3.5 Vegetation

This section provides a baseline overview of vegetation, noxious weeds, riparian wetlands and riparian areas within the Project area including regulatory background, data sources, analysis area, a general overview, and regional summaries. Impacts to vegetation are then disclosed from the construction, operation, maintenance, and decommissioning of the Project.

3.5.1 Regulatory Background

Regulations that directly influence vegetation resources within the Project area are primarily implemented by the BLM, USFS, Department of Agriculture for Wyoming, Colorado, Utah, and Nevada, and the USACE. The vegetation regulations, including those regulations for noxious weed management and riparian and wetland areas that are relevant to the Project are presented in **Table 3.5-1** and summarized for each resource below.

Table 3.5-1 Relevant Regulations for Vegetation Resources

Topic	Regulation
Noxious and Invasive Weeds	Federal Plant Protection Act of 2000 (formerly the Noxious Weed Act of 1974) 7 USC 2801-2814 Colorado Revised Statutes 35-5.5-104.5 to 35-5.5-119; 25-8-205; 25-8-205.5; 35-9-118 Colorado Code of Regulations 8 Colorado Code of Regulations (CCR) 1206-2 Wyoming Statutes 11- 5- 102.a.xi Wyoming Weed and Pest Control Act Utah Code 04-17-1 to 04-17-11 Utah Administrative Code Rules 68-9 Nevada Revised Statutes 555.005-555.5570 FSM 2000 Zero Code 2080
Riparian and Wetland Areas	Clean Water Act (33 USC 1344) Rivers and Harbors Act (33 USC 401 et seq.) Code of Federal Regulations Title 33 Navigation and Navigable Waters Executive Order 11988, “Floodplain Management,” May 24, 1977 Executive Order 11990, “Protection of Wetlands,” May 24, 1977 Colorado Code of Regulations 5 CCR 1002-31 Wyoming Wetland Act W.S. 35-11-308 through 35-11-311 BLM Utah Riparian Policy (IM-UT-2005-091)
Vegetation Management	FR Vol 78 No 60 page 18817 – 18837 – Transmission Vegetation Management FAC-003-2 NERC Reliability Standard

3.5.1.1 Noxious and Invasive Weed Species

The terms “noxious weed” and “invasive weed” are often used interchangeably to describe any plant that is unwanted and grows or spreads aggressively. The term “noxious weed” is legally defined under both federal and state laws. Under the Federal Plant Protection Act of 2000, a noxious weed is defined as “any plant or plant product that can directly or indirectly injure or cause damage to crops, livestock, poultry, or other interests of agriculture, irrigation, navigation, natural resources of the U.S., public health, or the environment” (Animal and Plant Health Inspection Service 2000). Invasive species are defined as plants able to establish on a site where they were not present in the original plant composition (BLM 2008). The Federal Plant Protection Act of 2000 (formerly the Noxious Weed Act of 1974) and EO 13112 of February 3, 1999, require cooperation with state, local, and other federal agencies in the application and enforcement of all laws and regulations relating to the management and control of noxious weeds.

The BLM has established a goal that NEPA documents consider and analyze the potential for the spread of noxious weed species and provide preventative rehabilitation measures for each management action

involving surface disturbance. The USFS regulates noxious weeds as required in the FSM 2000 Zero Code 2080. BLM and USFS BMPs and Stipulations and Guidelines, as defined in the RMPs and LRMPs, list requirements for noxious weed control and management. In addition to the federal noxious weed list, each state maintains a list of regulated and prohibited noxious and invasive weed species. Weed control and management are typically required in each county on public and private lands. Counties also can have their own list of regulated and prohibited invasive weed species. For the land management agencies, while the primary concern is the control of noxious weeds of concern identified by the state statutes and regulations in Wyoming, Colorado, Utah, and Nevada, a secondary concern is the control of invasive species (e.g., halogeton, henbane, and cheatgrass). The following paragraphs outline the management and regulatory requirements by state.

Wyoming

The Wyoming Department of Agriculture defines noxious weeds as “weeds, seeds, or other plant parts that are considered detrimental, destructive, injurious or poisonous, either by virtue of their direct effect or as carriers of diseases or parasites that exist within the state, and are on the designated list (by the Wyoming Statutes” (Title 11, Chapter 5, Section 102.a.xi). Noxious weeds that are listed are eligible for statewide legal regulation and management.

Colorado

The Colorado Department of Agriculture (CDA) manages and regulates noxious and invasive species through the Colorado Noxious Weed Act, which classifies noxious weeds into three lists, A, B, and C (Colorado Revised Statutes Section 35 5.5-101 through 119). Under the Federal Plant Protection Act of 2000, a noxious weed is defined as “any plant or plant product that can directly or indirectly injure or cause damage to crops, livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the U.S., the public health, or the environment” (Animal and Plant Health Inspection Service 2000). Each list has specific control requirements, with the most stringent requirements for those species found on List A. List A species are designated for eradication. List B includes species for which state noxious weed management plans would be developed to stop the continued spread of these species. List C includes species for which state noxious weed management plans would be developed to support the efforts of local governing bodies to facilitate more effective integrated weed management on private and public lands (CDA 2011).

Utah

The Utah Department of Agriculture defines a “noxious weed” as any plant especially injurious to public health, crops, livestock, land, or other property per the Utah Noxious Weed Act, which classifies noxious weeds into three non-native classes: Class A (Early Detection Rapid Response [EDRR]), Class B (Control), and Class C (Containment). Class A species pose a serious threat to the state and should be considered a very high priority for EDRR. Class B species pose a threat to the state and should be considered a high priority for control. Class C species are widely spread and pose a threat to agricultural industry with a focus on stopping expansion (Utah Weed Control Association 2011).

Nevada

The State of Nevada defines noxious weeds as “any species of plant which is liable to be detrimental or destructive and difficult to control or eradicate” (NRS 555.010-555.220). The state has enacted laws requiring the control of noxious weed species (NRS 555.005, NAC 555.010) for which the Nevada Department of Agriculture (NDA) maintains jurisdiction, management, and enforcement. Under NRS 555.010-555.220 and per the NDA, state-listed noxious weeds are classified into three categories: A, B, and C. Each list has specific control requirements, with the most stringent requirements for those species found in Category A. Category A includes noxious weed species not found or limited in distribution throughout the state, actively excluded from the state, and actively eradicated wherever found, and whose control is required by the state for all infestations. Category B includes noxious weed species which are established in scattered populations in some counties of the state, actively excluded

where possible and whose control is required by the state in areas where populations are not well established or not previously known to occur. Category C includes noxious weed species currently established and generally widespread in many counties of the state and whose abatement remains at the discretion of the State Quarantine Officer (NDA 2010).

3.5.1.2 Riparian and Wetland Areas

Waters of the U.S. are defined in 33 CFR 328.3 as all non-tidal waters that are currently, or were used in the past, or may be susceptible to use in interstate commerce; all interstate waters including wetlands; all other waters such as interstate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, of which the use, degradation or destruction could affect interstate commerce; and all impoundments of waters otherwise defined as waters of the U.S. under this definition. In addition, tributaries of the above listed waters, including arroyos, other intermittent drainages, and wetlands adjacent to the above waters also are considered to be waters of the U.S.

Criteria used by the USACE to determine whether a drainage constitutes a water of the U.S. include presence of a defined bed, banks, or evidence of an ordinary high water mark.

Wetlands adjacent to other waters of the U.S., such as streams, also are considered to be waters of the U.S. In addition, and as used herein, the term “wetlands” has a regulatory definition as defined in 33 CFR 328. 7(b) as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Note that the frequency and duration of saturation may vary by geographical region and is largely dependent upon local climatic conditions.

According to the USACE’s 1987 Wetland Delineation Manual, a “three-parameter” approach is required for delineating USACE-defined wetlands (USACE 1987), where areas are identified as wetlands if they exhibit hydrophytic vegetation, hydric soils, and wetland hydrology.

The BLM defines a riparian area as “an area of land that is directly influenced by permanent water. It has visible vegetation or physical characteristics reflective of permanent water influence. Lake shores and stream banks are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon “free water in the soil” (BLM 2008). The USFS defines riparian areas as “Geographically delineable areas of land directly influenced by water, comprised of the aquatic and riparian ecosystems. Riparian ecosystems occupy the transition between the aquatic and adjacent terrestrial ecosystem and are characterized by distinctive vegetation communities that require free or unbound water” (USFS 1986a,b). Riparian and wetland communities typically have persistent water or obligate vegetation (e.g., sedges, rushes, willows) due to the availability of surface water or groundwater.

3.5.2 Data Sources

Information regarding vegetation resources within the analysis area was obtained from a review of existing published sources, BLM RMPs, USFS LRMPs, and Wyoming Natural Diversity Database (WYNDD), Colorado Natural Heritage Program (CNHP), Utah Natural Heritage Program (UNHP), and Nevada Natural Heritage Program (NNHP) database information. Vegetation communities, including riparian and wetland areas, and acreages were identified using the Southwest Regional Gap Analysis Project (SWReGAP) and Northwest Regional Gap Analysis Project (NWReGAP) land cover data (USGS 2008, 2004). Vegetation community characterizations were compiled based on SWReGAP Land Cover Descriptions (USGS 2005), NWReGAP Land Cover Descriptions (NatureServe 2012), BLM RMPs, and USFS LRMPs. Species nomenclature is consistent with the USDA-NRCS Plants Database (USDA-NRCS 2013-2010) unless otherwise specified. Noxious weed regulated species were obtained from state statutes and supplemented by information provided on state websites.

3.5.3 Analysis Area

The analysis area for vegetation encompasses the total area within the HUC10 watershed boundaries (as defined in Section 3.4.3) crossed by the refined transmission corridor for all alternatives and locations of other Project components including terminals and ground electrode sites.

3.5.4 Baseline Description

An overview of the vegetation, noxious weeds, and riparian and wetland areas found in the analysis area is provided below and summarized by Project region in Section 3.5.5.

3.5.4.1 Vegetation

The analysis area crosses a range of vegetation types in several ecoregions. Ecoregions are areas where the ecosystems and the type, quality, and quantity of environmental resources are generally similar as defined by the analysis of patterns and composition of biotic and abiotic phenomena including geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology (CEC 2011). The CEC has mapped ecoregions at various scales for North America, with the coarsest scale labeled as Level I and the most detailed as Level IV. For this analysis, the Level III ecoregions provide sufficient detail at a broad enough scale to discuss the various ecosystems within the analysis area. The following five Level III ecoregions cover the analysis area: the Wyoming Basin, the Colorado Plateau, the Wasatch and Uinta Mountains, the Central Basin and Range, and the Mojave Basin and Range (CEC 2011). Climate and precipitation are covered in Section 3.1, Climate and Air Quality, while topography, physiographic regions, and range of elevations are discussed in Section 3.2, Geological, Paleontological, and Mineral Resources. Soils and land uses are presented in Section 3.3, Soil Resources, and Section 3.14, Land Use, respectively.

The Wyoming Basin is a broad, arid basin drained by the Green and North Platte rivers within the analysis area. Surrounded by mountains, the basin is dominated by grasslands and shrublands (Chapman et al. 2004). The arid uplifted, eroded, and deeply dissected tableland of the Colorado Plateau is crossed by the Green and Colorado rivers within the analysis area. The vegetation is sparse and predominately composed of dwarf shrubs in the low-elevation basins and canyons, whereas in the uplands and higher valleys, shrublands and pinyon-juniper woodlands are common. The Wasatch and Uinta Mountain region includes the Uinta Mountains, Wasatch Range, and Wasatch Plateau. The vegetation communities tend to group along elevation bands, with grasslands and shrublands common in the low elevations, mixed, ponderosa, and pinyon-juniper woodlands in the low to middle elevations, and fir, spruce, pine, and aspen species in the forested communities in the middle to high elevations. In the highest elevations, the vegetation tends to be small, low stature, alpine shrub and forb species, with stunted spruce, fir and pine trees. The Central Basin and Range ecoregion is composed of elevated, internally drained xeric basins in between scattered mountain ranges (Bryce et al. 2003). The vegetation is a mosaic of sagebrush or saltbush-greasewood shrublands and salt flats. The Mojave Basin and Range, found in southern Nevada and southwestern Utah, is sparsely vegetated, dominated by desert shrubs such as creosote bush, white bursage, Joshua-tree, yucca species, and blackbrush. Tree species are found in the higher elevations and include juniper, singleleaf pinyon, ponderosa pine, white fir, limber pine, and bristlecone pine.

The NWReGAP and SWReGAP land cover type categories have been grouped into 21 associated vegetation communities which are further grouped into 8 land cover types. The land cover types and associated vegetation communities, and their spatial extent within the analysis area, are listed in **Table 3.5-2**. Descriptions of the plant communities for each land cover and associated vegetation communities are provided in the following text.

Table 3.5-2 Vegetation Cover and Land Use Types within the Analysis Area[1]

Land Cover Types	Vegetative Communities Associated with Land Cover Types	Extent within Analysis Area (acres)
Agriculture	Cultivated Crop and Pasture	788,417
Barren Areas	Barren/Sparsely Vegetated	316,712
	Cliff and Canyon	816,613
	Dunes	117,775
Developed/Disturbed	Developed/Disturbed	990,655
Forest and Woodlands	Aspen Forest and Woodland	682,304
	Conifer Forest	546,369
	Deciduous Forest	14,082
	Pinyon-juniper Woodland	4,123,148
Grasslands	Grassland	1,533,945
	Montane Grassland	72,084
	Tundra	13,956
Greasewood Flat	Greasewood Flat	876,836
Riparian and Wetlands	Open Water	155,477
	Herbaceous Wetland	194,940
	Ephemeral Wash	68,472
	Woody Riparian and Wetlands	209,643
Shrubland	Desert Shrubland	3,073,997
	Saltbush Shrubland	2,893,155
	Sagebrush Shrubland	6,326,232
	Montane Shrubland	893,369
Total		**24,708,181**

[1] The analysis area includes the HUC10 watershed boundaries crossed by the refined transmission corridors and associated facilities.

The agriculture cover type consists of 3 percent of the analysis area and is composed of agricultural lands, including cultivated cropland and pasture. For additional details of agriculture within the analysis area, see Section 3.14, Land Use.

The barren areas cover type is found in 5 percent of the analysis area and encompasses three vegetative communities including barren and sparsely vegetated areas, cliffs and canyons, and active and stabilized dunes. Barren and sparsely vegetated areas within the analysis area typically have less than 10 percent vegetative cover usually consisting of dwarf shrubs. In the analysis area, these areas are composed of shale badlands in Wyoming, Colorado, and Utah; desert pavements and badlands in Nevada; areas composed of volcanic rock in Utah and Nevada; and scree and bedrock areas in the alpine areas of Utah. Cliff and canyon areas are found throughout the analysis area but are most common in Utah and Nevada. The cliff and canyon vegetation community is comprised of barren and sparsely vegetated landscapes such as steep cliff faces, narrow canyons, small rock outcrops, and open tablelands of sandstone, shale, and limestone. The vegetation in cliff and canyon areas is characterized by very open tree canopy or scattered trees and shrubs with a sparse herbaceous layer. Common species can include conifers, montane and desert short-shrub, succulents, and herbaceous species. Dunes are found in Wyoming and Utah on windswept mesas, broad basins, and plains where the substrates are stabilized sandsheets or shallow to moderately deep sandy soils that form small hummocks or small coppice dunes. Typical dune vegetation is short shrubs with 10 to 30 percent cover.

The developed/disturbed cover type covers 4 percent of the analysis area and is found throughout the analysis area. Developed areas include urban and rural development, roads, utility corridors and stations, oil and gas development, mines, quarries, and recently burned and charred areas. The urban areas within the analysis area include several towns and subdivisions. For more information on impacts to developed areas, see Section 3.14, Land Use, and Section 3.17, Social and Economic Conditions.

The forest and woodlands cover type comprises 21 percent of the analysis area and encompasses four vegetation communities including aspen forest and woodland, other deciduous forests, pinyon-juniper woodlands, and other conifer forests. Forest types and dominant tree species in each of these vegetation communities are determined by elevation, slope, aspect, soil characteristics, and climate. Several of the forest types are commercially important as timber. Aspen forest and woodlands are found in montane and subalpine zones in areas with adequate moisture. The vegetation is dominated by stands of quaking aspen (*Populus tremuloides*), even though other tree species may be present. In the analysis area, aspen woodlands are typically found with mixed conifer forests of fir, pines, and Engelmann spruce. In many areas, the conifers are increasing in dominance in the aspen and mixed conifer woodlands due to pressures from livestock grazing and fire suppression (USGS 2005). Other deciduous forests in the analysis area are found in Wyoming and Utah and consist of oaks (*Quercus* spp.), maples (*Acer* spp.), and boxelders (*Acer negundo*). In Wyoming, much of the deciduous woodlands have high vegetative tree canopy cover and establishment of invasive vegetation. Conifer forests are found throughout the analysis area but are most common in Utah's mountainous areas. The dominant conifer forest type in the analysis area is pinyon-juniper woodlands which occupy 16 percent of the analysis area. Pinyon-juniper woodlands are located in Colorado Plateau's lower elevations and the dry mountain ranges of the Great Basin region. Pinyon-juniper woodland communities typically occur in warm, dry areas on mountain slopes, mesas, plateaus, and ridges. Dominant overstory species include singleleaf pinyon (*Pinus monophylla*), two needle pinyon (*Pinus edulis*), and Utah juniper (*Juniperus osteosperma*). Understory vegetation can be sparse shrubs or graminoids with species consisting of greenleaf manzanita (*Arctostaphylos patula*), basin big sagebrush (*Artemisia tridentata* spp. *tridentata*), mountain mahogany (*Cercocarpus* spp.), muttongrass (*Poa fendleriana*), and Idaho fescue (*Festuca idahoensis*). Understory forbs can include penstemons (*Penstemon* spp.) and Scarlet globemallow (*Sphaeralcea coccerea*). Other conifer forests in the analysis area consist of areas dominated by one species such as ponderosa pine (*Pinus ponderosa*) and lodgepole (*Pinus contorta*) or mixed conifer forests such as spruce-fir, limber pine-bristlecone pine, and limber pine-juniper. These forests are found in foothills, montane, and subalpine environments on dry to mesic sites.

The grasslands cover type occupies 7 percent of the analysis area and encompasses three vegetation communities including grasslands, montane grasslands, and tundra. Grassland vegetation communities occupy a wide range of areas within the analysis area including swales, plains, plateaus, and flat to rolling uplands. Grassland compositions vary across the analysis area with mixed grass prairie occurring in Wyoming, juniper savanna in Colorado, and semi-desert grassland in Colorado, Utah, and Nevada. Throughout the analysis area, invasive noxious and non-native species occur in many of the grasslands. Common species that occur in this vegetation community include western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nassella viridula)*, fescue (*Festuca* spp.), Indian ricegrass (*Achnatherum hymenoides*), blue grama *(Bouteloua gracilis*), needle-and-thread (*Hesperostipa comata*), muhly (*Muhlenbergia* spp.), and James' galleta (*Pleuraphis jamesii*). Montane grasslands are found within the analysis area in montane and subalpine areas, predominantly in Utah. Dominant vegetation ranges from graminoids, specifically bunch grasses, to forbs. Dominant graminoid species include oatgrass (*Danthonia* spp.), fescue (*Festuca* spp.), slimstem muhly (*Muhlenbergia filiculmis*), and bluebunch wheatgrass (*Pseudoroegneria spicata*), while forb species include fleabane (*Erigeron* spp.), asters (*Asteraceae* spp.), and penstemons (*Penstemon* spp.). In the analysis area, the tundra vegetation community is found above treeline in mountainous regions in Utah. It typically is found on gentle to moderate slopes, flat ridges, valleys, and basins where the soil is relatively stable and the water supply is fairly constant. Vegetation is low-growing, perennial graminoids and forbs with rhizomatous, sod-forming sedges as the dominant graminoids.

The greasewood flat cover type occupies 4 percent of the analysis area. Greasewood flats are found in all four states crossed by the analysis area. This vegetation community type is defined as a mixed wetland and upland cover type. Based on the categorization used by NWReGAP and SWReGAP, greasewood flats are defined as a woody wetland. More detail about this vegetation community is provided below under Riparian and Wetland Areas.

The riparian and wetland cover type occupies 3 percent of the analysis area and encompasses four vegetation communities including open water, herbaceous wetlands, ephemeral wash, and woody riparian and wetlands. More detail about these vegetation communities are provided below under Riparian and Wetland Areas.

The shrubland cover type is the dominant land cover type within the analysis area, comprising 54 percent of the area. Vegetation communities associated with the shrubland cover type include sagebrush shrubland, montane shrubland, saltbush shrubland, and desert shrubland.

Sagebrush and saltbush shrublands are found predominantly in the northeast of the analysis area, montane shrublands are located in the mountainous regions of central Utah, while desert shrub communities dominate in the southwest portion of the analysis area. In the sagebrush shrubland communities, sagebrush (*Artemisia* spp.) species dominate. The dominant sagebrush species and cover varies with elevation, aspect, water availability, substrate, and disturbance regime. Disturbance regimes also can alter shrub cover with wildland fires decreasing shrub cover, while heavy grazing and fire suppression can increase shrub dominance. Typical sagebrush species in the sagebrush shrubland vegetation community are the Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), mountain big sagebrush (*Artemisia tridentata* ssp*. vaseyana*), threetip sagebrush (*Artemisia tripartita*)*,* black sagebrush (*Artemisia nova*), and little sagebrush (*Artemisia arbuscula*). Other shrubs include shadscale saltbush (*Atriplex confertifolia*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), rubber rabbitbrush (*Ericameria nauseosa*), and fringed sage (*Artemisia frigida)*. Herbaceous species are typically less than 25 percent cover, and can include Idaho fescue (*Festuca idahoensis*), prairie junegrass (*Koeleria macrantha*), bluebunch wheatgrass, Sandberg bluegrass (*Poa secunda),* needle-and-thread (*Hesperostipa comata*), and Great Basin wildrye (*Elymus cinereus* var. *cinereus*).

Montane shrublands are found in the mountains, plateaus, foothills, canyons, and hills in all four states. In Wyoming, the montane shrublands are a minor component of the analysis area and consist of mountain mahogany shrublands on ridges and steep slopes. In Colorado and Utah, the composition of montane shrublands is determined by aspect, climate, and water availability. Dominant species can include gambel oak (*Quercus gambelii*), serviceberry (*Amelanchier* spp.), antelope bitterbrush (*Purshia tridentata*), and mountain mahogany. In the more arid areas in the southwest portions of the analysis area, montane shrublands tend to occur in the transition areas between the Mojave, Sonoran, and northern Chihuahuan deserts where their composition consists of species that are fire-adapted, such as scrub oak (*Quercus* spp.) and ceanothus (*Ceanothus* spp.).

Salt-desert shrublands are found in Wyoming, Colorado, and Utah on lower elevation slopes, saline basins, alluvial slopes, and plains. The vegetation cover is characterized by an open to moderately dense shrubland dominated by shadscale, four-winged saltbush (*Atriplex canescens*), Wyoming big sagebrush, yellow rabbitbrush, rubber rabbitbrush, and Nevada jointfir (*Ephedra nevadensis*). The understory is comprised of herbaceous species such as galleta (*Hilaria jamesii*), Indian ricegrass, blue grama, western wheatgrass, primrose (*Camissonia* spp., *Oenothera* spp.), and annual buckwheat (*Eriogonum* spp.).

The desert shrub vegetation community is the dominant shrubland vegetation community in the southwest portion of the analysis area. It is found on benchlands, pediments, lower piedmont slopes, bajadas, broad valleys, plains and low hills. The dominant vegetation is dependent on the surrounding vegetation communities, region, climate, elevation, and substrate. Desert shrub vegetation communities can be quite variable with the vegetation of the Colorado Plateau region typically dominated by

blackbrush (*Coleogyne ramosissima*) and mormon tea (*Ephedra viridis*); the Mojave and Sonoran deserts are dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). The shrub cover tends to be open, with a sparse herbaceous layer.

