3.21 Wildland Fire

This section describes the wildland fire ecology, and fuels and fire management in the Project analysis area. The section provides baseline and impact information for wildland fire, and analyzes the impacts from the construction, operation, maintenance, and decommissioning of the transmission line.

3.21.1 Regulatory Background

Wildland fire policy and management is guided by federal, state, and local policies. Due to the complexity of wildland fire management and the multi-jurisdictional nature of wildland fires, interagency guidelines, strategies and organizations have been developed that seek to more effectively protect human life and communities, and natural resources, and provide a more pro-active approach to fuels and ecosystem management (USFWS 2008).Throughout most of the twentieth century, wildland fire management consisted of fire suppression (USDOI and USDA 2001). Starting in the 1960s, wildland fire management began to shift as scientific research demonstrated the positive benefits of natural and prescribed fires to native ecosystems (USDOI and USDA 2001). Current wildland fire management practices now include fire suppression, fuels management, emergency stabilization and rehabilitation, and fire prevention and mitigation.

Due to dramatic increases in the 1980s in frequency, size, and catastrophic nature of wildland fires in the Western US (U.S. General Accounting Office [GAO] 1999), the Secretaries of the Interior and Agriculture developed the Federal Wildland Fire Management Policy (USDOI and USDA 1995) to address these changes in fire behavior (USDOI and USDA 2001). In 2001, a review and update of the Federal Wildland Fire Management Policy was published (USDOI and USDA 2001). The Review and Update of the 1995 Federal Wildland Fire Management Policy outlines guiding principles, policy statements, and implementation actions. The overall focus of the Federal Wildland Fire Management Policy is that the priority of fire management is to provide for firefighter and public safety, protect and enhance land management objectives and human welfare, integrate programs and disciplines, require interagency collaboration, emphasize the natural ecological role of fire, and contribute to ecosystem stability (USDOI and USDA 2001). The Federal Wildland Fire Management Policy provides nine guiding principles to support the wildland fire management program. In 2009, the Federal Land Assistance, Management, and Enhancement Act was enacted to provide separate accounting for funding of emergency wildland fire suppression activities (Council of Western State Foresters 2009). In addition, the Federal Land Assistance, Management, and Enhancement Act of 2009 requires the Secretaries of Interior and Agriculture to develop a cohesive wildland fire management strategy that focuses on GAO recommendations, including appropriate management responses to wildland fires, and assessing communities' level of risk. The National Wildland Fire Coordinating Group (NWCG) is an operational group designed to coordinate programs of participating wildland fire management agencies, which include the BLM, USFS, NPS, USFWS, and BIA.

Additional governing policies for wildland fire management for federal land management are outlined in agencies' RMPs, LRMPs, or LUPs. Also, federal land management agencies are required under the National Fire Plan to prepare and update Fire Management Plans.

States are responsible for wildland fire management on state and trust lands. The State Agencies have their own processes and policies for managing wildland fire as defined in their state statues. These statutes typically delegate authority to specific organizations within each state down to the county level. State agencies may participate in wildland fire management on adjacent lands under cooperative agreements with federal agencies. Additional federal and state policies and requirements for vegetation, and noxious weeds also affect wildland fire management.

3.21.2 Data Sources

Information regarding wildland fire resources within the analysis area was obtained from a review of existing published sources; BLM RMPs, USFS LRMPs, Fire Management Plans, Wildland Fire Leadership Council, NWCG, and Landscape Fire and Resource Management Planning Tools (Landfire).

3.21.3 Analysis Area

The analysis area for wildland fire is the same as for Vegetation and encompasses the HUC10 watershed boundaries crossed by the refined transmission line corridor and locations of other project components including roads, terminals, and ground electrodes.

3.21.4 Baseline Description

Wildland fires are defined by the NWCG as any non-structure fire that occurs in the wildland (NWCG 2012). According to the NWCG, three distinct types of wildland fire have been defined and include wildland fire, wildland fire use, and prescribed fire. Wildland fire is an unplanned, unwanted wildland fire including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to extinguish the fire. Wildland fire use is the application of the appropriate management response to naturally ignited wildland fires to accomplish specific resource management objectives in pre-defined designated areas outlined in Fire Management Plans . Prescribed fire is the use of management actions to ignite fire to meet specific objectives.

Wildland fires occur from natural causes, such as lightning, or are caused by humans either accidentally or with the intent to cause damage. Wildland fires in the Western U.S. have been increasing in size, intensity, and damage due to climatic changes, history of fuel suppression, over accumulation of vegetation, insect and disease infestations, and invasion of noxious species into native vegetation communities (GAO 1999; The Brookings Institute 2008).

Climatic conditions associated with the analysis area are described in Section 3.1, Air Quality. Topography of the analysis area is described in Section 3.2, Geology. Vegetation communities within the analysis area are described in Section 3.5, Vegetation. Stand and vegetation structures, topography, and weather all play a role in the history of fire occurrences within the analysis area. Point source ignition data from the Landfire dataset summarizes fire history within the analysis area. The point source ignition data was summarized by fire size for the time frame 1990 to 2014. During this time frame, the majority of the fires have been less than 10 acres. The cause of wildland fires varied, but the predominant cause was lightning.

Within each vegetative community type found in the analysis area, there is a characteristic fire regime. A fire regime is a general description of the role fire would play across a landscape in the absence of modern human mechanical intervention while including the influence of aboriginal burning (NWCG 2003). Historical fire regimes are classified based on the average number of years between fires (fire frequency) combined with the severity of the fire on the dominant overstory vegetation (amount of vegetation replacement).

Generally, fire frequency is inversely related to fire intensity. For example, due to higher precipitation levels and cooler mean temperatures (which foster plant growth), there are higher fuel loads in pinyon-juniper woodlands and upper montane forest vegetation types as compared to lowland shrublands and grasslands. The wildland fire risk in pinyon-juniper woodlands in the western U.S. has increased due to high tree densities, drought conditions, and region-wide bark beetle infestation (Gottfried and Overby 2011).

In addition, higher precipitation amounts and cooler temperatures provide greater resistance to fire for longer periods. This leads to infrequent, high-intensity fires in montane and subalpine forests. The

reverse is true in grasslands where fine fuel types lead to a high frequency of fires that burn rapidly with low intensity.

Other factors that determine fire behavior include site topography, weather and climatic conditions, time of year, type of plant community, health of the ecosystem, fuel moisture levels, depth and duration of heat penetration, fire frequency, and site productivity. The highest potential rates of fire spread occur in areas with flashy fuels such as cured-out annual bromes, and steep brushy mountain slopes. Wildland fire risk tends to be high in areas with disturbed grasslands and forb lands dominated by non-native noxious and invasive species; especially those dominated by annual brome species.

There are five natural (historic) fire regimes based on average number of years between fires (fire frequency) combined with the severity of the fire on the dominant overstory vegetation (amount of replacement) (National Interagency Fuels, Fire, and Vegetation Technology Transfer 2010). These five regimes include:

- I – 0 to 35 year frequency and low to mixed severity (surface fires most common; less than 75 percent of the dominant overstory vegetation replaced);
- II – 0 to 35 year frequency and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced);
- III – 35 to 200+year frequency and mixed severity (less than 75 percent of the dominant overstory vegetation replaced);
- IV – 35 to 200+year frequency and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced);
- V – 200+year frequency and high (stand replacement) severity.

FRCC is a discrete metric that describes how similar a landscape's fire regime is to its natural or historical state. FRCC quantifies the amount that current vegetation has departed from the simulated historical vegetation reference conditions (Barrett et al. 2010; Hann and Bunnell 2001; Hardy et al. 2001; Holsinger et al. 2006). The three condition classes describe low departure (FRCC I), moderate departure (FRCC II), and high departure (FRCC III). Landscapes determined to fall within the category of FRCC I contain vegetation, fuels, and disturbances characteristic of the natural regime; FRCC II landscapes are those that are moderately departed from the natural regime; and FRCC III landscapes reflect vegetation, fuels, and disturbances that are uncharacteristic of the natural regime. More detailed descriptions of the FRCCs and associated attributes are provided in **Table 3.21-1**. Extreme departure from the historic fire regime results in changes to one or more of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g., insect and disease mortality, grazing, and drought).

Fuels loads data is available from the LandFire Fuel Loading Model. Fuel Loading Model classes characterize all vegetation and ecological types and are based on how the different fuel components predict fire effects. The two key fire effects focused on by Fuel Loading Model classes are the amount of smoke produced upon combustion, and the amount of soil heating, both of which are indicators of the physical and chemical changes that will occur when the fuels are burned (Sikkink et al. 2009). To quantify the effects of a wildland fire, a Fire Behavior Fuel Model (FBFM) is selected to use as input to the fire spread model. A FBFM is defined by a set of fuel bed inputs needed for a particular fire behavior or fire effects model. A FBFM is chosen by the primary carrier of the fire (e.g., grass, brush, timber litter, slash) and its fuel characteristics (e.g., fuel loading, surface area to volume ratio, fuel depth, etc.). Rothermel (1983) has a detailed discussion on fuel models and how they are used to predict the spread and intensity of forest and range fires. These fuel models are derived from the vegetation layer and can describe fire behavior based on weather and topography.

Table 3.21-1 Fire Regime Condition Class Description

Condition Class	Fire Regime	Example Management Options	Species Composition and Structure	Non-native Species
I	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Where appropriate, these areas can be maintained within the natural (historical) fire regime by treatments such as fire use.	Species composition and structure are functioning within their natural (historical) range at both patch and landscape scales.	Non-native species are currently not present or present in limited extent. Through time, or following disturbance, sites are potentially vulnerable to invasion by non-native species.
II	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the natural fire regime.	Species composition and structure have been moderately altered from their historical range at patch and landscape scales.	Populations of nonnative invasive species may have increased, thereby increasing the potential risk for these populations to expand following disturbances, such as wildland fires.
III	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the natural fire regime.	Species composition and structure have been substantially altered from their historical range at patch and landscape scales.	Invasive species may be common and in some cases the dominant species on the landscape. Any disturbance will likely increase both the dominance and geographic extent of these invasive species.

The Rapid Refresh LANDFIRE fuel model layer was used and is the basis for the FBFM analysis. Fuel models selected for this analysis primarily fit into five different fuel types; unburnable areas (NB), Grass-Shrub (GS), Shrub (SH), Timber-Understory (TU), and Timber-Litter (TL). **Table 3.21-2** displays the fuel models in terms of description, and percent present within the boundary of the treatment area.

Table 3.21-2 FBFM Classes and Descriptions Found within the Analysis Area

FBFM Category	FBFM Class	FBFM Description
Unburnable areas	NB1, NB2, NB3, NB8, NB9	Urban, Snow/Ice, Agriculture, Water, Barren.
Grass	GR1, GR2, GR3, GR4	Predicted rate of fire spread and flame length is low, any shrubs do not affect fire behavior. Varies from dry to humid climate grasses, and different fuel bed depths.
Grass-shrubs	GS1, GS2	Grass with shrubs either about 1 foot high or 1 to 3 feet high, grass load is low, spread rate moderate to high depending on grass load, flame length is low to moderate.
Shrubs	SH1, SH2, SH5, SH7	Shrubs, woody shrubs and shrub litter, fuel bed depth varies from 1 to 2 feet or greater, some to no grass or herbaceous fuel, spread rate and flame low to very high depending on fuel load depth.
Timber-Litter	TL1, TL2, TL3, TL5, TL6, TL8	Spread rate and flame heights vary from low to moderate based on tree types, and litter types and loads.
Timber-Understory	TU1, TU2, TU5	Spread rate and flame heights vary from low to moderate based on litter types and loads and herbaceous and shrub understory layer cover and type.

