. Fac	Op. Fac.	
Proposed Segment 2 – Total Length	370.3	0.3	7.0	3.2	0.2	6.6	20.3	408.0
Proposed – Comparison Portion for Alternative 2A	71.7	–	–	0.6	0.2	t ^{6/}	1.4	74.0
Alternative 2A	83.7	–	–	1.2	4.6	–	5.6	95.0
Proposed – Comparison Portion for Alternative -2B	16.1	–	–	t ^{6/}		t ^{6/}	0.4	16.4
Alternative 2B	16.6	–	–	0.4	3.4	–	0.6	21.0
Proposed - Comparison Portion for Alternative 2C	67.5	–	–	0.5	0.2	6.3	3.0	77.5
Alternative 2C	49.0	–	–	t ^{6/}	–	0.1	3.0	52.2

1/ "Shrublands" include sagebrush, saltbush, greasewood, disturbed shrub, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Op. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

Segment 3

Segment 3, as proposed, would link the Creston and Anticline Substations in southeast Wyoming with two 500-kV circuits on one structure. One circuit would be operated at 230 kV during the initial phase of the Project. Its total proposed length between those

two substations is 46.7 miles. Sixty-nine acres of the construction of the Anticline and Creston Substations are attributed to Segment 3. Segment 3 would also link the Anticline and Jim Bridger Substations with a 4.3-mile 230-kV line and a 5.5-mile 345-kV line, and includes the 10-acre expansion of the Jim Bridger 345-kV Substation. There are no alternatives proposed along this segment (see Appendix A, Figure A-4). Proposed Segment 3 crosses an area primarily consisting of sagebrush, saltbush, dwarf shrub, and greasewood.

Construction

The impacts to vegetation from construction of Segment 3 are presented in Table 3.6-9. Construction of the Proposed Route and clearing of the ROW along Segment 3 would directly affect 863 acres for installation of transmission line facilities (infrastructure, roads, temporary staging areas, and fly yards). A majority of the vegetation impacted consists of shrubland (94 percent) but also includes 13 acres of wetland/riparian vegetation.

Operations

The impacts from operations of Segment 3 are presented in Table 3.6-9. During operations of the proposed Project along Segment 3, approximately 221 acres of vegetation would be permanently affected by Project features, including 4 acres of wetland/riparian vegetation.

Table 3.6-9. Acreage Affected by Construction and Operations of Segment 3 Proposed Route

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian		Grass land	Other Cover Types ^{4/}	Total ^{5/}
	Fac. ^{3/}	Fac.	ROW	Fac.	ROW	Fac.	Fac.	
Proposed Segment 3 – Total Length – Construction	811.8	–	–	12.6	–	0.6	38.1	863.1
Proposed Segment 3 – Total Length – Operations and Maintenance	204.4	–	–	2.3	–	0.1	12.7	219.4

1/ "Shrublands" include sagebrush, saltbush, greasewood, disturbed shrub, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

Segment 4

Segment 4, as proposed, would link the Anticline Substation near the Jim Bridger Power Plant in southwestern Wyoming with the Populus Substation in Idaho with two 500-kV circuits on one structure. Its total proposed length is 203 miles. Eighty-nine acres of the construction of the Anticline Substation and the expansion of the Populus Substation and 1.5 acres for three regeneration sites are attributed to Segment 4. It has six Route Alternatives in the middle portion of its route, but the first 52 miles to the east and the last 61 miles to the west (in Idaho) do not have any Route Alternatives. The middle section of the Proposed Route is 90.2 miles long, and its Route Alternatives vary

from 85 to 102 miles long. These alternatives were proposed by the Wyoming Governor’s office (4A, paralleling the existing 345-kV lines throughout); by the BLM Kemmerer FO (4B through 4E, including edits from various cooperating agencies), with the intent to avoid impacts to cultural resources to the extent practical; and by the Proponents (4F, attempting to avoid impacts to cultural resources while still remaining north of the existing lines) (see Appendix A, Figures A-5 and A-6). Proposed Segment 4 and its alternatives cross an area dominated by shrubland, with components of disturbed sagebrush, conifer and deciduous forest, and agriculture (Table D.6-1).

Construction

The impacts from construction of Segment 4 and its alternatives are presented in Table 3.6-10. Construction of the Proposed Route and clearing of the ROW along Segment 4 would directly affect about 3,521 acres for installation of the transmission line, primarily consisting of shrubland (61 percent) and forest/woodland vegetation (27 percent). This includes vegetation cleared to accommodate installation of facilities including infrastructure, roads, temporary staging areas, and fly yards, as well as vegetation along the ROW that would be cleared.

Table 3.6-10. Comparison of Construction-related Vegetation Impacts (acres) for Segment 4 Proposed Route and Alternatives 4A through 4F

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/ Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Const. Fac. ^{3/}	Const. Fac.	ROW	Const. Fac.	ROW	Const. Fac.	Const. Fac.	
Proposed Segment 4 – Total Length	2,146.9	369.9	671.5	61.9	3.3	85.6	280.3	3,520.9
Proposed – Comparison Portion for Alternatives 4A,B,C,D,E,F	1,034.5	108.7	264.3	15.5	1.1	45.5	29.4	1,499.1
Alternative 4A	1,100.8	13.9	37.4	53.1	2.3	26.5	55.2	1,289.3
Alternative 4B	1,321.6	2.1	3.1	42.5	0.6	17.1	100.7	1,487.7
Alternative 4C	1,311.4	1.4	2.5	35.7	0.6	15.2	114.0	1,480.9
Alternative 4D	1,345.9	3.0	5.6	39.2	0.6	17.1	100.0	1,511.4
Alternative 4E	1,328.1	2.3	5.0	35.6	0.6	15.2	113.7	1,500.4
Alternative 4F	1,113.8	32.7	64.0	39.9	3.0	26.3	47.7	1,327.4

1/ "Shrublands" include sagebrush, saltbush, greasewood, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Const. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

Within the Caribou portion of the Caribou-Targhee NF, construction along the Proposed Route of Segment 4 would affect approximately 339 acres (see Table D.6-5). Of this, approximately 311 acres are dominated by forest/woodland vegetation and the rest are dominated by non-forested vegetation. As requested by the Montpelier District of the Caribou-Targhee NF, an initial mapping effort and field review was conducted to identify whether or not any of the forest stands crossed by the Project potentially met the Forest Service Region 4 definition of old-growth (Hamilton 1993). Four stands identified as warranting more detailed stand examination were subsequently visited in July 2010. The results of this field effort, which involved the use of Forest Service Region 4

Common Stand Exam/Quick Plot protocol, indicated that none of the forest stands crossed by the Project met the Region 4 definition of old growth (Tetra Tech 2010a). Therefore, the proposed Project would not result in the removal of any old-growth forest stands.

The Caribou Forest Plan has a standard that states that at least 20 percent of the forested acres within a fifth-field HUC watershed must be maintained in mature and old-age classes. The Project would not result in reducing the amount of mature and old-age classes to below the 20 percent level in either of the two fifth-field watersheds that would be crossed. The standard also states that at least 15 percent of the forested acres must meet, or be managed to attain, Region 4 old-growth conditions (Hamilton 1993). Field surveys conducted in 2010 in forest stands on the Caribou-Targhee NF that exhibited potential old-growth characteristics determined that none of these forest stands on the Forest crossed by the Project met Forest Service Region 4 definitions for old-growth. Given that the Project would not result in the removal of any old-growth, the Project would be consistent with these Forest Plan standards.