3.5.4.2 Noxious and Invasive Weeds

Noxious and invasive weeds have become a growing concern in the western U.S. as their spread has resulted in impacts to endangered native species, available forage for livestock and wildlife, and economic resources. Noxious and invasive species threaten native ecosystems and biological diversity based on their ability to increase in cover relative to surrounding vegetation and exclude native plants from an area. Noxious and invasive species readily establish and spread in recently disturbed areas, which can impede successful reclamation and impact management of livestock, wildlife, and human activities. State regulated and prohibited noxious and invasive weed species in Colorado, Utah, Wyoming, and Nevada are listed in **Appendix G**.

3.5.4.3 Riparian and Wetland Areas

Riparian and wetland areas comprise a small percentage of the lands in the West but their importance to the surrounding ecosystems and associated species is disproportionately great. Most wildlife species use riparian areas at some point in their life cycles (e.g., many migratory birds during breeding and migration seasons and some, such as amphibians, depend almost entirely on these systems. Riparian and wetland areas are often rich in vegetation diversity and structure, providing food, water, shade, and cover to wildlife and livestock, in addition to acting as water purifiers, supplying groundwater recharge, and aiding in flood control.

Riparian and wetland mapping is sparse or unavailable in much of the analysis area. To provide consistent coverage across the entire analysis area, riparian and wetland areas were determined using NWReGAP and SWReGAP land cover type categories. As SWReGAP has not been ground-truthed in the entire coverage area and delineating riparian and wetland areas from satellite imagery can omit narrow (i.e., <100 feet wide) occurrences of this cover type, not all riparian and wetland areas may be captured within the analysis area. Conversely, SWReGAP also may overestimate the coverage of riparian and wetland communities in some areas, especially in the southern portions of the analysis area. Land cover types identified in **Table 3.5-2** were further split out into five riparian and wetland types. The riparian and wetland types and their spatial extent within the analysis area are listed in **Table 3.5-3**.

Table 3.5-3 Riparian and Wetland Types within the Analysis Area

Riparian and Wetland Types	Extent within Analysis Area (acres)
Greasewood Flat	876,836
Herbaceous Wetlands	
Depression Wetlands	26,829
Marshes	41,209
Playas	126,902
Woody Riparian and Wetland Areas	
Montane Riverine	133,772
Riverine	76,590
Open Water	155,477
Ephemeral Wash	67,753
Total	**1,505,368**

Wetlands are found in areas with a connection to a permanent water source such as the groundwater table or surface drainages or where an impermeable soil subhorizon prevents water from draining through the surface profile. Vegetation can consist of herbaceous and woody species that are adapted to saturated soil conditions and are often salt tolerant.

Greasewood flats are found in all four states crossed by the analysis area. This vegetation community type is defined as a mixed wetland and upland land cover type. Based on the categorization used by NWReGAP and SWReGAP, greasewood flats are defined as a woody wetland. Greasewood flats can cover large, flat areas, on broad expanses along lake shores and playas, on older alluvial terraces, on broad or narrow floodplains, or on stream terraces along drainages. Sites typically have saline soils and a shallow water table and flood intermittently, but remain dry for most of the growing season. Despite salt accumulations, the water table remains high enough to maintain vegetation. The water table is typically shallow and the soils are extremely saline. The vegetation cover is open to moderately dense shrublands that are typically halophytes (saline tolerant species) and can consist of both upland and wetland species. Typical species include greasewood species (*Sarcobatus* spp.), winter fat (*Kraschenkovia lanata*), and saltbush species (A*triplex* spp.). Herbaceous species are salt tolerant and include salt grass (*Distichlis spicata*), common spikerush (*Eleocharis palustris*), and alkali sacaton (*Sporobolus airoides*).

Based on the NWReGAP and SWReGAP land cover categories, the herbaceous wetland types in the analysis area are depressional wetlands, marshes, and playas. The depressional wetlands are concave to flat herbaceous wetlands which can include alpine wet meadows, fens, palustrine emergent, and closed and open depressions. Typical wetland species include sedges (*Carex* spp.), rushes (*Juncus* spp.), reedgrass (*Calamagrostis* spp.), spikerush (*Eleocharis* spp.), bulrush (*Scirpus* spp., *Schoenoplectus* spp.), cattails (*Typha* spp.), and canarygrass (*Phalaris* spp.). Playas are barren and sparsely vegetated concave areas that are intermittently flooded. Species around the edges of the playas are typically saline-tolerant such as greasewood (*Sarcobatus vermiculatus*) and saltbush species (*Atriplex* spp.). SWReGAP only identifies playas in the southwestern portion of the analysis area. However, playa type wetlands are common throughout the analysis area.

Woody riparian and wetland areas are found along river, stream, and drainage corridors and with greasewood flats. Within the analysis area, woody riparian and wetland areas are further divided into montane riverine and riverine riparian types. Montane riverine areas are found at higher elevations in Regions I, II, and III. Montane riverine communities are found in areas with natural hydrologic regimes, areas with annual to episodic flooding, flood zones, sand or cobble bars, and streambanks along perennial and seasonally intermittent streams, and around seeps, fens, and isolated springs on hillsides. Communities tend to be mosaics of multiple woodland and shrubland communities. Vegetation is usually a mix of riparian shrub and tree species including cottonwood (*Populus* spp.), willow (*Salix* spp.), dogwood (*Cornus* spp.), birch (*Betula* spp.), alder (*Alnus* spp.), chokecherry (*Prunus virginiana*), and boxelder (*Acer negundo*). In the southern portions of Region III, species composition is similar but also can include Arizona willow (*Juglans major*), mesquite (*Prosopis* spp.), velvet ash (*Fraxinus velutina*), and wingleaf soapberry (*Sapindus saponaria*). Herbaceous species are similar to the ones described for herbaceous wetlands. Exotic trees including Russian olive (*Elaeagnus angustifolia*) and salt cedar (tamarisk [*Tamarix* spp.]) are common in some stands.

Riverine areas are found along streams, rivers, floodplains, and desert valleys where intermittent flooding occurs, overflowing the defined banks of the drainage, or where the groundwater table is high. Vegetation types are variable based on elevation, flooding frequency and duration, stream gradient, floodplain width, climate, substrate, and disturbance regimes (livestock grazing, water diversion structures, or invasive species). Typically, annual or periodic flooding or an annual rise in the water table is required by the riparian species for growth and reproduction. Vegetation is usually a mix of riparian shrub and tree species similar to those identified for montane riverine wetland communities. Typical herbaceous species are similar to the ones described for herbaceous wetlands. The invasive riparian tree species, salt cedar and Russian olive, are often found in these areas.

Open water in the analysis area consists of rivers, streams, lakes, reservoirs, and stock ponds. See Section 3.4, Water Resources, for a discussion of the open water features within the analysis area.

Ephemeral Wash areas include washes and arroyos in desert and semi-desert areas where storm runoff scours vegetation away and deposits sediment on a semi-frequent (e.g., annual) basis. Generally, herbaceous vegetation can be found as sparse to moderately dense cover in these drainage bottoms across the analysis area.

3.5.4.4 USFS MIS Plant Species

The USFS defines MIS for each national forest. A MIS is a plant or animal species selected because its status is believed to: 1) be indicative of the status of a larger group of species; 2) be reflective of the status of a key habitat type; or 3) act as an early warning of an anticipated stressor to ecological integrity. The key characteristics of a MIS is that its status and trends provide insight to the integrity of the larger ecological system to which it belongs.

Wildlife MIS species are discussed in Section 3.7, Wildlife. There is only one identified MIS plant species within the National Forests crossed by the Project.

This one identified MIS plant species is Rydberg milkvetch (*Astragalus perianus*) for the Fishlake National Forest. The perennial species has clustered stems arising from a subterranean caudex. The flowers are sparse and white or lavender tinged. The species flowers and fruits from June to September. It is found in sparsely vegetated areas on shallow soils from 7,200 to 11,500 feet (USFS 2006). It is primarily associated in openings in spruce-fir forests but other common vegetation community associations include mountain big sagebrush, black sagebrush, alpine krummholz, mixed-conifer, and open aspen-fir-mahogany (USFS 2006). Distribution appears to be determined by substrate and elevation. Typical substrates are igneous intrusive gravels, volcanic gravel, or clayey soils. It was listed as a USFWS threatened species in 1978 and delisted in 1989. The species was listed as a USFS Sensitive Species from 1989 to 1994. The Fishlake National Forest included the species as a MIS in their 1986 forest plan when the population of Rydberg milkvetch on the Fishlake National Forest was estimated to be about 4,000. Currently, the plant is known to exist in at least 20 locations with a combined population in excess of 100,000. The species was included as a MIS species based on its previous listing as a USFWS threatened species and its representation of a selected habitat type of igneous intrusive and volcanic gravels between 8,000 and 11,000 feet (USFS 2006). Threats to the species include off-highway vehicle (OHV) use, grazing, mining, and severe erosion (USFS 2006).

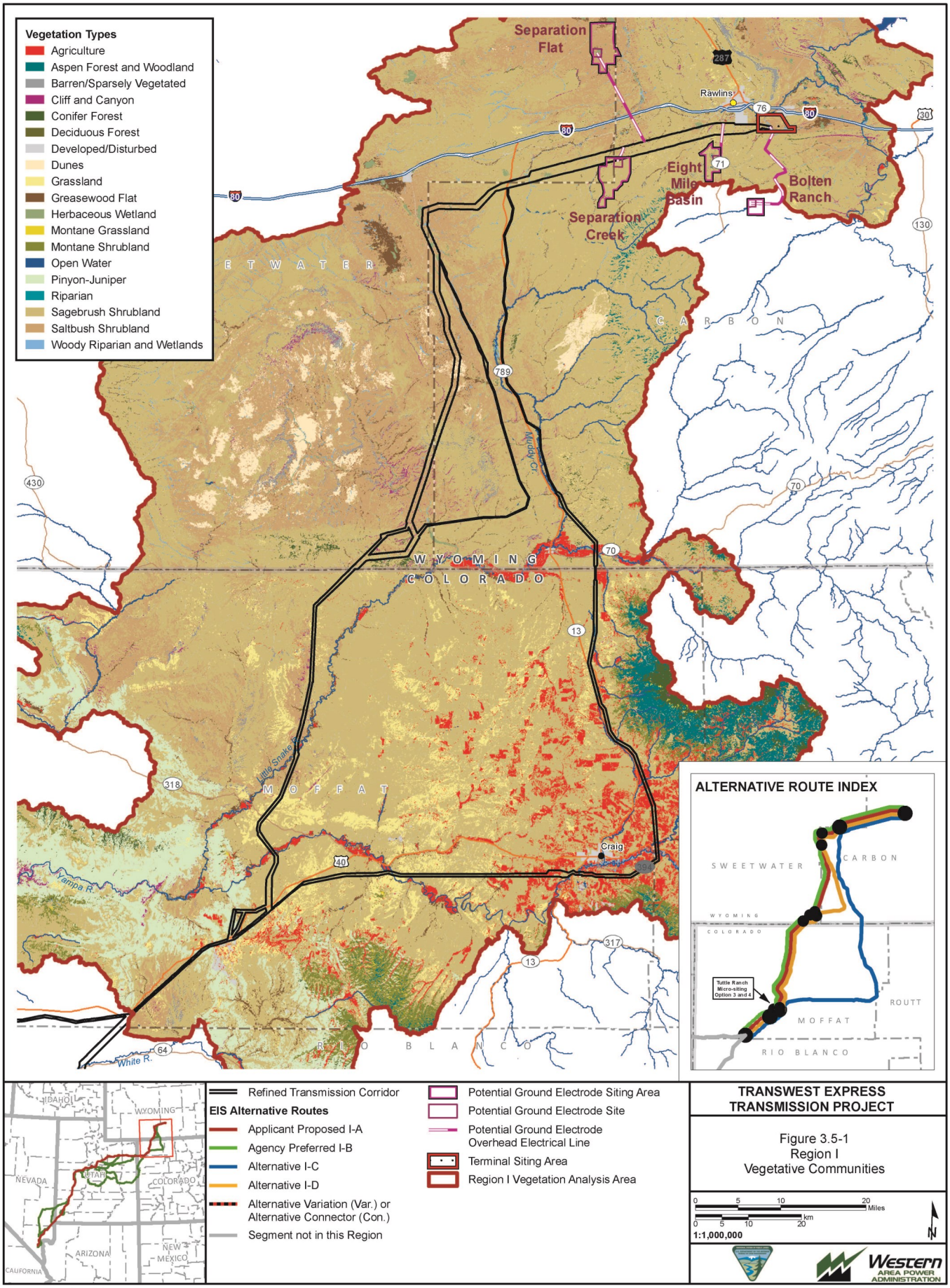
3.5.5 Regional Summary of Vegetation

As described in Section 3.5.4, Baseline Description, a wide variety of land cover and associated vegetation communities is found within the analysis area. Many of these vegetation communities are found over a wide geographic area within the analysis area. Land cover and associated vegetation communities are described in Section 3.5.4, Baseline Description, and are summarized by Project region below.

Table 3.5-4 summarizes the percent of each land cover and associated vegetation community within the analysis area by region. Shrublands are the dominant land cover in each region with sagebrush shrubland and desert shrub the two most common vegetation communities. Vegetation communities found within the analysis area for each Project region are presented in **Figures 3.5-1** through **3.5-4**.

Table 3.5-4 Vegetation Community Types Within the Analysis Area by Region

Cover and Land Use Types	Vegetative Communities Associated with Each Cover Type	Acres and Percent of Vegetation Type Within the Analysis Area by Region[1]							
		I		II		III		IV	
		Acres	%	Acres	%	Acres	%	Acres	%
Agriculture	Agriculture	232,801	5	486,193	4	69,424	1	–	–
Barren/Sparsely Vegetated	Barren/Sparsely Vegetated	33,240	1	221,541	2	29,338	<1	32,592	3
	Cliff and Canyon	29,379	1	566,040	5	164,119	2	57,076	5
	Dunes	69,895	1	32,567	<1	15,313	<1	–	–
Developed/Disturbed	Developed/Disturbed	111,492	2	458,615	4	180,970	2	239,578	21
Forest and Woodland	Aspen Forest and Woodland	94,240	2	580,615	5	7,448	<1	–	–
	Conifer Forest	36,190	1	483,581	4	26,599	<1	–	–
	Deciduous Forest	36	<1	14,021	<1	26	<1	–	–
	Pinyon–juniper Woodland	367,635	7	2,461,193	22	1,292,431	18	1,888	<1
Grassland	Grassland	211,313	4	514,409	5	801,102	11	7,121	1
	Montane Grassland	4,022	<1	66,777	1	1,284	<1	–	–
	Tundra	–	–	13,956	<1	–	–	–	–
Greasewood Flat	Greasewood Flat	92,552	2	510,203	5	274,080	4	–	–
Riparian and Wetland Areas	Open Water	12,519	<1	62,030	1	12,219	<1	68,709	6
	Herbaceous Wetland	27,479	1	85,001	1	81,742	1	719	<1
	Ephemeral Wash	719	<1	–	–	65,177	1	2,576	<1
	Woody Riparian and Wetlands	41,347	1	112,839	1	54,362	1	1,096	<1
Shrubland	Desert Shrub	–	–	125,983	1	2,227,317	30	720,698	63
	Montane Shrubland	128,716	2	577,625	5	187,028	3	–	–
	Sagebrush Shrubland	2,864,128	56	2,268,487	20	1,192,946	16	671	<1
	Saltbush Shrubland	801,059	16	1,454,726	13	635,458	9	1,912	<1
Total		**5,158,761**	**100**	**11,096,401**	**100**	**7,318,383**	**100**	**1,134,637**	**100**


Vegetation Types
Agriculture
Aspen Forest and Woodland
Barren/Sparsely Vegetated
Cliff and Canyon
Conifer Forest
Deciduous Forest
Developed/Disturbed
Dunes
Grassland
Greasewood Flat
Herbaceous Wetland
Montane Grassland
Montane Shrubland
Open Water
Pinyon-Juniper
Riparian
Sagebrush Shrubland
Saltbush Shrubland
Woody Riparian and Wetlands
Separation Flat
Separation Creek
Eight Mile Basin
Bolten Ranch
Rawlins
SWEETWATER
CARBON
WYOMING
COLORADO
MOFFAT
RIO BLANCO
Craig
Little Snake R.
Yampa R.
White R.
Muddy Cr.
ALTERNATIVE ROUTE INDEX
Tuttle Ranch Micro-siting Option 3 and 4
ROUTT
IDAHO
NEVADA
UTAH
ARIZONA
NEW MEXICO
CALIFORNIA
Refined Transmission Corridor
EIS Alternative Routes
Applicant Proposed I-A
Agency Preferred I-B
Alternative I-C
Alternative I-D
Alternative Variation (Var.) or Alternative Connector (Con.)
Segment not in this Region
Potential Ground Electrode Siting Area
Potential Ground Electrode Site
Potential Ground Electrode Overhead Electrical Line
Terminal Siting Area
Region I Vegetation Analysis Area
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 3.5-1
Region I
Vegetative Communities
Miles
km
1:1,000,000
N
Western AREA POWER ADMINISTRATION
Exported On: 1/16/2015
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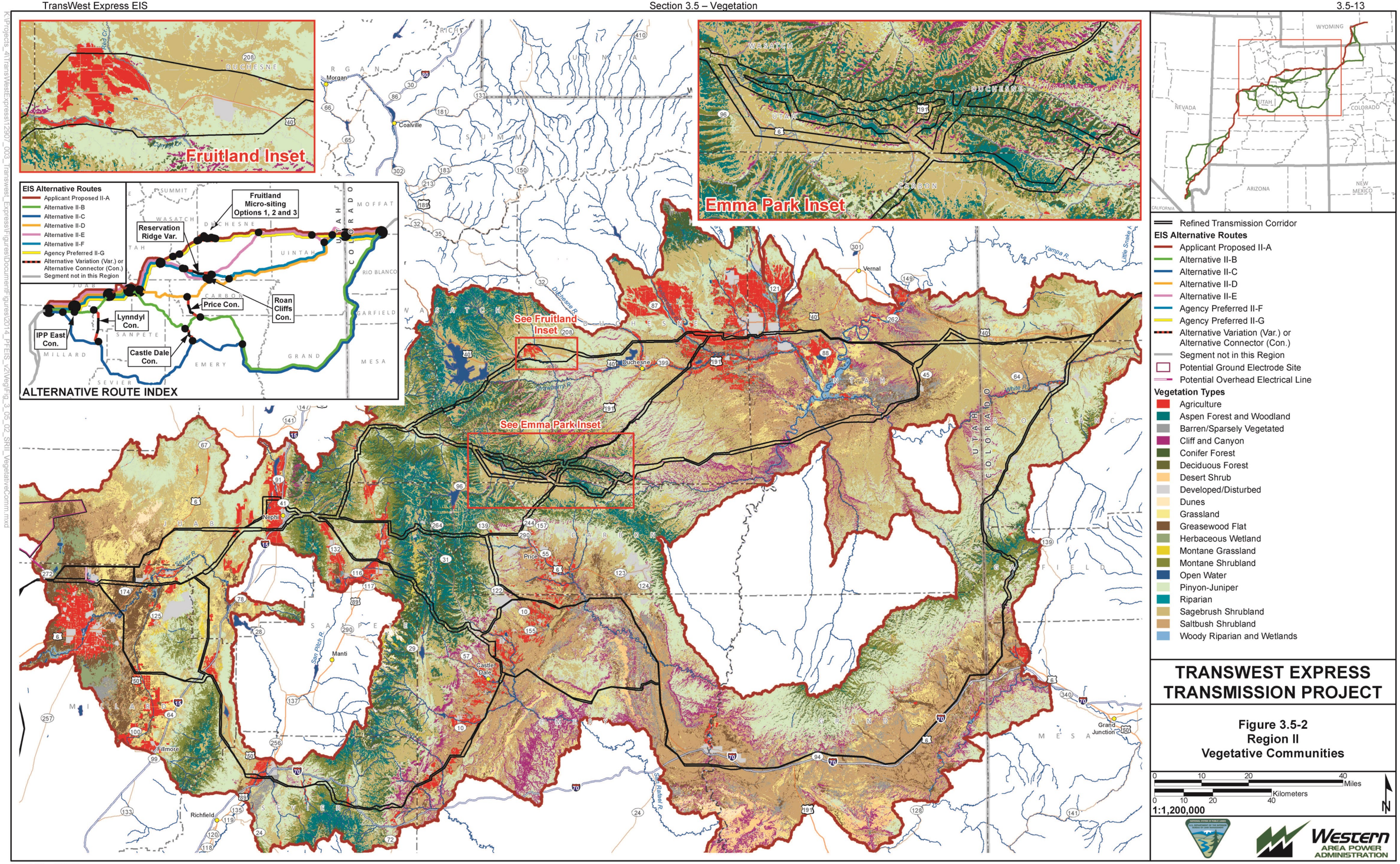

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 3.5-2
Region II
Vegetative Communities