3.21.5 Regional Summary

The analysis area contains a diverse mix of vegetation communities and land cover types, each having a distinct fire regime. All five fire regimes are found within the analysis area. The acreage of vegetation in each fire regime in the analysis area is summarized in **Table 3.21-3**.

All three categories of FRCCs also are found within the analysis area. The acreage of vegetation in each FRCC in the analysis area is summarized in **Table 3.21-4**. **Figures 3.21-1** through **3.21-4** depict the FRCC in each region.

Table 3.21-3 Fire Regime Acreage for Each Region

Fire Regime	Frequency (Fire Return Interval)	Severity	Region I	Region II	Region III	Region IV
I	0 to 35+years, frequent	Predominantly Low	67,516	594,497	102,839	9,805
II	0 to 35+years, frequent	Replacement	3,052	0	0	0
III	35 to 200+years, less frequent	Mixed and Low	760,263	3,250,374	1,528,688	3,273
IV	35 to 200+years, less frequent	Replacement	3,903,552	3,501,856	1,301,666	6
V	200+years	Replacement	234,258	2,370,652	3,782,106	870,193

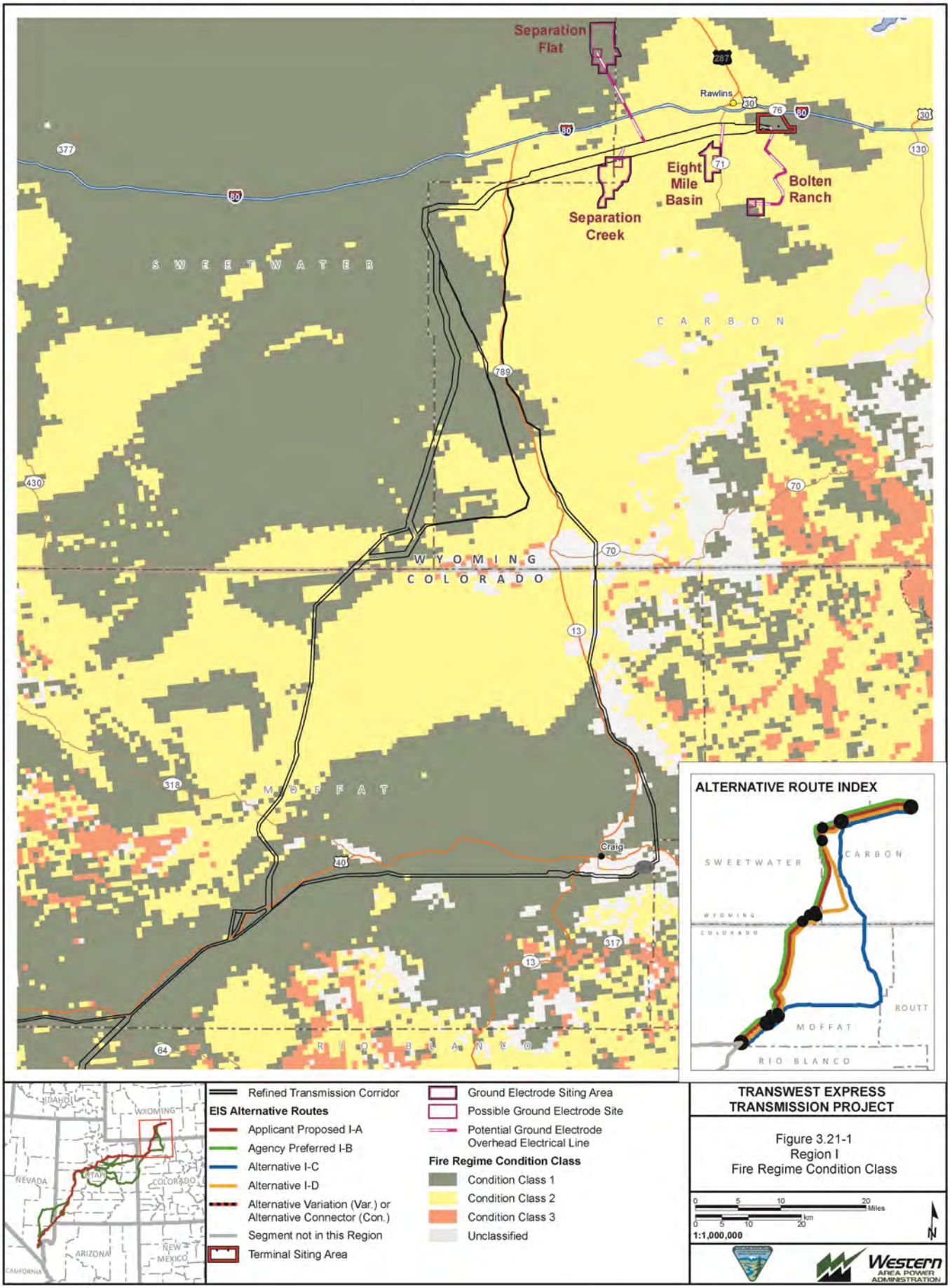
Table 3.21-4 Acres of Lands Classified as FRCC I, II, or III within the Analysis Area by Region

FRCC	Region I	Region II	Region III	Region IV
FRCC I	1,023,043	2,396,151	663,237	268
FRCC II	2,391,009	3,910,122	1,753,539	124,736
FRCC III	1,592,745	3,795,549	4,207,418	717,950

Table 3.21-5 indicates the acres of each FBFM Class within the analysis area by Region. **Figures 3.21-5** through **3.21-8** depict the FBFM Class by Project Region. The FBFM classification in the bulk of the analysis area is grass and grass-shrub. Unburnable areas are 9 percent of the total analysis area, while areas with timber are 7 percent. Region II has the greatest acres of the timber FBFM classification.

Table 3.21-5 Acres of FBPFM Classes within the Analysis Area by Region

FBFM Category	FBFM Class	Region I	Region II	Region III	Region IV
Unburnable areas	NB1, NB2, NB3, NB8, NB9	253,105	1,005,897	600,309	257,836
Grass	GR1, GR2, GR3, GR4	858,716	2,818,781	3,123,967	324,274
Grass- shrubs	GS1, GS2	3,325,415	3,819,702	1,895,744	332,356
Shrubs	SH1, SH2, SH5, SH7	325,863	2,291,651	1,533,234	139,009
Timber-Litter	TL1, TL2, TL3, TL5, TL6, TL8	292,413	411,865	56,500	442
Timber-Understory	TU1, TU2, TU5	103,248	748,505	108,628	16,048



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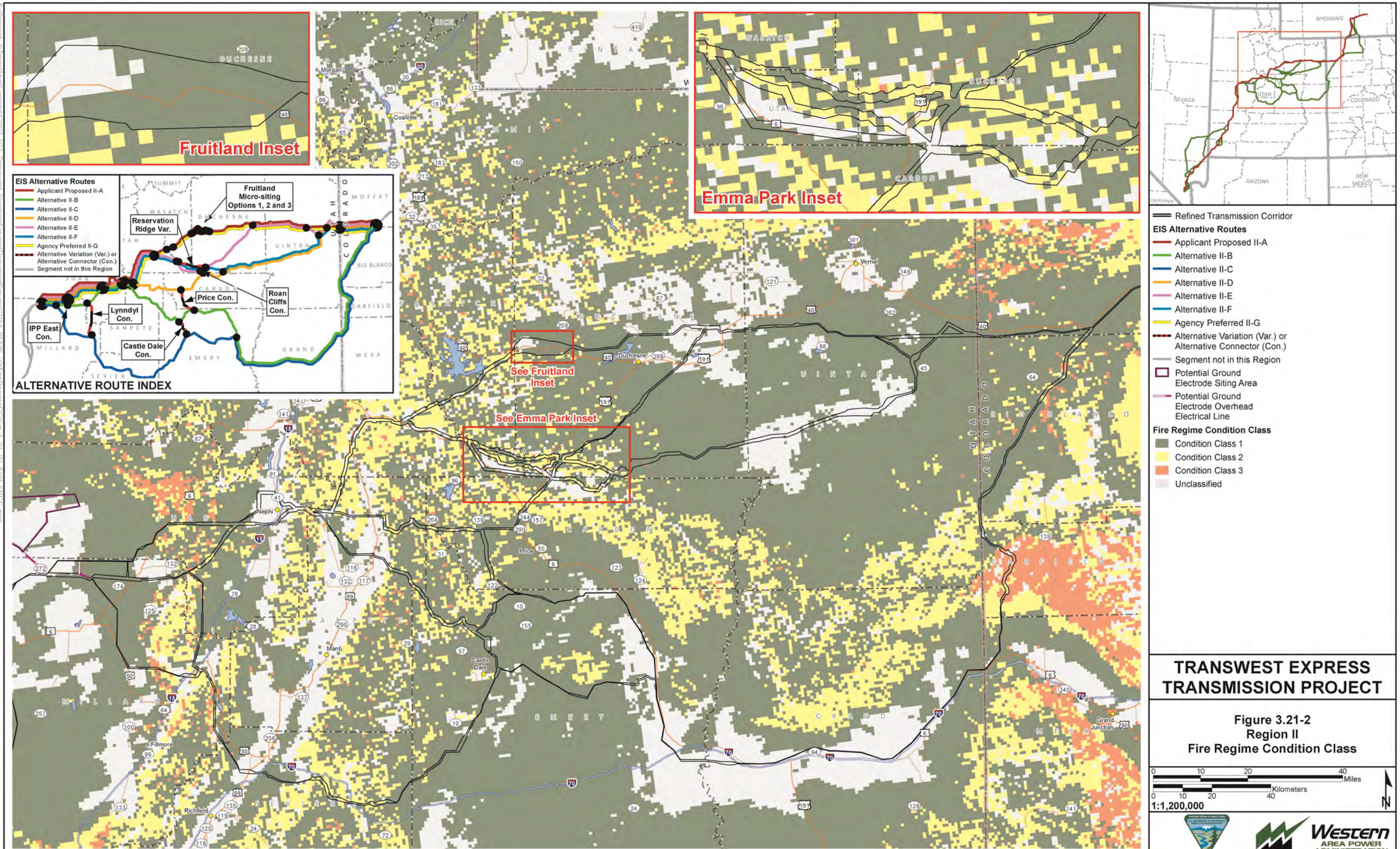