Alternative 4D would have the greatest effect on general vegetation (1,511 acres), followed by Alternative 4E (1,501 acres), the comparison portion of the Proposed Route (1,499 acres) Alternative 4B (1,488 acres), Alternative 4C (1,481 acres), Alternative 4F (1,327 acres), and Alternative 4A (1,289 acres). All of the alternatives would affect more sensitive vegetation types including shrubland and wetland/riparian vegetation than the comparison portion of the Proposed Route, the most being under Alternatives 4D (shrubland) and 4A (wetland/riparian). However, the amount of forest and woodland affected by the comparison portion of the Proposed Route would be much greater than any of the Route Alternatives (Table 3.6-10). Given that there would be no loss of old-growth under any of the alternatives, all alternatives would be consistent with the Caribou-Targhee NF standard of maintaining at least 20 percent mature and old age classes within each fifth-field HUC watershed.

Operations

The impacts from operations of Segment 4 and its alternatives are presented in Table 3.6-11. During operations of the proposed Project along Segment 4, approximately 1,496 acres of vegetation would be permanently affected by Project features, of which 651 acres would be cleared for operations facilities and 845 acres of vegetation, located between structures along the ROW, would be maintained in an early seral stage.

The comparison portion of the Proposed Route would have the greatest permanent effect on vegetation (599 acres), followed by Alternative 4F (366 acres), Alternative 4D (363 acres), Alternative 4B (353 acres), Alternative 4E (352 acres), Alternative 4C (345 acres), and Alternative 4A (324 acres). Along all alternative segments, 75 percent or more of the vegetation affected would be shrubland. The comparison portion of the Proposed Route would permanently affect the most forest/woodland vegetation (Table 3.6-11). Alternative 4F and Alternative 4A would affect the most wetland/riparian vegetation.

Table 3.6-11. Comparison of Operations and Maintenance Vegetation Impacts (acres) for Segment 4 Proposed Route and Alternatives 4A through 4F

Segment or Alternative	Shrubland ^{1/}	Forest/ Woodland ^{2/}		Wetland/ Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Op. Fac. ^{3/}	Op. Fac.	ROW	Op. Fac.	ROW	Op. Fac.	Op. Fac.	
Proposed Segment 4 – Total Length	509.8	56.5	841.9	13.0	3.3	16.4	55.3	1,496.2
Proposed – Comparison Portion for Alts. 4A–F	222.3	19.6	336.1	2.9	1.1	9.7	7.7	599.4
Alternative 4A	243.4	4.0	44.8	6.6	2.7	8.6	14.0	324.1
Alternative 4B	314.1	0.4	4.3	3.8	0.6	3.7	25.6	352.6
Alternative 4C	306.5	0.2	3.4	2.9	0.6	3.3	27.8	344.8
Alternative 4D	321.1	0.8	7.1	4.0	0.6	3.7	25.6	363.0
Alternative 4E	309.7	0.6	6.2	3.1	0.6	3.3	27.9	351.5
Alternative 4F	246.7	6.7	82.8	4.2	3.4	8.5	13.5	365.8

1/ "Shrublands" include sagebrush, saltbush, greasewood, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Op. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

Segment 5

Segment 5, as proposed, would link the Populus and Borah Substations with a 54.6-mile single-circuit 500-kV line. Forty-four acres of the expansion of the Populus and Borah Substations are attributed to Segment 5. There are five Route Alternatives, including two proposed by the BLM to avoid the Deep Creek Mountains (5A and 5B; 8 miles and 19 miles longer than the comparison portion of the Proposed Route), one preferred by Power County that crosses the Fort Hall Indian Reservation (5C; 7 miles shorter than the comparison portion of the Proposed Route), one originally proposed by the Proponents (5D; 2 miles shorter than the comparison portion of the Proposed Route but located within more agricultural lands), and one proposed by Power County as an alternative approach to the Borah Substation (5E) (see Appendix A, Figure A-7). Proposed Segment 5 and its alternatives cross an area of predominantly sagebrush, forest (deciduous, conifer, and juniper), and agriculture (Table D.6-1 in Appendix D).

Construction

The impacts from construction of Segment 5 and its alternatives are presented in Table 3.6-12. Construction of the Proposed Route and clearing of the ROW along Segment 5 would directly affect 1,282 acres for installation of the transmission line, primarily consisting of forest/ woodland vegetation (40 percent), shrubland (35 percent), and other cover types (agriculture; 21 percent).

The comparison portion of the Proposed Route would result in less vegetation disturbance during construction (646 acres), than Alternative 5A (751 acres) and Alternative 5B (842 acres). Of the three routes, the comparison portion of the Proposed Route would affect the most forest/ woodland vegetation and wetland/riparian vegetation (Table 3.6-12).

Table 3.6-12. Comparison of Construction-related Vegetation Impacts (acres) for Segment 5 Proposed Route and Alternatives 5A through 5E

Segment or Alternative	Shrubland ^{1/}	Forest/ Woodland ^{2/}		Wetland/ Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Const. Fac. ^{3/}	Const. Fac.	ROW	Const. Fac.	ROW	Const. Fac.	Const. Fac.	
Proposed Segment 5 – Total Length	449.8	201.3	299.2	9.5	0.1	47.0	274.9	1,281.8
Proposed – Comparison Portion for Alternative 5A,5B	165.7	154.8	207.0	4.5	0.1	5.5	108.8	646.4
Alternative 5A	240.2	118.5	197.8	1.0	t ^{6/}	59.1	134.1	751.4
Alternative 5B	361.7	85.7	158.8	0.8	0.7	26.8	207.5	842.4
Proposed – Comparison Portion for Alternative 5C	273.8	163.3	232.9	3.7	–	15.0	134.0	823.0
Alternative 5C	292.8	51.9	104.1	5.2	1.0	10.5	71.9	537.9
Proposed – Comparison Portion for Alternative 5D	208.0	57.9	85.2	4.5	–	13.6	127.1	496.3
Alternative 5D	136.3	71.2	83.3	4.4	5.7	8.3	144.5	454.5
Proposed – Comparison Portion for Alternative 5E	56.6	2.3	3.2	1.1	–	8.8	68.8	140.8
Alternative 5E	41.2	– t ^{6/}	–	0.1	–	9.2	53.7	104.2

1/ "Shrublands" include sagebrush, saltbush, greasewood, disturbed shrub, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Const. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

Alternative 5C would disturb less vegetation during construction than the comparison portion of the Proposed Route (538 acres and 823 acres, respectively). The comparison portion of the Proposed Route would affect over twice as many acres of forest/ woodland vegetation (nearly 50 percent of its total acreage) than Alternative 5C; effects to wetland/riparian vegetation and shrubland would be comparable.

Alternative 5D would disturb less vegetation during construction than the comparison portion of the Proposed Route (455 acres and 496 acres, respectively). Impacts to wetland/riparian and forest/woodland vegetation would be comparable along both route segment; however, impacts to natural sagebrush would be greater under the comparison portion of the Proposed Route.