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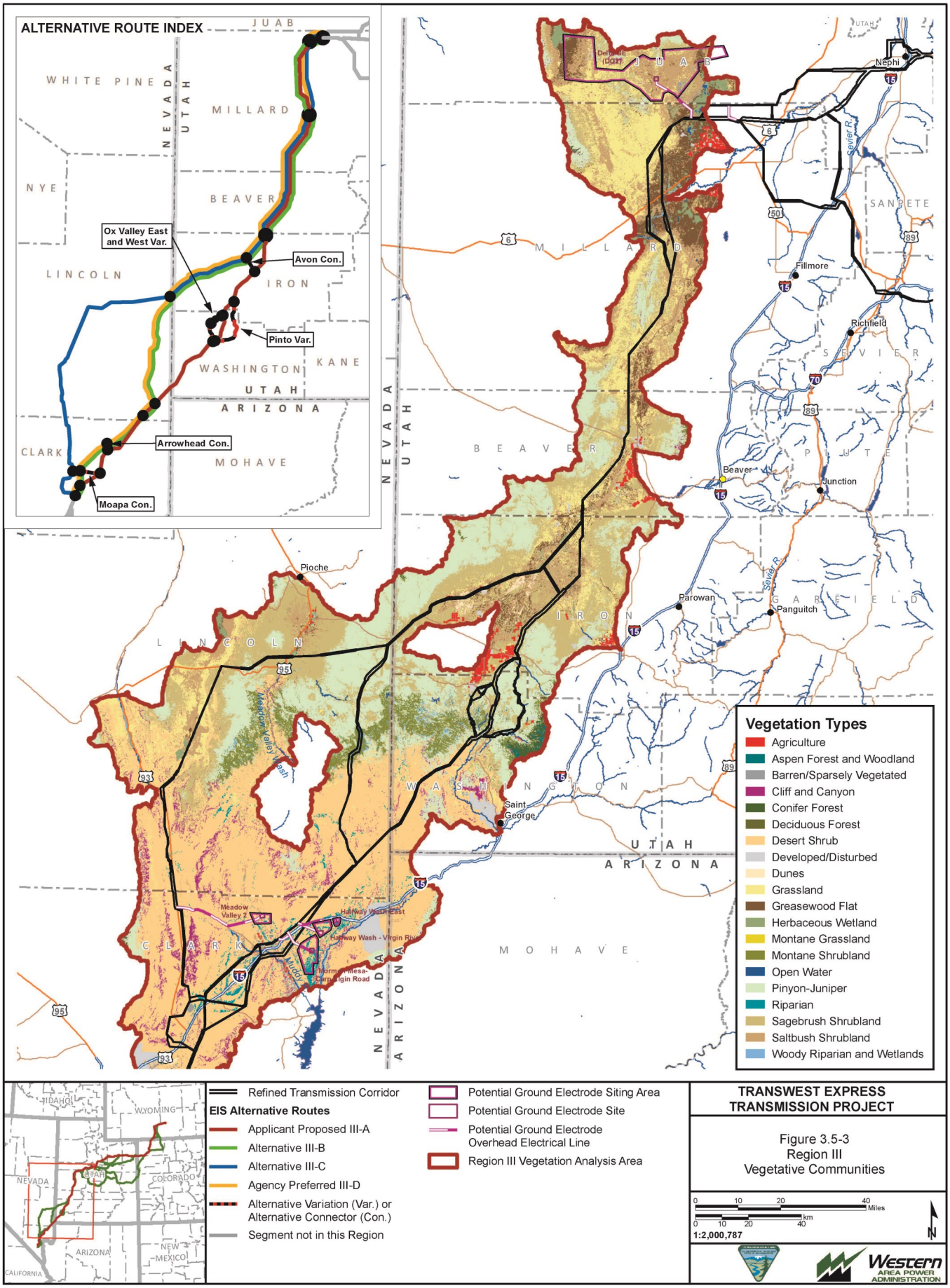
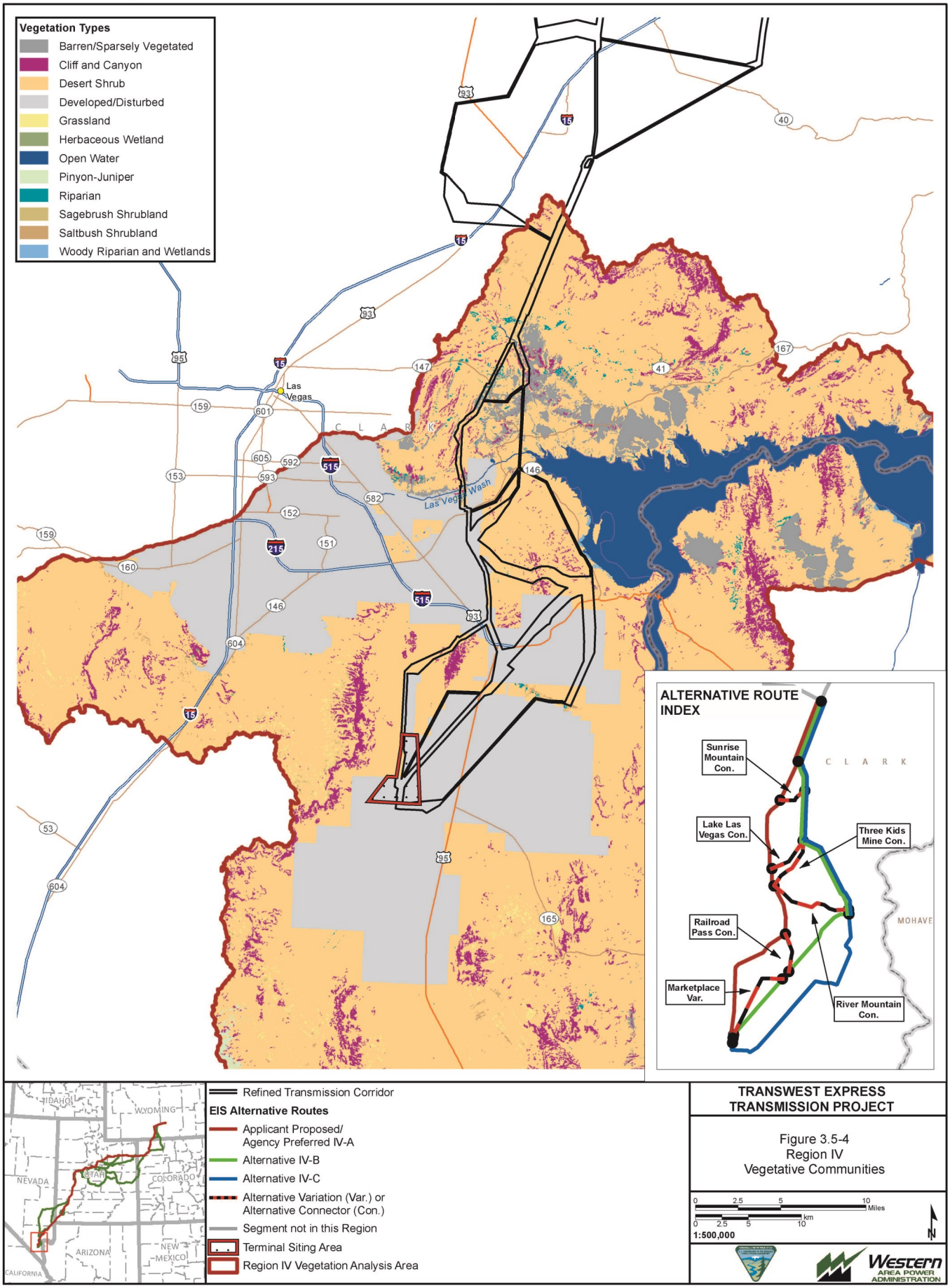

ALTERNATIVE ROUTE INDEX
WHITE PINE
NEVADA
UTAH
MILLARD
NYE
BEAVER
Ox Valley East and West Var.
Avon Con.
LINCOLN
IRON
Pinto Var.
WASHINGTON
KANE
UTAH
ARIZONA
CLARK
Arrowhead Con.
MOHAVE
Moapa Con.
Nephi
Fillmore
Richfield
SANPETE
SEVIER
PIUTE
Beaver
Junction
Parowan
Panguitch
GARFIELD
Pioche
Saint George
Meadow Valley 2
Hatfaway Wash East
Hatfaway Wash - Virgin Riv
Mormon Mesa-Carpenter Road
Vegetation Types
Agriculture
Aspen Forest and Woodland
Barren/Sparsely Vegetated
Cliff and Canyon
Conifer Forest
Deciduous Forest
Desert Shrub
Developed/Disturbed
Dunes
Grassland
Greasewood Flat
Herbaceous Wetland
Montane Grassland
Montane Shrubland
Open Water
Pinyon-Juniper
Riparian
Sagebrush Shrubland
Saltbush Shrubland
Woody Riparian and Wetlands
Refined Transmission Corridor
EIS Alternative Routes
Applicant Proposed III-A
Alternative III-B
Alternative III-C
Agency Preferred III-D
Alternative Variation (Var.) or Alternative Connector (Con.)
Segment not in this Region
Potential Ground Electrode Siting Area
Potential Ground Electrode Site
Potential Ground Electrode Overhead Electrical Line
Region III Vegetation Analysis Area
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 3.5-3
Region III
Vegetative Communities
Miles
km
1:2,000,787
Western AREA POWER ADMINISTRATION
Exported On: 1/28/2015


Vegetation Types
Barren/Sparsely Vegetated
Cliff and Canyon
Desert Shrub
Developed/Disturbed
Grassland
Herbaceous Wetland
Open Water
Pinyon-Juniper
Riparian
Sagebrush Shrubland
Saltbush Shrubland
Woody Riparian and Wetlands
Las Vegas
C L A R K
Las Vegas Wash
ALTERNATIVE ROUTE INDEX
Sunrise Mountain Con.
Lake Las Vegas Con.
Three Kids Mine Con.
Railroad Pass Con.
Marketplace Var.
River Mountain Con.
MOHAVE
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
Refined Transmission Corridor
EIS Alternative Routes
Applicant Proposed/ Agency Preferred IV-A
Alternative IV-B
Alternative IV-C
Alternative Variation (Var.) or Alternative Connector (Con.)
Segment not in this Region
Terminal Siting Area
Region IV Vegetation Analysis Area
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 3.5-4
Region IV
Vegetative Communities
0 2.5 5 10 Miles
0 2.5 5 10 km
1:500,000
N
Western AREA POWER ADMINISTRATION
Exported On: 1/28/2015
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In Region I, the dominant vegetation communities are sagebrush shrubland and saltbush shrubland. In the Colorado portion of Region I at higher elevations, pinyon-juniper woodland becomes more dominant. Overall in Region I, pinyon-juniper woodland accounts for 7 percent of the analysis area. Riparian and wetland areas are predominantly herbaceous wetlands and open water. Open water and associated riparian corridors are found along the Little Snake River and the Yampa River. Agriculture is 5 percent of the analysis area and typically consists of irrigated pasture and haylands. Agriculture lands are found mainly around the valley floors near Baggs, Wyoming. Developed and disturbed lands are 2 percent of the Region I analysis area and consist predominantly of roads, oil and gas development, and urban areas including Rawlins, Wyoming.

Region II is predominantly sagebrush shrubland, saltbush shrubland, and pinyon-juniper woodland vegetation communities. The topography varies greatly in Region II as the area includes high deserts, mountain ranges, valleys, canyons, gorges, mesas, and buttes. In the eastern portion of Region II is the Uinta Basin; while in the southern portion of Region II is the Book Cliffs and San Rafael Swell, a dome-shaped anticline of sandstone, shale, and limestone. In the northern portion of Region II are the Uinta Mountains, while the Wasatch Mountains cross the center of the Region. Pinyon-juniper woodland vegetation communities are dominant in the higher elevation areas, especially in the Wasatch Mountains, Book Cliffs, and the Uinta Mountains. Sagebrush shrubland is dominant in the mid-elevation areas with saltbush shrublands common in the lower elevations and the San Rafael Swell. Riparian and wetland areas are predominantly herbaceous wetlands and open water. Open water and associated riparian corridors are found mainly along the Green River and the White River. Agriculture is 4 percent of the Region II analysis area and is typically irrigated alfalfa, corn, and hay. Developed and disturbed lands are 4 percent of the analysis area and consist of oil and gas development, logged areas, roads, power plants, utility corridors, and urban areas.

Desert shrub, pinyon-juniper woodland, sagebrush shrubland, grassland, and saltbush shrubland are the dominant vegetation communities in Region III. Sagebrush shrubland, pinyon-juniper woodland, grassland, and saltbush shrubland are dominant in the portions of Region III analysis area in Utah while desert shrub is dominant in the Nevada portions of Region III. Wetland areas are a mix of herbaceous wetlands, riparian communities, woody riparian and wetlands, and open water. Agriculture is 1 percent of the Region III analysis area and is limited by available water. Developed and disturbed lands are 2 percent of the analysis area, and consist of military lands, roads, utility corridors, industrial areas, and urban areas.

Region IV is dominated by desert shrub vegetation communities. The other common vegetation communities are cliff and canyon, barren/sparsely vegetated, and open water. Wetland areas are a mix of herbaceous wetlands, riparian communities, woody riparian and wetlands, and open water. There are no agriculture lands in Region IV. Developed and disturbed lands are 21 percent of the analysis area and consist of urban development in the Las Vegas metropolitan area, military lands, transmission line corridors, solar power plants, and electrical substations.

For more detail on land use in each region, see Section 3.14, Land Use. For more detail on surface water, see Section 3.4, Water Resources.

3.5.5.1 Noxious and Invasive Weed Species

As described in Section 3.5.4, Baseline Description, noxious and invasive weed species are an issue for all land management agencies and private landowners throughout the analysis area. **Appendix G** contains a list of regulated noxious weed species by region for each state within the analysis area. Noxious weed occurrence data is not available with enough consistency and geographic range to be presented by region.

On federal lands in the analysis area, dominant noxious and invasive species include grasses in the *Bromus* genus including cheatgrass, halogeton, houndstongue, leafy spurge, Canada thistle, salt cedar, spotted knapweed, rush skeletonweed, Russian knapweed, diffuse knapweed, and hoary cress.

3.5.5.2 Riparian and Wetland Areas

As described in Section 3.5.4, Baseline Description, there are several riparian and wetland types found within the analysis area. While only occurring in a small proportion of the analysis area, the riparian and wetland areas are found over a wide geographic area. Riparian and wetland types are described in Section 3.5.4, Baseline Description, and summarized by region below. See Section 3.7, Wildlife, for discussion of specific wetland communities important to wildlife and bird species.

Table 3.5-5 summarizes the percent of each riparian and wetland type within the analysis area. Most of the riparian and wetland areas cover less than 1 percent of the analysis area, except for greasewood flats and open water. Greasewood flats, which can be a mix of wetlands and uplands, cover 2, 5, and 4 percent of Regions I, II and III, respectively, while open water covers 6 percent of Region IV. Riparian and wetland types found within each Project region are included in **Figures 3.5-1** through **3.5-4**.

Table 3.5-5 Percent of Riparian and Wetland Areas in the Analysis Area by Region

	Acres and Percent of Region by Riparian and Wetland Type							
	I		II		III		IV	
Riparian and Wetland Types	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
Greasewood Flat	92,552	2	510,203	5	274,080	4	–	–
Herbaceous Wetlands								
Depression Wetland	26,829	1	–	–	–	–	–	–
Marsh	641	<1	34,591	<1	5,522	<1	455	<1
Playa	9	<1	50,410	<1	76,220	1	264	<1
Woody Riparian and Wetland Areas								
Montane Riverine	8,323	<1	84,418	1	41,031	1	–	–
Riverine	33,743	1	28,420	<1	13,331	<1	1,096	<1
Open Water	12,519	<1	62,030	1	12,219	<1	68,709	6
Ephemeral Wash	–	–	–	–	65,177	1	2,576	<1

3.5.5.3 USFS MIS Plant Species

Within the analysis area, the Rydberg milkvetch is found in Region II, in the southern part of the USFS Fishlake National Forest. It has been found in five locations in abundant numbers. Potential habitat is found in the analysis area in the USFS Fishlake National Forest based on substrate, elevation, and vegetation parameters. The population historically has been found to be stable and viable across the USFS Fishlake National Forest (USFS 2006).

3.5.6 Impacts to Vegetation Resources

As described in Section 3.5.3, Analysis Area, the analysis area for vegetation resources encompasses the HUC10 watershed boundaries crossed by the refined transmission corridor. For the impacts discussion, the focus is on the impacts resulting from construction and operation activities that could occur within the refined transmission corridor and could extend out approximately within 1 mile of the preliminary engineered alignment. The 250-foot-wide transmission line ROW would be located within the refined transmission corridor. Associated access roads would be located within the ROW and the refined transmission corridor wherever possible. Some temporary construction facilities and temporary and permanent access roads may be located outside of the refined transmission corridor; however, they would be the only disturbing activities that would occur there and they would be confined to within approximately 1 mile from each side of the alignment (see **Figure 2-4**). Exact locations have not been defined at this time; however, conservative estimates of impacts for these facilities and access roads are disclosed by vegetation type. Locations for any other permanent surface facilities located outside of the

1-mile distance from the alignment, including terminals and electrode beds, are identified by component and impacts are disclosed by vegetation type.

The primary issues associated with vegetation resources include direct and/or indirect impacts to native vegetation communities and riparian and wetland habitats, impacts associated with the introduction and/or spread of noxious weeds and invasive species, and changes in fire regime and FRCC.

To evaluate impacts on vegetation resources, potential impacts to vegetation resources were identified based on the locations of these resources in relation to the proposed surface disturbance areas. To determine acres of vegetation disturbed by the Project using GIS, the known locations of proposed surface disturbances have been overlain on the vegetation layer to determine the amount of acreage disturbed for each vegetation type as described in the introduction to Chapter 3.0. For impacts from noxious weeds, areas of higher risk of introduction or spread of noxious weed and invasive species have been identified based on vegetation community type, soil constraints, and climate. To determine impacts to wetland resources, the same methodology, as described above for vegetation resources, has been applied. Construction, operation, and maintenance activities, including vegetation management will be applied as described in the COM Plan, and POD (**Appendix D**). Design features (e.g., environmental protection measures) committed to by the applicant were considered in the impact analysis.

The applicant has committed to the following design features to mitigate impacts to the Project:

- Project Design Features: TWE-9/TWE-10 (restrict travel to pre-designated areas, access, or public roads); TWE-11/TWE-27 (where re-contouring is not required, vegetation will be left in place wherever possible); TWE-12 (no widening or upgrading of existing access roads in areas sensitive to disturbance); TWE-13 (restoration of temporary work areas); TWE-14 (borrow pits); TWE-19 (Erosion Control Plan); TWE-26 (Vegetation Management Plan and Noxious Weed Management Plan); TWE-20 (as part of the CWA 404 Permit, development of a Wetlands and Waters of the U.S. Plan to avoid and minimize impacts to wetlands and waters of the U.S. to the extent practical); TWE-21 (NPDES Permit); TWE-22 to TWE-25 (mitigation for runoff and limits to impacts near waterbodies); TWE-28 (clearing will be minimized to the extent possible); TWE-29 (Biological Protection Plan); and TWE-58 (development of a Pesticide Use Plan).

Additional environmental protection measures that would apply to the Project and factored into the impact analysis include the WWEC performance standards and NSU and Controlled Surface Use (CSU) restrictions, which are listed in **Appendix C**. The NSU and CSU restrictions include restrictions for surface disturbance around wetlands, riparian areas, and drainages. A brief overview of the WWEC performance standards applicable to vegetation resources are listed below:

- WWEC performance standards: VEG-1 (restoration must use weed-free native species); VEG-2 (integrated vegetation management plan development); VEG-3 (pesticide use); SOIL-1 (topsoil salvage); SOIL-2 (slopes); ECO-1/ECO-2/ECO-4/ECO-6 (protection of sensitive and unique habitats); ECO-3/ECO-5 (in consultation with USACE and in accordance with permit requirements, delineate and avoid, minimize or mitigate impacts to wetlands and riparian areas); FIRE-1/FIRE-2 (fire management and fuels buildup strategies); REST-1 (topsoil salvage, seeding with weed-free, native seeds, and restoring pre-development contours); REST-2 (restoring vegetation to values commensurate with the ecological setting); WAT-9 (erosion controls); WAT-7 (development of Stormwater Pollution Prevention Plan [SWPPP]); WAT-10 (minimization of stream crossings), WAT-11 (erosion controls at drainage crossings); and AIR-1/AIR-2 (fugitive dust control).

Each BLM FO and USFS forest has specific surface disturbance avoidance buffers for riparian and wetland areas. Examples of NSU and CSU restrictions that apply to riparian and wetland resources include:

- Rock Springs FO – 500 feet from surface water, perennial streams, riparian areas, and wetlands. Surface disturbing activities will be avoided within 100 feet from the inner forge of ephemeral channels.
- Little Snake FO – NSO stipulations for up to 0.25 mile from perennial water sources, if necessary, depending on type and use of the water source, soil type, and slope steepness.
- Las Vegas FO – Protect artificial and natural waters that provide benefit to wildlife by providing a minimum buffer of 0.25 mile for permitted activities (such as for ORV events).
- Uinta National Forest Planning Area – 300-foot buffer associated with major drainages where volumes of base water flows are at least 10 cfs.

Individual BLM FOs have FO-specific BMPs and USFS forests have forest-specific stipulations and guidelines that will apply to the Project within the boundaries of each FO and forest. Where there is conflict with the WWEC performance standards and individual BLM or USFS FO BMPs, stipulations and guidelines, the requirements of the individual offices will supersede the WWEC performance standards. Example of agency BMPs specific to vegetation resources include:

- Fugitive dust abatement techniques;
- No surface disturbing activities within a specified distance of riparian and wetland areas;
- Erosion control methods; and
- Reclamation standards, including seed mix requirements, noxious weed control, and fencing to limit herbivory.

Impact issues and the analysis considerations for vegetation resources are listed in **Table 3.5-6**. Impact parameters are used in combination with effects information for the purpose of quantifying impacts. The impact parameters also allow comparisons among alternatives or alternative variations. The following impact parameters were used for this analysis:

- Effects of construction activities on the spread and establishment of noxious and invasive weed species; and
- Acres of disturbance based on the extent of construction activities in riparian and wetland areas.

Table 3.5-6 Relevant Analysis Considerations for Vegetation

Resource Topic	Analysis Considerations and Relevant Assumptions
Erosion and Non-native Species Invasion	Areas of recently disturbed bare ground would be more susceptible to erosion and invasion by non-native species.
Reclamation Timeframes	Erosion from disturbed areas would be minimal once vegetation or other surface stabilization is established. Successful establishment of herbaceous vegetation generally takes a minimum of 3 to 5 years, depending on soil and precipitation. Areas with soil limitations, limited precipitation, and large number of invasive and weedy species can take up to 10 years or longer for herbaceous vegetation to establish successfully. In these areas, additional mitigation measures, such as integrated weed control, are often required for successful establishment of native vegetation. Some plant communities may not return to pre-construction conditions due to alteration of soils, noxious weed invasions, and loss of biological soil crust.
Revegetation	Areas with rehabilitation constraints (e.g., highly erodible or droughty soils, low precipitation amounts, etc.) can have little to no reclamation success, unless additional mitigation measures are implemented.
Landscape Fragmentation	Extensive networks of roads and utility corridors can lead to fragmentation of native landscapes, which can decrease species diversity, lead to decreases in the number and populations of native and special status species, and provide corridors for invasion of non-native species.
Vegetative Type Conversion	Proposed surface disturbance activities can result in the conversion of shrub and tree-dominated vegetation communities to grass/forb-dominated vegetation and the conversion of tree-dominated vegetation communities to shrub-dominated vegetation in the short and long term.

3.5.6.1 Impacts from Terminal Construction and Operation

The Northern Terminal would be constructed regardless of alternative route. For the Proposed Action and alternatives corridors, the Southern Terminal would be located in Clark County, Nevada, at either the Southern Terminal or Southern Terminal Alternate location as described below. Under Design Option 2, the Southern Terminal would be located near IPP near Delta, Utah. **Table 3.5-7** identifies estimated acreages of Project-related surface disturbance by vegetation cover type within the Northern, Southern, and Southern Terminal Alternate locations.

Northern Terminal

Construction of the Northern Terminal would result in surface direct disturbance effects to 519 acres of vegetation and consist of the converter station and substation footprint, access roads, concrete batch plant site, temporary work areas, and pulling, tensioning, and splicing sites for the interconnections. The majority of the disturbance associated with the Northern Terminal would occur in the saltbush and sagebrush shrubland vegetation communities. For the Northern Terminal, the herbaceous wetlands are depressional wetlands.

Operation surface disturbance would be approximately 249 acres and would include footprints of the access roads, footprints of the station facilities, and the installation of perimeter fence.

Vegetation would be cleared within the entire operational Northern Terminal location plus an additional buffer of 8 to 10 feet outside the fence. After vegetation clearing, the area would be graded to a level surface as needed and the drainage design would be implemented. A soil sterilizer would be applied to prevent regrowth of vegetation and a 4- to 6-inch layer of crushed rock would be laid down resulting in a loss of vegetation for the footprint of the terminal site. Following completion of Northern Terminal construction, 270 acres of disturbed land would be immediately reclaimed pursuant to TransWest's Final POD. Reclamation would consist of re-grading, mitigating soil compaction, and preparing areas for seeding and revegetating in accordance with land management agency or private landowner requirements.

For the Northern Terminal, Project-related activities would result in the conversion of 270 acres of mixed vegetation types to grass/forb-dominated vegetation in the short term until reclamation is successful. Over the life of the Project, the loss of 249 acres of vegetated land would occur from permanent facilities. Herbaceous wetland and greasewood flat areas would be temporarily impacted by construction activities and permanently impacted by the placement of surface facilities in each of these areas. The conversion and loss of vegetation also would impact the quantity and arrangement of surface fuels, resulting in both temporary and long-term impacts to fire regime condition classifications within the area.

Table 3.5-7 Acreages of Affected Vegetation for the Northern Terminal, Southern Terminal, and Southern Terminal Alternate

	Northern Terminal				Southern Terminal				Southern Terminal Alternate			
	Construction Disturbance		Operation Disturbance		Construction Disturbance		Operation Disturbance		Construction Disturbance		Operation Disturbance	
Vegetation Type	**Acres**	**% of Analysis Area**	**Acres**	**% of Analysis Area**	**Acres**	**% of Analysis Area**	**Acres**	**% of Analysis Area**	**Acres**	**% of Analysis Area**	**Acres**	**% of Analysis Area**
Agriculture	–	–	–	–	–	–	–	–	–	–	–	–
Aspen Forest and Woodland	–	–	–	–	–	–	–	–	–	–	–	–
Barren/Sparsely Vegetated	<1	<1	<1	<1	–	–	–	–	–	–	–	–
Cliff and Canyon	3	<1	2	<1	–	–	–	–	–	–	–	–
Conifer Forest	<1	<1	<1	<1	–	–	–	–	–	–	–	–
Deciduous Forest	–	–	–	–	–	–	–	–	–	–	–	–
Desert Shrub	–	–	–	–	63	<1	25	<1	85	<1	29	<1
Developed/Disturbed	17	<1	8	<1	495	<1	201	<1	670	<1	230	<1
Dunes	<1	<1	<1	<1	–	–	–	–	–	–	–	–
Grassland	1	<1	1	<1	–	–	–	–	–	–	–	–
Greasewood Flat	4	<1	2	<1	–	–	–	–	–	–	–	–
Herbaceous Wetland	7	<1	3	<1	–	–	–	–	–	–	–	–
Montane Grassland	–	–	–	–	–	–	–	–	–	–	–	–
Montane Shrubland	–	–	–	–	–	–	–	–	–	–	–	–
Open Water	<1	<1	<1	<1	–	–	–	–	–	–	–	–
Pinyon–juniper Woodland	–	–	–	–	–	–	–	–	–	–	–	–
Ephemeral Wash	–	–	–	–	–	–	–	–	–	–	–	–
Sagebrush Shrubland	193	<1	92	<1	–	–	–	–	–	–	–	–
Saltbush Shrubland	266	<1	127	<1	–	–	–	–	–	–	–	–
Tundra	–	–	–	–	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	28	<1	14	<1	–	–	–	–	–	–	–	–
Total	**519**	**<1**	**249**	**<1**	**557**	**<1**	**226**	**<1**	**755**	**<1**	**260**	**<1**

Indirect effects associated with construction of the Northern Terminal would include the potential spread and establishment of noxious and invasive weed species, changes in surface fuels due to establishment and growth of annual species, erosion and sedimentation, and fugitive dust generation. Following surface disturbance activities, noxious weeds and invasive species may readily colonize areas that have minimal vegetation cover. It is anticipated that populations of weedy annual species (e.g., halogeton, cheatgrass) may become established in localized areas for extended periods of time.