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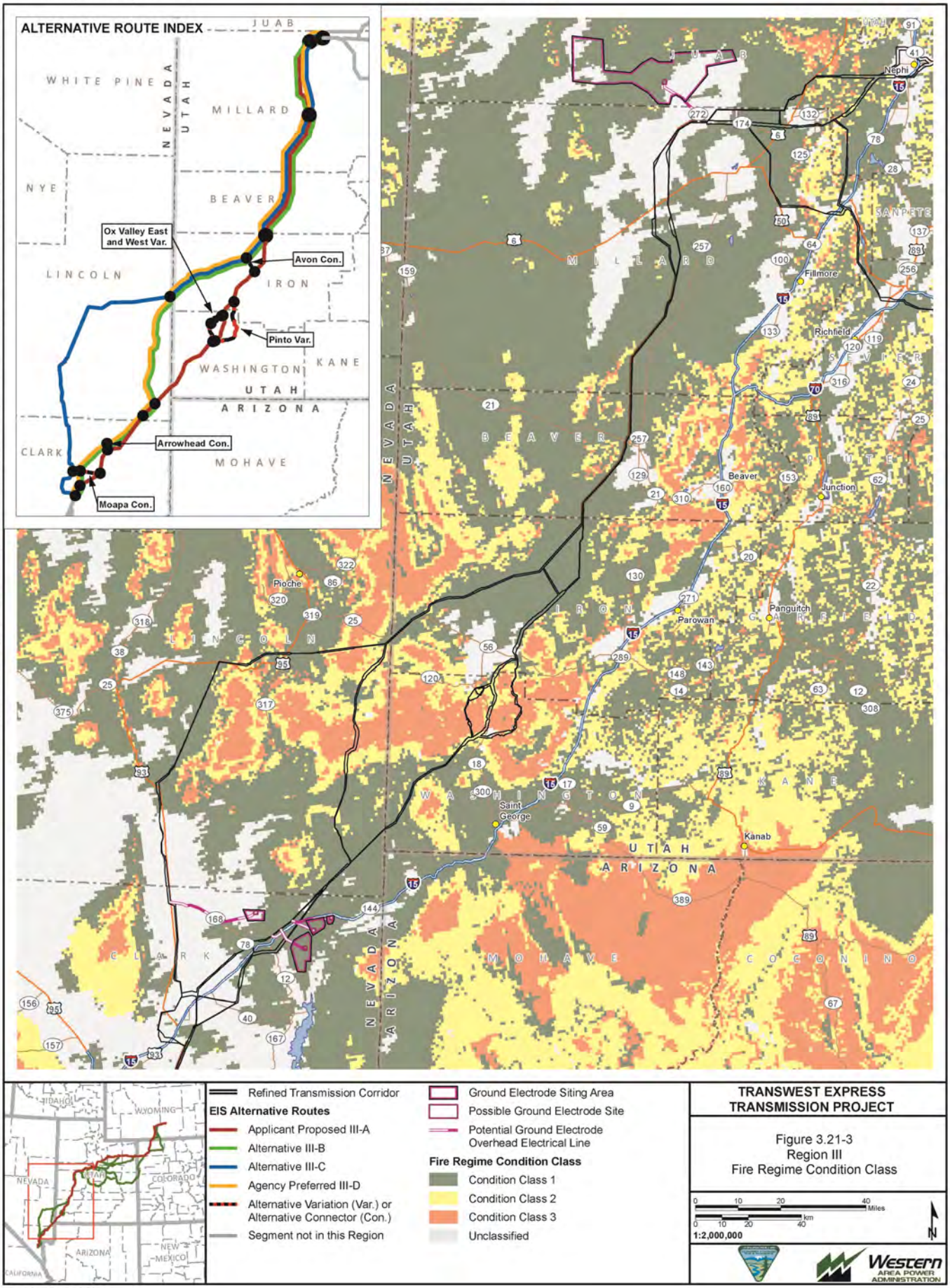
ALTERNATIVE ROUTE INDEX
JUAB
WHITE PINE
NEVADA
UTAH
MILLARD
NYE
BEAVER
Ox Valley East and West Var.
Avon Con.
LINCOLN
IRON
Pinto Var.
WASHINGTON
KANE
UTAH
ARIZONA
Arrowhead Con.
CLARK
MOHAVE
Moapa Con.
Nephi
Fillmore
Richfield
Beaver
Junction
Parowan
Panguitch
Pioche
Saint George
Kanab
Refined Transmission 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
Ground Electrode Siting Area
Possible Ground Electrode Site
Potential Ground Electrode Overhead Electrical Line
Fire Regime Condition Class
Condition Class 1
Condition Class 2
Condition Class 3
Unclassified
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 3.21-3
Region III
Fire Regime Condition Class
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Western AREA POWER ADMINISTRATION
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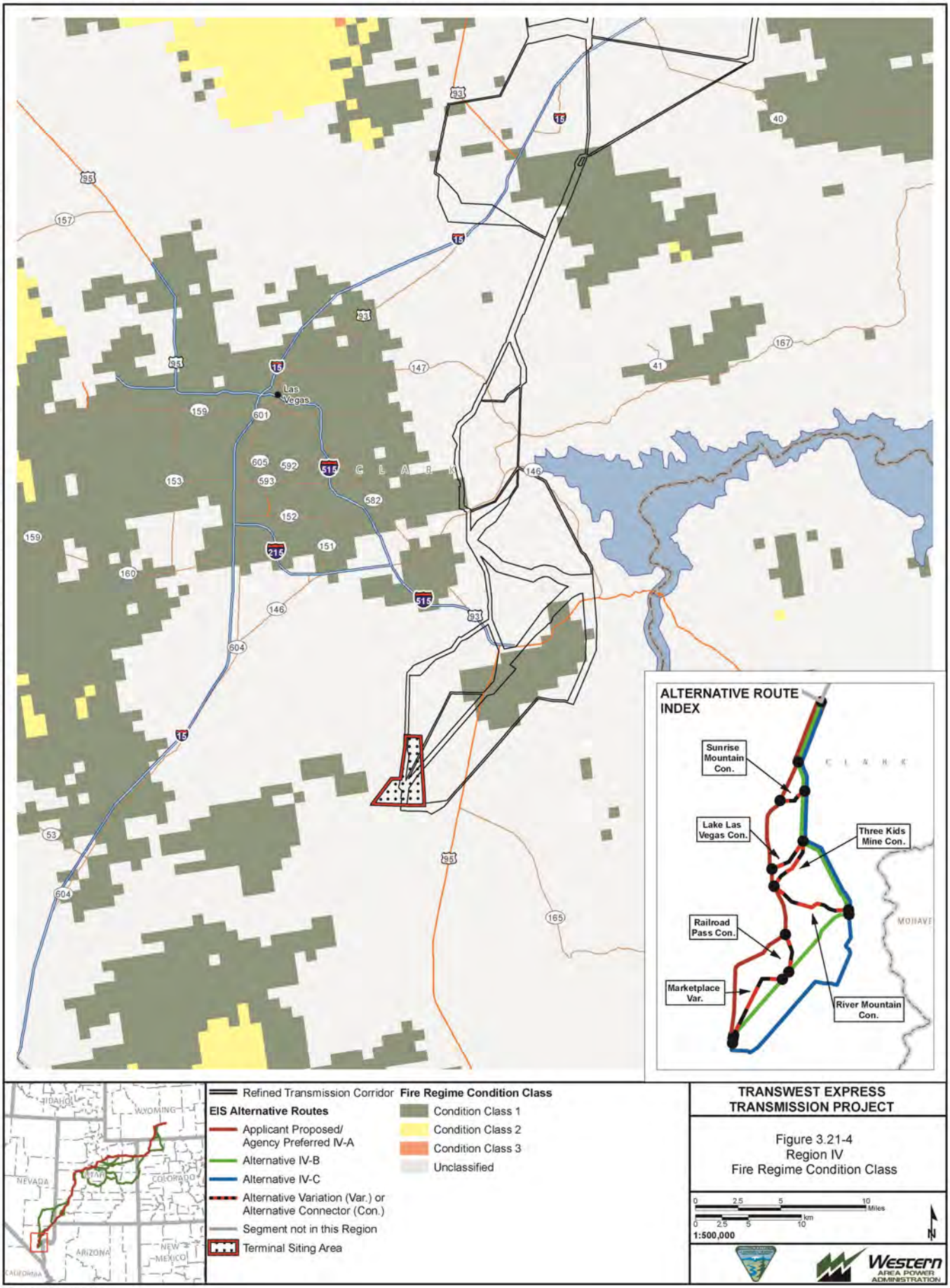

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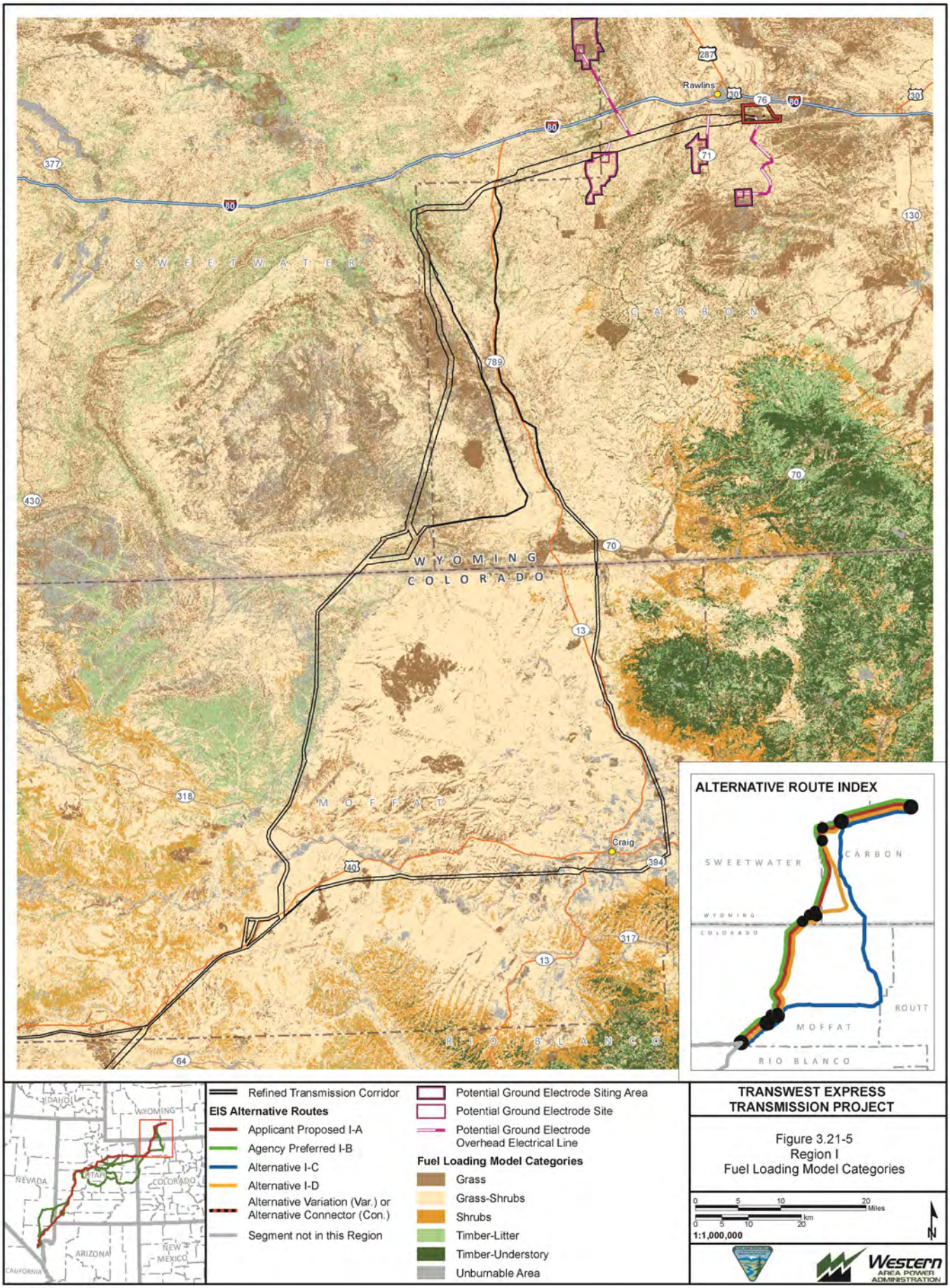