Alternative 5E would disturb less vegetation during construction than the comparison portion of the Proposed Route (104 acres and 141 acres, respectively). The comparison portion of the Proposed Route would affect more forest/woodland, wetland/riparian, and natural sagebrush vegetation (Table D.6-2 in Appendix D) than Alternative 5E.

Operations

The impacts from operations of Segment 5 and its alternatives are presented in Table 3.6-13. During operations of the proposed Project along Segment 5 approximately 572

Table 3.6-13. Comparison of Operations-related Vegetation Impacts (acres) for Segment 5 Proposed Route and Alternatives 5A through 5E

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Op. Fac. ^{3/}	Op. Fac.	ROW	Op. Fac.	ROW	Op. Fac.	Op. Fac.	
Proposed Segment 5 – Total Length	101.7	38.3	397.3	0.8	0.1	5.0	28.8	572.0
Proposed – Comparison Portion for Alts. 5A,5B	31.5	28.8	274.7	0.3	0.1	0.9	11.2	347.5
Alternative 5A	38.4	23.9	253.1	0.3	0.4	5.4	18.9	340.5
Alternative 5B	54.9	13.6	206.4	0.3	1.0	2.4	27.4	306.0
Proposed – Comparison Portion for Alternative 5C	45.9	32.1	306.7	0.6	–	2.0	13.8	401.1
Alternative 5C	35.6	10.4	133.5	0.1	1.3	1.1	8.8	190.9
Proposed – Comparison Portion for Alternative 5D	38.8	9.4	111.9	0.6	–	1.4	13.3	175.3
Alternative 5D	28.2	6.3	109.9	0.2	8.1	2.1	16.0	170.8
Proposed – Comparison Portion for Alternative 5E	16.4	–	4.4	–	–	0.5	7.0	28.4
Alternative 5E	16.2	–	–	–	–	0.2	7.7	24.1

1/ "Shrublands" include sagebrush, saltbush, greasewood, disturbed shrub, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Op. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

acres of vegetation would be permanently affected by the Project features, of which 175 acres of vegetation would be cleared for operations facilities and 397 acres of vegetation, located between structures along the ROW, would be maintained in an early seral stage. A majority (76 percent) of the operations impacts would occur in forest and woodlands, mainly due to vegetation management in the ROW.

Although they are longer segments, Alternatives 5A and 5B would have fewer permanent impacts on vegetation (341 acres and 306 acres, respectively) than the comparison portion of the Proposed Route (348 acres). This is because both alternatives require fewer acres of ROW maintenance within forested communities during operations than the Proposed Route.

Likewise, Alternative 5C and the comparison portion of the Proposed Route, which are comparable in length, also differ substantially in permanent vegetation impacts (191 acres and 401 acres, respectively). This is because the comparison portion of the Proposed Route crosses more forested/woodland vegetation requiring vegetation maintenance within the ROW than Alternative 5C.

Alternative 5D and the comparison portion of the Proposed Route would result in similar permanent effects to vegetation, including similar amounts of forest/woodland vegetation that would be maintained within the ROW. However, Alternative 5D would

have a greater permanent effect on wetland/riparian vegetation than the comparison portion of the Proposed Route.

Alternative 5E and the comparison portion of the Proposed Route would also result in similar permanent effects to vegetation. The comparison portion of the Proposed Route would have greater clearing of forest/ woodland vegetation within the ROW than Alternative 5E.

Segment 6

Segment 6 is an existing transmission line linking the Borah and Midpoint Substations; it is now operated at 345 kV but would be changed to operate at 500 kV. This segment has no Route Alternatives. Existing support structures would be used and impacts would be limited to within approximately one-quarter mile from each substation to allow for moving the entry point into the substation to the new 500-kV bay. Thirty-one acres of the expansion of the Borah and Midpoint Substations are attributed to Segment 6. Changes in the two substations would allow it to be operated at 500 kV (see Appendix A, Figure A-8).

The impacts from construction and operations of Segment 6 are presented in Table 3.6-14. Construction of Segment 6 would impact about 65 acres of vegetation for installation of the transmission line, consisting of grassland, and other cover types (disturbed/ developed); no additional acreage would be cleared for the ROW. Of these acres, 61 acres would be permanently impacted during operations.

Table 3.6-14. Acreage Affected by Construction and Operations of Segment 6 Proposed Route

Segment or Alternative	Shrubland ^{1/}	Forest/ Woodland ^{2/}		Wetland/ Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Fac. ^{3/}	Fac.	ROW	Fac.	ROW	Fac.	Fac.	
Proposed Segment 6 – Total Length – Construction	16.1	–	–	–	–	26.0	22.6	64.7
Proposed Segment 6 – Total Length – Operations and Maintenance	15.2	–	–	–	–	25.3	20.2	60.7

1/ "Shrublands" include sagebrush, saltbush, greasewood, disturbed shrub, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

Segment 7

Segment 7, as proposed, would link the Populus and Cedar Hill Substations with a 118.1-mile single-circuit 500-kV line. Forty-two acres of the expansion of the Populus Substation and the construction of the Cedar Hill Substation, and 1 acre for two regeneration sites are attributed to Segment 7. In addition to the Proposed Route, which is principally on private lands, Route Alternatives have been proposed by the BLM to avoid the Deep Creek Mountains (7A and 7B; which are 3 miles and 11 miles longer than the comparison portion of the Proposed Route), by local landowners (7C, 7D, 7E, 7F, and 7G, which all represent minor adjustments proposed to address local issues), by local landowners to avoid private agricultural lands (7I or the State Line

Route, which is 55 miles longer than the Proposed Route and would require 0.5 acre for an additional regeneration site), and by the Proponents to avoid the State Line Route (7H, which is 9 miles longer than the Proposed Route). Alternative 7J, which is a variant of the State Line Route also proposed by local landowners, would not terminate at the Cedar Hill Substation. This alternative, referred to as the Rogerson Alternative, would require a different substation be constructed near a 345-kV existing transmission line (approximately 24 miles southwest of the Cedar Hill Substation; see Appendix A, Figure A-9). The tables and discussion in this document compare 7J (202 miles) with the corresponding portion of Segment 7/9 (118.1 miles of Segment 7 and 25.8 miles of Segment 9, for a total of 143.9 miles). All other Segment 7 alternatives are compared to Segment 7 of the Proposed Route (118.1 miles) only.

Segment 7 crosses an area of predominantly agriculture and sagebrush, with components of forest and woodland vegetation. The vegetation surrounding the Segment 7 alternatives is similar, although Alternatives 7C through 7G would not cross forest/woodland vegetation.

Construction

The impacts from construction of Segment 7 and its alternatives are presented in Table 3.6-15. Construction of the Proposed Route and clearing of the ROW along Segment 7 would directly affect 2,083 acres for installation of the transmission line, primarily consisting of other cover types (agriculture 40 percent, shrubland 30 percent, and forest/ woodland vegetation 20 percent).