TransWest has committed to the development of a Wetlands and Waters of the U.S. Plan as part of the CWA 404 Permit, which would include measures to avoid and minimize impacts to wetlands and waters of the U.S. to the extent practical. If wetlands are impacted by the Project, mitigation measures would be developed through the CWA 404 permitting process. At the end of the useful life of the Project, decommissioning would occur, the facilities would be dismantled and removed, and the entire terminal site would be reclaimed.

The following are proposed mitigation measures to minimize impacts to vegetation, wetlands and riparian areas, and noxious weeds.

VG-1*: Native seed mixes to be used for reclamation would be developed in consultation with the land managers for the various regions crossed by the Project. Seed mixes would meet the requirements of the individual agency FOs crossed by the Project. Site-specific seed mixes for soils with LRP would be developed. The LRP seed mixes would be specifically designed for alkaline, saline, or sodic soils and would be used in areas where reclamation would potentially be difficult based on soil conditions. Additional soil amendments may be required in these areas and would be implemented at the direction of the land manager. Reclaimed areas would be monitored annually by the Applicant to ensure successful reclamation is occurring. The length of time for the annual monitoring and the definition of successful reclamation would be determined by the appropriate land management agency. Subsequent actions in areas without successful reclamation would be determined in consultation with the appropriate land management agency.*

WET-1*: Wetland surveys would be conducted at terminals, above the ROW, at ancillary facilities, and along proposed access roads corridors to identify wetlands, waters of the U.S., and riparian areas located in these areas. Survey information collected would include wetland type, type and cover of hydrophytic and riparian vegetation species present, soil characteristics, site hydrology, Global Positioning System (GPS) location of the wetland, and associated information required to determine jurisdictional status. Based on survey results, no surface disturbance including temporary and permanent facilities, the placement of fill material or vegetation clearing for storage, parking, construction activities, or construction work areas as feasible would occur within the avoidance buffer or surface use restriction defined in the resource management plan for each BLM FO and USFS forest. If avoidance is not feasible, USACE, BLM, USFS, and USFWS crossing and construction techniques for wetlands and riparian areas will be employed. The wetland crossing and construction techniques would be approved by the USACE, BLM, USFS, and USFWS and would be outlined in the Final POD.*

WET-2*: For any features identified during field surveys as jurisdictional under the USACE and USEPA guidance under Section 4 of the CWA, consultation with the USACE will occur prior to construction. Mitigation for these features would be determined in consultation with the USACE and BLM.*

NX-1*: The noxious weed management plan to be developed as part of the COM Plan would include the following:*

1. *Pre-construction surveys for noxious weeds in the footprints of the ROW, access roads, and ancillary facilities;*
2. *Pre-construction weed control;*
3. *Education of construction and operation personnel in each Project region;*

4. *Washing of vehicles and equipment before entering and leaving the ROW;*
5. *Herbicide spraying; and*
6. *Annual monitoring and reporting.*

Survey information collected during pre-construction surveys would include species name, GPS location of weed infestations, percent cover, and approximate size of weed infestations. Control of noxious and invasive species could include chemical, physical, and biological methods and would be developed in consultation with the land agencies and private landowners. The plan would identify species of concern for each BLM FO and USFS forest and would focus monitoring and control methods on these species. The plan would comply with the existing BLM, USFS, USFWS, state, and federal regulations concerning noxious weed management. Post construction annual monitoring would be determined with the appropriate land management agencies.

***NX-2**: Herbicide spraying would be conducted following all applicable state and federal laws regarding chemical use, adverse weather, chemical storage, and chemical drift. Further guidelines and protocols for herbicide spraying on BLM land are provided in the Final BLM Vegetation Treatment Using Herbicides Programmatic EIS (BLM Vegetation EIS) (BLM 2007). Standard operating procedures for herbicide spraying include buffers for sensitive areas such as riparian and wetland areas and threatened and endangered species habitat, timing restrictions, and safety protocols. No aerial spraying of herbicides would be permitted within 500 feet of known sensitive species with hand-only application methods allowed.*

***NX-3**: On lands managed by the BLM, an approved Pesticide Use Proposal (PUP) would be obtained from each BLM FO prior to herbicide spraying. PUPs would have site-specific information about the herbicides to be used. The PUPs and associated reporting requirements would be submitted in accordance with the schedule required for each BLM FO. Herbicide spraying in desert tortoise habitat in Nevada would require consultation with the BLM and USFWS.*

Effectiveness: Implementation of mitigation measure **VG-1**, as well as BMPs and design features, would aid in reclamation activities and restoring communities to native ecosystems, especially in areas where reclamation is difficult. Implementation of mitigation measures **WET-1** and **WET-2** would help avoid or minimize direct and indirect impacts to wetlands and riparian areas resulting from construction and operation of the Northern and Southern Terminals. Implementation of **NX-1** would minimize and mitigate impacts associated with the potential introduction or spread of noxious weeds and invasive species and control the methods used to treat noxious and invasive species. WWEC VEG-3 ensures herbicide use to be in compliance with agency policies and be applied in a manner consistent with label directions and state pesticide regulations. **NX-2** and **NX-3** would ensure compliance with BLM standards for herbicide use on BLM lands.

While mitigation measures, BMPs, and design features would increase reclamation success, in areas of temporary disturbance, the loss of woody-dominated vegetation related to construction activities would represent a long-term impact, as it would take up to 10 to 25 years following reclamation for mature shrub species to re-establish and 30 to 50 or more years for re-establishment of mature woodlands. Through the implementation of mitigation measures, direct impacts to wetlands and riparian areas would be avoided and the spread of noxious weeds would be minimized.

<u>Southern Terminal</u>

Construction of the Southern Terminal would result in surface direct disturbance effects to 557 acres of vegetation. **Table 3.5-7** identifies estimated acreages of Project-related surface disturbance by vegetation cover type within the Southern Terminal location. The Southern Terminal is located in only two vegetation community types (desert shrub and developed/disturbed). The majority of the disturbance in the Southern Terminal would occur in the developed/disturbed community type.

Surface disturbance activities, site clearing operation, and decommissioning impacts associated with the Southern Terminal would be identical to those associated with the Northern Terminal. Since the predominant cover type within the Southern Terminal area is developed/disturbed, no direct impacts to vegetation resources are anticipated. As with the Northern Terminal, indirect effects associated with construction of the Southern Terminal include the spread and establishment of noxious and invasive weed species, erosion and sedimentation, and fugitive dust generation.

Conclusion: As the majority of the construction and operations disturbance would occur on already developed/disturbed vegetation cover type, direct impacts to vegetation, wetlands, and fire potential would not be anticipated. Indirect impacts associated with vegetation, wetlands, and noxious weeds would be similar to those discussed for the Northern Terminal. The same design features, BMPs, and mitigation measures listed for the Northern Terminal would be implemented to minimize these impacts.

Southern Terminal Alternate

Construction of the Southern Terminal Alternate location would result in surface direct disturbance effects to 755 acres of vegetation. **Table 3.5-7** identifies estimated acreages of Project-related surface disturbance by vegetation cover type within the Southern Terminal Alternate location. The Southern Terminal Alternate is located in the same siting area as the Southern Terminal. Within the site for the Southern Terminal Alternate are two vegetation community types (desert shrub and developed/ disturbed). The majority of the disturbance for the Southern Terminal Alternate would occur in the developed/disturbed community type.

Surface disturbance activities, site clearing operation, and decommissioning impacts associated with the Southern Terminal Alternate would be identical to those described for the Northern Terminal. Since the predominant cover type within the Southern Terminal Alternate area is developed/disturbed, no direct impacts to vegetation resources are anticipated. Indirect impacts to vegetation, wetlands, and noxious weeds would be similar to those discussed for the Northern Terminal. The same design features, BMPs, and mitigation measures listed for the Northern Terminal would be implemented to minimize these impacts.

Design Options

Design options would utilize the same alternative routes and construction techniques as the proposed Project. Impacts from construction and operation of the design options would be similar to those discussed under the alternative routes.

Design Option 2 – DC from Wyoming to IPP; AC from IPP to Marketplace Hub

Differences between this design option and the proposed Project include the locations of the Southern Terminal near IPP, the southern converter station and the ground electrode system, as well as the addition of a series compensation station midway between IPP and Marketplace. The series compensation station would be located adjacent to the transmission line and impacts are therefore disclosed within the description of the proposed Project routes. The southern converter station would be located near IPP in Utah instead of Marketplace in Nevada and the ground electrode system would be within 50 miles of IPP. **Table 3.5-8** provides a summary of impacts associated with the Southern Terminal near IPP under Design Option 2.

Construction and operation of a converter station near IPP, the ground electrode system, and the series compensation station would result in impacts similar to those described in Section 3.5.6.1, Impacts from Terminal Construction and Operation. The same design features, BMPs, and mitigation measures listed for the Northern Terminal would be implemented to minimize the impacts resulting from Design Option 2. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area.

Table 3.5-8 Summary of Design Option 2 and Design Option 3 Site Impacts to Vegetation

	Design Option 2 Southern Terminal near IPP–Converter/Substation				Design Option 3 Substation near IPP			
	Construction Disturbance		Operation Disturbance		Construction Disturbance		Operation Disturbance	
Vegetation Communities	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area
Agriculture	–	–	–	–	–	–	–	–
Aspen Forest and Woodland	–	–	–	–	–	–	–	–
Barren/Sparsely Vegetated	–	–	–	–	–	–	–	–
Cliff and Canyon	–	–	–	–	–	–	–	–
Conifer Forest	–	–	–	–	–	–	–	–
Deciduous Forest	–	–	–	–	–	–	–	–
Desert Shrub	–	–	–	–	–	–	–	–
Developed/Disturbed	<1	<1	<1	<1	<1	<1	<1	<1
Dunes	–	–	–	–	–	–	–	–
Grassland	6	<1	3	<1	5	<1	3	<1
Greasewood Flat	80	<1	47	<1	71	<1	38	<1
Herbaceous Wetland	1	<1	1	<1	1	<1	1	<1
Montane Grassland	–	–	–	–	–	–	–	–
Montane Shrubland	–	–	–	–	–	–	–	–
Open Water	–	–	–	–	–	–	–	–
Pinyon–juniper Woodland	–	–	–	–	–	–	–	–
Ephemeral Wash	–	–	–	–	–	–	–	–
Sagebrush Shrubland	<1	<1	<1	<1	<1	<1	<1	<1
Saltbush Shrubland	69	<1	41	<1	61	<1	33	<1
Tundra	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	–	–	–	–	–	–	–	–
Total	**156**	**<1**	**93**	**<1**	**138**	**<1**	**75**	**<1**

Design Option 3 – Phased Build Out

Design Option 3 would utilize the same alternative routes, facilities, and construction techniques as the proposed Project; however, construction would occur in phases as described in Chapter 2.0. Differences between this design option and the proposed Project include the construction of an interim substation and connection at IPP and a series compensation station midway between Sinclair, Wyoming and IPP that would operate during Phase I of the design option as described in Chapter 2.0. **Table 3.5-8** provides a summary of impacts associated with the interim substation under Design Option 3.

The total surface disturbance at a given time might be less depending on the timing and reclamation activities associated with the phased build out. Impacts from construction and operation of this design option would be similar to those discussed under the alternative routes below. The series compensation station would be located adjacent to the transmission line and impacts are therefore disclosed within the description of the proposed Project routes below.

Construction and operation of a substation and series compensation station would have similar impacts as those described in Section 3.5.6.1, Impacts from Terminal Construction and Operation and

Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. The same design features, BMPs, and mitigation measures listed for the Northern Terminal would be implemented to minimize the impacts resulting from Design Option 3. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area.

3.5.6.2 Impacts Common to All Alternative Routes and Associated Components

Construction Impacts

Construction-related surface-disturbing activities would occur in the 250-foot-wide transmission line ROW, the refined transmission corridor, and at ancillary facilities. In the ROW, surface-disturbing activities would consist of ROW clearing, installation of transmission line structures and wires, and construction of temporary and long-term facilities related to construction and operations. Surface-disturbing activities related to the construction of temporary and long-term access roads and temporary work areas would occur inside and outside of the refined transmission corridor. Acres of surface disturbance are listed below under each of the Region's impact discussions.

Construction of the transmission line would occur concurrently with construction of terminals and the ground electrode system. Prior to construction, sensitive environmental features to be avoided during construction would be flagged. Direct surface disturbing impacts to vegetation would include the trampling/crushing of vegetation, the removal of vegetation, and soil compaction. Indirect effects to vegetation would include increased erosion, sedimentation, fugitive dust generation, the potential spread and establishment of noxious and invasive weed species, and habitat fragmentation.

Vegetation clearing in the ROW during construction would occur as described in the COM Plan, POD, and associated framework summary of the draft Vegetation Management Plan (POD, **Appendix D**). The development of a Vegetation Management Plan is a requirement of NERC reliability standard FAC-003-02. NERC reliability standard FAC-003-2 is focused on preventing vegetation-related outages from occurring on transmission lines. The vegetation management program was developed in accordance with NERC Reliability Standards.

The vegetation management program is composed of three distinct vegetation management levels to be implemented based on resource concerns and management requirements along the ROW. Level 1 would be applied to the majority of the ROW while Levels 2 and 3, due to their increased cost and maintenance, would only be applied to areas identified as sensitive based on biological, cultural, visual, or other characteristics. The definitions and specific details of the individual management levels are explained in the POD, including outlines of which three vegetation management levels could be applied in various vegetation community types. Vegetation management levels would be applied both during construction and operation activities.

For all three vegetation management levels, vegetation removal techniques would be similar. Trees to be cleared would be cut off at ground level and the stumps left in place for erosion control. Vegetation would be removed using mechanical means or left in place (such as woody debris) as appropriate for the area, except in IRAs. Within IRAs, clearing and maintenance of vegetation would be conducted through the appropriate means and with consultation from the relevant USFS office. Marketable timber removed from the ROW would be purchased from the appropriate land management agency or private landowner. Slash would be removed from the ROW or chipped and spread according to approved land agency practices. Vegetation debris and density would be assessed to determine wildland fire risks and additional mitigation. As access is needed to the ROW during construction activities, the remaining vegetation not removed during clearing would be driven over. This would leave the root stock and topsoil in place in the majority of the ROW.

Level 1 – Standard ROW Vegetation Management

Level 1 would be applied to the entire ROW except for areas identified as highly sensitive and critically sensitive which would require Level 2 or 3 Vegetation Management. For construction clearing and

operation maintenance, woody vegetation over 6 feet in height would be cleared or removed as described above. Vegetation over 6 feet in height predominantly would include trees and larger shrub species found in the following vegetation community types: Aspen Forest and Woodland, Conifer Forest, Deciduous Forest, and Pinyon-juniper Woodland. Low-growing trees, shrubs, and ground vegetation under 6 feet in height would be left in place and driven over if access is required. Danger trees, identified as quick-growing or invasive trees, also would be removed regardless of height. The desired condition from Level 1 vegetation management is low growth plants, composed of herbaceous plants and low growing shrubs (heights ranging from 2 to 6 feet) (see **Appendix D**, POD, Figures 21 and 22).

Level 2 – Selective ROW Wire-Border Zone Vegetation Management

Level 2 would be applied in areas where highly sensitive or constrained resource or agency management issues have been identified. The Wire-Zone/Border-Zone concept would be implemented for Level 2 Vegetation Management (Yahner 2004). The Wire-Zone/Border-Zone technique defines two zones within the ROW, the Wire Zone and the Border Zone. The Wire Zone is defined as the section of the utility ROW that is directly under the wires and extends outward a distance sufficient to accommodate anticipated wire movement (90 feet in width centered on the centerline of the transmission line); the Border Zone starts 45 feet from the centerline and runs to the ROW boundary.

Each zone would have different maximum tree heights. Within the Wire Zone, maximum tree heights and vegetation management would be as described for Level 1 above. Within the Border Zone, the only trees to be removed would be trees identified as danger trees, trees over 25 feet within the center half (between towers) of the Border Zone, and trees over 35 feet in the quarter span (near towers) of the Border Zone. In canyons, or low-lying valleys and depending on growth and density characteristics of individual trees, taller vegetation might be allowed. Additionally, aspens would be cleared during construction. During operation, aspens would be allowed to grow but would be managed to allowable tree heights and densities.

The center half of the Border Zone starts at the edge of the quarter span and runs half the distance of the span width to the start of the next quarter span. The quarter span starts at an individual tower and runs a quarter of the distance to the next tower along the route (see **Appendix D**, POD, Figures 26 and 27). Other vegetation management techniques to be used in Level 2 include selective mechanical or manual tree removal, side pruning, and selective use of herbicide.

Level 3 – Selective ROW Clearance Based Vegetation Management

Level 3 would be applied in areas of the ROW where critical resource or agency management issues associated with vegetation within the Wire Zone have been identified. The only trees to be removed would be trees over the minimum clearance heights and fast growing or invasive species. Minimum clearances are:

- ±600-kV DC – 29 feet (at maximum elevation of 10,000 feet); and
- 500-kV AC – 23 feet (at maximum elevation of 10,000 feet).

Level 3 would be applied in riparian and wetlands crossings except during construction where trees in the center span of the Wire Zone would be removed. Other exceptions to the implementation of Level 3 in riparian and wetland areas would include invasive riparian species, areas where the fuel load is too great, or where conductor clearance cannot be maintained.

For any routes that cross IRAs, special construction and maintenance methods are proposed (see **Appendix D**, Section D.3.8.3). Clearing and maintenance of vegetation would be conducted through the appropriate means and with consultation from the relevant USFS office. The root mat and low growing understory vegetation would be left in place to minimize sediment erosion, and debris that falls in streams would be carefully removed to minimize stream bank damage. Access would be limited to use of

existing roads and/or low impact vehicles for overland travel (i.e., no new road construction). Helicopters or gin-poles may be used for tower erection. Construction in IRAs would occur over a shorter time frame (6 to 9 months).

The depth of wood chips spread over the ROW after vegetation clearing activities could impact vegetation and soil resources in the ROW. Spreading wood chips at a 3-inch depth could increase soil temperature in the winter, moderately increase soil moisture, and substantially decrease soil nitrogen supply and understory vegetation. The increase in soil temperature and soil moisture would have relatively minor ecological effects. However, reductions in the soil nitrogen supply may temporarily reduce productivity of the soil and affect revegetation rates (Binkley et al. 2003). With increasing depth of mulch, these impacts will increase in magnitude and duration.

Driving over remaining vegetation not cleared during construction clearing would result in trampling and/or crushing of the vegetation. Leaving the root stock and topsoil in place would allow the vegetation in the ROW to resprout from the existing seed bank and root stock. The removal of woody vegetation over 6 feet in height could result in changes in vegetation community structure through increases in the amount of light and open areas in the ROW. Depending on the species present and the length of time for the woody species to re-establish in the ROW, woody communities could temporarily or permanently shift to communities dominated by herbaceous and/or low growing shrubs. In addition, increased light and open areas in the ROW could lead to increased noxious and invasive weed species establishment and spread.

Biological soil crusts damaged during construction activities could affect the health and successful restoration of native vegetative communities. See Section 3.3, Soil Resources, for further discussion of impacts related to compaction and topsoil. Wetlands would be avoided to the extent practical.

Indirect impacts from ROW clearing could include increased runoff, erosion, and sedimentation, potential spread and establishment of noxious and invasive species, herbicide drift, changes in the quantity and arrangement of surface fuels, and changes in surface runoff from additional surface disturbance. The amount of vegetation impacted by indirect impacts as a result of Project implementation would vary depending on the type of indirect disturbance. Typically, indirect impacts occur 100 to 300 feet away from the construction disturbance but could affect vegetation communities farther away through increased sedimentation into drainages, affecting communities downstream (USFWS 2013).

Construction activities may increase erosion and sedimentation and may modify the floodplain surface as well as channel beds and banks. These effects may create indirect impacts on nearby riparian vegetation, may directly affect habitat for wildlife and endangered fish, may adversely impact water quality, and may adversely affect wildlife and plant species further downstream. Following surface disturbance activities, noxious weeds and invasive species may readily colonize areas that have minimal vegetation cover. It is anticipated that populations of weedy annual species (e.g., halogeton, cheatgrass) may become established in localized areas for extended periods of time.

Temporary work areas would be located approximately within 1 mile of the alignment and would include staging areas, material storage yards, fly yards, pulling, tensioning, and splicing sites, work areas at each structure site, batch plant sites, and guard structures. The portion of surface disturbance associated with each of these areas varies. Staging areas, fly yards, and batch plant sites would be co-located to the extent possible and located in areas that have been previously disturbed or areas of minimal vegetation to minimize surface disturbance. The vegetation in these areas would be cleared only to the extent necessary. Staging areas and fly yards might be bladed and graveled. Equipment staging and refueling sites would be co-located with other temporary work areas. Wire pulling, tensioning, and splicing sites, as well as structure work areas, would be completely cleared of vegetation during construction. The Applicant would locate wire pulling, tensioning, and splicing sites such that clearing and blading activities would be minimized to the extent practical. The work area to be cleared around

each structure would depend on the type of structure to be installed (e.g., guyed lattice structures, tubular steel pole, or self-supporting lattice structures).

Within the ROW and corridor, temporary and long-term access roads would be required to provide surface access to all structures and work areas. To minimize disturbance, existing access roads would be utilized wherever practical. Existing roads would be improved as necessary. Non-graded overland access (drive-and-crush) would be used where terrain and soil conditions are suitable. Vegetation along existing access roads would be affected (e.g., reduction in growth rate) as a result of dust deposition. No access roads are proposed in IRAs.

Where access to structures or work areas is prohibited by lack of existing roads or where topographic conditions prohibit safe overland access to the site, new access roads would be constructed. To limit surface disturbance from construction of new access roads, the new roads would be located within the ROW where practical, and sited to minimize potential environmental impacts. An access road plan would be developed during engineering and design, which would define site-specific access. Access roads would be constructed on public lands in accordance with American Association of State Highway and Transportation Officials (AASHTO) standards and guidelines and BLM, USFS, and county road requirements. Water crossings to be implemented for access roads are described in the POD (**Appendix D**).

Direct surface disturbance impacts from access road construction would include vegetation trampling/crushing, vegetation removal, grading, and compaction. Indirect impacts from access road construction would include increased erosion, sedimentation, fugitive dust generation, the potential spread and establishment of noxious and invasive weed species, and habitat fragmentation. Outside of the ROW, construction impacts would be limited to the construction of access roads and temporary work areas. The linear construction surface disturbance-related activities can result in increased introduction and/or spread of noxious weeds and invasive species within adjacent areas. In areas where there are already extensive infestations of noxious weeds, noxious weed control during construction, operation, and maintenance activities could be difficult due to the large local seed source.

Linear surface disturbances such as those associated with transmission lines and roads can and have provided pathways for further spread of noxious and invasive species into adjacent undisturbed areas (Gelbard and Belnap 2003; Watkins et al. 2003) and serve as a source of propagules (D'Antonio et al. 2001). Localized surface disturbances can facilitate the invasion of noxious and invasive species by removing native vegetative cover, creating areas of bare ground (Burke and Grime 1996; Watkins et al. 2003), and increasing light and nutrient availability (Stohlgren et al. 2003, 1999). Noxious and invasive weed species compete with native plants, can degrade and modify native communities, and can reduce resources for native species (e.g., moisture, soil nutrients, and light).