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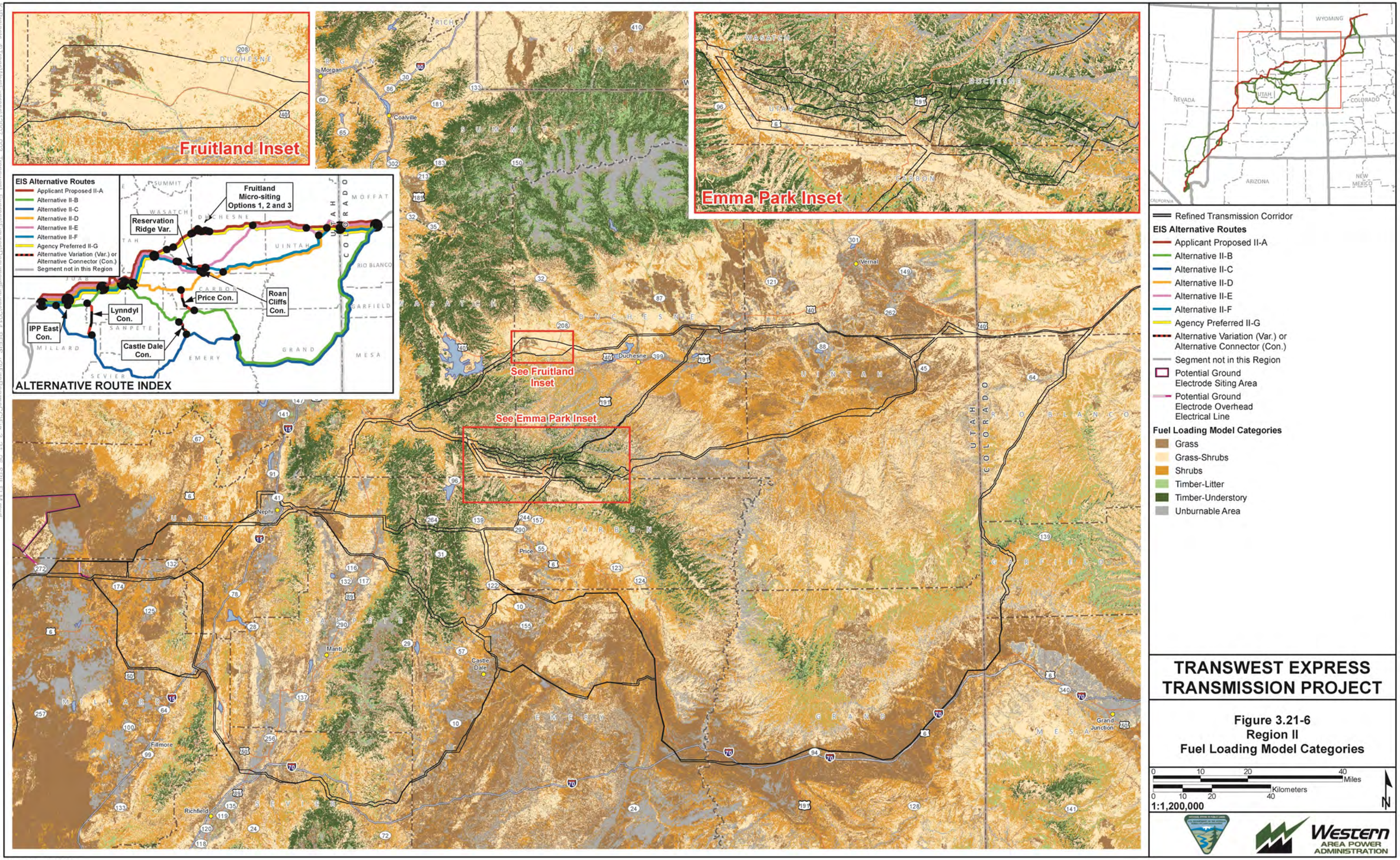

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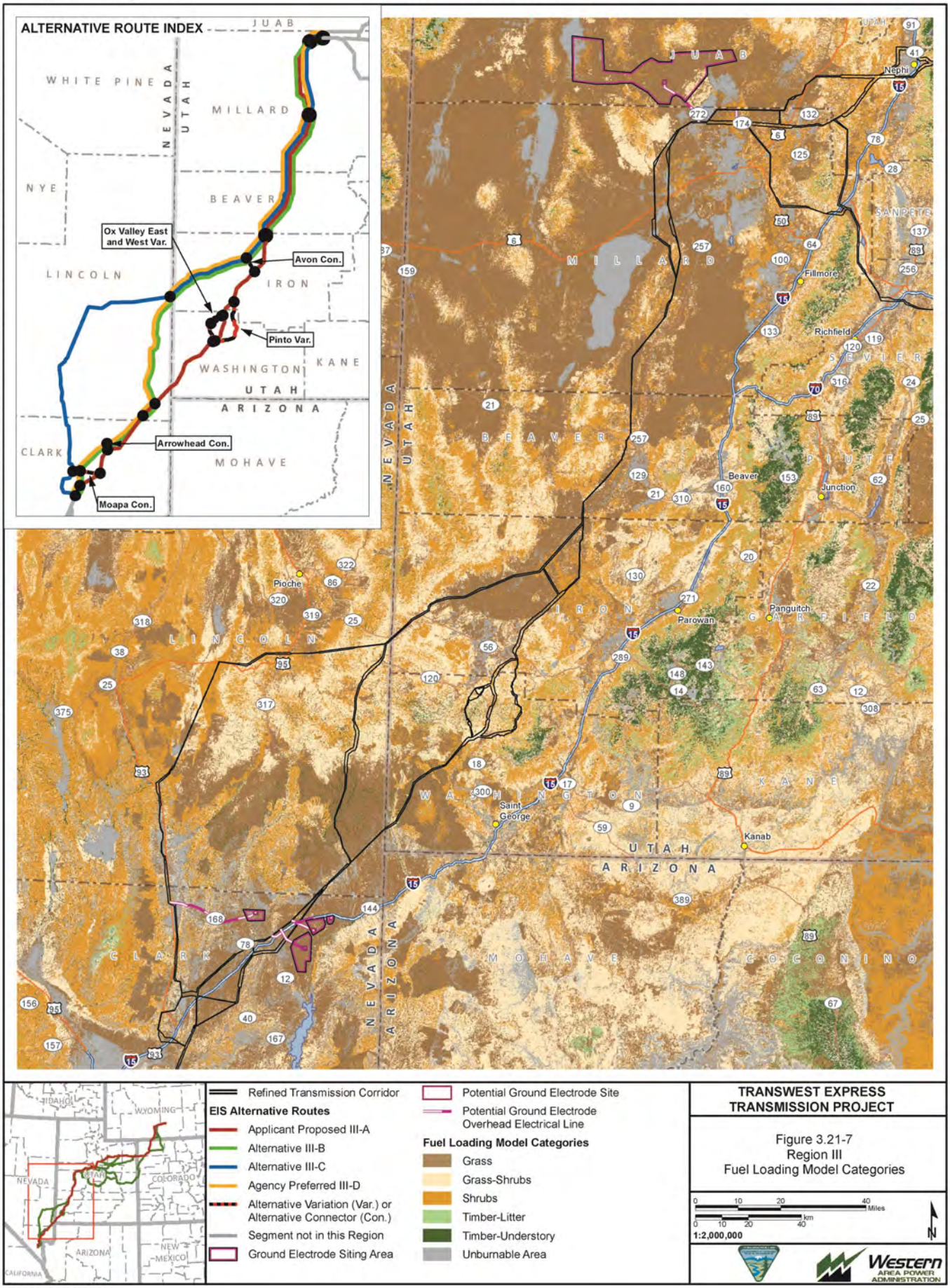
ALTERNATIVE ROUTE INDEX
JUAB
WHITE PINE
NEVADA
UTAH
MILLARD
NYE
BEAVER
Ox Valley East and West Var.
Avon Con.
LINCOLN
IRON
Pinto Var.
WASHINGTON
KANE
UTAH
ARIZONA
CLARK
Arrowhead Con.
MOHAVE
Moapa Con.
Nephi
Fillmore
Richfield
Beaver
Junction
Pioche
Parowan
Panguitch
Saint George
Kanab
Refined Transmission 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
Ground Electrode Siting Area
Potential Ground Electrode Site
Potential Ground Electrode Overhead Electrical Line
Fuel Loading Model Categories
Grass
Grass-Shrubs
Shrubs
Timber-Litter
Timber-Understory
Unburnable Area
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 3.21-7
Region III
Fuel Loading Model Categories
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Western AREA POWER ADMINISTRATION
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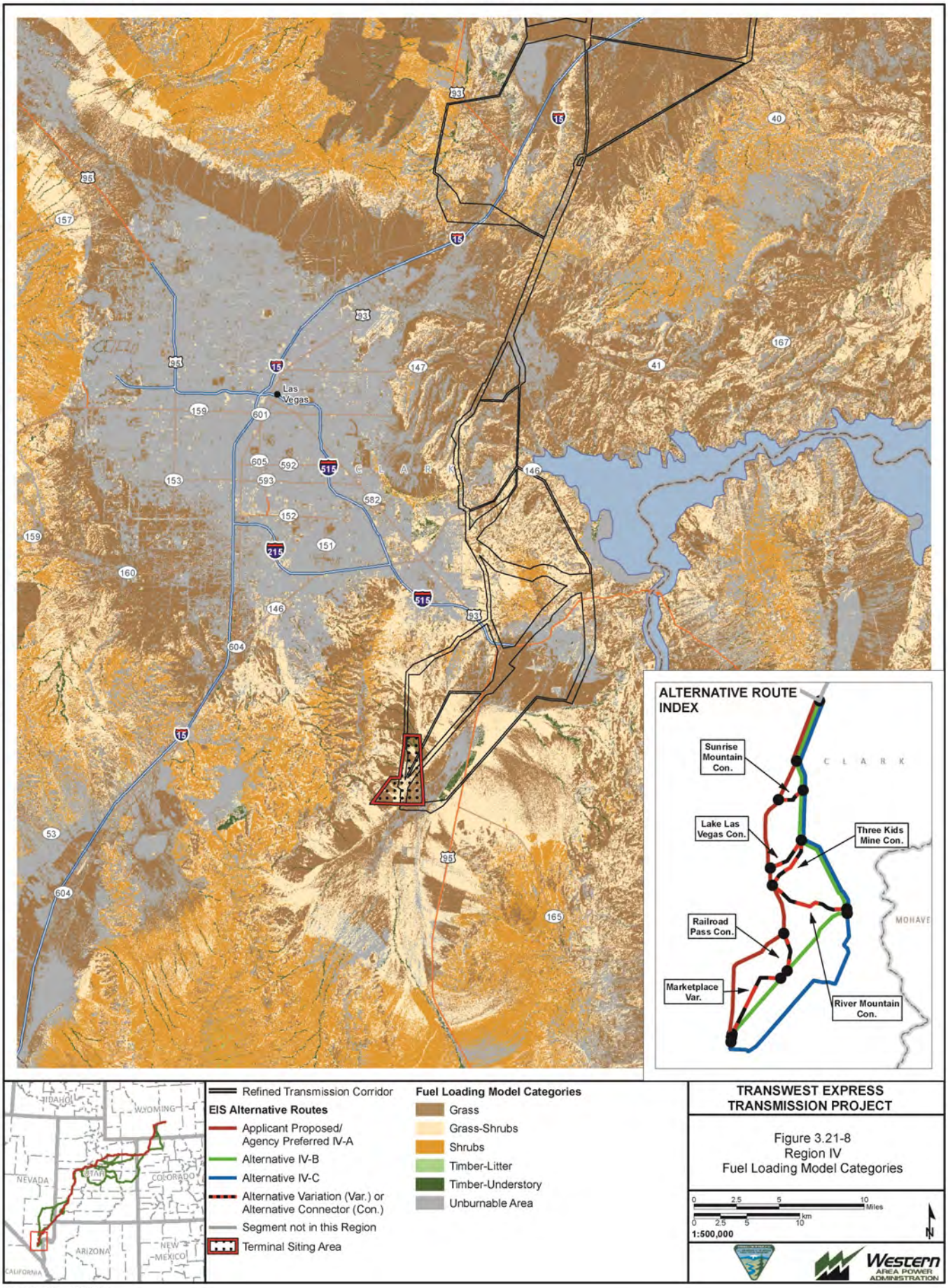

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Acres of historical fires from 1990 to 2014 by region are presented in **Table 3.21-6**. Since 1990, the greatest number of fires have occurred in Region III.