Table 3.6-15. Comparison of Construction-related Vegetation Impacts (acres) for Segment 7 Proposed Route and Alternatives 7A through 7J

Segment or Alternative	Shrubland ^{1/}	Forest/ Woodland ^{2/}		Wetland/ Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Const. Fac. ^{3/}	Const. Fac.	ROW	Const. Fac.	ROW	Const. Fac.	Const. Fac.	
Proposed Segment 7 – Total Length	619.8	139.6	278.7	7.9	–	210.7	826.1	2,082.9
Proposed – Comparison Portion for Alternative 7A,7B	175.6	79.1	158.4	3.6	–	51.5	189.1	657.3
Alternative 7A	294.8	107.2	158.9	4.3	0.3	60.2	151.3	777.4
Alternative 7B	409.9	50.6	81.2	1.2	–	27.6	256.9	827.7
Proposed – Comparison Portion for Alt. 7C	151.2	–	–	t ^{6/}	–	16.3	120.6	288.2
Alternative 7C	115.1	–	–	–	–	99.7	74.1	289.1
Proposed – Comparison Portion for Alt. 7D	37.1	2.6	5.8	2.9	–	24.8	44.9	118.2
Alternative 7D	38.8	2.6	5.1	2.9	–	35.0	46.0	130.8
Proposed – Comparison Portion for Alt. 7E	33.0	4.0	9.5	–	–	15.0	14.4	76.2
Alternative 7E	41.0	7.1	17.4	–	–	16.3	12.7	95.3
Proposed – Comparison Portion for Alt. 7F	54.7	38.4	59.2	0.4	–	38.1	69.5	260.7
Alternative 7F	53.2	42.7	63.5	t ^{6/}	–	41.7	31.6	232.9
Proposed – Comparison Portion for Alt. 7G	39.3	–	–	t ^{6/}	–	1.5	7.5	48.4
Alternative 7G	44.2	–	–	0.8	–	6.4	20.8	72.1

Table 3.6-15. Comparison of Construction-related Vegetation Impacts (acres) for Segment 7 Proposed Route and Alternatives 7A through 7J (continued)

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Const. Fac. ^{3/}	Const. Fac.	ROW	Const. Fac.	ROW	Const. Fac.	Const. Fac.	
Proposed – Comparison Portion for Alt. 7H,I	619.8	139.6	278.7	7.9	–	210.7	826.1	2,082.8
Alternative 7H	1,372.3	272.4	431.9	8.6	1.2	139.4	322.2	2,550.6
Alternative 7I	1,613.4	418.2	477.6	20.2	5.3	373.6	309.5	3,217.7
Proposed – Comparison Portion 7/9 for Alt. 7J ^{7/}	787.8	139.6	278.7	8.2	–	357.6	937.4	2,59.6
Alternative 7J ^{7/}	2,055.5	372.2	425.7	19.3	1.2	406.4	325.5	3,606.4

1/ "Shrublands" include sagebrush, saltbush, greasewood, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Const. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

7/ Alternative 7J connects with Segment 9 approximately 25.8 miles west of the proposed Cedar Hill Substation, which is the western terminus of Segment 7 and the beginning point for Segment 9. The table above compares 7J (202 miles) with the corresponding portion of Segment 7/9 (118.1 miles of Segment 7 and 25.8 miles of Segment 9, for a total of 143.9 miles). All other Segment 7 alternatives are compared to Segment 7 of the Proposed Route (118.1 miles) only.

Alternatives 7A and 7B would have greater impacts to vegetation during construction (777 acres and 828 acres, respectively) than the comparison portion of the Proposed Route (657 acres). Alternative 7B would have the greatest effect on shrubland vegetation, followed by Alternative 7A, and the comparison portion of the Proposed Route, respectively (Table D.6-2 in Appendix D). Alternative 7A would have the greatest effect on forest/ woodland vegetation, followed by the comparison portion of the Proposed Route, and Alternative 7B, respectively. Finally, the Alternative 7A would have the greatest effect on wetland/riparian vegetation, followed by the comparison portion of the Proposed Route and Alternative 7B, respectively.

Alternative 7C and the comparison portion of the Proposed Route would impact a comparable amount of vegetation. Alternative 7C would impact more grassland (all of which is disturbed), and the comparison portion of the Proposed Route would impact more shrubland vegetation (Table D.6-2 in Appendix D).

Alternative 7D would impact more vegetation than the comparison portion of the Proposed Route (131 acres and 118 acres, respectively). Impacts to individual vegetation types are comparable between the segments, with Alternative 7D affecting more grassland and other cover types (Table 3.6-15).

Alternative 7E results in a slightly greater amount of construction disturbance than the comparison portion of the Proposed Route (95 and 76 acres, respectively). Alternative 7E would affect slightly more forest and woodland and shrubland vegetation than the comparison portion of the Proposed Route.

Alternative 7F would impact fewer acres of vegetation than the comparison portion of the Proposed Route (233 acre and 261 acres, respectively). Alternative 7F would

impact more forest/woodland vegetation and grassland than the comparison portion of the Proposed Route, which would impact more acres of other cover types.

Alternative 7G would affect more vegetation during construction than the comparison portion of the Proposed Route (72 acres and 48 acres, respectively); however, much of the acreage affected by Alternative 7G includes previously disturbed shrublands, disturbed grasslands, and agriculture (Table D.6-2 in Appendix D).

Alternative 7I would have a greater effect on vegetation during construction (3,218 acres), followed by Alternative 7H (2,551 acres), and the comparison portion of the Proposed Route (2,083 acres). Alternative 7H and 7I would primarily impact shrubland, whereas the comparison portion of the Proposed Route would impact an abundance of shrublands and other cover types such as agriculture. Alternative 7I would affect the most forest/woodland and wetland/riparian vegetation, followed by Alternative 7H and the comparison portion of the Proposed Route, respectively.

Alternative 7J would have a greater effect on vegetation during construction (3,606 acres) than the comparison portion of the Proposed Route (2,510 acres). Alternative 7J would have greater impacts to shrublands and forested vegetation types than the comparison portion of the Proposed Route, which would primarily impact other cover types (mainly agriculture). However, due to the routing of Alternative 7J in relation to the Proposed Routes of Segments 7 and 9, it cannot be directly compared with the Proposed Route of Segment 7, as can the other alternatives for this segment.

Alternatives 7H, 7I, and 7J cross the Sawtooth NF, impacting a total of 255 acres, 329 acres, and 244 acres, respectively, of forest/woodland vegetation on the Forest during construction (Table D.6-5 in Appendix D). Based on the vegetation layer provided by the Forest, Alternatives 7H, 7I, and 7J would impact 45 acres, 15 acres, and 15 acres of mature forest during construction, respectively. GIS data from the Forest does not include information on forest age class or seral stage. Based on aerial photo interpretation, these forest areas do not appear to possess characteristics of old-growth meeting the Forest Service Region 4 definition.

Alternatives 7H and 7I also cross the Caribou-Targhee NF. Impacts to vegetation from the Project would be minimal and would include less than an acre disturbance to sagebrush (Table D.6-5).

Operations

The impacts from operations and maintenance of Segment 7 and its alternatives are presented in Table 3.6-16. A total of 587 acres of vegetation would be permanently affected by Segment 7, of which 231 acres of vegetation would be cleared for operations facilities and 356 acres of vegetation, located along the ROW between structures, would be maintained in early seral stage.

Alternative 7A would have the greatest permanent impacts to vegetation (304 acres), followed by the comparison portion of the Proposed Route (246 acres), and Alternative 7B (205 acres), respectively. Alternative 7A would require the most maintenance of forest/ woodland vegetation and wetland/riparian vegetation, followed by the comparison portion of the Proposed Route and Alternative 7B.