Landscape fragmentation would result from the development of the access road network, facilities, and transmission line towers. Landscape fragmentation is defined as the transformation or break-up of large patches of continuous, connected areas into a number of patches of smaller total area which are isolated from each other. Landscape fragmentation, through the construction of access roads, utility corridors, and facilities, breaks up native habitats into smaller units separated by areas of disturbance or different habitat types. Landscape fragmentation can result in loss of habitats, increased edge effects, effects on sensitive species populations, and increased competition from noxious and invasive weed species. Surface disturbance and associated landscape fragmentation increase the potential for noxious weed and invasive species to spread and establish proportionate to the amount of disturbance.

Impacts to vegetation from reclamation would be similar to those described under Section 3.5.6.1, Impacts from Terminal Construction and Operation. In IRAs, areas disturbed in the construction zone would be re-contoured, the topsoil replaced, and revegetated per USFS requirements and the Vegetation Management Plan. Areas disturbed and reclaimed in the IRAs would be monitored for 3 to 5 years (as per USFS requirements), or until determined to be successfully recovered by the appropriate

agency. For all areas disturbed and reclaimed, a general mitigation monitoring plan would be developed that would address how each mitigation measure would be monitored for compliance, as described in Appendix Q of the POD (**Appendix D**, Section Q.5.0). Reclamation of the vegetation communities back to their native diversity and composition would vary across the Project due to various factors such as soil mixing, timing and duration of disturbance, topography, slope, soil moisture, and precipitation. Reclamation standards for the Project would vary by the requirements defined by each land management agency crossed by the Project. In general, reclamation success is defined as re-establishing a self-sustaining, diverse vegetation community composed of species native to the region in sufficient species density and diversity to approximate closely the natural, undisturbed vegetation potential. In herbaceous communities, reclamation is often determined by the establishment of adequate ground cover to prevent erosion and provide forage for wildlife species and grazing operations.

It is estimated that, overall, herb-dominated plant communities would require a minimum of 2 to 5 years to establish adequate ground cover to prevent erosion and provide forage for wildlife species and grazing operations. Woody-dominated plant communities would require at least 10 to 25 years for shrubs to recolonize the area while re-establishment of mature woodlands would require at least 30 to 50 or more years. Depending on the composition and topography of existing woodlands, recovery could take up to 80 to 100 years to achieve mature trees of similar stature to pre-construction conditions. In areas with soil reclamation constraints, low regional annual precipitation rates, and the invasion and spread of noxious and invasive weed species, successful reestablishment of native vegetation may require additional measures, and take a longer timeframe. The success of woodland re-establishment could be impacted by co-located disturbances and adverse environmental conditions including wildland fire, drought, climate change, insects, and disease (Folke et al. 2004; Loehman et al. 2011).

In areas with soil reclamation constraints, low regional annual precipitation rates, and the invasion and spread of noxious and invasive weed species, community recovery is anticipated to be long-term and may not be successful (10 to 100 years depending on the community structure). Some plant communities may not return to pre-construction conditions due to alteration of soil communities, noxious weed invasion, and loss of biological soil crusts. The implementation of additional reclamation techniques such as minimization of surface disturbance, soil amendments, and noxious weed control may be required in these areas to achieve successful reclamation. Areas with soil reclamation constraints are identified in Section 3.3, Soil Resources.

The implementation of BMPs and design features would be the same as described under Section 3.5.6.1, Impacts from Terminal Construction and Operation. Examples of agency BMPs specific to vegetation resources would be the same as described in Section 3.5.6.1, Impacts from Terminal Construction and Operation. The proposed mitigation measures, outlined in Section 3.5.6.1, Impacts from Terminal Construction and Operation, would be implemented to minimize impacts to vegetation, to wetlands and riparian areas, and from noxious weeds. In addition, the following mitigation measures are proposed to minimize impacts to vegetation, wetlands and riparian areas, and from noxious weeds.

VG-3*: A vegetation reclamation and monitoring plan would be developed as part of the COM Plan. The reclamation monitoring plan would define reclamation success for each vegetation type and management agency, list reclamation seed mixes, and detail reclamation monitoring for both interim and final reclamation. Interim and final reclamation success would be monitored quarterly for the first year and then annually for at least 3 years, or until reclamation success, as defined by each land management agency crossed by the Project, is achieved. Reporting of construction, reclamation progress and monitoring results would be submitted to each land management agency per each office's reporting requirements.*

VG-4*: During vegetation clearing, if chipping and spreading woody material in the ROW, wood chips would not exceed 3 inches in depth. Chips would be distributed in discontinuous patches that would not result in a continuous chip mat (less than 40 percent of surface covered by 3 inches of chips).*

***VG-5**: Masticated material spread in the ROW will not exceed a depth of 3 to 6 inches. Material would be distributed in discontinuous patches that would not result in a continuous chip mat (less than 40 percent of surface covered 3 to 6 inches thick).*

***NX-4**: The cut-stumps of mature salt cedar stands that are cut as part of vegetation clearing would be immediately painted with herbicides. The specific control methods and herbicide to be used would be determined in consultation with the appropriate state or federal land-managing agencies. Additional control measures could include the planting of native or desired plant species following treatment to provide erosion control and the use of biocontrols.*

***WET-3**: Access roads would be routed around riparian areas, wetlands, intermittent or perennial drainages and ephemeral channels to the extent practical. If jurisdictional wetlands or waters of the U.S. cannot be avoided, USACE approved construction techniques for construction in wetlands and waters of the U.S. would be applied. BLM and USFS construction techniques for non-jurisdictional wetlands, riparian areas, intermittent drainages, and ephemeral channels would be applied on BLM and USFS lands, as appropriate. These include the use of timber mats, erosion controls, and the placement of equipment outside of the wetland, riparian area, intermittent drainage, and ephemeral channel boundaries.*

Effectiveness: **VG-3** would define the reclamation requirements, seed mixes to be used for reclamation, and reclamation success monitoring to be conducted by the applicant. **VG-4** and **VG-5** would mitigate impacts to soil and vegetation resources from the spreading of chipped and masticated material in the ROW as part of vegetation clearing activities. **NX-4** would improve the control and management of salt cedar stands that are to be cleared as part of the construction and maintenance activities. Implementation of mitigation measures **WET-1** through **WET-3**, in conjunction with design feature TWE-20 (as part of the CWA 404 Permit, development of a Wetlands and Waters of the U.S. Plan to avoid and minimize impacts to wetlands and waters of the U.S. to the extent practical), would mitigate impacts to wetlands and riparian areas through identification and mapping of wetlands, riparian areas, and drainages and the avoidance of surface disturbance in these areas. For access roads, where avoidance of wetland, riparian areas, and drainages is not feasible, mitigation would be applied as directed in **WET-3** to minimize impacts.

Through the implementation of the mitigation measures identified under Section 3.5.6.1, Impacts from Terminal Construction and Operation, impacts to vegetation, wetlands, and noxious weeds would be minimized. The loss of woody-dominated vegetation related to construction activities would represent a long-term impact. Implementation of **WET-2** and **WET-3** would minimize or avoid direct and indirect impacts to wetlands and riparian areas due to construction. Implementation of **NX-1** would minimize and mitigate impacts associated with the potential introduction or spread of noxious weeds and invasive species through the development of the Noxious Weed Management Plan and identification of noxious weed species of concern in the ROW and ancillary facilities during annual monitoring. The Noxious Weed Management Plan would identify control and prevention methodologies and techniques to be implemented during the construction, reclamation, operation, and decommissioning phases of the proposed Project.

Project-related activities would result in the conversion of tree-dominated vegetation communities to shrub- and grass/forb-dominated vegetation in the short and long term. Long-term impacts would include the loss of vegetation from long-term facilities (structure footprints and roads) during the life of the Project; other disturbed areas would be reclaimed immediately following completion of construction.

If wetlands and riparian areas cannot be avoided, potential construction impacts may include, but are not limited to, clearing of all vegetation, topsoil handling during construction and restoration, and potential temporary disturbance of the surface and subsurface hydrology. If drainages cannot be avoided, construction impacts may include erosion and sedimentation of stream channels and the introduction of contaminants into flows and/or existing channel sediments. Cuts-and-fills at streams associated with

access road crossings or other Project features may affect the extent and cross-sectional geometry of drainages. The extent of impacts would depend on presence of water at the time of construction, channel crossing methods, erosion controls during construction, and the subsequent success of reclamation and stabilization. To minimize impacts at stream crossings, TransWest would apply design features TWE-20 to TWE-25. Potential post-construction impacts may include alteration of vegetation composition resulting from the establishment of noxious weeds and invasive plant species.

Operation and Maintenance Impacts

Operation and maintenance impacts include the permanent loss of vegetation due to facility, structure, and access road footprints, maintenance activities in the ROW, and increased use of access roads. Acres of operation-related surface impacts are listed under each of the Region specific impact discussions below.

Vegetation maintenance for the ROW would be defined by the Vegetation Management Plan as described under Construction Impacts. Any direct maintenance activities that occur in the wetlands or riparian areas could impact wetlands and other waters of the U.S. and may require USACE consultation.

In IRAs, maintenance activities would be conducted using aircraft, non-motorized methods, or approved all-terrain vehicles. For emergency repairs, or to maintain NERC electrical line clearance, motorized vehicles potentially would be used. Active vegetation management would occur in the ROW width for the life of the Project.

Noxious weed and invasive species impacts could result from maintenance activities and increased use of access roads. Maintenance activities can aid in the mechanical transport of propagules from outside the ROW. Removal of taller vegetation can create open patches of vegetation and bare ground and facilitate the invasion of noxious and invasive species with increased light and nutrient availability (Burke and Grime 1996; Stohlgren et al. 2003, 1999; Watkins et al. 2003). Mitigation measures and their effectiveness are the same as described for construction activities.

Vegetation management levels would be applied to the ROW and temporary use areas cleared during construction would be successfully reclaimed once construction activities are completed.

Decommissioning Impacts

Decommissioning activities would include the removal of facilities and the reclamation of the ROW, access roads, and ancillary facilities. Impacts would be similar to those discussed for construction activities except that removal of vegetation would not be required as part of decommissioning. The same BMPs, design features, and mitigation measures would be applied to reduce impacts during decommissioning activities.

3.5.6.3 Region I

Impact areas in the regional table are split between ROW clearing/trampling and facilities. Clearing is defined as cutting off vegetation at ground level and leaving the stumps in place for erosion control. Trampling is defined as leaving vegetation in place and driving over the vegetation with construction equipment. Facilities would include access roads, temporary work areas such as staging areas, material storage yards, fly yards, drilling, fencing, and splicing sites, batch plant sites, and guard structures within approximately 1 mile of the alignment. **Table 3.5-9** provides a comparison of impacts associated with the alternative routes in Region I.

Table 3.5-9 Summary of Region I Alternative Route Impacts for Vegetation

Vegetation Communities	Construction Disturbance								Operation Disturbance							
	Alternative I–A		Alternative I–B		Alternative I–C		Alternative–I–D		Alternative I–A		Alternative I–B		Alternative I–C		Alternative I–D	
	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I
ROW Clearing/Trampling[1]																
Agriculture	21	<1	21	<1	522	<1	21	<1	–	–	–	–	–	–	–	–
Aspen Forest and Woodland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Barren/Sparsely Vegetated	12	<1	13	<1	1	<1	6	<1	–	–	–	–	–	–	–	–
Cliff and Canyon	29	<1	32	<1	8	<1	16	<1	–	–	–	–	–	–	–	–
Conifer Forest	2	<1	2	<1	2	<1	1	<1	–	–	–	–	–	–	–	–
Deciduous Forest	<1	<1	<1	<1	–	–	<1	<1	–	–	–	–	–	–	–	–
Desert Shrub	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Developed/Disturbed	63	<1	65	<1	106	<1	87	<1	–	–	–	–	–	–	–	–
Dunes	21	<1	21	<1	<1	<1	1	<1	–	–	–	–	–	–	–	–
Grassland	163	<1	163	<1	268	<1	162	<1	–	–	–	–	–	–	–	–
Greasewood Flat	42	<1	43	<1	47	<1	56	<1	–	–	–	–	–	–	–	–
Herbaceous Wetland	36	<1	36	<1	12	<1	52	<1	–	–	–	–	–	–	–	–
Montane Grassland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Montane Shrubland	–	–	–	–	2	<1	–	–	–	–	–	–	–	–	–	–
Open Water	3	<1	3	<1	5	<1	3	<1	–	–	–	–	–	–	–	–
Pinyon–juniper Woodland	36	<1	36	<1	36	<1	36	<1	–	–	–	–	–	–	–	–
Ephemeral Wash	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Sagebrush Shrubland	1,906	<1	1,962	<1	2,630	<1	2,214	<1	–	–	–	–	–	–	–	–
Saltbush Shrubland	907	<1	883	<1	258	<1	843	<1	–	–	–	–	–	–	–	–
Tundra	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	28	<1	29	<1	29	<1	25	<1	–	–	–	–	–	–	–	–
Total	**3,269**	**<1**	**3,310**	**<1**	**3,925**	**<1**	**3,524**	**<1**								
Facilities[2]																
Agriculture	16	<1	16	<1	324	<1	16	<1	4	<1	4	<1	72	<1	4	<1
Aspen Forest and Woodland	–	–	–	–	<1	<1	–	–	–	–	–	–	<1	<1	–	–

Table 3.5-9 Summary of Region I Alternative Route Impacts for Vegetation

Vegetation Communities	Construction Disturbance								Operation Disturbance							
	Alternative I–A		Alternative I–B		Alternative I–C		Alternative–I–D		Alternative I–A		Alternative I–B		Alternative I–C		Alternative I–D	
	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I
Barren/Sparsely Vegetated	9	<1	9	<1	2	<1	5	<1	2	<1	2	<1	1	<1	1	<1
Cliff and Canyon	18	<1	20	<1	5	<1	10	<1	4	<1	5	<1	1	<1	2	<1
Conifer Forest	1	<1	3	<1	2	<1	2	<1	<1	<1	1	<1	<1	<1	1	<1
Deciduous Forest	<1	<1	<1	<1	–	–	<1	<1	<1	<1	<1	<1	–	–	<1	<1
Desert Shrub	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Developed/Disturbed	43	<1	45	<1	77	<1	56	<1	10	<1	10	<1	19	<1	12	<1
Dunes	14	<1	14	<1	<1	<1	1	<1	3	<1	3	<1	<1	<1	<1	<1
Grassland	115	<1	115	<1	179	<1	115	<1	31	<1	31	<1	43	<1	31	<1
Greasewood Flat	28	<1	29	<1	35	<1	35	<1	6	<1	7	<1	9	<1	8	<1
Herbaceous Wetland	20	<1	20	<1	9	<1	29	<1	4	<1	4	<1	2	<1	5	<1
Montane Grassland	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Montane Shrubland	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1
Open Water	3	<1	3	<1	4	<1	3	<1	1	<1	1	<1	1	<1	1	<1
Pinyon–juniper Woodland	23	<1	23	<1	23	<1	23	<1	6	<1	6	<1	6	<1	6	<1
Ephemeral Wash	–	–	–	–	<1	<1	<1	<1	–	–	–	–	<1	<1	<1	<1
Sagebrush Shrubland	1,182	<1	1,218	<1	1,628	<1	1,376	<1	261	<1	269	<1	354	<1	296	<1
Saltbush Shrubland	584	<1	568	<1	174	<1	527	<1	126	<1	125	<1	41	<1	110	<1
Tundra	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	16	<1	17	<1	21	<1	15	<1	3	<1	3	<1	5	<1	3	<1
Total	**2,072**	**<1**	**2,101**	**<1**	**2,484**	**<1**	**2,212**	**<1**	**461**	**<1**	**471**	**<1**	**554**	**<1**	**480**	**<1**

[1] Within the ROW, vegetation would be cleared or trampled. Vegetation clearing is defined as cutting off vegetation at ground level and leaving the stumps in place for erosion control. Trampling is defined as leaving vegetation in place and driving over the vegetation with construction equipment. The heights of the vegetation to be cleared would be determined by the vegetation management level to be applied.

[2] Facilities would include access roads, temporary work areas such as staging areas, material storage yards, fly yards, pulling, tensioning, and splicing sites, work areas at each structure site, batch plant sites and guard structures within a 1-mile distance of the corridor. Staging areas, fly yards, and batch plant sites would be cleared as necessary. Staging areas and fly yards might be bladed and graveled. Equipment staging and refueling sites would be co-located with other temporary work areas. Wire pulling, tensioning, and splicing sites, and structure work areas would be completely cleared of vegetation during construction.

Note: Discrepancies in totals due to rounding.

The impact analysis discussion below highlights the vegetation and riparian and wetland community types where the majority of the impact would occur, acres of woody vegetation to be cleared by the vegetation management program, and areas of concern for each alternative segment. The proposed mitigation relevant to the specific impacts for each alternative segment is identified.

Alternative I-A (Applicant Proposed)

Key Parameters Summary

In Alternative I-A, the majority of the disturbance would occur in the sagebrush shrubland and saltbush shrubland vegetation community types. The types of construction and operation impacts that would occur under this alternative would be the same as those described in Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. The route would follow US-40 for a considerable portion of the line's length in Colorado. This area historically has been disturbed. Vegetation management could impact 2 acres of conifer forest and 36 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. Vegetation in the remaining portions of the ROW not impacted by facility construction might be trampled or driven over during construction activities.

Implementation of **VG-1** would mitigate impacts to saltbush communities and other areas that may be difficult to reclaim to pre-disturbance native vegetation conditions. The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Implementation of **VG-3** would assist in ensuring post-reclamation success through monitoring and reporting of reclamation results. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area.

Construction of facilities would disturb 28 acres of greasewood flat, 20 acres of herbaceous wetlands and 16 acres of woody riparian and wetlands. Of this, 6 acres of greasewood flat, 4 acres of herbaceous wetland and 3 acres of woody riparian and wetland areas would be impacted by operation. Specific herbaceous riparian and wetland types along Alternative I-A include wet meadows, fens and wetlands associated with topographical depressions. Specific riparian woodlands and wetlands found along Alternative I-A would include riparian woodlands and shrublands in both montane and lower elevation areas. Implementation of **WET-1** through **WET-3** would mitigate impacts to wetland and woody riparian and wetland areas, as described in Section 3.5.6.1 and Section 3.5.6.2.

Alternative I-B (Agency Preferred)

Key Parameters Summary

In Alternative I-B, the majority of the disturbance would occur in the sagebrush shrubland and saltbush shrubland vegetation communities. Vegetation management would impact 2 acres of conifer forest and 36 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. Vegetation in the remaining portions of the ROW not impacted by facility construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 29 acres of greasewood flat, 20 acres of herbaceous wetlands, and 17 acres of woody riparian and wetland areas. Of this, 7 acres of greasewood flat, 4 acres of herbaceous wetland, and 3 acres of woody riparian and wetlands would be impacted by operation. Specific herbaceous riparian and wetland types in Alternative I-B include wetlands associated with topographical depressions. Specific riparian woodlands and wetlands found along Alternative I-B would include riparian woodlands and shrublands in lower elevation areas.

Along Alternative I-B are the Tuttle Ranch Micro-siting Options 3 and 4. For the Tuttle Ranch Micro-sites, the vegetation communities located along Options 3 and 4 are similar to the vegetation communities located along Alternative I-B. The two micro-siting options would affect more pinyon-juniper woodland and less grassland and sagebrush shrubland vegetation communities compared to Alternative I-B.

Impacts to vegetation would be similar between the two micro-siting options and the comparable section of Alternative I-B.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative I-C

Key Parameters Summary

In Alternative I-C, the majority of the disturbance would occur in the sagebrush shrubland vegetation community. Vegetation management would impact 2 acres of conifer forest and 36 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. Vegetation in the remaining portions of the ROW not impacted by facility construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 35 acres of greasewood flat, 9 acres of herbaceous wetlands and 21 acres of woody riparian and wetland areas. Of this, 9 acres of greasewood flat, 2 acres of herbaceous wetland, and 5 acres of woody riparian and wetlands would be impacted by operation. Specific herbaceous wetlands and riparian types along Alternative I-C include wetlands associated with topographical depressions. Specific riparian woodlands and wetlands types found along Alternative I-C include riparian woodlands and shrublands in montane and lower elevation areas.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative I-D

Key Parameters Summary

In Alternative I-D, the majority of the disturbance would occur in the sagebrush shrubland vegetation community. Vegetation management would impact 1 acre of conifer forest and 36 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. Alternative I-D has less impact to agriculture lands and grasslands compared to Alternative I-C. Vegetation in the remaining portions of the ROW not impacted by facility construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 35 acres of greasewood flat, 29 acres of herbaceous wetland and 15 acres of woody riparian and wetland areas. Of this, 8 acres of greasewood flat, 5 acres of herbaceous wetland and 3 acres of woody riparian and wetlands would be impacted by operation. Specific herbaceous wetlands and riparian types along Alternative I-D include wetlands associated with topographical depressions. Specific riparian woodlands and wetlands types found along Alternative I-D include riparian woodlands and shrublands in montane and lower elevation areas.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative Ground Electrode Systems in Region I

The northern ground electrode system would be necessary within 100 miles of the Northern Terminal as discussed in Chapter 2.0. Although the location for this system has not been determined, conceptual locations and connections to the alternative routes have been provided. The impacts associated with constructing and operating this system are discussed in Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. **Table 3.5-10** summarizes impacts associated with the northern ground electrode system. **Table 3.5-11** summarizes impacts associated with the northern ground electrode overhead electrical line. Each of the northern locations might serve multiple alternative routes. Impacts to each vegetative community would comprise less than 1 percent of the total acreage of each vegetative community in the analysis area.

Region I Conclusion

In Region I, the alternative resulting in the most acres of vegetation impacted is Alternative I-C. Alternative I-A would impact the least vegetation acreage. Impacts from vegetation clearing are fairly similar between Alternative I-A and Alternative I-B as both alternatives cross similar vegetation communities with similar acreages. Vegetation management would impact less than 1 percent of each vegetation community for each alternative in the Region I analysis area. Noxious weed impacts would be similar between Alternative I-A and Alternative I-B due to the similarities in vegetation communities crossed and similar climate conditions. Revegetation constraints would be similar between Alternatives I-A and I-B, as would the potential for vegetation type conversion from either shrublands to grasslands or woodlands to shrublands/grasslands.

Impacts to wetland areas would be similar between Alternative I-A and Alternative I-B. Less than 1 percent of wetlands in the analysis area would be impacted by each alternative in Region I.

3.5.6.4 Region II

Table 3.5-12 provides a comparison of impacts associated with the alternative routes in Region II.

Alternative II-A (Applicant Proposed)

Key Parameters Summary

In Alternative II-A, the majority of disturbance would occur in the sagebrush shrubland vegetation community. Alternative II-A would cross in the vicinity of the Little Sahara Sand Dunes RA. Due to the sandy substrate, shifting topography and winds in the area, reclamation would be difficult and most likely would not be successful. See Section 3.3, Soil Resources, for more detail.

Vegetation clearing of woody vegetation along the construction ROW would occur in 162 acres of aspen forest and woodland, 70 acres of conifer forest, 23 acres of deciduous forest and 711 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. The clearing and management of aspens would depend on the vegetation management level applied. Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction activities.