Table 3.21-6 Acres Burned Historical Fires within the Analysis Area 1990 to 2014 by Region

Years	Region I	Region II	Region III	Region IV
1990-1994	48,553	43,798	90,922	1,248
1995-1999	24,223	345,739	139,004	473
2000-2004	29,657	128,213	74,725	400
2005-2009	53,504	136,883	1,039,556	1,135
2010-2014	13,013	10,533	15,626	118

3.21.6 Impacts to Wildland Fire

As described in Section 3.21.3, Analysis Area, the analysis area for wildland fire resources encompasses the HUC10 watershed boundaries crossed by the refined transmission line corridor. For the impacts discussion, the focus is on the impacts resulting from construction and operation activities that could occur within the refined transmission line corridor, which could extend up to one mile on each side of the preliminary engineered alignment (alignment). The 250-foot-wide transmission line ROW would be located within the refined transmission line corridor. Associated access roads would be located within the 250-foot-wide transmission line ROW and the refined transmission line corridor wherever possible. In some instances, temporary construction facilities and temporary and permanent access roads may create surface-disturbance outside of the refined transmission line corridor (see **Figure 2-8**). Exact locations have not been defined at this time; however conservative estimates of impacts for these facilities and access roads are disclosed by fire regime, FRCC, and FBFM class. Locations for any other permanent surface facilities located outside of the refined transmission line corridor, including terminals and electrode beds, are identified by component and impacts are disclosed by fire regime, FRCC, and FBFM class.

The primary issues associated with wildland fire resources are the potential for the Project to alter the effectiveness of firefighting; increase the risk of a wildland fire event; and increase ignition potential. Ignition potential could be increased through changes in fire regime, FRCC, fuel loads, direct and/or indirect impacts to native vegetation communities; and impacts associated with the introduction and/or spread of noxious weeds and invasive species. The potential for wildland fire risk is unpredictable and based on a combination of factors including ignition points, fuel buildup, and weather conditions (California Public Utilities Commission 2008). Wildland fire typically can be attributed to weather (usually lightning) and human actions (including campfires, smoking, and arson). Due to the variability of weather and ingnition sources, site-specific impacts related to wildland fire are not reliably quantifiable. Fire regimes, FRCCs, and FBFM classes can be used as indicators of vegetation community health, and overall wildland fire risk for the broader area. However, current site-specific conditions could vary from these measurements due to existing disturbance, and land use, and current climatic conditions.

To evaluate impacts on existing fire regimes, potential impacts to wildland fire risk were identified based on the proposed surface disturbance on these regimes and the subsequent effect on FRCC and associated fire risk and behavior. To determine acres of fire regime areas, FRCCs, and FBFM classes disturbed by the Project, the known locations of proposed surface disturbances were overlayed with these layers to determine the amount of acreage disturbed for each class or area using GIS (as described in the introduction to Chapter 3.0).

Impact issues and the analysis considerations for wildland fire resources are listed in **Table 3.21-7**. 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 wildland fires.
- Acres of fire susceptible vegetation communities crossed; fire frequency and interval.

Table 3.21-7 Relevant Analysis Considerations for Wildland Fire Resources

Resource Topic	Analysis Considerations and Relevant Assumptions
Fire and Fuels	Increased risk of ignitions as a result of construction and operation equipment and activities, increased access, smoking, and contact between energized conductors.
Fire and Fuels	Surface disturbance activities may result in noxious weed invasions, which can lead to alterations in fire regime and FRCC for vegetation communities.
Fire and Fuels	Project could impact or facilitate land management agencies wildland fire management activities, and objectives.

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-5 (Compliance with laws and regulations); 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-13 (restoration of temporary work areas); TWE-19 (Erosion Control Plan); TWE-26 (Vegetation Management Plan and Noxious Weed Management Plan); TWE-45 (Marking of structures and/or shield/ground wire); TWE-51 (Meet or Exceed National Electrical Safety Code); TWE-62 (Development of a Hazardous Materials Management Plan); and TWE-64 (Development of Fire Protection Plan).

Additional environmental protection measures that would apply to the Project and are included in the impact analysis include the WWEC performance standards and NSU and CSU restrictions 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); FIRE-1/FIRE-2 (fire management and fuels buildup strategies); FIRE-3/FIRE-4 (Fire safety measures); 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); and SOIL-1 (topsoil salvage).

FO-specific BMPs from individual BLM FOs, and USFS forest-specific stipulations and guidelines 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 and stipulations and guidelines, the requirements of the individual offices will supersede the WWEC performance standards. In addition, the BLM FOs and USFS Districts have fire management plans that identify strategies, guidance, and requirements for fire prevention, preparedness, suppression, and restoration and rehabilitation. The Project would be required to be in conformance with these plans.

3.21.6.1 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 3.21-8** identifies estimated acreage of Project-related surface disturbance by Fire Regime within the Northern, Southern, and Southern Alternative Terminal locations. **Table 3.21-9** identifies estimated acreage of project-related surface disturbance by FRCC within the Northern, Southern, and Southern Alternative Terminal locations. **Table 3.21-10** identifies estimated acreage of project-related surface disturbance by FBFM class within the Northern, Southern, and Southern Alternative Terminal locations.

Table 3.21-8 Acreages of Fire Regime in the Northern, Southern, and Southern Alternative Terminals

	Northern Terminal				Southern Terminal				Southern Terminal Alternate			
	Construction Disturbance		Operation Disturbance		Construction Disturbance		Operation Disturbance		Construction Disturbance		Operation Disturbance	
Fire Regime	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area
I	<1	<1	<1	<1	–	–	–	–	–	–	–	–
II	-	-	-	-	-	-	-	-	-	-	-	-
III	1	<1	<1	<1	–	–	–	–	–	–	–	–
IV	509	<1	244	<1	–	–	–	–	–	–	–	–
V	–	–	–	–	438	<1	178	<1	593	<1	204	<1

Table 3.21-9 Acreages of FRCC I, II, or III in the Northern, Southern, and Southern Alternative Terminals

	Northern Terminal				Southern Terminal				Southern Terminal Alternate			
	Construction Disturbance		Operation Disturbance		Construction Disturbance		Operation Disturbance		Construction Disturbance		Operation Disturbance	
Condition Class	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area
I	1	<1	<1	<1	–	–	–	–	–	–	–	–
II	<1	<1	<1	<1	–	–	–	–	–	–	–	–
III	508	<1	244	<1	438	<1	178	<1	593	<1	204	<1

Table 3.21-10 Acreages of FBFM Classes in the Northern, Southern, and Southern Alternative Terminals

	Northern Terminal				Southern Terminal				Southern Terminal Alternate			
	Construction Disturbance		Operation Disturbance		Construction Disturbance		Operation Disturbance		Construction Disturbance		Operation Disturbance	
FBFM Class[1]	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area
NB	11	<1	6	<1	9	<1	4	<1	13	<1	4	<1
GR	324	<1	156	<1	311	<1	126	<1	421	<1	145	<1
GS	162	<1	78	<1	224	<1	91	<1	303	<1	104	<1
SH	<1	<1	--	--	1	<1	--	--	1	<1	--	--
TL	21	<1	10	<1	--	--	--	--	--	--	--	--
TU	<1	<1	0	<1	13	<1	5	<1	17	<1	6	<1

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

Northern Terminal

Construction of the Northern Terminal would result in direct surface disturbance effects to 519 acres. Following completion of construction, 270 acres of disturbed land would be immediately reclaimed pursuant to TransWest's Final POD. The area to be permanently impacted would be overlayed with a 4- to 6-inch layer of crushed rock. The majority of the disturbance would be in the saltbush and sagebrush shrubland vegetation communities. The majority of the Northern Terminal is located in Fire Regime IV and FRCC III. The bulk of the fuel load is categorized as Grass.

Construction and operation activities associated with the construction of the Northern Terminal could increase the source of ignitions points and fuel buildup within the Northern Terminal footprint. Construction and operation activities associated with the Northern Terminal that could be sources of ignition include welding, blasting, blading, small-engine use, OHV, and vehicle traffic over vegetated areas, and parking vehicles in areas of tall, dry grass. Impacts on fire risk would be proportional to the increased surface disturbance and increases in the sources of ignition. However within the permanent footprint of the terminal site, fire risk would be significantly lowered due to the replacement of vegetation with a layer of crushed rock. The FBFM class would shift from Grass to Unburnable.

The area to be impacted by the Northern Terminal is significantly altered from its natural fire regime. The area is most likely heavily impacted by the establishment and spread of invasive species into the shrubland areas. The land cover type with the highest overall risk of accidental fires spreading upon ignition is sagebrush shrubland. The risk of fire spread in the sagebrush cover type is largely dependent on the shrub interspaces and the cover of the herbaceous understory in any given area. Wide interspaces among shrubs and low herbaceous cover would limit fire spread whereas dense sagebrush shrub stands, and/or extensive herbaceous plant cover increases the risk of fire spread.

If cheatgrass, and other annual bromes are dominant species in the area, the risk for ignition is high due to the short growth period of the species (Pellant 1996). Cheatgrass tends to fill in the interspaces among shrubs, and grow in dense populations which increase the risk of fire spread (CSU 2012; Pellant 1996). Other characteristics of cheatgrass that increase wildland fire risk is that the species dries out earlier in the year, stays flammable longer than native vegetation, and the standing dead cheatgrass and litter are highly flammable (Pellant 1996). Surface disturbance from the Project could result in further spread and establishment of invasive species (such as cheatgrass), which would increase the risk of ignition and fire spread in the area. The effects of wildland fire and cheatgrass on sagebrush communities and sage-grouse are discussed in Section 3.5, Vegetation, and Section 3.8, Special Status Wildlife.

Indirect effects associated with construction of the Northern Terminal would include changes in surface fuels due to establishment and growth of annual species from increased surface disturbance. Additionally, increased risk of accidental wildland fire, combined with the presence of new infrastructure would have the potential to increase fire management (suppression) costs, and risk to firefighters. Fire management would most likely be consistent between lands adjacent to the terminal site and the terminal site, resulting in no effects to fire management objectives. To minimize the potential for wildland fire, all applicable fire laws and regulation would be observed during construction and operations of the Project. Noxious weed management would occur as described in Section 3.5, Vegetation.

To minimize the potential alterations of FRCC for each vegetation community, implementation of **VG-1**, **VG-2**, **VG-3**, and **NX-1** as described in Section 3.5, Vegetation, would mitigate Project impacts to the fire regime of these communities. The following are proposed mitigation measures to minimize impacts to wildland fire risk and management.

FR-1*: The fire protection plan to be developed as part of the COM Plan in addition to the items outlined in TWE-64 would include the following:*

- *TransWest would implement line patrols to inspect the ROW for hazard trees, damage to any component of the Project, and other potentially unsafe conditions that could increase wildland fire ignition risk.*
- *TransWest would develop a wildland fire traffic control plan which would stipulate mechanisms through which narrow roads shall be kept passable for emergency service providers in a wildland fire emergency situation; designate the point of contact to administer the wildland fire traffic control plan and facilitate emergency service providers access; identify vehicle parking for construction and maintenance vehicles during wildland fire emergencies; and identify alternative routes for large equipment and vehicle evacuation during wildland fire emergencies.*
- *TransWest would outline communication methods to ensure that immediate reporting of fires during construction activities and maintenance activities is feasible. Each crew member would carry a laminated card listing pertinent telephone numbers for reporting fires and defining immediate steps to take if a fire starts. The cards would be updated as needed, and redistributed to crew members.*
- *In consultation with land management agencies, TransWest would identify when and where construction and maintenance work would cease in response to Red Flag Warning events as issued daily by the National Weather Service. Overland drive-and-crush travel would be prohibited or limited (at land management agencies' discretion) during times of high fire risk.*
- TransWest would develop a fire protection plan in consultation with the appropriate land management agencies.