Table 3.6-16. Comparison of Operations-related Vegetation Impacts (acres) for Segment 7 Proposed Route and Alternatives 7A through 7J

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Op. Fac. ^{3/}	Op. Fac.	ROW	Op. Fac.	ROW	Op. Fac.	Op. Fac.	
Proposed Segment 7 – Total Length	96.7	18.9	356.0	0.5	–	22.1	92.5	586.7
Proposed – Comparison Portion for Alternative 7A,7B	15.8	10.7	199.8	0.1	–	4.0	15.9	246.3
Alternative 7A	46.5	23.1	208.3	0.6	0.4	4.3	21.1	304.3
Alternative 7B	59.9	9.9	106.0	0.2	–	0.1	28.6	204.8
Proposed – Comparison Portion for Alternative 7C	21.4	–	–	t ^{6/}	–	3.4	11.6	36.4
Alternative 7C	13.0	–	–	–	–	7.6	7.0	27.7
Proposed – Comparison portion for Alternative 7D	3.7	0.4	7.5	t ^{6/}	–	4.4	2.8	18.9
Alternative 7D	4.5	0.4	6.8	t ^{6/}	–	5.1	2.7	19.6
Proposed – Comparison Portion for Alternative 7E	3.2	0.5	12.5	–	–	1.5	1.0	18.7
Alternative 7E	5.5	0.9	21.5	–	–	1.9	0.1	29.9
Proposed – Comparison Portion for Alternative 7F	6.8	4.6	80.6	t ^{6/}	–	4.9	10.9	107.9
Alternative 7F	7.8	4.5	86.0	t ^{6/}	–	5.7	5.5	109.6
Proposed – Comparison Portion for Alternative 7G	3.5	–	–	t ^{6/}	–	0.1	1.9	5.5
Alternative 7G	2.7	–	–	t ^{6/}	–	0.1	2.7	5.5
Proposed – Comparison Portion for Alternative 7H,I	96.7	18.9	356.0	0.5	–	22.1	92.5	586.7
Alternative 7H	221.5	46.7	564.6	1.1	1.4	14.2	56.2	905.7
Alternative 7I	311.0	52.6	616.3	3.5	6.7	38.2	45.6	1,073.9
Proposed – Comparison Portion 7/9 for Alt. 7J ^{4/}	119.4	18.9	356.0	0.5	–	41.8	113.1	649.7
Alternative 7J ^{4/}	372.2	48.1	550.8	3.4	1.4	41.9	46.0	1,065.8

1/ "Shrublands" include sagebrush, saltbush, greasewood, disturbed shrub, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Op. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

7/ Alternative 7J connects with Segment 9 approximately 25.8 miles west of the proposed Cedar Hill Substation, which is the western terminus of Segment 7 and the beginning point for Segment 9. The table above compares 7J (202 miles) with the corresponding portion of Segment 7/9 (118.1 miles of Segment 7 and 25.8 miles of Segment 9, for a total of 143.9 miles). All other Segment 7 alternatives are compared to Segment 7 of the Proposed Route (118.1 miles) only.

Alternative 7C would have fewer permanent impacts on vegetation than the comparison portion of the Proposed Route (28 acres and 36 acres, respectively). Differences in vegetation types would be similar to those described above for construction.

Alternative 7D would also have similar permanent effects on vegetation relative to the comparison portion of the Proposed Route. Vegetation types affected would also be similar.

Alternative 7E would have greater permanent effects on vegetation than the comparison portion of the Proposed Route (30 acre and 19 acres, respectively). Alternative 7E would permanently disturb more forest/ woodland vegetation than the Proposed Route.

Alternatives 7F and 7G would have effects on vegetation similar to the comparison portions of the Proposed Route for these segments. Effects to vegetation types would be similar between these alternatives and the comparison portions of the Proposed Route.

Alternative 7I would have more permanent effects on vegetation (1,074 acres) than Alternative 7H (906 acres) and the comparison portion of the Proposed Route (587 acres), respectively. This relates to the amount of forest and woodland vegetation and wetland/riparian vegetation that would require maintenance within the ROW along each segment. Most of the shrubland affected by the three segments is undisturbed (Table D.6-3 in Appendix D).

Alternative 7J would also have more permanent effects on vegetation (1,064 acres) than the comparison portion of the Proposed Route (650 acres). Alternative 7J would require more maintenance of forest and woodland vegetation and wetland/riparian vegetation than the Proposed Route. However, due to the routing of Alternative 7J in relation to the Proposed Routes of Segments 7 and 9, it cannot be directly compared with the Proposed Route of Segment 7, as can the other alternatives for this segment.

Segment 8

Segment 8, as proposed, would link the Midpoint and Hemingway Substations. This 131-mile single-circuit 500-kV transmission line would stay north of the Snake River until crossing through the SRBOP parallel to an existing 500-kV transmission line before ending at the Hemingway Substation. Thirteen acres of the expansion of the Midpoint Substation and 0.5 acre for a regeneration site are attributed to Segment 8. There are five Route Alternatives: 8A, which follows the WWE corridor but crosses the Snake River and I-84 twice (while the Proposed Route would stay north of this area); 8B and 8C, which represent the old routes originally proposed by the Proponents but that have now been changed to avoid the cities of Kuna and Mayfield, respectively; 8D, which represents a small revision involving a rebuild of the existing transmission line to move both away from the National Guard Maneuver Area; and 8E, which was proposed by the BLM in order to avoid crossing the Halverson Bar nonmotorized portion of the Guffey Butte-Black Butte Archaeological District (see Appendix A, Figure A-10). Proposed Segment 8 and its alternatives would cross an area consisting of agriculture, disturbed grassland and sagebrush, and sagebrush (Table D.6-1 in Appendix D).

Construction

The impacts from construction of Segment 8 and its alternatives are presented in Table 3.6-17. Construction of the Proposed Route along Segment 8 would directly affect 2,125 acres for installation of the transmission line, primarily consisting of shrubland (55 percent) and grassland (32 percent).

Alternative 8A would disturb more vegetation during construction than the comparison portion of the Proposed Route (830 acres and 815 acres, respectively). Alternative 8A would disturb more agricultural lands than the comparison portion of the Proposed Route. Alternative 8A would disturb more wetland/riparian vegetation within the ROW than the comparison portion of the Proposed Route.

Table 3.6-17. Comparison of Construction-related Vegetation Impacts (acres) for Segment 8 Proposed Route and Alternatives 8A through 8E

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian ^{3/}		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Const. Fac. ^{3/}	Const. Fac.	ROW	Const. Fac.	ROW	Const. Fac.	Const. Fac.	
Proposed Segment 8 – Total Length	1,175.7	–	–	4.6	0.3	680.1	264.6	2,125.1
Proposed – Comparison Portion for Alternative 8A	439.0	–	–	2.0	0.3	167.0	206.5	814.6
Alternative 8A	378.3	–	–	1.6	4.8	163.7	280.5	829.0
Proposed – Comparison Portion for Alternative 8B	388.6	–	–	0.7	–	317.7	46.5	753.8
Alternative 8B	299.7	–	–	7.0	0.4	189.7	281.6	779.3
Proposed – Comparison Portion for Alternative 8C	69.8	–	–	0.1	–	66.0	2.6	138.6
Alternative 8C	43.6	–	–	t ^{6/}	–	54.6	39.0	138.2
Proposed – Comparison Portion for Alternative 8D	7.4	–	–	–	–	110.8	4.6	122.7
Alternative 8D	7.0	–	–	–	–	118.9	16.6	142.5
Proposed – Comparison Portion for Alternative 8E	44.9	–	–	–	–	42.1	11.0	97.9
Alternative 8E	198.7	–	–	0.2	–	80.7	2.9	283.2

1/ "Shrublands" include sagebrush, saltbush, greasewood, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Const. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

Alternative 8B would also disturb more vegetation during construction than the comparison portion of the Proposed Route (779 acres and 754 acres, respectively). Alternative B would impact more wetland/riparian vegetation than the comparison portion of the Proposed Route (Table D.6-2 in Appendix D).