Table 3.5-10 Summary of Region I Alternative Ground Electrode Siting Area Impact Parameters for Vegetation

Vegetation Communities	Bolten Ranch (All Alternatives)				Separation Flat (All Alternatives)				Separation Creek (All Alternatives)				Eight Mile Basin (All Alternatives)			
	Construction Dist (acres)		Operation Dist (acres)		Construction Dist (acres)		Operation Dist (acres)		Construction Dist (acres)		Operation Dist (acres)		Construction Dist (acres)		Operation Dist (acres)	
	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I	Acres	% of Region I
Agriculture	–	–	–	–	—	—	—	—	<1	<1	<1	<1	<1	<1	<1	<1
Aspen Forest and Woodland	–	–	–	–	—	—	—	—	–	–	–	–	<1	<1	<1	<1
Barren/Sparsely Vegetated	<1	<1	<1	<1	—	—	—	—	<1	<1	<1	<1	1	<1	<1	<1
Cliff and Canyon	–	–	–	–	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Conifer Forest	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Deciduous Forest	–	–	–	–	—	—	—	—	–	–	–	–	–	–	–	–
Desert Shrub	–	–	–	–	—	—	—	—	–	–	–	–	–	–	–	–
Developed/Disturbed	1	<1	<1	<1	2	<1	<1	<1	2	<1	<1	<1	3	<1	1	<1
Dunes	<1	<1	<1	<1	—	—	—	—	–	–	–	–	<1	<1	<1	<1
Grassland	–	–	–	–	—	—	—	—	<1	<1	<1	<1	3	<1	1	<1
Greasewood Flat	7	<1	3	<1	3	<1	1	<1	1	<1	<1	<1	1	<1	<1	<1
Herbaceous Wetland	<1	<1	<1	<1	5	<1	1	<1	<1	<1	<1	<1	2	<1	1	<1
Montane Grassland	–	–	–	–	—	—	—	—	–	–	–	–	–	–	–	–
Montane Shrubland	–	–	–	–	—	—	—	—	<1	<1	<1	<1	<1	<1	<1	<1
Open Water	–	–	–	–	—	—	—	—	–	–	–	–	2	<1	<1	<1
Pinyon–juniper Woodland	–	–	–	–	—	—	—	—	–	–	–	–	–	–	–	–
Ephemeral Wash	–	–	–	–	—	—	—	—	–	–	–	–	–	–	–	–
Sagebrush Shrubland	65	<1	22	<1	8	<1	2	<1	71	<1	10	<1	65	<1	13	<1
Saltbush Shrubland	76	<1	26	<1	103	<1	30	<1	1	<1	<1	<1	11	<1	2	<1
Tundra	–	–	–	–	—	—	—	—	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total	**151**	**<1**	**52**	**<1**	**121**	**<1**	**36**	**<1**	**76**	**<1**	**11**	**<1**	**89**	**<1**	**18**	**<1**

Note: Discrepancies in totals due to rounding.

Table 3.5-11 Summary of Region I Alternative Ground Electrode Overhead Electrical Line Impact Parameters for Vegetation (miles)

Vegetation Communities	Bolten Ranch (All Alternatives)	Separation Flat (All Alternatives)	Separation Creek (All Alternatives)	Eight Mile Basin (All Alternatives)
Agriculture	–	–	–	–
Aspen Forest and Woodland	–	–	–	–
Barren/Sparsely Vegetated	–	–	–	–
Cliff and Canyon	–	<1	–	–
Conifer Forest	–	–	–	–
Deciduous Forest	–	–	–	–
Desert Shrub	–	–	–	–
Developed/Disturbed	<1	<1	<1	2
Dunes	–	<1	–	–
Grassland	<1	–	–	<1
Greasewood Flat	–	<1	–	<1
Herbaceous Wetland	–	<1	–	–
Montane Grassland	–	–	–	–
Montane Shrubland	–	–	–	–
Open Water	–	–	–	–
Pinyon–juniper Woodland	–	–	–	–
Ephemeral Wash	–	–	–	–
Sagebrush Shrubland	12	4	1	3
Saltbush Shrubland	2	7	<1	<1
Tundra	–	–	–	–
Woody Riparian and Wetlands	<1	<1	–	–
Total	**15**	**12**	**2**	**5**

Note: Discrepancies in totals due to rounding. Blanks indicate no impact.

Table 3.5-12 Summary of Region II Alternative Route Impacts for Vegetation

	Construction Disturbance														Operation Disturbance													
	Alternative II–A		Alternative II–B		Alternative II–C		Alternative II–D		Alternative II–E		Alternative II–F		Alternative II–G		Alternative II–A		Alternative II–B		Alternative II–C		Alternative II–D		Alternative II–E		Alternative II–F		Alternative II–G	
Vegetation Communities	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**
ROW Clearing/Trampling[1]																												
Agriculture	540	<1	136	<1	282	<1	97	<1	352	<1	87	<1	503	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Aspen Forest and Woodland	162	<1	226	<1	82	<1	306	<1	114	<1	214	<1	156	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Barren/Sparsely Vegetated	15	<1	144	<1	195	<1	32	<1	21	<1	35	<1	16	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Cliff and Canyon	85	<1	134	<1	207	<1	144	<1	113	<1	151	<1	82	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Conifer Forest	70	<1	194	<1	70	<1	208	<1	115	<1	188	<1	66	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Deciduous Forest	23	<1	–	–	–	–	–	–	5	<1	5	<1	22	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Desert Shrub	–	–	8	<1	31	<1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Developed/Disturbed	311	<1	319	<1	246	<1	198	<1	328	<1	187	<1	301	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Dunes	<1	<1	2	<1	5	<1	<1	<1	<1	<1	<1	<1	0	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Grassland	374	<1	310	<1	424	<1	436	<1	361	<1	433	<1	325	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Greasewood Flat	245	<1	697	<1	610	<1	283	<1	277	<1	276	<1	243	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Herbaceous Wetland	20	<1	14	<1	10	<1	22	<1	43	<1	16	<1	19	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Montane Grassland	13	<1	25	<1	3	<1	54	<1	29	<1	51	<1	11	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Montane Shrubland	321	<1	317	<1	465	<1	326	<1	370	<1	405	<1	325	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Open Water	3	<1	28	<1	29	<1	3	<1	3	<1	3	<1	4	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Pinyon–juniper Woodland	711	<1	1,516	<1	1,695	<1	852	<1	966	<1	971	<1	807	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Ephemeral Wash	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Sagebrush Shrubland	2,032	<1	1,672	<1	1,773	<1	1,607	<1	1,927	<1	1,677	<1	1,893	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Saltbush Shrubland	425	<1	1,396	<1	1,487	<1	599	<1	472	<1	599	<1	423	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Tundra	–	–	9	<1	–	–	<1	<1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Woody Riparian and Wetlands	53	<1	46	<1	50	<1	18	<1	43	<1	25	<1	53	<1	–	–	–	–	–	–	–	–	–	–	–	–	-	-
Total	**5,406**	**<1**	**7,192**	**<1**	**7,662**	**<1**	**5,185**	**<1**	**5,538**	**<1**	**5,323**	**<1**	**5,249**	<1	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**-**	**-**
Facilities[2]																												
Agriculture	361	<1	119	<1	181	<1	84	<1	258	<1	72	<1	319	<1	75	<1	40	<1	45	<1	29	<1	61	<1	25	<1	60	<1
Aspen Forest and Woodland	123	<1	186	<1	52	<1	269	<1	89	<1	219	<1	121	<1	45	<1	52	<1	13	<1	83	<1	26	<1	73	<1	45	<1
Barren/Sparsely Vegetated	14	<1	108	<1	145	<1	32	<1	18	<1	34	<1	15	<1	5	<1	27	<1	36	<1	10	<1	5	<1	11	<1	5	<1
Cliff and Canyon	66	<1	92	<1	142	<1	117	<1	85	<1	128	<1	65	<1	21	<1	22	<1	34	<1	32	<1	21	<1	37	<1	21	<1
Conifer Forest	53	<1	160	<1	43	<1	165	<1	83	<1	192	<1	52	<1	19	<1	45	<1	10	<1	46	<1	19	<1	67	<1	19	<1
Deciduous Forest	17	<1	<1	–	<1	–	<1	–	4	<1	4	<1	16	<1	6	<1	<1	–	<1	–	<1	–	1	<1	1	<1	6	<1
Desert Shrub	–	–	7	<1	21	<1	–	–	–	–	–	–	–	–	–	–	2	<1	4	<1	–	–	–	–	–	–	–	–
Developed/Disturbed	221	<1	253	<1	186	<1	162	<1	236	<1	154	<1	217	<1	54	<1	69	<1	48	<1	46	<1	60	<1	48	<1	54	<1
Dunes	<1	<1	2	<1	3	<1	<1	<1	<1	<1	<1	<1	0	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	–	0	<1
Grassland	244	<1	191	<1	279	<1	290	<1	240	<1	290	<1	214	<1	51	<1	41	<1	61	<1	66	<1	54	<1	68	<1	48	<1
Greasewood Flat	148	<1	412	<1	408	<1	189	<1	175	<1	182	<1	147	<1	31	<1	79	<1	90	<1	45	<1	37	<1	44	<1	31	<1
Herbaceous Wetland	15	<1	9	<1	7	<1	17	<1	29	<1	11	<1	14	<1	4	<1	2	<1	2	<1	4	<1	6	<1	2	<1	3	<1
Montane Grassland	10	<1	23	<1	2	<1	39	<1	19	<1	37	<1	8	<1	3	<1	7	<1	<1	<1	10	<1	4	<1	10	<1	3	<1
Montane Shrubland	271	<1	236	<1	266	<1	297	<1	324	<1	374	<1	282	<1	100	<1	68	<1	57	<1	101	<1	122	<1	139	<1	106	<1
Open Water	5	<1	16	<1	18	<1	3	<1	5	<1	4	<1	5	<1	1	<1	3	<1	4	<1	1	<1	1	<1	1	<1	1	<1
Pinyon–juniper Woodland	546	<1	1,006	<1	1,038	<1	679	<1	731	<1	749	<1	621	<1	159	<1	262	<1	237	<1	194	<1	213	<1	230	<1	187	<1
Ephemeral Wash	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Sagebrush Shrubland	1,334	<1	1,044	<1	1,034	<1	1,170	<1	1,316	<1	1,261	<1	1,279	<1	348	<1	251	<1	228	<1	303	<1	338	<1	352	<1	337	<1

Table 3.5-12 Summary of Region II Alternative Route Impacts for Vegetation

	Construction Disturbance														Operation Disturbance													
	Alternative II–A		Alternative II–B		Alternative II–C		Alternative II–D		Alternative II–E		Alternative II–F		Alternative II–G		Alternative II–A		Alternative II–B		Alternative II–C		Alternative II–D		Alternative II–E		Alternative II–F		Alternative II–G	
Vegetation Communities	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**	**Acres**	**% of Region II**
Saltbush Shrubland	289	<1	974	<1	1,123	<1	445	<1	330	<1	444	<1	288	<1	76	<1	230	<1	284	<1	113	<1	78	<1	113	<1	76	<1
Tundra	–	–	8	<1	–	–	<1	<1	–	–	–	–	–	–	–	–	2	<1	–	–	<1	–	–	–	–	–	–	–
Woody Riparian and Wetlands	41	<1	30	<1	33	<1	14	<1	34	<1	21	<1	41	<1	12	<1	7	<1	8	<1	4	<1	10	<1	7	<1	13	<1
Total	**3,759**	**<1**	**4,874**	**<1**	**4,980**	**<1**	**3,971**	**<1**	**3,976**	**<1**	**4,227**	**<1**	**3,704**	<1	**1,011**	**<1**	**1,210**	**<1**	**1,163**	**<1**	**1,089**	**<1**	**1,057**	**<1**	**1,226**	**<1**	**1,015**	<1

[1] Within the ROW, vegetation would be cleared or trampled. Vegetation clearing is defined as cutting off vegetation at ground level and leaving the stumps in place for erosion control. Trampling is defined as leaving vegetation in the ROW and driving over the vegetation with construction equipment. The height of the vegetation to be cleared would be determined by the vegetation management level to be applied.

[2] Facilities would include access roads, temporary work areas such as staging areas, material storage yards, fly yards, pulling, tensioning, and splicing sites, work areas at each structure site, batch plant sites and guard structures within a 1-mile distance of the corridor. Staging areas, fly yards and batch plant sites would be cleared as necessary. Staging areas and fly yards might be bladed and graveled. Equipment staging and refueling sites would be co-located with other temporary work areas. Wire pulling, tensioning, and splicing sites and structure work areas would be completely cleared of vegetation during construction.

Note: Discrepancies in totals due to rounding.

Construction of facilities would disturb 148 acres of greasewood flat, 15 acres of herbaceous wetland and 41 acres of woody riparian and wetlands. Of this, 31 acres of greasewood flat, 4 acres of herbaceous wetland and 12 acres of woody riparian and wetlands would be impacted by operation impacts. Specific herbaceous riparian and wetland types along Alternative II-A would include playas and wet meadows. Specific riparian woodlands and wetlands found along Alternative II-A would include riparian woodlands and shrublands in both montane and lower elevation areas.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Along Alternative II-A are five micro-siting options –Fruitland Micro-siting Option 1, Fruitland Micro-siting Option 2, Fruitland Micro-siting Option 3, Strawberry IRA Option 2, and Strawberry IRA Option 3. The vegetation communities located along the Fruitland Micro-siting Options are similar to the vegetation communities located along Alternative II-A. Agriculture and sagebrush shrubland clearing impacts along the Fruitland Micro-siting Option 3 would be slightly less than the other Fruitland options. Clearing impacts to pinyon-juniper woodland would be lowest under Fruitland Micro-siting Option 2, and construction impacts to pinyon-juniper woodland would be higher with Fruitland Micro-siting Option 3. For the Strawberry IRA micro-siting options, the vegetation communities located along Options 2 and 3 are similar to the vegetation communities located along Alternative II-A.

Alternative II-B

Key Parameters Summary

In Alternative II-B, the majority of the disturbance would occur in the sagebrush shrubland and pinyon-juniper woodland vegetation community types. Vegetation clearing of woody vegetation along the construction ROW would occur in 226 acres of aspen forest and woodland, 194 acres of conifer forest and 1,516 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. The clearing and management of aspens would depend on the vegetation management level applied. Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 412 acres of greasewood flat, 9 acres of herbaceous wetlands and 30 acres of woody riparian and wetlands. Of this, 79 acres of greasewood flat, 2 acres of herbaceous wetland and 7 acres of woody riparian and wetlands would be impacted by operation. Specific herbaceous wetland and riparian types along Alternative II-B would include playas, emergent marshes and wet meadows. Specific riparian woodlands and wetlands found along Alternative II-B would include riparian woodlands and shrublands in both montane and lower elevation areas.

The USFS MIS plant species, Rydberg milkvetch, is listed for the USFS Fishlake National Forest, which is crossed by Alternative II-B. Based on the elevation requirements for the species, there is no habitat for this species along this alternative within the USFS Fishlake National Forest.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the

analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative II-C

Key Parameters Summary

In Alternative II-C, the majority of the disturbance would occur in the sagebrush shrubland and pinyon-juniper woodland vegetation community types. Vegetation clearing of woody vegetation along the construction ROW would occur in 82 acres of aspen forest and woodland, 70 acres of conifer forest and 1,695 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. The clearing and management of aspens would depend on the vegetation management level applied. Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 408 acres of greasewood flat, 7 acres of herbaceous wetlands, and 33 acres of woody riparian and wetlands. Of this, 90 acres of greasewood flat, 2 acres of herbaceous wetlands, and 8 acres of woody riparian and wetlands would be impacted by operation. Specific herbaceous wetland and riparian types along Alternative II-C include playas, emergent marshes, and wet meadows. Specific riparian woodlands and wetlands found along Alternative II-C would include riparian woodlands and shrublands in both montane and lower elevation areas.

The USFS MIS plant species, Rydberg milkvetch, is listed for the USFS Fishlake National Forest, which is crossed by Alternative II-C. While there are no known occurrences along Alternative II-C in Sevier County, Utah, where the route crosses the USFS Fishlake National Forest, potential habitat would be possible based on substrate, elevation, and vegetation parameters. Direct impacts would include the loss of potential habitat while indirect impacts could include the spread and establishment of noxious and invasive weed species and increased access in the vicinity of known populations.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative II-D

Key Parameters Summary

In Alternative II-D, the majority of the disturbance would occur in the sagebrush shrubland vegetation community type. Alternative II-D would cross in the vicinity of the Little Sahara Sand Dunes RA. Due to the sandy substrate, shifting topography and winds in the area, reclamation would be difficult and most likely would not be successful. See Section 3.3, Soil Resources, for more detail. Vegetation clearing of woody vegetation along the construction ROW would occur in 306 acres of aspen forest and woodland, 208 acres of conifer forest and 852 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. The clearing and management of aspens would depend on the vegetation management level applied. Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 189 acres of greasewood flat, 17 acres of herbaceous wetland, and 14 acres of woody riparian and wetlands. Of this, 45 acres of greasewood flat, 4 acres of herbaceous wetland, and 4 acres of woody riparian and wetlands would be impacted by operation.

Specific herbaceous wetland and riparian types along Alternative II-D would include playas, emergent marshes, and wet meadows. Specific riparian woodlands and wetlands found along Alternative II-D would include riparian woodlands and shrublands in both montane and lower elevation areas.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative II-E

Key Parameters Summary

In Alternative II-E, the majority of the disturbance would occur in the sagebrush shrubland and pinyon-juniper woodland vegetation community types. Alternative II-E would cross in the vicinity of the Little Sahara Sand Dunes RA. Due to the sandy substrate, shifting topography, and winds in the area, reclamation would be difficult and most likely would not be successful. See Section 3.3, Soil Resources, for more detail. Vegetation clearing of woody vegetation along the construction ROW would occur in 114 acres of aspen forest and woodland, 115 acres of conifer forest, 5 acres of deciduous forest, and 966 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. The clearing and management of aspens would depend on the vegetation management level applied. Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction.

Construction of facilities would disturb 175 acres of greasewood flat, 29 acres of herbaceous wetland, and 34 acres of woody riparian and wetlands. Of this, 37 acres of greasewood flat, 6 acres of herbaceous wetland, and 10 acres of woody riparian and wetlands would be impacted by operation. Specific herbaceous wetland and riparian types along Alternative II-E include playas, emergent marshes, and wet meadows. Specific riparian woodlands and wetlands found along Alternative II-E include riparian woodlands and shrublands in both montane and lower elevation areas.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative II-F

Key Parameters Summary

In Alternative II-F, the majority of the disturbance for this alternative would occur in the sagebrush shrubland and pinyon-juniper woodland vegetation community types. Alternative II-F would cross in the vicinity of the Little Sahara Sand Dunes RA. Due to the sandy substrate, shifting topography and winds in the area, reclamation would be difficult and most likely would not be successful. See Section 3.3, Soil Resources, for more detail. Vegetation clearing of woody vegetation along the construction ROW would occur in 214 acres of aspen forest and woodland, 188 acres of conifer forest, 5 acres of deciduous forest and 971 acres of pinyon-juniper woodland. The vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction.

Construction of facilities would disturb 182 acres of greasewood flat, 11 acres of herbaceous wetland, and 21 acres of woody riparian and wetlands. Of this, 44 acres of greasewood flat, 2 acres of herbaceous wetlands, and 7 acres of woody riparian and wetlands would be impacted by operation. Specific herbaceous wetland and riparian types along Alternative II-F would include playas, emergent marshes, and wet meadows. Specific riparian woodlands and wetlands found along Alternative II-F include riparian woodlands and shrublands in both montane and lower elevation areas.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative II-G (Agency Preferred)

Key Parameters Summary

In Alternative II-G, the majority of disturbance would occur in the sagebrush shrubland vegetation community. Alternative II-G would cross in the vicinity of the Little Sahara Sand Dunes RA. Due to the sandy substrate, shifting topography, and winds in the area, reclamation would be difficult and most likely would not be successful. See Section 3.3, Soil Resources, for more detail.

Vegetation clearing of woody vegetation along the construction ROW would occur in 156 acres of aspen forest and woodland, 66 acres of conifer forest, 22 acres of deciduous forest, and 807 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. The clearing and management of aspens would depend on the vegetation management level applied. Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 147 acres of greasewood flat, 14 acres of herbaceous wetland, and 41 acres of woody riparian and wetlands. Of this, 31 acres of greasewood flat, 3 acres of herbaceous wetland, and 13 acres of woody riparian and wetlands would be impacted by operation impacts. Specific herbaceous riparian and wetland types along Alternative II-G would include playas and wet meadows. Specific riparian woodlands and wetlands found along Alternative II-G would include riparian woodlands and shrublands in both montane and lower elevation areas.

The types of construction and operation impacts to vegetation under Alternative II-G would be the same as those described in Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

The same micro-siting options discussed under Alternative II-A also apply to this alternative, with similar comparisons between the micro-siting options and the comparable portion of Alternative II-G.

Alternative Variation in Region II

Reservation Ridge Alternative Variation

The Reservation Ridge Alternative Variation would impact similar vegetation community types compared to those of Alternative II-F. **Table 3.5-13** summarizes impacts associated with the Reservation Ridge Alternative Variation and the comparable portion of Alternative II-F. The Reservation Ridge Alternative Variation would decrease the total area affected by ROW trampling and clearing from 362 to 334 acres. The area of conifer forest impacted would increase while the acreage of aspen forest and woodland and pinyon-juniper woodland impacted would decrease compared to Alternative II-F. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Table 3.5-13 Summary of Region II Alternative Variation Impacts for Vegetation (acres)

	Reservation Ridge Alternative Variation						Alternative II–F Comparable					
	ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance	
Vegetation Communities	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II
Agriculture	–	–	–	–	–	–	–	–	–	–	–	–
Aspen Forest and Woodland	75	<1	93	<1	30	<1	90	<1	102	<1	32	<1
Barren/ Sparsely Vegetated	–	–	–	–	–	–	–	–	–	–	–	–
Cliff and Canyon	2	<1	3	<1	1	<1	14	<1	19	<1	6	<1
Conifer Forest	92	<1	120	<1	42	<1	42	<1	55	<1	18	<1
Deciduous Forest	<1	<1	<1	<1	<1	<1	–	–	–	–	–	–
Desert Shrub	–	–	–	–	–	–	–	–	–	–	–	–
Developed/ Disturbed	9	<1	10	<1	3	<1	7	<1	8	<1	2	<1
Dunes	–	–	–	–	–	–	–	–	–	–	–	–
Grassland	–	–	–	–	–	–	<1	<1	<1	<1	<1	<1
Greasewood Flat	–	–	–	–	–	–	–	–	–	–	–	–
Herbaceous Wetland	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1
Montane Grassland	4	<1	5	<1	2	<1	3	<1	5	<1	2	<1
Montane Shrubland	28	<1	34	<1	11	<1	48	<1	58	<1	19	<1
Open Water	–	–	–	–	–	–	–	–	<1	<1	<1	<1
Pinyon–juniper Woodland	3	<1	4	<1	1	<1	17	<1	21	<1	7	<1
Ephemeral Wash	–	–	–	–	–	–	–	–	–	–	–	–
Sagebrush Shrubland	122	<1	154	<1	51	<1	139	<1	174	<1	57	<1
Saltbush Shrubland	–	–	–	–	–	–	<1	<1	1	<1	<1	<1
Tundra	–	–	–	–	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total	**334**	**<1**	**423**	**<1**	**142**	**<1**	**362**	**<1**	**444**	**<1**	**143**	**<1**

[1] Within the ROW, vegetation would be cleared or trampled. Vegetation clearing is defined as cutting vegetation off at ground level and leaving the stumps in place for erosion control. Trampling is defined as leaving vegetation in the ROW and driving over the vegetation with construction equipment. The height of the vegetation to be cleared would be determined by the vegetation management level to be applied.

Note: Discrepancies in totals due to rounding.

Alternative Connectors in Region II

Each of the Region II alternative connectors would result in small disturbance acreage increases in the various vegetation community types crossed. Vegetation clearing would occur in aspen forest and woodlands, conifer forest and pinyon-juniper woodland if some of these alternative connectors were used. **Table 3.5-14** summarizes impacts and advantages associated with the alternative connectors in Region II. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area.

Region II Series Compensation Stations (Design Option 3)

If Design Option 3 were implemented, a series compensation station would be necessary along the alternative routes of Region II during the first-phase (AC operation). There are three potential sites, each corresponding to specific alternative routes. Upon completion of Phase 2 of Design Option 2 and when there would be no utility for the station, it would be deconstructed and reclaimed to the original condition. These series compensation station alternatives are depicted in **Figure 2-3**.

Series Compensation Station 1 – Design Option 3 corresponds to Alternatives II-A and II-E. The approximate potential construction impacts to vegetation communities would include 23 acres of developed/disturbed. The approximate potential operation impacts to vegetation communities would include 15 acres of developed/disturbed.

Series Compensation Station 2 – Design Option 3 corresponds to Alternatives II-B and II-C. The approximate potential construction impacts to vegetation communities would include: 10 acres of greasewood flat, 10 acres of saltbush shrubland, and 1 acre of grassland. The approximate potential operation impacts to vegetation communities would include 7 acres of greasewood flat, 7 acres of saltbush shrubland, and less than 1 acre of grassland.