***FR-2**: No open trash burning would occur, unless specifically permitted by the appropriate authorities.*

***FR-3**: Activities that could generate a spark such as refueling, smoking, blasting, and welding would only occur on areas that have been cleared. A spotter would be used for welding and other similar activities. The spotter would be equipped with water and tools to quickly extinguish any sparks.*

***FR-4**: All engines used in the ROW would have an approved spark arrestor.*

Implementation of **FR-1** would mitigate impacts from wildland fire events by ensuring that wildland fires could be reported immediately, that emergency vehicles and firefighters have access as needed during wildland fire events, and that construction and maintenance workers are not at risk from wildland fire events during high risk days. Implementation of **FR-2**, **FR-3**, and **FR-4** would reduce the potential for a project-related ignition sources in the analysis area.

Southern Terminal

Construction of the Southern Terminal would result in surface direct disturbance effects to 557 acres of vegetation. Following completion of construction, 331 acres of disturbed land would be immediately reclaimed pursuant to TransWest's Final POD. The area to be permanently impacted would be overlayed with a 4- to 6-inch layer of crushed rock. 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. The majority of the Southern terminal is located in Fire Regime V, and FRCC III. FBFM classification is predominantly Grass.

Since the predominant cover type within the Southern Terminal area is developed/disturbed, no direct impacts related to wildland fire risk and management are anticipated during operations; however, if cheatgrass and noxious weeds are present in the disturbed areas, the risk for ignition during construction may be high until surface disturbance and vegetation removal is complete.

Indirect impacts 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. Following completion of construction, 495 acres of disturbed land would be immediately reclaimed pursuant to TransWest's Final POD. The area to be permanently impacted would be overlayed with a 4- to 6-inch layer of crushed rock. The Southern Terminal Alternate is located in the same siting area as the Southern Terminal. The Southern Terminal Alternate is located in only two vegetation community types (desert shrub and developed/disturbed). The majority of the disturbance in the Southern Terminal Alternate would occur in the Developed/Disturbed community type. The majority of the Southern Terminal Alternate is located in Fire Regime V, and FRCC III. FBFM classification is predominantly Grass.

Since the predominant cover type within the Southern Terminal area is developed/disturbed, no direct impacts related to wildland fire risk and management are anticipated. Indirect impacts 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 this design option 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, southern converter station and 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. **Tables 3.21-11**, **3.21-12**, and **3.21-13** provide a summary of impacts associated with Design Option 2.

Table 3.21-11 Summary of Design Option 2 and Design Option 3 Site Impacts by Fire Regime

	Design Option 2 Southern Terminal – Converter/Substation				Design Option 3 Converter/Substation			
	Construction Disturbance		Operation Disturbance		Construction Disturbance		Operation Disturbance	
Fire Regime	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area
I	–	–	–	–	–	–	–	–
II	-	-	-	-	-	-	-	-
III	–	–	–	–	–	–	–	–
IV	–	–	–	–	–	–	–	–
V	156	<1	92	<1	138	<1	74	<1

Table 3.21-12 Summary of Design Option 2 and Design Option 3 Site Impacts to FRCC I, II, and III

Condition Class	Design Option 2 Southern Terminal – Converter/Substation				Design Option 3 Converter/Substation			
	Construction Disturbance		Operation Disturbance		Construction Disturbance		Operation Disturbance	
	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area
I	43	<1	38	<1	26	<1	21	<1
II	–	–	–	–	–	–	–	–
III	112	<1	99	<1	67	<1	54	<1

Table 3.21-13 Summary of Design Option 2 and Design Option 3 Site Impacts to FBFM Classes

FBFM Class[1]	Design Option 2 Southern Terminal – Converter/Substation				Design Option 3 Converter/Substation			
	Construction Disturbance		Operation Disturbance		Construction Disturbance		Operation Disturbance	
	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area	Acres	% of Analysis Area
NB	1	<1	0	<1	1	<1	0	<1
GR	66	<1	39	<1	58	<1	32	<1
GS	21	<1	12	<1	18	<1	10	<1
SH	69	<1	41	<1	60	<1	32	<1
TL	--	--	--	--	--	--	--	--
TU	--	--	--	--	--	--	--	--

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

Construction and operation of a converter station near IPP, ground electrode system, and series compensation station would be similar to impacts described in Section 3.21.6.1, Impacts from Terminal Construction and Operation. The same design features, BMPs, and mitigation measures listed for the Northern Terminal would be implemented to minimize these impacts resulting from Design Option 2.

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. **Tables 3.21-11**, **3.21-12**, and **3.21-13** provide 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 as 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 3.21.6.1, Impacts from Terminal Construction and Operation and Section 3.21.6.2, 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 these impacts resulting from Design Option 3.

3.21.6.2 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 line corridor, and the ancillary facilities. Within the 250-foot-wide transmission line ROW, surface-disturbing activities would consist of ROW clearing, and installation of transmission line structures and wires. Within the refined transmission line corridor, surface-disturbing activities would be related to the construction of temporary and long-term facilities related to construction and operations and temporary and long-term access roads. Acres of surface impacts are listed below under each of the Region's impact discussions. Construction of the transmission line would occur concurrently with construction of terminals and ground electrode system construction.

Direct impacts to wildland fire ecology and management from the Project would include increasing the source of ignition points, increasing the risk of ignition, changing the spread and intensity of wildland fire, and impacting the effectiveness of wildland fire management and suppression.

Impacts to ignition points from construction and operation activities such as welding, vehicle ignition, blasting, blading, and overland travel would be similar to those described under Section 3.21.6.1, Impacts from Terminal Construction and Operation.

Surface disturbance associated with the Project could alter vegetation communities classified as FRCC I. These alterations may result in fire frequencies departing from their natural frequencies. These changes may result in landscape alterations that shift FRCC I classified communities into FRCC II or III. Noxious weed invasions into disturbed areas may result in incremental changes to the FRCC for each vegetation community. Impacts related to noxious weeds, specifically cheatgrass and other annual grasses, would be similar to those described under Section 3.5.6.1, Impacts from Terminal Construction and Operation. In addition, impacts to wildland fire risk could extend beyond the Project surface disturbance areas as described in Section 3.5, Vegetation. The establishment of weedy annual species may lead to buildup of fine fuels that ignite readily and are consumed rapidly. Noxious weed management would be implemented as described in Section 3.5, Vegetation.

Fire regimes in vegetation communities modified by construction activities would be altered. Cover type conversions, the removal or rearrangement of canopy and surface fuels, the temporary creation of localized areas devoid of vegetation or firebreaks, and colonization of disturbed areas by annual invasive species would result in altered fire regimes at facility locations and within vegetation communities within the ROW.

The implementation of BMPs and design features would be the same as described under Section 3.21.5.1, Impacts from Terminal Construction and Operation. The proposed mitigation measures outlined in Section 3.21.5.1, Impacts from Terminal Construction and Operation, would be implemented to minimize impacts to wildland fire ecology, risk, and management. In addition, the following mitigation measures are proposed to minimize impacts to wildland fire ecology, risk, and management:

***FR-5**: TransWest would consult with the land management agencies to ensure vegetation management activities are in line with land management agencies fire management objectives.*

***FR-6**: Where appropriate and feasible, micro-siting of the route would occur in recently burned areas.*

Implementation of **FR-5** would ensure vegetation management activities are in compliance with the land management agencies fire management objectives. **FR-6** would route the line in areas previously burned to reduce wildland fire risk.

Operation and Maintenance Impacts

Impacts to ignition points from operation or maintenance activities such as welding, vehicle ignition, blasting, blading, and overland travel would be similar to those described under Section 3.21.6.1, Impacts from Terminal Construction and Operation. In addition, the presence of the energized transmission line could increase the risk of wildland fire ignition in areas of high fire risk and lightning strikes. Lightning protection would be provided by overhead shield wires on the top of the line.

Fires where power lines are located can be started by contact between the conductors and/or insulation and anything flammable or that could create a spark such as vegetation, floating or wind-blown debris, bullets, airplanes or helicopters, or other conductors. Failure of transmission structures could occur as a result of intentional damage (e.g., vandalism, terrorism), natural disasters, vehicle or aircraft collision, or a design or engineering flaw in a system component. However, the conductors and structures for high voltage lines tend to be of sufficient size to be resistant to physical damage. In addition, the transmission line would be protected with power circuit breakers and line relay protection equipment. If a conductor or component failure occurs, power would be automatically removed from the line. All buildings, fences, and other structures with metal surfaces located within 300 feet of the alignment would be grounded to the mutual satisfaction of the parties involved.

While the risk of wildland fire ignition does increase with power lines, high-voltage power lines are much less likely to cause wildland fires than lower voltage and distribution lines due to their height and spacing, which limits contact with other lines, vegetation, and debris. In addition, the applicant will implement the Vegetation Management Plan described in Section 3.5, Vegetation, and **Appendix D**, POD, to minimize contact and or arcs with vegetation. The Vegetation Management Plan is designed to maintain trees and shrubs within certain heights to limit direct contact with the line, as well as prevent arcs from the power line to trees. A key component of the Vegetation Management Plan is the identification of hazard trees. Hazard trees are defined as trees located within or adjacent to the 250-foot-wide transmission line ROW that present a hazard to employees, the public, or power system facilities.

Typical characteristics used in identifying a hazard tree include: encroachment within the safe distance to the conductor as a result of the tree bending, growing, swinging, or falling toward the conductor; deterioration or physical damage to the root system, trunk, stem or limbs and/or the direction and lean of the tree; vertical or horizontal conductor movement and increased sag as a result of thermal, wind and ice loading; exceeding facility design specifications; fire risk; and other threats to the electric power system facilities or worker/public safety. The Applicant would conduct annual inspections to identify and remove hazard trees. Vegetation management activities could increase wildland fire risk through removing tree canopy cover resulting in changes in moisture and temperature for understory species. However, vegetation management would likely decrease wildland fire risk, wildland fire intensity and wildland fire severity through the removal of hazard trees, the thinning of dense vegetation cover, the removal of debris piles that are identified as high risk fuel loads, and the reducing of total fuel volume in the 250-foot-wide transmission line ROW.

Level 1 and 2 (Wire Zone) vegetation management levels (as described in Section 3.5, Vegetation), would create fuel breaks within forested areas. Fuel breaks can assist in wildland firefighting by slowing down fire growth, reducing fireline intensity, and providing enhanced fire suppression opportunities. Level 2 (Border Zone) and 3 vegetation management levels would not receive intensive vegetation management within the ROW, and may not provide a substantial fuel break should a fire occur near the Project. In sage-grouse habitat, the BLM's WO-IM 2013-128 (Sage-grouse Conservation in Fire Operations and Fuels Management) includes forming partnerships with linear ROW holders to maintain fuel breaks, which reduce fuel continuity and serve to protect at-risk landscapes. As the majority of sagebrush is under the height limits outlined in the Vegetation Management plan, vegetation clearing in

sagebrush would typically not occur. However, the implementation of fuel breaks of sagebrush habitat could provide a benefit to sage-grouse management by facilitating fire suppression, reducing the acres of habitat burned, and limiting vegetation clearing in suitable habitat. Implementation of this policy and its impacts are discussed in Section 3.7, Wildlife.

Increased access through the new and upgraded network of access roads and the maintained ROW would increase recreation traffic, and trespassing which would increase the potential for more vehicle and human caused ignitions. However increased access roads would increase fire breaks, and allow easier access for fire suppression activities during wildland fire events.

Removal of fuels along the power lines through vegetation management would reduce the hazard of wildland fire caused by power line malfunction. The removal of hazardous trees and fuels in a linear fashion along the power line ROW would create a zone of disturbed fuels. In the event of power line discharge or arcing, the arc from the power line would not likely be able to ignite a fire event because there would little fuels to sustain a fire. Additionally, creation of a ROW with a grass fuel load would make for easier fire suppression since access would be easier and there would be fewer trees to sustain a high-intensity fire. However, the ROW may facilitate a higher probability of ignition and faster spreading fire due to possible invasion of abundant fine fuels such as annual grasses (e.g., cheatgrass). Indirectly, removal of hazard trees and fuel loads along the power lines may prevent power line damage from wildland fire by moving the sources of heat and flame away from power lines and power line structures, thus preventing power failure.