Alternative 8C and the comparison portion of the Proposed Route would result in comparable vegetation impacts during construction. Alternative 8C would impact more other cover types whereas the comparison portion of the Proposed Route would impact more shrubland.

Alternative 8D would disturb more vegetation during construction than the comparison portion of the Proposed Route (143 acres and 123 acres, respectively).

Alternative 8E would disturb more vegetation during construction than the comparison portion of the Proposed Route (283 and 98 acres, respectively).

Operations

The impacts from operations of Segment 8 and its alternatives are presented in Table 3.6-18. During operations of the Proposed Route along Segment 8, approximately 246 acres of vegetation would be permanently impacted. Much of the vegetation affected consists of disturbed grasslands and disturbed shrublands (Table D.6-3 in Appendix D).

Alternative 8A and the comparison portion of the Proposed Route would have comparable permanent impacts to vegetation. However, Alternative 8A would impact more wetland/riparian vegetation than the comparison portion of the Proposed Route, much of this due to vegetation maintenance in the ROW.

Table 3.6-18. Comparison of Operations-related Vegetation Impacts (acres) for Segment 8 Proposed Route and Alternatives 8A through 8E

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Op. Fac. ^{3/}	Op. Fac.	ROW	Op. Fac.	ROW	Op. Fac.	ROW	
Proposed Segment 8 – Total Length	138.6	–	–	0.7	0.3	79.0	27.6	246.2
Proposed – Comparison Portion for Alternative 8A	54.3	–	–	0.2	0.3	25.0	19.4	99.3
Alternative 8A	47.0	–	–	0.4	5.5	28.2	26.6	107.7
Proposed – Comparison Portion for Alternative 8B	48.6	–	–	0.2	–	31.2	7.0	87.0
Alternative 8B	35.4	–	–	0.2	0.4	18.7	14.7	69.4
Proposed – Comparison Portion for Alternative 8C	8.9	–	–	t ^{6/}	–	5.8	0.3	14.9
Alternative 8C	6.4	–	–	t ^{6/}	–	8.7	0.7	15.8
Proposed – Comparison Portion for Alternative 8D	0.7	–	–	–	–	15.7	2.2	18.6
Alternative 8D	0.5	–	–	–	–	11.0	3.8	15.4
Proposed – Comparison Portion for Alternative 8E	5.7	–	–	–	–	3.0	0.9	9.6
Alternative 8E	19.0	–	–	–	–	7.3	0.5	26.8

1/ "Shrublands" include sagebrush, saltbush, greasewood, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Op. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

Alternative 8B would have fewer permanent effects to vegetation than the comparison portion of the Proposed Route (69 acres and 87 acres, respectively). The comparison portion of the Proposed Route would permanently impact more shrubland and grassland vegetation, whereas Alternative 8B would impact more other cover types.

Alternatives 8C and 8D would have similar permanent effects to vegetation as their respective comparison portions of the Proposed Route.

Alternative 8E would have a greater permanent effect to vegetation than the comparison portion of the Proposed Route (27 acres and 10 acres, respectively). Both route segments would primarily impact shrubland and grassland vegetation.

Segment 9

Segment 9, as proposed, would link the Cedar Hill and Hemingway Substations with a 161.7 mile single-circuit 500-kV transmission line which skirts the Jarbidge and Owyhee Military Operating Areas to the north, then follows the WWE corridor just north of the Saylor Creek Air Force Range, passing through Owyhee County before entering into the Hemingway Substation. Fifteen acres of the construction of the Cedar Hill Substation and 1 acre for two regeneration sites are attributed to Segment 9. There are eight Route Alternatives proposed, including 9A, which was the Proponents' Proposed Route until moving to avoid the Hollister area; 9B, which is being considered by the BLM because it follows the WWE corridor and parallels existing utility corridors; 9C, which was the Proponents' Proposed Route until moving to avoid the Castleford area; and 9D and 9E, proposed by the Owyhee County Task Force, that cross more public lands north and south of the Proposed Route, respectively, than the Proposed Route. Most of Alternative 9D would be within the SRBOP. Alternatives 9F, 9G, and 9H were proposed to avoid crossing the nonmotorized area south of C.J. Strike Reservoir. Alternatives 9G and 9H provide an alternate route location south of Alternative 8E (see Appendix A, Figure A-11). Proposed Segment 9 and its alternatives cross an area consisting of both natural and disturbed shrubland with a small agricultural component (Table D.6-1 in Appendix D).

Construction

The impacts from construction of Segment 9 and its alternatives are presented in Table 3.6-19. Construction of the Proposed Route and clearing of the ROW along Segment 9 would directly affect 2,671 acres for installation of the transmission line, primarily consisting of shrubland (45 percent) and grassland (39 percent). Potentially sensitive vegetation crossed by Segment 9 includes natural sagebrush, native grassland, and a small amount of wetland/riparian vegetation (Table D.6-2 in Appendix D).

Alternative 9A would impact more vegetation during construction than the comparison portion of the Proposed Route (133 acres and 117 acres, respectively); however, Alternative 9A would disturb more shrubland (75 percent of which is previously disturbed; Table D.6-2 in Appendix D), whereas the Proposed Route would disturb more grassland (all of which is disturbed).

Alternative 9B would result in a similar amount of vegetation disturbance during construction than the comparison portion of the Proposed Route. However, the comparison portion of the Proposed Route would affect more shrubland and grassland than Alternative 9B; effects to wetland/riparian vegetation would be similar between segments (Table D.6-2 in Appendix D).