Series Compensation Station 3 – Design Option 3 corresponds to Alternatives II-D and II-F. The approximate potential construction impacts to vegetation communities would include 10 acres of sagebrush shrubland, 9 acres of saltbush shrubland, 2 acres of grassland, and 2 acres of greasewood flat. The approximate potential operation impacts to vegetation communities would include: 7 acres of sagebrush shrubland, 6 acres of saltbush shrubland, 1 acre of grassland, and 1 acre of greasewood flat.

Region II Conclusion

In Region II, Alternative II-C would result in the most acres of vegetation impacted, both through clearing and construction. Alternative II-D would impact the least amount of vegetation through clearing, while Alternative II-G would affect the least amount of vegetation through construction. Alternative II-G would impact vegetation only slightly less than Alternative II-A (**Table 3.5-12**). Both routes would cross the Uinta Basin and the Wasatch Mountains and follow relatively the same route but diverge around the Town of Nephi. Vegetation clearing and construction would impact more pinyon-juniper woodland and sagebrush shrubland communities under Alternative II-G, whereas there would be a greater impact to agriculture, aspen and grassland communities under Alternative II-A. The rest of the vegetation communities would undergo similar clearing and construction-related impacts for each alternative. Operation impacts would be similar between Alternatives II-A and II-G due to similarities in vegetation communities crossed and similar climate conditions. Impacts to vegetation communities under both Alternative II-A and Alternative II-G would comprise less than 1 percent of the analysis area in Region II.

For all routes, reclamation in the Uinta Basin would be difficult due to soil reclamation constraints, low regional annual precipitation rates, and the invasion and spread of noxious and invasive weed species, specifically halogeton. Additionally, reclamation in the San Rafael Swell area, specifically along Alternatives II-B and II-C, would be difficult due to soil reclamation constraints, and low regional annual precipitation rates. Construction and operation impacts would be similar between Alternative II-F and Alternative II-A due to the similarities in vegetation communities crossed and similar climate conditions.

Table 3.5-14 Summary of Region II Alternative Connector Impacts for Vegetation (acres)

Vegetation Communities	Roan Cliffs Alternative Connector						Castle Dale Alternative Connector						Price Alternative Connector						Lynndyl Alternative Connector						IPP East Alternative Connector					
	ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance	
	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II	Acres	% of Region II
Agriculture	–	–	–	–	–	–	32	<1	22	<1	4	<1	–	–	<1	<1	<1	<1	<1	32	4	<1	1	<1	–	–	–	–	–	–
Aspen Forest and Woodland	<1	<1	<1	<1	<1	<1	–	–	–	–	–	–	–	–	<1	<1	<1	<1	–	–	–	–	–	–	–	–	–	–	–	–
Barren/ Sparsely Vegetated	–	–	–	–	–	–	5	<1	3	<1	1	<1	2	<1	2	<1	<1	<1	–	5	–	–	–	–	–	–	–	–	–	–
Cliff and Canyon	3	<1	3	<1	1	<1	10	<1	7	<1	1	<1	8	<1	8	<1	3	<1	–	10	<1	<1	<1	<1	–	–	–	–	–	–
Conifer Forest	–	–	<1	<1	<1	<1	–	–	–	–	–	–	–	–	1	<1	<1	<1	–	–	–	–	–	–	–	–	–	–	–	–
Deciduous Forest	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Desert Shrub	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Developed/ Disturbed	1	<1	1	<1	<1	<1	21	<1	14	<1	3	<1	43	<1	27	<1	6	<1	15	21	9	<1	2	<1	11	<1	9	<1	1	<1
Dunes	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grassland	–	–	–	–	–	–	3	<1	2	<1	<1	<1	1	<1	1	<1	<1	<1	115	3	70	<1	15	<1	7	<1	6	<1	1	<1
Greasewood Flat	–	–	–	–	–	–	9	<1	6	<1	1	<1	2	<1	2	<1	1	<1	1	9	1	<1	<1	<1	24	<1	18	<1	3	<1
Herbaceous Wetland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Montane Grassland	<1	<1	<1	<1	<1	<1	–	–	–	–	–	–	–	–	<1	<1	<1	<1	15	–	13	<1	3	<1	–	–	–	–	–	–
Montane Shrubland	<1	<1	<1	<1	<1	<1	–	–	–	–	–	–	3	<1	3	<1	1	<1	<1	–	<1	<1	<1	<1	–	–	–	–	–	–
Open Water	–	–	–	–	–	–	<1	<1	<1	<1	<1	<1	–	–	<1	<1	<1	<1	–	<1	<1	<1	<1	<1	–	–	–	–	–	–
Pinyon–juniper Woodland	8	<1	9	<1	3	<1	9	<1	7	<1	1	<1	153	<1	105	<1	26	<1	69	9	44	<1	10	<1	–	–	<1	<1	<1	<1
Ephemeral Wash	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Sagebrush Shrubland	16	<1	20	<1	8	<1	22	<1	15	<1	3	<1	151	<1	101	<1	24	<1	286	22	163	<1	35	<1	–	–	<1	<1	<1	<1
Saltbush Shrubland	<1	<1	<1	<1	<1	<1	104	<1	71	<1	14	<1	10	<1	12	<1	4	<1	2	104	2	<1	<1	<1	26	<1	20	<1	3	<1
Tundra	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	–	–	–	–	–	–	3	<1	2	<1	<1	<1	2	<1	1	<1	<1	<1	–	3	<1	<1	<1	<1	–	–	–	–	–	–
Total	**29**	**<1**	**33**	**<1**	**13**	**<1**	**219**	**<1**	**150**	**<1**	**30**	**<1**	**376**	**<1**	**263**	**<1**	**66**	**<1**	**503**	**219**	**306**	**<1**	**68**	**<1**	**68**	**<1**	**53**	**<1**	**9**	**<1**

[1] Within the ROW, vegetation would be cleared or trampled. Vegetation clearing is defined as cutting off vegetation at ground level and leaving the stumps in place for erosion control. Trampling is defined as leaving vegetation in the ROW and driving over the vegetation with construction equipment. The height of the vegetation to be cleared would be determined by the vegetation management level to be applied.

Note: Discrepancies in totals due to rounding.

3.5.6.5 Region III

Table 3.5-15 provides a comparison of impacts associated with the alternative routes in Region III.

Alternative III-A (Applicant Proposed)

Key Parameters Summary

In Alternative III-A, the majority of the disturbance would occur in the desert shrub, grassland, sagebrush shrubland and saltbush shrubland vegetation community types. Vegetation clearing of woody vegetation along the construction ROW would occur in 281 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 241 acres of greasewood flats, 68 acres of herbaceous wetland, 46 acres of ephemeral wash and 14 acres of woody riparian and wetlands. Of this, 40 acres of greasewood flats, 10 acres of herbaceous wetland, 13 acres of ephemeral wash and 4 acres of woody riparian and wetlands would be impacted by operation. Specific herbaceous wetlands and riparian types along Alternative III-A include wetlands associated with topographical depressions. Specific riparian woodlands and wetlands found along Alternative III-A would include riparian woodlands and shrublands in both montane and lower elevation areas.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative III-B

Key Parameters Summary

In Alternative III-B, the majority of the disturbance would occur in desert shrub, grassland, sagebrush shrubland and saltbush shrubland vegetation community types. Vegetation clearing of woody vegetation along the construction ROW would occur in 383 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. The clearing and management of aspens would depend on the vegetation management level applied. Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 258 acres of greasewood flat, 69 acres of herbaceous wetland, 52 acres of ephemeral wash and 31acres of woody riparian and wetlands. Of this, 46 acres of greasewood flat, 11 acres of herbaceous wetland, 9 acres of ephemeral wash and 6 acres of woody riparian and wetlands would be impacted by operation. Specific herbaceous wetland and riparian types along Alternative III-B include wetlands associated with topographical depressions. Specific riparian woodlands and wetlands found along Alternative III-B would include riparian woodlands and shrublands in lower elevation areas.

Table 3.5-15 Summary of Region III Alternative Route Impacts for Vegetation

	Construction Disturbance								Operation Disturbance							
	Alternative III–A		Alternative III–B		Alternative III–C		Alternative III-D		Alternative III–A		Alternative III–B		Alternative III–C		Alternative III-D	
Vegetation Communities	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III
ROW Clearing/Trampling[1]																
Agriculture	5	<1	7	<1	4	<1	7	<1	–	–	–	–	–	–	–	–
Aspen Forest and Woodland	–	–	–	–	–	–	-	-	–	–	–	–	–	–	–	–
Barren/Sparsely Vegetated	28	<1	9	<1	1	<1	9	<1	–	–	–	–	–	–	–	–
Cliff and Canyon	38	<1	6	<1	29	<1	4	<1	–	–	–	–	–	–	–	–
Conifer Forest	–	–	–	–	–	–	-	-	–	–	–	–	–	–	–	–
Deciduous Forest	–	–	<1	<1	<1	<1	0	-	–	–	–	–	–	–	–	–
Desert Shrub	1,960	<1	1,457	<1	1,971	<1	1,457	<1	–	–	–	–	–	–	–	–
Developed/Disturbed	132	<1	99	<1	115	<1	113	<1	–	–	–	–	–	–	–	–
Dunes	–	–	40	<1	40	<1	40	<1	–	–	–	–	–	–	–	–
Grassland	945	<1	1,015	<1	1,006	<1	914	<1	–	–	–	–	–	–	–	–
Greasewood Flat	456	<1	473	<1	601	<1	593	<1	–	–	–	–	–	–	–	–
Herbaceous Wetland	130	<1	125	<1	127	<1	95	<1	–	–	–	–	–	–	–	–
Montane Grassland	1	<1	1	<1	1	<1	1	<1	–	–	–	–	–	–	–	–
Montane Shrubland	20	<1	273	<1	<1	<1	273	<1	–	–	–	–	–	–	–	–
Open Water	3	<1	3	<1	3	<1	3	<1	–	–	–	–	–	–	–	–
Pinyon–juniper Woodland	281	<1	383	<1	382	<1	383	<1	–	–	–	–	–	–	–	–
Ephemeral Wash	70	<1	85	<1	21	<1	85	<1	–	–	–	–		–	–	–
Sagebrush Shrubland	931	<1	1,124	<1	1,352	<1	1,085	<1	–	–	–	–	–	–	–	–
Saltbush Shrubland	958	<1	939	<1	1,068	<1	975	<1	–	–	–	–	–	–	–	–
Tundra	–	–	–	–	–	–	-	-	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	23	<1	55	<1	6	<1	53	<1	–	–	–	–	–	–	–	–
Total	**5,981**	**<1**	**6,092**	**<1**	**6,727**	**<1**	**6,090**	<1	**–**	**–**	**–**	**–**	**–**	**–**	–	–

Table 3.5-15 Summary of Region III Alternative Route Impacts for Vegetation

	Construction Disturbance								Operation Disturbance							
	Alternative III–A		Alternative III–B		Alternative III–C		Alternative III-D		Alternative III–A		Alternative III–B		Alternative III–C		Alternative III-D	
Vegetation Communities	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III
Facilities[2]																
Agriculture	4	<1	6	<1	3	<1	6	<1	1	<1	1	<1	1	<1	1	<1
Aspen Forest and Woodland	–	–	–	–	–	–	-		–	–	–	–	–	–	-	
Barren/Sparsely Vegetated	16	<1	7	<1	2	<1	7	<1	4	<1	2	1	<1	<1	2	<1
Cliff and Canyon	24	<1	7	<1	24	<1	6	<1	7	<1	2	<1	6	<1	2	<1
Conifer Forest	–	–	–	–	–	–	-		–	–	–	–	–	–	-	
Deciduous Forest	<1	<1	<1	<1	<1	<1	0		<1	<1	<1	–	<1	<1	0	
Desert Shrub	1,219	<1	872	<1	1,101	<1	872	<1	323	<1	166	<1	224	<1	166	<1
Developed/Disturbed	74	<1	60	<1	64	<1	64	<1	13	<1	11	<1	11	<1	11	<1
Dunes	–	–	23	<1	23	<1	23	<1	–	–	5	<1	5	<1	5	<1
Grassland	531	<1	574	<1	558	<1	492	<1	100	<1	110	<1	105	<1	87	<1
Greasewood Flat	241	<1	258	<1	313	<1	307	<1	40	<1	46	<1	49	<1	48	<1
Herbaceous Wetland	68	<1	69	<1	79	<1	56	<1	10	<1	11	<1	15	<1	9	<1
Montane Grassland	1	<1	1	<1	1	<1	1	<1	<1	<1	<1	<1	<1	<1	0	<1
Montane Shrubland	17	<1	163	<1	<1	–	163	<1	4	<1	37	<1	<1	<1	37	<1
Open Water	2	<1	2	<1	1	<1	1	<1	1	<1	<1	<1	<1	<1	0	<1
Pinyon–juniper Woodland	223	<1	261	<1	216	<1	261	<1	56	<1	64	<1	48	<1	64	<1
Ephemeral Wash	46	<1	52	<1	11	<1	52	<1	13	<1	9	<1	2	<1	9	<1
Sagebrush Shrubland	606	<1	655	<1	803	<1	637	<1	132	<1	130	<1	169	<1	127	<1
Saltbush Shrubland	504	<1	518	<1	593	<1	520	<1	84	<1	96	<1	112	<1	91	<1
Tundra	–	–	–	–	–	–			–	–	–	–	–	–	-	<1
Woody Riparian and Wetlands	14	<1	31	<1	5	<1	31	<1	4	<1	6	<1	1	<1	7	<1
Total	**3,588**	**<1**	**3,559**	**<1**	**3,797**	**<1**	**3,499**	<1	**791**	**<1**	**697**	**<1**	**749**	**<1**	**666**	<1

[1] Within the ROW, vegetation would be cleared or trampled. Vegetation clearing is defined as cutting off vegetation at ground level and leaving the stumps in place for erosion control. Trampling is defined as leaving vegetation in the ROW and driving over the vegetation with construction equipment. The height of the vegetation to be cleared would be determined by the vegetation management level to be applied.

[2] Facilities would include access roads, temporary work areas such as staging areas, material storage yards, fly yards, pulling, tensioning, and splicing sites, work areas at each structure site, batch plant sites and guard structures within a 1-mile distance of the corridor. Staging areas, fly yards and batch plant sites would be cleared as necessary. Staging areas and fly yards might be bladed and graveled. Equipment staging and refueling sites would be co-located with other temporary work areas. Wire pulling, tensioning, and splicing sites and structure work areas would be completely cleared of vegetation during construction.

Note: Discrepancies in totals due to rounding.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative III-C

Key Parameters Summary

In Alternative III-C, the majority of the disturbance would occur in desert shrub, grassland, sagebrush shrubland and saltbush shrubland vegetation community types. Vegetation clearing of woody vegetation along the construction ROW would occur in 382 acres of pinyon-juniper woodland. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 313 acres of greasewood flat, 79 acres of herbaceous wetland, 11 acres of ephemeral wash, and 5 acres of woody riparian and wetlands. Of this, 49 acres of greasewood flat, 15 acres of herbaceous wetland, 2 acres of ephemeral wash and 1 acre of woody riparian and wetlands would be impacted by operation. Specific herbaceous riparian and wetland types along Alternative III-C include wetlands associated with topographical depressions. Specific riparian woodlands and wetlands found along Alternative III-C would include riparian woodlands and shrublands in both montane and lower elevation areas.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative III-D (Agency Preferred)

Key Parameters Summary

Beginning at the border of Juab and Millard Counties in Utah, Alternative III-D shares the same route as Alternative III-C. However, at the Nevada/Utah border, Alternative III-D turns south along the same route as Alternative III-B. Under Alternative III-D, the majority of the disturbance would occur in desert shrub, grassland, sagebrush shrubland, greasewood flat, and pinyon-juniper woodland vegetation community types. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 307 acres of greasewood flat, 56 acres of herbaceous wetland, 52 acres of ephemeral wash and 31 acres of woody riparian and wetlands. Of this, 48 acres of greasewood flat, 9 acres of herbaceous wetland, 9 acres of ephemeral wash, and 7 acres of woody riparian and wetlands would be impacted by operation. Specific herbaceous riparian and wetland types along Alternative III-D include wetlands associated with topographical depressions. Specific riparian woodlands and wetlands found along Alternative III-D would include riparian woodlands and shrublands in both montane and lower elevation areas.

The types of construction and operation impacts that would occur under Alternative III-D would be the same as those described in Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative Variations in Region III

Table 3.5-16 provides a comparison of impacts associated with the alternative variations in Region III.

The Ox Valley East Alternative Variation would impact similar vegetation community types compared to those of Alternative III-A; however, there would be additional impacts in aspen forest and woodland, cliff and canyon, montane shrubland, and pinyon-juniper woodland vegetation community types. Wetlands and riparian areas in the Ox Valley East Variation include riparian woodlands and shrublands in both montane and lower elevation areas. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

The Ox Valley West Alternative Variation would impact similar vegetation community types compared to those of Alternative III-A; however, there would be additional impacts in aspen forest and woodland, cliff and canyon, pinyon-juniper woodland, montane shrubland, and woody riparian community types and decreased impacts in the developed/disturbed and sagebrush shrubland community types. Wetlands and riparian areas in the Ox Valley West Variation include riparian woodlands and shrublands in both montane and lower elevation areas. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

The Pinto Alternative Variation would impact similar vegetation community types compared to those of Alternative III-A; however, there would be additional impacts in agriculture, aspen forest and woodland, conifer forest, desert shrub, pinyon-juniper woodland, and saltbush shrub community types and decreased impacts in the grassland and sagebrush shrubland community types. Wetlands and riparian areas in the Pinto Variation include riparian woodlands and shrublands in both montane and lower elevation areas. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative Connectors in Region III

Wetlands and riparian areas in the Moapa Alternative Connector include riparian woodland and shrublands. The Avon connector includes wetland communities such as warm desert washes. **Table 3.5-17** summarizes impacts and advantages associated with the alternative connectors in Region III. Impacts to each vegetative community would comprise less than 1 percent of the total of each vegetative community in the analysis area.

Alternative Ground Electrode Systems in Region III

The southern ground electrode system would be necessary within 100 miles of the Southern Terminal as discussed in Chapter 2.0. Although the location for this system has not been determined, conceptual locations and connections to the alternative routes have been provided by the Applicant. The impacts associated with constructing and operating this system are discussed in Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. **Table 3.5-18** summarizes impacts associated with the southern ground electrode overhead electrical line. Some locations might serve multiple alternative routes while others could only be associated with a certain alternative route.

Region III Series Compensation Stations (Design Option 2)

If Design Option 2 were implemented, a series compensation station would be necessary along the AC-configured alternative routes of Region III. There are three potential sites, each corresponding to a specific alternative route. These series compensation station alternatives are depicted in **Figure 2-2**.

Series Compensation Station 1 – Design Option 2 corresponds to Alternative III-A. The approximate potential construction impacts to vegetation communities would include: 14 acres of saltbush shrubland, 3 acres of greasewood flat, 2 acres of grassland, 2 acres of herbaceous wetland, and 1 acre of sagebrush shrubland. The approximate potential operation impacts to vegetation communities would include: 9 acres of saltbush shrubland, 2 acres of greasewood flat, 1 acre of grassland, 2 acres of herbaceous wetland, and 1 acre of sagebrush shrubland.

Series Compensation Station 2 – Design Option 2 corresponds to Alternative III-C. The approximate potential construction impacts to vegetation communities would include: 14 acres of sagebrush shrubland, 5 acres of desert shrubland, 3 acres of grassland, and less than 1 acre of saltbush shrubland. The approximate potential operation impacts to vegetation communities would include: 9 acres of sagebrush shrubland, 4 acres of desert shrubland, 2 acres of grassland, and less than 1 acre of saltbush shrubland.

Series Compensation Station 3 – Design Option 2 corresponds to Alternative III-B. The approximate potential construction impacts to vegetation communities would include: 16 acres of saltbush shrubland, 3 acres of dunes, 2 acres of grassland, 1 acre of greasewood flat, and 1 acre of sagebrush shrubland. The approximate potential operation impacts to vegetation communities would include: 10 acres of saltbush shrubland, 2 acres of dunes, 1 acre of grassland, 1 acre of greasewood flat, and 1 acre of sagebrush shrubland.

Region III Conclusion

In Region III, the alternative that would result in the greatest area of impact to vegetation is Alternative III-C. Alternative III-A would impact the least vegetation acreage through clearing, whereas Alternative III-D would impact the least amount of vegetation through facilities construction. Impacts from vegetation clearing are comparable between Alternative III-B and Alternative III-D as these alternatives cross similar vegetation communities with similar acreages of disturbance. Impacts to vegetation communities under all Alternatives would be less than 1 percent of the analysis area in Region III.

Noxious weeds impacts would be similar between the two alternatives due to the similarities in vegetation communities crossed and similar climate conditions. Revegetation constraints would be similar between the two alternatives as would the potential for vegetation type conversion from either shrublands to grasslands or woodlands to shrublands/grasslands. Alternative III-B crosses more acres of herbaceous wetland, specifically in Lincoln County, Nevada, while Alternative III-A crosses slightly more acres of woody riparian and wetlands habitat.

3.5.6.6 Region IV

Table 3.5-19 provides a comparison of impacts associated with the alternative routes in Region IV.

Alternative IV-A (Applicant Proposed and Agency Preferred)

Key Parameters Summary

The majority of the disturbance for this alternative would occur in the desert shrub and developed/ disturbed vegetation community types, with minor impacts occurring in the barren/sparsely vegetated, cliff and canyon, ephemeral wash, saltbush shrubland and woody riparian and wetlands community types. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction activities.

Table 3.5-16 Summary of Region III Alternative Variation Impacts for Vegetation

Vegetation Communities	Ox Valley East Alternative Variation						Alternative III–A Comparable						Ox Valley West Alternative Variation						Alternative III–A Comparable						Pinto Alternative Variation						Alternative III–A Comparable					
	ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance	
	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III
Agriculture	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12	<1	9	<1	2	<1	–	–	<1	<1	<1	<1
Aspen Forest and Woodland	2	<1	2	<1	1	<1	–	–	–	–	–	–	2	<1	2	<1	1	<1	–	–	–	–	–	–	<1	<1	<1	<1	<1	<1	–	–	–	–	–	–
Barren/ Sparsely Vegetated	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cliff and Canyon	1	<1	1	<1	<1	<1	–	–	–	–	–	–	1	<1	1	<1	<1	<1	–	–	–	–	–	–	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Conifer Forest	–	–	–	–		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	<1	<1	<1	<1	<1	<1	–	–	–	–	–	–
Deciduous Forest	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Desert Shrub	<1	<1	<1	<1	<1	<1	5	<1	5	<1	1	<1	<1	<1	<1	<1	<1	<1	5	<1	5	<1	1	<1	15	<1	12	<1	3	<1	1	<1	1	<1	<1	<1
Developed/ Disturbed	6	<1	6	<1	2	<1	8	<1	7	<1	2	<1	3	<1	3	<1	1	<1	8	<1	7	<1	2	<1	10	<1	8	<1	2	<1	13	<1	11	<1	3	<1
Dunes	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grassland	<1	<1	2	<1	1	<1	1	<1	3	<1	1	<1	<1	<1	2	<1	1	<1	1	<1	3	<1	1	<1	30	<1	23	<1	5	<1	1	<1	3	<1	2	<1
Greasewood Flat	–	–	–	–	–	–	<1	–	<1	<1	<1	<1	–	–	–	–	–	–	<1	<1	<1	<1	<1	<1	1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Herbaceous Wetland	–	–	–	–	–	–	1	–	1	<1	<1	<1	–	–	–	–	–	–	1	<1	1	<1	<1	<1	2	<1	2	<1	1	<1	1	<1	1	<1	<1	<1
Montane Grassland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	<1	<1	<1	<1	–	–	<1	<1	<1	<1
Montane Shrubland	55	<1	51	<1	16	<1	17	<1	15	<1	4	<1	54	<1	50	<1	16	<1	17	<1	15	<1	4	<1	18	<1	15	<1	4	<1	17	<1	15	<1	4	<1
Open Water	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	<1	<1	<1	<1	–	–	<1	<1	<1	<1
Pinyon–juniper Woodland	130	<1	132	<1	43	<1	119	<1	108	<1	26	<1	142	<1	129	<1	44	<1	119	<1	108	<1	26	<1	237	<1	219	<1	57	<1	169	<1	150	<1	39	<1
Ephemeral Wash	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Sagebrush Shrubland	103	<1	121	<1	43	<1	128	<1	139	<1	43	<1	115	<1	121	<1	45	<1	128	<1	139	<1	43	<1	195	<1	163	<1	39	<1	239	<1	229	<1	67	<1
Saltbush Shrubland	–	–	–	–	–	–	<1	<1	<1	<1	<1	<1	–	–	–	–	–	–	<1	<1	<1	<1	<1	<1	–	–	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tundra	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	4	<1	5	<1	2	<1	3	<1	3	<1	1	<1	4	<1	5	<1	2	<1	3	<1	3	<1	1	<1	11	<1	8	<1	2	<1	3	<1	3	<1	1	<1
Total	**300**	**<1**	**319**	**<1**	**108**	**<1**	**282**	**<1**	**282**	**<1**	**79**	**<1**	**321**	**<1**	**313**	**<1**	**110**	**<1**	**282**	**<1**	**282**	**<1**	**79**	**<1**	**532**	**<1**	**461**	**<1**	**114**	**<1**	**445**	**<1**	**415**	**<1**	**115**	**<1**

[1] Within the ROW, vegetation would be cleared or trampled. Vegetation clearing is defined as cutting vegetation off at ground level and leaving the stumps in place for erosion control. Trampling is defined as leaving vegetation in the ROW and driving over the vegetation with construction equipment. The heights of the vegetation to be cleared would be determined by the vegetation management level to be applied.