Other causes of increased ground fuel sources include the build-up of slash (branches and other small woody debris less than 3 inches in diameter) and coarse woody debris (branches and downed trees more than 3 inches in diameter) created during ROW clearing and maintenance. Increased ground fuels can affect fire intensity and severity, and piled slash can create long-lasting, hot fires that may damage and sterilize soils on a small scale. 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.

In areas where removal is not feasible or possible, fuel treatments such as mastication, chipping, or lopping and scattering would be used to reduce overhead hazards. These fuel treatments are designed to place as much of the fuel as possible in direct contact with the ground to facilitate decay through increased moisture retention, potentially lessening the intensity of a fire situation over time while providing increased access for firefighters. However, these methods would do little to slow or prevent fire movement to the power line structures.

The response and revegetation potential of each vegetation type varies depends on actual fire conditions, the seasonal timing, pre- and post-fire vegetation, elevation, and post-fire weather patterns. Vegetation in cool fire areas (for example areas where native perennial bunchgrass cover and site productivity are high) can frequently revegetate naturally without seeding. Hot fires in areas with dense sagebrush or pinyon juniper stands can result in scorched, water-resistant soils that become unproductive until the condition changes, which could take several years. Extremely severe fires have been known to sterilize soils and lead to the permanent loss of productivity.

If a wildland fire occurs due to the proposed Project, it could impact air quality, water quality, wildlife, vegetation communities, recreation activities, timber resources, and nearby rural and urban development. Wildland fire events can impact the operation of the transmission line as well impacting reliability of electrical sources. Transmission line operation can be impacted by dense smoke, heat and fire suppression activities. This could result in damaged structures, conductors, power line, circuits and/or insulation, with the net result of short-term power outages and possible related repair and maintenance activity impacts.

Impacts to air quality from wildland fire are discussed in Section 3.1, Climate and Air Quality. Impacts on water quality from wildland fire would result from increased rates of erosion and sedimentation from burned hillsides, increased water temperature from changes in vegetative cover, and changes in water chemistry from the use of fire retardants. Accidental wildland fires ignited as a result of construction or operation activities could affect vegetation communities in a variety of ways. Impacts may include, but are not limited to: partial to complete removal of aboveground plant cover and below-ground components (e.g., roots, rhizomes, and seed bank); soil moisture loss and possible subsequent hydrophobic soil; loss of cacti, yucca, and special status plant species and/or their associated habitats; propensity to increase the spread or introduction of noxious and non-native invasive weed species; and loss of suitable habitat for wildlife and grazing animals. Post-wildland fire revegetation to a pre-disturbance baseline structure and composition may vary depending on physical, environmental, and physiological factors such as the severity, intensity, and duration of the wildland fire; extent of disturbance; topography; slope; soil moisture; precipitation; and sensitivity of the impacted species. Vegetation cover type recovery time frames would generally be consistent with those described in Section 3.5, Vegetation, for post-construction reclamation. Recreation activities would be impacted by closures of any RAs where wildland fire occurs, and any changes in trails, access, and vegetation communities post-wildland fire. Timber resources could be permantly lost as a result of wildland fire, and/or temporarily or permantly unharvestable due to a loss in access during and afterwildland fire. Accidental wildland fire also may indirectly affect fire management through increases in suppression costs, and increased risk to firefighters.

If a wildland fire occurs near the Project, wildland firefighters and fire suppression efforts could be negatively and positively impacted. The ROW and structures could be an obstacle, and another feature requiring fire suppression efforts. The energized line during fires could be a risk to fire fighters on the ground, and could limit the area in which aircraft could assist in fire suppression activities. The Project would alter fire suppression priorities during wildland fire events. In portions of the route, the Project may be the only infrastructure in the area, and as such may be an obstacle to letting a fire burn safely to natural or engineered containment boundaries. The energized line and broken conductors can deliver currents long distance, especially if the line or conductors come in contact with linear features such as fences. Smoke particles can carry electrical charge, and dense smoke can allow arcing from the conductor to the ground. If the Project is not de-energized during a wildland fire event, buffers would be required around structures and conductors for the safety of fire personnel. Positive impacts from the Project on wildland fire suppression would include the development of a 250-foot-wide transmission line ROW and additional access roads acting as fire breaks, and providing access to fire personnel. In addition, the vegetation management associated with the Project could decrease fuel loads, and fire intensity and severity within the ROW.

In general, all of the impacts described above would contribute to a substantial shift in fire management strategy and priorities for the land management agencies. The presence of the transmission line does increase risk of ignitions through increased access. However, more importantly, it prevents the use of certain fire and fuels management tools (prescribed fire or wildland fire use) in the vicinity of the transmission line. Additionally, it requires a prioritization to suppress fires in and around the line to protect human lives and infrastructure. This, in turn, can result in fiscal impacts to the agency due to the risk of ignitions to suppress, additional values to protect, and the reduction in areas that wildland fire can be used to meet land management objectives. Additional risks include increased potential for undesirable fire effects and increased risk to fire suppression personnel.

The implementation of BMPs and design features would be the same as described under Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components. The proposed mitigation measures outlined in Section 3.21.6.1, impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components, would be implemented to minimize impacts to wildland fire ecology, risk, and management.

Decommission 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 and design features and mitigation measures would be applied to reduce impacts during decommissioning activities. See **Appendix D** to this Final EIS for more details on decommissioning activities.

3.21.6.3 Region I

Impact areas in the regional table are split between ROW clearing/trampling and construction and operation facilities. Clearing is defined as cutting vegetation off at ground level and leaving the stumps in place for erosion control. Trampling is defined as driving over the vegetation with construction equipment and leaving the resulting flattened vegetation in place.Facilities would include towers, 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 the refined transmission line corridor. **Tables 3.21-14, 3.21-15,** and **3.21-16** provide a comparison of impacts associated with the alternative routes in Region I.

Alternative I-A (Applicant Proposed)

In Alternative I-A, there would be 156 miles of transmission line. The majority of the disturbance would occur in the sagebrush and saltbush shrubland vegetation community types. 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. The route follows US-40 for about half the distance of the line's length in Colorado. The majority of Alternative I-A is found within Fire Regime IV and FRCC II. FBFM classification is predominantly Grass-Shrub.

Construction activities could alter the vegetation communities classified as FRCC I. These alterations may result in fire frequencies departing from their natural frequencies. Due to the location of the line along US-40, fire risk and impacts to fire management would be minimal. In addition, implementation of Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components, would mitigate impacts to wildland fire risk, and management.

Alternative I-B (Agency Preferred)

In Alternative I-B, there would be 158 miles of transmission line. The majority of the disturbance would occur in the sagebrush and saltbush shrubland vegetation community types. 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. The route follows US-40 for about half the distance of the line's length in Colorado. The majority of Alternative I-B is found within Fire Regime Group IV and FRCC II. FBFM classification is predominantly Grass-Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Table 3.21-14 Summary of Region I Alternative Route Impacts by Fire Regime

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																
Fire Regime I	26	<1	26	<1	37	<1	26	<1	–	–	–	–	–	–	–	–
Fire Regime II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire Regime III	90	<1	90	<1	258	<1	88	<1	–	–	–	–	–	–	–	–
Fire Regime IV	2,628	<1	2,624	<1	3,565	<1	2,833	<1	–	–	–	–	–	–	–	–
Fire Regime V	325	<1	329	<1	52	<1	372	<1	–	–	–	–	–	–	–	–
Facilities																
Fire Regime I	16	<1	16	<1	22	<1	16	<1	4	<1	4	<1	5	<1	4	<1
Fire Regime II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire Regime III	64	<1	64	<1	184	<1	63	<1	17	<1	17	<1	45	<1	17	<1
Fire Regime IV	1,672	<1	1,668	<1	2,235	<1	1,774	<1	364	<1	367	<1	493	<1	377	<1
Fire Regime V	200	<1	204	<1	33	<1	231	<1	50	<1	51	<1	8	<1	55	<1

Table 3.21-15 Summary of Region I Alternative Route Impacts for FRCC I, II, or III

	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	
FRCC	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																
FRCC I	201	<1	201	<1	640	<1	206	<1	–	–	–	–	–	–	–	–
FRCC II	1,684	<1	1,728	<1	1,608	<1	1,917	<1	–	–	–	–	–	–	–	–
FRCC III	1,303	<1	1,299	<1	1,505	<1	1,354	<1	–	–	–	–	–	–	–	–
Facilities																
FRCC I	138	<1	138	<1	411	<1	141	<1	34	<1	34	<1	95	<1	35	<1
FRCC II	1,094	<1	1,124	<1	1,068	<1	1,232	<1	255	<1	264	<1	249	<1	276	<1
FRCC III	789	<1	786	<1	896	<1	807	<1	160	<1	160	<1	186	<1	161	<1

Table 3.21-16 Summary of Region I Alternative Route Impacts for FBFM Classes

	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	
FBFM Class[1]	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																
NB	216	<1	214	<1	274	<1	161	<1	–	–	–	–	–	–	–	–
GR	607	<1	622	<1	540	<1	578	<1	–	–	–	–	–	–	–	–
GS	2,063	<1	2,086	<1	2,964	<1	2,414	<1	–	–	–	–	–	–	–	–
SH	64	<1	64	<1	80	<1	67	<1	–	–	–	–	–	–	–	–
TL	315	<1	320	<1	57	<1	301	<1	–	–	–	–	–	–	–	–
TU	4	<1	4	<1	10	<1	4	<1	–	–	–	–	–	–	–	–
Facilities																
NB	140	<1	139	<1	172	<1	111	<1	33	<1	34	<1	38	<1	27	<1
GR	377	<1	388	<1	343	<1	356	<1	80	<1	83	<1	76	<1	72	<1
GS	1,313	<1	1,328	<1	1872	<1	1,510	<1	292	<1	298	<1	416	<1	327	<1
SH	40	<1	40	<1	50	<1	42	<1	10	<1	10	<1	12	<1	10	<1
TL	199	<1	202	<1	39	<1	191	<1	45	<1	46	<1	9	<1	43	<1
TU	3	<1	3	<1	8	<1	3	<1	1	<1	1	<1	2	<1	1	<1

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

Alternative I-C

In Alternative I-C, there would be 186 miles of transmission line. The majority of the disturbance would occur in the sagebrush vegetation community types. 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. The route follows Wyoming SH-789/ Colorado SH-13 for over half the distance of the line's length in Wyoming and follows US-40 for about half the distance of the line's length in Colorado. The majority of Alternative I-C is found within Fire Regime IV. The bulk of Alternative I-C is located in FRCC II. FBFM classification is predominantly Grass-Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative I-D

In Alternative I-D, there would be 168 miles of transmission line. The majority of the disturbance would occur in the sagebrush vegetation community types. 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. The route follows US-40 for about half the distance of the line's length in Colorado. The majority of Alternative I-D is found within Fire Regime IV. The bulk of Alternative I-D is located in FRCC II. FBFM classification is predominantly Grass-Shrub.

Along Alternative I-D are the Tuttle Ranch Micro-siting Options 3 and 4. For the Tuttle Ranch Micro-sites, the wildland fire risk parameters located along Options 3 and 4 are similar to the wildland fire risk parameters located along Alternative I-D. The two micro-siting options would affect more pinyon-juniper, and less grassland and sagebrush shrubland vegetation communities compared to Alternative I-D. Impacts to wildland fire risk parameters would be similar between the three micro-siting options and the comparable section of Alternative I-D.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

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 3.21-17** summarizes impacts associated with the northern ground electrode system. Some locations might serve multiple alternative routes, while others could only be associated with a specific alternative route.