Table 3.6-19. Comparison of Construction-related Vegetation Impacts (acres) for Segment 9 Proposed Route and Alternatives 9A through 9H

Segment or Alternative	Shrubland ^{1/}	Forest/ Woodland ^{2/}		Wetland/ Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Const. Fac. ^{3/}	Const. Fac.	ROW	Const. Fac.	ROW	Const. Fac.	Const. Fac.	
Proposed Segment 9 – Total Length	1,200.9	0.5	0.6	3.2	t ^{6/}	1,035.1	430.1	2,670.5
Proposed – Comparison Portion for Alternative 9A	48.2	–	–	0.3	–	51.8	16.8	117.4
Alternative 9A	83.2	–	–	0.3	–	32.6	16.2	132.9
Proposed – Comparison Portion for Alternative 9B	304.7	0.5	0.6	0.3	–	454.5	64.1	825.5
Alternative 9B	233.3	–	–	0.2	0.3	355.2	226.9	816.1
Proposed – Comparison Portion for Alternative 9C	93.4	0.5	0.6	0.2	–	132.8	11.9	239.4
Alternative 9C	64.4	–	–	–	–	136.0	78.3	278.6
Proposed – Comparison Portion for Alts. 9D–H	542.3	–	–	2.6	–	183.9	225.4	954.5
Alternative 9D	401.4	0.6	0.9	2.5	–	368.9	40.8	815.6
Alternative 9E	772.2	–	–	2.2	–	218.1	12.0	1,004.5
Alternative 9F	460.0	–	–	6.0	–	362.8	141.9	971.4
Alternative 9G	426.8	0.6	0.9	3.6	–	367.8	49.1	848.8
Alternative 9H	485.6	–	–	6.3	–	341.7	145.1	978.9

1/ "Shrublands" include sagebrush, saltbush, greasewood, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Const. Fac. = clearing for facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

Alternative 9C would result in more vegetation disturbance during construction than the comparison portion of the Proposed Route (279 acres and 239 acres, respectively). The comparison portion of the Proposed Route would impact a greater amount of sagebrush vegetation, whereas Alternative 9C would impact more other cover types (Table D.6-2 in Appendix D).

Alternative 9E would result in the greatest amount of vegetation disturbance during construction (1,004 acres), followed by Alternative 9H (979 acres), Alternative 9F (971 acres), the comparison portion of the Proposed Route (954 acres), Alternative 9G (849 acres), and Alternative 9D (816 acres). Minor impacts to forest/woodland would occur under Alternatives 9D and 9G. Impacts to wetland/riparian would be greatest under Alternatives 9F and 9H. Impacts to shrub vegetation would be the greatest under Alternative 9E.

Operations

The impacts from operations of Segment 9 and its alternatives are presented in Table 3.6-20. During operations of the proposed Project along Segment 9,

approximately 360 acres would be permanently impacted, consisting primarily of shrubland and grassland vegetation. Alternative 9A and the comparison portion of the Proposed Route would have similar permanent impacts to vegetation. Alternative 9B would have fewer permanent impacts to vegetation than the comparison portion of the Proposed Route (85 acres and 122 acres, respectively). Both routes primarily impact shrubland and grassland. Alternative 9C and the comparison portion of the Proposed Route would have comparable impacts to vegetation, also both primarily impacting shrubland and grassland.

Table 3.6-20. Comparison of Operations-related Vegetation Impacts (acres) for Segment 9 Proposed Route and Alternatives 9A through 9H

Segment or Alternative	Shrubland ^{1/}	Forest/ Woodland ^{2/}		Wetland/ Riparian		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Op. Fac. ^{3/}	Op. Fac.	ROW	Op. Fac.	ROW	Op. Fac.	Op. Fac.	
Proposed Segment 9 – Total Length	171.9	t ^{6/}	1.0	0.9	t ^{6/}	138.7	47.0	359.6
Proposed – Comparison Portion for Alternative 9A	5.6	–	–	t ^{6/}	–	7.5	1.9	15.1
Alternative 9A	11.6	–	–	t ^{6/}	–	4.5	1.7	17.7
Proposed – Comparison Portion for Alternative 9B	52.0	t ^{6/}	1.0	t ^{6/}	–	65.7	3.5	122.3
Alternative 9B	30.9	–	–	t ^{6/}	0.3	38.4	15.7	85.4
Proposed – Comparison Portion for Alternative 9C	11.8	t ^{6/}	1.0	t ^{6/}	–	12.3	2.0	27.1
Alternative 9C	12.5	–	–	–	–	13.0	6.0	31.4
Proposed – Comparison Portion for Alternatives 9D and 9E	70.1	–	–	0.9	–	16.4	18.7	106.0
Alternative 9D	40.5	t ^{6/}	1.4	t ^{6/}	–	34.1	5.6	81.6
Alternative 9E	108.6	–	–	0.2	–	23.2	2.4	134.5
Alternative 9F	47.5	–	–	0.6	–	32.8	12.0	93.0
Alternative 9G	42.1	t ^{6/}	1.4	0.2	–	33.9	7.1	84.8
Alternative 9H	49.1	–	–	0.8	–	32.6	13.6	96.2

1/ "Shrublands" include sagebrush, saltbush, greasewood, and dwarf shrub.

2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.

3/ Op. Fac. = clearing for operations facilities such as infrastructure and roads; ROW = right-of-way clearing

4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).

5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

6/ Value is less than 0.1 acre.

Alternative 9E would have the greatest permanent impacts to vegetation (135 acres), followed by Alternative 9H (96 acres), the comparison portion of the Proposed Route (106 acres), Alternative 9 F (93 acres), Alternative 9 G (85 acres), and Alternative 9D (82 acres). Alternatives 9D and 9G would require a minor amount of forest/woodland vegetation maintenance within the ROW (1.4 acres along each). All segments would result in the removal of a minor amount of wetland/riparian vegetation.

Segment 10

Segment 10, as proposed, would link the Cedar Hill and Midpoint Substations with a 33.6-mile single-circuit 500-kV line, following a WWE corridor for most of its distance. Twenty-eight acres of the expansion of the Midpoint Substation and of the construction of the Cedar Hill Substation are attributed to Segment 10. There are no Route Alternatives proposed along this segment (see Appendix A, Figure A-12). Segment 10

would cross an area consisting of agriculture, disturbed grassland, and disturbed sagebrush (Table D.6-1 in Appendix D).

Construction

The impacts from construction of Segment 10 are presented in Table 3.6-21. Construction of the Proposed Route and clearing of the ROW along Segment 10 would directly affect 549 acres for installation of the transmission line, primarily consisting of other cover types and disturbed grassland (Table D.6-3 in Appendix D).

Table 3.6-21. Summary of Construction- and Operations-related Vegetation Impacts (acres) for Segment 10 Proposed Route

Segment or Alternative	Shrubland ^{1/}	Forest/Woodland ^{2/}		Wetland/Riparian ^{3/}		Grassland	Other Cover Types ^{4/}	Total ^{5/}
	Fac. ^{3/}	Fac.	ROW	Fac.	ROW	Fac.	Fac.	
Proposed Segment 10 – Total Length – Construction	96.5	–	–	0.1	–	157.1	294.8	549.0
Proposed Segment 10 – Total Length – Operations and Maintenance	13.5	–	–	–	–	23.9	44.0	81.4

1/ "Shrublands" include sagebrush, saltbush, greasewood, and dwarf shrub.
 2/ "Forest/woodlands" include conifer and deciduous forest and juniper woodlands.
 3/ Fac. = clearing for construction or operation facilities such as infrastructure, roads, temporary staging areas, and fly yards; ROW = right-of-way clearing
 4/ "Other Cover Types" include agriculture, disturbed/developed, water, areas with no vegetation data, and "miscellaneous" (substrate dominated).
 5/ Numbers in table are inexact; columns or rows may not sum exactly due to rounding.

Operations

The impacts from operations of Segment 10 and its alternatives are presented in Table 3.6-21. During operations of the Proposed Route along Segment 10, approximately 81 acres would be permanently disturbed by Project features. Vegetation impacted would consist of other cover types, grassland, and shrubland.