Note: Discrepancies in totals due to rounding.

Table 3.5-17 Summary of Region III Alternative Connector Impacts for Vegetation

Vegetation Communities	Moapa Alternative Connector						Avon Alternative Connector						Arrowhead Alternative Connector					
	ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance	
	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III	Acres	% of Region III
Agriculture	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Aspen Forest and Woodland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Barren/Sparsely Vegetated	<1	<1	<1	<1	<1	<1	–	–	–	–	–	–	8	<1	9	<1	2	<1
Cliff and Canyon	–	–	–	–	–	–	–	–	–	–	–	–	<1	<1	<1	<1	<1	<1
Conifer Forest	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Deciduous Forest	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Desert Shrub	198	<1	129	<1	24	<1	–	–	–	–	–	–	36	<1	39	<1	6	<1
Developed/Disturbed	2	<1	1	<1	<1	<1	5	<1	3	<1	1	<1	1	<1	1	<1	<1	<1
Dunes	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grassland	–	–	–	–	–	–	8	<1	5	<1	1	<1	–	–	–	–	–	–
Greasewood Flat	–	–	–	–	–	–	3	<1	2	<1	<1	<1	–	–	–	–	–	–
Herbaceous Wetland	–	–	–	–	–	–	1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Montane Grassland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Montane Shrubland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Open Water	–	–	–	–	–	–	<1	<1	<1	<1	<1	<1	–	–	–	–	–	–
Pinyon–juniper Woodland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Ephemeral Wash	69	<1	45	<1	8	<1	–	–	–	–	–	–	2	<1	2	<1	<1	<1
Sagebrush Shrubland	–	–	–	–	–	–	18	<1	12	<1	2	<1	–	–	–	–	–	–
Saltbush Shrubland	–	–	<1	<1	<1	<1	121	<1	75	<1	14	<1	1	<1	1	<1	<1	<1
Tundra	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	1	<1	<1	<1	<1	<1	–	–	–	–	–	–	1	<1	1	<1	<1	<1
Total	**270**	**<1**	**176**	**<1**	**33**	**<1**	**156**	**<1**	**99**	**<1**	**18**	**<1**	**49**	**<1**	**54**	**<1**	**9**	**<1**

[1] Within the ROW, vegetation would be cleared or trampled. Vegetation clearing is defined as cutting vegetation off at ground level and leaving the stumps in place for erosion control. Trampling is defined as leaving vegetation under in the ROW and driving over the vegetation with construction equipment. The height of the vegetation to be cleared would be determined by the vegetation management level to be applied.

Note: Discrepancies in totals due to rounding.

Table 3.5-18 Summary of Region III Alternative Ground Electrode Overhead Electrical Line Impact Parameters to Vegetation (miles)

Vegetation Communities	Mormon Mesa –Carp Elgin Rd (Alt. III–A)	Halfway Wash – Virgin River (Alt. III–A)	Halfway Wash East (Alt. III–A)	Mormon Mesa–Carp Elgin Rd (Alt. III–B)	Halfway Wash – Virgin River (Alt. III–B)	Halfway Wash East (Alt. III–B)	Meadow Valley 2 (Alt. III–C)	Delta (Design Option 2)
Agriculture	–	–	–	–	–	–	–	–
Aspen Forest and Woodland	–	–	–	–	–	–	–	–
Barren/Sparsely Vegetated	–	–	–	–	–	–	<1	–
Cliff and Canyon	–	<1	–	–	<1	–	<1	–
Conifer Forest	–	–	–	–	–	–	–	–
Deciduous Forest	–	–	–	–	–	–	–	–
Desert Shrub	6	3	7	6	5	8	20	–
Developed/Disturbed	<1	–	–	<1	<1	<1	–	<1
Dunes	–	–	–	–	–	–	–	–
Grassland	–	–	–	–	–	–	–	2
Greasewood Flat	–	–	–	–	–	–	–	2
Herbaceous Wetland	–	–	–	–	–	–	<1	<1
Montane Grassland	–	–	–	–	–	–	–	–
Montane Shrubland	–	–	–	–	–	–	–	–
Open Water	–	–	–	–	–	–	–	–
Pinyon–juniper Woodland	–	–	–	–	–	–	–	–
Ephemeral Wash	2	<1	1	4	<1	1	<1	–
Sagebrush Shrubland	–	–	–	–	–	–	–	<1
Saltbush Shrubland	–	–	–	–	–	–	<1	7
Tundra	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	–	–	–	–	–	–	<1	–
Total	**8**	**4**	**8**	**10**	**6**	**10**	**22**	**13**

Note: Discrepancies in totals due to rounding.

Construction of facilities would disturb 5 acres of ephemeral wash and less than 1 acre of woody riparian and wetlands, while operation impacts would occur in 1 acre of ephemeral wash.

Specific riparian woodlands and wetlands found along Alternative IV-A would include desert washes and riparian woodlands and shrublands.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Table 3.5-19 Summary of Region IV Alternative Route Impacts for Vegetation

	Construction Disturbance						Operation Disturbance					
	Alternative IV–A		Alternative IV–B		Alternative IV–C		Alternative IV–A		Alternative IV–B		Alternative IV–C	
	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV
ROW Clearing/Trampling[1]												
Agriculture	–	–	–	–	–	–	–	–	–	–	–	–
Aspen Forest and Woodland	–	–	–	–	–	–	–	–	–	–	–	–
Barren/Sparsely Vegetated	52	<1	47	<1	47	<1	–	–	–	–	–	–
Cliff and Canyon	18	<1	10	<1	10	<1	–	–	–	–	–	–
Conifer Forest	–	–	–	–	–	–	–	–	–	–	–	–
Deciduous Forest	–	–	–	–	–	–	–	–	–	–	–	–
Desert Shrub	498	<1	439	<1	493	<1	–	–	–	–	–	–
Developed/Disturbed	190	<1	312	<1	338	<1	–	–	–	–	–	–
Dunes	–	–	–	–	–	–	–	–	–	–	–	–
Grassland	–	–	–	–	–	–	–	–	–	–	–	–
Greasewood Flat	–	–	–	–	–	–	–	–	–	–	–	–
Herbaceous Wetland	–	–	1	<1	1	<1	–	–	–	–	–	–
Montane Grassland	–	–	–	–	–	–	–	–	–	–	–	–
Montane Shrubland	–	–	–	–	–	–	–	–	–	–	–	–
Open Water	–	–	–	–	–	–	–	–	–	–	–	–
Pinyon–juniper Woodland	–	–	–	–	–	–	–	–	–	–	–	–
Ephemeral Wash	10	<1	2	<1	2	<1	–	–	–	–	–	–
Sagebrush Shrubland	–	–	–	–	–	–	–	–	–	–	–	–
Saltbush Shrubland	3	<1	2	<1	4	<1	–	–	–	–	–	–
Tundra	–	–	–	–	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	–	–	6	<1	6	<1	–	–	–	–	–	–
Total	**771**	**<1**	**818**	**<1**	**901**	**<1**	**–**	**–**	**–**	**–**	**–**	**–**
Facilities[2]												
Agriculture	–	–	–	–	–	–	–	–	–	–	–	–
Aspen Forest and Woodland	–	–	–	–	–	–	–	–	–	–	–	–

Table 3.5-19 Summary of Region IV Alternative Route Impacts for Vegetation

	Construction Disturbance						Operation Disturbance					
	Alternative IV–A		Alternative IV–B		Alternative IV–C		Alternative IV–A		Alternative IV–B		Alternative IV–C	
	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV
Barren/Sparsely Vegetated	27	<1	39	<1	40	<1	5	<1	9	<1	9	<1
Cliff and Canyon	19	<1	13	<1	13	<1	5	<1	3	<1	3	<1
Conifer Forest	–	–	–	–	–	–	–	–	–	–	–	–
Deciduous Forest	–	–	–	–	–	–	–	–	–	–	–	–
Desert Shrub	339	<1	298	<1	321	<1	77	<1	71	<1	73	<1
Developed/Disturbed	155	<1	204	<1	236	<1	35	<1	37	<1	40	<1
Dunes	–	–	–	–	–	–	–	–	–	–	–	–
Grassland	–	–	–	–	–	–	–	–	–	–	–	–
Greasewood Flat	–	–	–	–	–	–	–	–	–	–	–	–
Herbaceous Wetland	<1	<1	1	<1	1	<1	<1	<1	<1	<1	<1	<1
Montane Grassland	–	–	–	–	–	–	–	–	–	–	–	–
Montane Shrubland	–	–	–	–	–	–	–	–	–	–	–	–
Open Water	–	–	3	<1	3	<1	–	–	2	<1	2	<1
Pinyon–juniper Woodland	–	–	–	–	–	–	–	–	–	–	–	–
Ephemeral Wash	5	<1	1	<1	1	<1	1	<1	<1	<1	<1	<1
Sagebrush Shrubland	–	–	–	–	–	–	–	–	–	–	–	–
Saltbush Shrubland	1	<1	1	<1	1	<1	<1	<1	<1	<1	1	<1
Tundra	–	–	–	–	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	<1	<1	4	<1	4	<1	<1	<1	1	<1	1	<1
Total	**547**	**<1**	**565**	**<1**	**622**	**<1**	**123**	**<1**	**123**	**<1**	**128**	**<1**

[1] Within the ROW, vegetation would be cleared or trampled. Vegetation clearing is defined as cutting vegetation off at ground level and leaving the stumps in place for erosion control. Trampling is defined as leaving vegetation in the ROW and driving over the vegetation with construction equipment. The height of the vegetation to be cleared would be determined by the vegetation management level to be applied.

[2] Facilities would include access roads, temporary work areas such as staging areas, material storage yards, fly yards, pulling, tensioning, and splicing sites, work areas at each structure site, batch plant sites and guard structures within the 2–mile wide corridor. Staging areas, fly yards, and batch plant sites would be cleared as necessary. Staging areas and fly yards might be bladed and graveled. Equipment staging and refueling sites would be co-located with other temporary work areas. Wire pulling, tensioning, and splicing sites, and structure work areas would be completely cleared of vegetation during construction.

Note: Discrepancies in totals due to rounding.

Alternative IV-B

Key Parameters Summary

In Alternative IV-B, the majority of the disturbance would occur in the desert shrub and developed/ disturbed community types with minor impacts occurring in barren/sparsely vegetated, cliff and canyon, herbaceous wetland, ephemeral wash, saltbush shrubland, and woody riparian and wetland community types. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings. Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 1 acre of herbaceous wetland, 1 acre of ephemeral wash, and 4 acres of woody riparian and wetlands. Of this, less than 1 acre of herbaceous wetland, less than 1 acre of ephemeral wash, and 1 acre of woody riparian and wetlands would be impacted by operations. Specific herbaceous wetland and riparian types along Alternative IV-B include emergent marshes while specific riparian woodlands and wetlands include desert washes and riparian woodlands and shrublands.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Vegetation management levels would be applied as indicated in the POD and through mitigation prescribed according to other resource concerns (see **Appendix C**, **Table C.5-1**). The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative IV-C

Key Parameters Summary

In Alternative IV-C, the majority of the disturbance would occur in desert shrub and developed/disturbed vegetation community types with minor impacts occurring in barren/sparsely vegetated, cliff and canyon, herbaceous wetland, ephemeral wash, saltbush shrubland, and woody riparian and wetland vegetation community types. Vegetation Management Level 3 would be applied in herbaceous wetland and woody riparian and wetland crossings Vegetation in the remaining portions of the ROW not impacted by construction would be trampled or driven over during construction activities.

Construction of facilities would disturb 1 acre of herbaceous wetland, 1 acre of ephemeral wash, and 4 acres of woody riparian and wetlands. Of this, less than 1 acre each of herbaceous wetland and ephemeral wash and 1 acre of woody riparian and wetlands would be impacted by operation. Specific herbaceous wetland and riparian types along Alternative IV-C include emergent marshes while specific riparian woodlands and wetlands include desert washes and riparian woodlands and shrublands.

Construction and operation impacts would be the same as described for Section 3.5.6.2, Impacts Common to All Alternative Routes and Associated Components. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative Variations in Region IV

The Marketplace Alternative Variation would impact the same vegetation communities as Alternative IV-B. Implementation and effects of mitigation measures would be the same as described for Alternative I-A. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area.

Table 3.5-20 provides a comparison of impacts associated with the alternative variation in Region IV.

Table 3.5-20 Summary of Region IV Alternative Variation Impacts for Vegetation

	Marketplace Alternative Variation (Alternative IV–B)						Alternative IV–B Comparable					
	ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance	
Vegetation Communities	**Acres**	**% of Region IV**	**Acres**	**% of Region IV**	**Acres**	**% of Region IV**	**Acres**	**% of Region IV**	**Acres**	**% of Region IV**	**Acres**	**% of Region IV**
Agriculture	–	–	–	–	–	–	–	–	–	–	–	–
Aspen Forest and Woodland	–	–	–	–	–	–	–	–	–	–	–	–
Barren/Sparsely Vegetated	–	–	–	–	–	–	–	–	–	–	–	–
Cliff and Canyon	–	–	1	<1	<1	<1	–	–	–	–	–	–
Conifer Forest	–	–	–	–	–	–	–	–	–	–	–	–
Deciduous Forest	–	–	–	–	–	–	–	–	–	–	–	–
Desert Shrub	64	<1	48	<1	9	<1	<1	<1	<1	<1	<1	<1
Developed/Disturbed	95	<1	59	<1	10	<1	161	<1	81	<1	12	<1
Dunes	–	–	–	–	–	–	–	–	–	–	–	–
Grassland	–	–	–	–	–	–	–	–	–	–	–	–
Greasewood Flat	–	–	–	–	–	–	–	–	–	–	–	–
Herbaceous Wetland	–	–	–	–	–	–	–	–	–	–	–	–
Montane Grassland	–	–	–	–	–	–	–	–	–	–	–	–
Montane Shrubland	–	–	–	–	–	–	–	–	–	–	–	–
Open Water	–	–	–	–	–	–	–	–	–	–	–	–
Pinyon–juniper Woodland	–	–	–	–	–	–	–	–	–	–	–	–
Ephemeral Wash	–	–	–	–	–	–	–	–	–	–	–	–
Sagebrush Shrubland	–	–	–	–	–	–	–	–	–	–	–	–
Saltbush Shrubland	–	–	–	–	–	–	–	–	–	–	–	–
Tundra	–	–	–	–	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	–	–	–	–	–	–	–	–	–	–	–	–
Total	**159**	**<1**	**108**	**<1**	**19**	**<1**	**161**	**<1**	**81**	**<1**	**12**	**<1**

[1] Within the ROW, vegetation would be cleared or trampled. Vegetation clearing is defined as cutting vegetation off at ground level and leaving the stumps in place for erosion control. Trampling is defined as leaving vegetation in the ROW and driving over the vegetation with construction equipment. The height of the vegetation to be cleared would be determined by the vegetation management level to be applied.

Note: Discrepancies in totals due to rounding.

Alternative Connectors in Region IV

All the Alternative Connectors in Region IV would include minor surface disturbance increases across the various vegetation community types with the greatest disturbances associated with barren/sparsely vegetated and desert shrub community types. There would be no vegetation clearing of woody vegetation along the construction ROW for the Region IV alternative connectors. The River Mountains Alternative Connector includes a small area of riparian vegetation communities. **Table 3.5-21** summarizes impacts and advantages associated with the alternative connectors in Region IV. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area.

Table 3.5-21 Summary of Region IV Alternative Connector Impacts for Vegetation

	Sunrise Mountain Alternative Connector						Lake Las Vegas Alternative Connector						Three Kids Mine Alternative Connector						River Mountains Alternative Connector						Railroad Pass Alternative Connector					
	ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance		ROW Clearing[1]		Construction Disturbance		Operation Disturbance	
Vegetation Communities	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV
Agriculture	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Aspen Forest and Woodland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Barren/Sparsely Vegetated	22	<1	26	<1	4	<1	2	<1	2	<1	<1	<1	–	–	–	–	–	–	1	<1	1	<1	<1	<1	–	–	<1	<1	<1	<1
Cliff and Canyon	1	<1	1	<1	<1	<1	–	–	<1	–	<1	–	2	<1	2	<1	<1	<1	5	<1	7	<1	3	<1	<1	<1	<1	<1	<1	<1
Conifer Forest	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Deciduous Forest	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Desert Shrub	19	<1	23	<1	4	<1	56	<1	57	<1	15	<1	66	<1	71	<1	20	<1	130	<1	144	<1	50	<1	4	<1	9	<1	4	<1
Developed/Disturbed	–	–	–	–	–	–	16	<1	16	<1	5	<1	28	<1	25	<1	6	<1	10	<1	13	<1	5	<1	61	<1	59	<1	13	<1
Dunes	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grassland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	<1	<1	<1	<1	<1	<1	–	–	–	–	–	–
Greasewood Flat	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Herbaceous Wetland	–	–	<1	<1	<1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Montane Grassland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Montane Shrubland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Open Water	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Pinyon–juniper Woodland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Ephemeral Wash	–	–	<1	<1	<1	–	–	–	–	–	–	–	–	–	–	–	–	–	<1	<1	<1	<1	<1	<1	–	–	–	–	–	–
Sagebrush Shrubland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Saltbush Shrubland	–	–	<1	<1	<1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Tundra	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Woody Riparian and Wetlands	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	**42**	**<1**	**51**	**<1**	**8**	**<1**	**74**	**<1**	**75**	**<1**	**20**	**<1**	**95**	**<1**	**98**	**<1**	**27**	**<1**	**146**	**<1**	**165**	**<1**	**58**	**<1**	**65**	**<1**	**69**	**<1**	**17**	**<1**

[1] Within the ROW, vegetation would be cleared or trampled. Vegetation clearing is defined as cutting off vegetation at ground level and leaving the stumps in place for erosion control. Trampling is defined as leaving vegetation in the ROW and driving over the vegetation with construction equipment.

Note: Discrepancies in totals due to rounding.

Region IV Conclusion

In Region IV, the alternative that would result in the greatest area of vegetation impacted is Alternative IV-C while Alternative IV-A would impact the least vegetation acreage. Impacts to vegetation communities in the various alternatives would comprise less than 1 percent of the analysis area in Region IV.

Noxious weed impacts would be similar between these two alternatives due to the similarities in vegetation communities crossed and similar climate conditions. Revegetation constraints would be similar between the two alternatives as would the potential for vegetation type conversion from either shrublands to grasslands or woodlands to shrublands/grasslands. According to the SWReGAP data, Alternative IV-A would cross the least amount of herbaceous wetland and woody riparian and wetlands.

3.5.6.7 Residual Impacts

Residual impacts would include the loss of vegetation related to the permanent placement of facilities and access roads for the life of the Project, the invasion and spread of noxious weeds and invasive species into previously undisturbed areas, and fragmentation of native habitats.

Vegetation recovery to similar cover and species composition after implementation of a reclamation program is expected to occur at varying rates. Overall community recovery is anticipated to take 2 to 3 years to reestablish an early seral vegetation community. In areas with soil reclamation constraints, low regional annual precipitation rates, and the invasion and spread of noxious and invasive weed species, successful reestablishment of early seral native vegetation may take a longer timeframe. It is estimated that overall, herbaceous-dominated plant communities would require a minimum of 3 to 5 years to establish adequate ground cover to prevent erosion and provide forage for wildlife species and grazing operations. Woody-dominated plant communities would require at least 10 to 25 years for shrubs to recolonize the area while re-establishment of mature woodlands would require at least 30 to 50 or more years. In areas with soil reclamation constraints, low regional annual precipitation rates and the invasion and spread of noxious and invasive weed species, community recovery is anticipated to be long-term and may not be successful (10 to 100 years depending on the community structure).

Depending on the composition and topography of existing woodlands, recovery could take up to 80 to 100 years to achieve mature trees of similar stature to pre-construction conditions. The success of woodland re-establishment could be impacted by co-located disturbances and adverse environmental conditions including wildland fire, drought, climate change, insects and disease (Folke et al. 2004; Loehman et al. 2011). Wildland fire in combination with adverse environmental conditions could result in woodlands converting to shrubland communities over time.

Implementation of the Project design features, the agency and WWEC BMPs, and the proposed additional mitigation measures would minimize residual impacts to vegetation, wetlands, and riparian areas from noxious weeds and invasive species, erosion, and fire. Residual impacts due to the loss of sagebrush habitat are discussed in Section 3.8, Special Status Wildlife Species. Noxious weed and invasive species may persist over the long term regardless of the implementation of control programs. Some plant communities may not return to pre-construction conditions due to alteration of soil communities, noxious weed invasion, and loss of biological soil crusts. Fragmentation and the conversion of vegetation communities may occur over the long-term, depending on the success of reclamation and associated disturbance from maintenance activities over the life of the Project.

Residual impacts, especially noxious weed invasion, may impact the reclamation success as defined by each BLM FO and USFS forest. Residual impacts, depending on their type and quantity, may exceed the significance threshold of impacts for individual BLM FOs or USFS forests, depending on the requirements of the management documents.

3.5.6.8 Irreversible and Irretrievable Commitment of Resources

For areas successfully reclaimed (as defined by each land management agency after construction), no irretrievable commitments are anticipated. For plant communities, including woody dominated vegetation communities and areas of low-reclamation potential, the alteration of these communities may persist during the life of the Project, resulting in an irretrievable loss of these resources. These impacts would be reversible by the successful reclamation of these communities to pre-construction conditions.

Irreversible commitments would result from construction and operation impacts that result in the permanent conversion of plant communities. This may occur in areas where reclamation is not successful or fragmentation and noxious weed and invasive species permanently change native habitats. If successful reclamation is not achieved, disturbed areas would no longer support native vegetation.

3.5.6.9 Relationship between Local Short-term Uses and Long-term Productivity

For all alternatives, Project-related impacts that may affect productivity include the disturbance of shrub-dominated and woody vegetation cover types that would require 10 to 100 years to recover and the potential that populations of weedy annual species (e.g., halogeton, cheatgrass) may become established in localized areas for extended periods of time. The decrease in vegetation cover types, either through direct impacts (i.e., removal of vegetation) or indirect impacts (i.e., the spread of noxious and invasive species), could impact ecological function, livestock and wildlife grazing, and recreation activities in and around the areas to be disturbed.

For areas with low reclamation potential (i.e., slow revegetation rates and low revegetation success), the proposed Project could result in impacts to vegetation communities that would extend beyond construction, operation, and decommissioning activities which would affect long-term habitat value and human uses of these areas.

3.5.6.10 Impacts to Vegetation from the No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed or operated. The analysis area would exist under current authorizations and land uses (e.g., livestock grazing, agriculture, energy development, mining, etc.). Therefore, impacts to vegetation resources associated with the development of the proposed Project would not occur.