3.6.2.4 Design Variation

A Design Variation is being considered that would consist of constructing two single-circuit lines in Segments 2 through 4 instead of a single double-circuit line (which is the design assessed above). The disturbance footprint of the two single-circuit towers is greater than that of the double-circuit tower, in part because the requested ROW would be wider, but also because helicopter-assisted construction could be implemented in these areas due to the lighter weight of the towers, which would require additional fly yards. The additional ROW space and the fly yards would cause additional temporary disturbance during construction. Across Segments 2, 3, and 4, the additional disturbance of the single-circuit tower alternative ranges from 25 to 30 percent greater than the comparable portions of the double-circuit tower disturbance under the proposed design. The two single circuits require more ground disturbance, but would be designed and constructed to the same standards as the Proposed Action.

Impacts to vegetation communities under the design variation are included in Table D.6-4 in Appendix D. Impacts from ROW maintenance in forests, woodlands, and tall shrub communities would increase. While the wire zone would only slightly increase from a 146-foot width for the one double-circuit structure to a total of 154 feet for the two single-circuit structures, the border zone would increase more, from 154 feet for the double-circuit option to 196 feet for the two single-circuit structures. The average increase in impacts from ROW maintenance would be about 21 percent.

3.6.2.5 Structure Variation

The proposed guyed Structure Variation would add four guy wires about 140 feet long from a point about 100 feet up in each tower to four guy anchors spaced in a square around the tower (Appendix B, Figure B-6). This would not change the amount of disturbance during construction or operations appreciably, given that it would be limited to the size of the guy anchors. Extra care would be needed where towers are near sensitive vegetation types such as native grasslands, wetland/riparian areas, areas of intact shrubland (sagebrush) or forest and woodland vegetation to avoid placing guy wires in these areas. Therefore, there is no measurable difference in impact on vegetation from the use of this Structure Variation when compared to the use of self-supporting lattice towers.

3.6.2.6 Schedule Variation

The Schedule Variation uses the two single-circuit Design Variation described above but extends construction over a longer time frame. Initially, only one of the eventual two single-circuit lines would be constructed, with the second to be constructed at a later date. The Schedule Variation proposes that the first single-circuit transmission line in Segments 2, 3, and 4 would be built as soon as a ROW grant is issued, but that the second line would not begin construction until late 2018. This would mean nearly 2 years between the end of construction for the first line and beginning of construction for the second line. Any staging areas and fly yards that had been used for the first stage would have been revegetated after construction was complete. There would be two sets of construction disturbances, adding movement, noise, and dust to the area of construction in two instances in any given area. In addition to the loss of regenerating vegetation, the two periods of vegetation disturbance would also result in two periods in which there is increased risk of noxious weed introduction and spread.

3.6.3 Mitigation Measures

To minimize or avoid impacts on vegetation communities, the Proponents have committed to EPMS and mitigation measures that would be implemented Project-wide, as outlined in this section (identified above) and in Appendix C.

The following mitigation measures identified by the Agencies are required on federally managed lands. The Agencies recommend that the Proponents incorporate the measures into their EPMS and mitigation measures and apply them Project-wide.

- VEG-1 The Proponents shall consult with each appropriate local land management agency (Forest Service and BLM) office or landowner to determine appropriate seed mix for revegetation. Also see WEED-1.

- VEG-2 During construction, blading of native plant communities should be minimized, consistent with safe construction practices. Where feasible, shrubs should be cut at or near ground level to facilitate re-growth after construction. The footprint of construction and operations facilities should be kept to the minimum necessary.
- VEG-3 Where feasible, locate new access roads to minimize the number of trees removed during construction.
- VEG-4 In areas where revegetation would be completed, topsoil salvage and replacement should be used for areas larger than 1 acre where soils would be disturbed during construction. In areas where revegetation would be completed, topsoil salvage will be used in all areas of cut or fill in order to facilitate revegetation.

There are state and county regulations pertaining to fire prevention and control that the Proponents would adhere to on all lands. In addition, the Agencies have identified the following measure on federally managed lands and recommend the Proponents incorporate these measures into their EPMs and apply them Project-wide:

- VEG-5 The Proponents' employees and contractors will employ typical practices to prevent fire during construction and operations including brush clearing prior to work, stationing a water truck at the job site to keep the ground and vegetation moist in extreme fire conditions, enforcing red flag warnings, providing training to all pertinent personnel, keeping vehicles on designated roads and within work areas, and providing fire suppression and emergency notification numbers at each construction site. Brush clearing will be limited to the construction ROW.

In addition to the Proponents' Framework Reclamation Plan for Construction Activities, referenced above, the Agencies have identified the following additional measures during operations and maintenance on federally managed lands and recommend the Proponent incorporate these measures into their EPMs and apply them Project-wide:

- VEG-6 The Reclamation, Revegetation, and Weed Management Plan must provide a site-specific plan for access road and ROW vegetation management in areas where removal of trees is proposed. The site-specific plan must include tree removal, slash disposal plans, and BMPs to avoid erosion and sedimentation of watercourses or wetlands. This plan must be submitted to each applicable land management agency for approval prior to clearing.
- VEG-7 Herbicide use must conform to the existing types and application methods approved by those land-managing agencies. The Reclamation, Revegetation, and Weed Management Plan must specify where herbicides would be used, what types would be used, and what application methods would be used. The plan must be in conformance with regulations regarding herbicide use from the land-managing agency or county in which herbicide use is proposed.

- VEG-8 Prior to the start of construction and maintenance activities, all contractor vehicles and equipment (including personal protective equipment) shall be cleaned of soil and debris capable of transporting invasive plant seeds or other propagates. All vehicles and equipment shall be inspected by Agency-approved inspectors and certified as weed free by agency approved personnel, in order to ensure they have been cleaned properly. The final Reclamation, Revegetation, and Weed Management Plan will include the location of all cleaning stations, how materials cleaned from vehicles at these stations would be either captured or treated so that cleaning station locations would not also become infected, and who would confirm/certify that vehicles leaving cleaning stations and/or entering construction sites are free of invasive plant materials.
- VEG-9 Agency staff will approve weed-free straw or other erosion control on federal lands prior to application.
- VEG-10 Agency staff will approve tree seedlings planted in decommissioned roadbeds and other temporarily disturbed areas on federal lands to assure seedlings are matched to site conditions.
- VEG-11 The Proponents will consult with appropriate Forest Service staff to identify the top soil layer on NFS lands.
- VEG-12 Post-construction monitoring and treatment of invasive plants on closed roads and fly yards shall continue for at least 3 years. If after 3 years post-construction conditions are not equivalent or better than pre-construction conditions, monitoring and treatment will continue until these conditions are met.
- VEG-13 The Proponents will meet Wyoming State Forest Practices Act requirements and apply Region 4 BMPs for timber removal operations on the Medicine Bow NF and meet Idaho State Forest Practices Act requirements and apply Region 2 BMPs for timber removal operations on the Caribou-Targhee and Sawtooth NFs.
- VEG-14 Where the route would be visible on timbered slopes on lands managed by the Kemmerer FO, allow tree removal only at structure locations and where required for safety rather than from the entire ROW in order to prevent a linear feature on the landscape from clear-cutting trees. Vegetation removal requirements will consider Appendix A, Key Standards Relating to Electric System Reliability and Safety, of the MOU with the Edison Electric Institute (2006).