Region I Conclusion

All alternatives cross very similar vegetation communities, with sagebrush shrubland as the dominant vegetation. In general, potential impacts would include the potential for introduction of non-native annual grasses due to disturbance. This could lead to an increase in fine fuels and fire frequency, although that potential increase would be in a relatively small area (<1 percent of the watershed). The ability to suppress and/or manage fire would not be adversely impacted by the Project due to the relatively low amount of disturbance, generally open landscape, and relatively easy access to the alternative alignments.

Table 3.21-17 Summary of Region I Alternative Ground Electrode System Construction Impact Parameters for Wildland fire (acres)

	Bolton Ranch (All Alternatives)	Separation Flat (All Alternatives)	Separation Creek (All Alternatives)	Eight Mile Basin (All Alternatives)
Fire Regime				
Fire Regime I	–	–	<1	–
Fire Regime II	-	-	-	-
Fire Regime III	2	<1	2	1
Fire Regime IV	134	110	74	87
Fire Regime V	–	–	–	<1
FRCC I, II, or III				
FRCC I	2	2	2	2
FRCC II	–	–	<1	1
FRCC III	133	110	74	84
FBFM Class[1]				
NB	16	9	10	<1
GR	69	78	105	9
GS	62	5	7	63
SH	1	<1	6	2
TL	3	--	--	1
TU	<1	--	--	1

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

Impacts to wildland fire risk, and management would be similar between the Alternatives I-A, I-B and I-D due to the similarities in miles/acreage of disturbance and Fire Regimes, FRCCs, and FBFM classes crossed. Alternative I-C would have more miles of alignment and more proposed surface disturbance, and would cross about 3 times more FRCC I acreage than the other alternatives; this would increase the impacts to vegetation from wildland fire as compared to the other alternatives. However, Alternative I-C also would follow highways for more miles than other alternatives, which would help to minimize the acreage that could be affected by a wildland fire. Impacts on costs of fire suppression cannot be precisely predicted for each alternative. However, the relative mileage of each alternative provides an indicator of relative cost in that increased mileage means increased need for suppression to protect infrastructure, as well as increased area where fire cannot be used as a tool to address reduced fuel loading. Accordingly, Alternative I-C would likely result in the greatest potential impacts on fire suppression costs, followed by Alternatives I-D, I-B (Agency Preferred), and I-A, respectively (see specific mileages in analysis above).

Region II

Tables 3.21-18, **3.21-19**, and **3.21-20** provide a comparison of impacts associated with the alternative routes in Region II.

Alternative II-A (Applicant Proposed)

In Alternative II-A, there would be 258 miles of transmission line. The majority of the disturbance would occur in the sagebrush shrubland and the grass vegetation community types. 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. The majority of Alternative II-A is found within Fire Regime IV. The bulk of Alternative II-A is located in FRCC II. FBFM classification is predominantly Grass, Grass-Shrub, and Shrub.

Along Alternative II-A are five micro-siting options: Fruitland Micro-siting 1, 2, and 3, and Strawberry IRA Micro-siting Options 2 and 3. For Fruitland Micro-siting Options 1, 2and 3, the wildland fire risk parameters located along the micro-siting options would be similar to the wildland fire risk parameters located along the portion of Alternative II-A that the micro-siting options would replace. For the Strawberry IRA Micro-siting Options 2 and 3, the wildland fire risk parameters located along micro-siting option would be similar to the wildland fire risk parameters located along Alternative II-A that the micro-siting options would replace. Impacts to the wildland fire risk parameters would be the same for the Fruitland, and Strawberry IRA Micro-siting Options as for Alternative II-A.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative II-B

In Alternative II-B, there would be 346 miles of transmission line. The majority of the disturbance would occur in the sagebrush shrubland and pinyon-juniper vegetation community types. 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. The majority of Alternative II-B is found within Fire Regime IV. The bulk of Alternative II-B is located in FRCC II. FBFM classification is predominantly Grass, Grass-Shrub, and Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative II-C

In Alternative II-C, there would be 365 miles of transmission line. The majority of the disturbance would occur in the sagebrush shrubland and pinyon-juniper vegetation community types. 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. The majority of Alternative II-C is found within Fire Regime IV. The bulk of Alternative II-C is located in FRCC II. FBFM classification is predominantly Grass, Grass-Shrub, and Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative II-D

In Alternative II-D, there would be 259 miles of transmission line. The majority of the disturbance would occur in the sagebrush shrubland vegetation community types. 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. The majority of Alternative II-D is found within Fire Regime IV. The bulk of Alternative II-D is located in FRCC II. FBFM classification is predominantly Grass, Grass-Shrub, and Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Table 3.21-18 Summary of Region II Alternative Route Impacts by Fire Regime

	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	
	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																												
Fire Regime I	106	<1	179	<1	249	<1	456	<1	241	<1	303	<1	104	<1	--	--	--	--	--	--	--	--	--	--	--	--	-	-
Fire Regime II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire Regime III	1,033	<1	1,710	<1	2,056	<1	1,094	<1	1,262	<1	1,356	<1	1,080	<1	--	--	--	--	--	--	--	--	--	--	--	--	-	-
Fire Regime IV	2,889	<1	2,344	<1	2,305	<1	2,206	<1	2,554	<1	2,365	<1	2,705	<1	--	--	--	--	--	--	--	--	--	--	--	--	-	-
Fire Regime V	1220	<1	2,082	<1	1,996	<1	990	<1	1,303	<1	965	<1	1,207	<1	--	--	--	--	--	--	--	--	--	--	--	--	-	-
Facilities																												
Fire Regime I	84	<1	129	<1	154	<1	376	<1	184	<1	253	<1	86	<1	20	<1	34	<1	34	<1	104	<1	42	<1	75	<1	20	<1
Fire Regime II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire Regime III	828	<1	1,204	<1	1,258	<1	927	<1	1,015	<1	1,195	<1	870	<1	281	<1	317	<1	286	<1	283	<1	331	<1	400	<1	295	<1
Fire Regime IV	1,935	<1	1,574	<1	1,355	<1	1,656	<1	1,790	<1	1,776	<1	1,851	<1	488	<1	414	<1	298	<1	450	<1	466	<1	471	<1	481	<1
Fire Regime V	798	<1	1,273	<1	1,381	<1	660	<1	858	<1	646	<1	786	<1	188	<1	265	<1	322	<1	156	<1	188	<1	153	<1	185	<1

Table 3.21-19 Summary of Region II Alternative Route Impacts for FRCC I, II, or III

	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	
	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																												
FRCC I	1,021	<1	1,214	<1	1,377	<1	1,033	<1	921	<1	916	<1	1,051	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FRCC II	2,361	<1	3,049	<1	3,083	<1	2,423	<1	2,710	<1	2,844	<1	2,277	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FRCC III	1,674	<1	2,618	<1	2,704	<1	1,505	<1	1,566	<1	1,410	<1	1,606	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Facilities																												
FRCC I	720	<1	776	<1	821	<1	798	<1	664	<1	715	<1	750	<1	205	<1	182	<1	177	<1	221	<1	178	<1	208	<1	214	<1
FRCC II	1,663	<1	2,019	<1	1,840	<1	1,836	<1	1,928	<1	2,258	<1	1,641	<1	482	<1	507	<1	410	<1	507	<1	556	<1	667	<1	481	<1
FRCC III	1,129	<1	1,841	<1	1,979	<1	1,154	<1	1,124	<1	1,046	<1	1,088	<1	265	<1	455	<1	491	<1	308	<1	258	<1	264	<1	264	<1

Table 3.21-20 Summary of Region II Alternative Route Impacts for FBFM Class

	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	
FBFM Class[1]	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																												
NB	252	<1	422	<1	595	<1	229	<1	324	<1	249	<1	225	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GR	1,512	<1	2,075	<1	2,536	<1	1221	<1	1,398	<1	1,311	<1	1,428	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GS	2,387	<1	2,714	<1	2,780	<1	2,026	<1	2,440	<1	2,128	<1	2,363	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SH	914	<1	1,582	<1	1,509	<1	1,192	<1	1,076	<1	1,299	<1	903	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TL	67	<1	163	<1	188	<1	138	<1	107	<1	114	<1	70	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TU	273	<1	236	<1	53	<1	379	<1	193	<1	328	<1	261	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Facilities																												
NB	192	<1	303	<1	395	<1	188	<1	244	<1	201	<1	173	<1	50	<1	82	<1	97	<1	55	<1	62	<1	55	<1	47	<1
GR	1,030	<1	1,492	<1	1,788	<1	897	<1	980	<1	959	<1	975	<1	253	<1	371	<1	432	<1	237	<1	242	<1	246	<1	244	<1
GS	1,630	<1	1,753	<1	1,678	<1	1,546	<1	1721	<1	1,645	<1	1,658	<1	435	<1	434	<1	379	<1	423	<1	462	<1	471	<1	444	<1
SH	644	<1	1,002	<1	972	<1	901	<1	794	<1	973	<1	638	<1	178	<1	232	<1	221	<1	243	<1	222	<1	269	<1	185	<1
TL	57	<1	118	<1	115	<1	113	<1	84	<1	107	<1	58	<1	20	<1	31	<1	26	<1	32	<1	25	<1	36	<1	20	<1
TU	207	<1	205	<1	32	<1	325	<1	153	<1	342	<1	201	<1	74	<1	60	<1	8	<1	99	<1	44	<1	119	<1	74	<1

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

Alternative II-E

In Alternative II-E, there would be 268 miles of transmission line. The majority of the disturbance would occur in the sagebrush shrubland and pinyon-juniper vegetation community types. 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. The majority of Alternative II-E is found within Fire Regime IV. The bulk of Alternative II-E is located in FRCC II. FBFM classification is predominantly Grass, Grass-Shrub, and Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative II-F

In Alternative II-F, there would be 265 miles of transmission line. The majority of the disturbance would occur in the sagebrush shrubland and pinyon-juniper vegetation community types. 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. The majority of Alternative II-F is found within Fire Regime IV. The bulk of Alternative II-F is located in FRCC II. FBFM classification is predominantly Grass, Grass-Shrub, and Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative II-G (Agency Preferred)

In Alternative II-G, there would be 252 miles of transmission line. The majority of the disturbance would occur in the sagebrush shrubland and grass vegetation community types. 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. The majority of Alternative II-G is found within Fire Regime IV. The bulk of Alternative II-G is located in FRCC II. FBFM classification is predominantly Grass, Grass-Shrub, and Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative Variation in Region II

Reservation Ridge Alternative Variation

The Reservation Ridge Alternative Variation would impact FRCCs and FBFM classes compared to those of Alternative II-A. The bulk of the Reservoir Reservation Ridge Alternative Variation is located in FRCC II. FBFM classification is predominantly Grass, Grass-Shrub, and Timber-Understory. The Reservation Ridge Alternative Variation has more impacts in Fire Regime IV, compared to the comparable portion of Alternative II-F. **Table 3.21-21** summarizes impacts associated with the Reservation Ridge Alternative Variation and the comparable portion of Alternative II-A. The Reservation Ridge Alternative Variation would decrease the total area affected by the Project from 362 to 334 acres. The area of conifer forests impacted would increase, while the acreage of aspen forest and woodland, and pinyon-juniper impacted would decrease compared to Alternative II-F. Implementation and effects of mitigation measures would be the same as described for Alternative II-F.

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. **Table 3.21-22** summarizes impacts parameters associated with the alternative connectors in Region II. The majority of the connectors are located in Fire Regime IV, except for the IPP East Alternative which is predominantly in the Fire Regime V. The FRCC for the connectors is II and III. The FBFM classifications range from Grass, Grass-Shrub, and Shrub.

Table 3.21-21 Summary of Region II Alternative Variation Impacts for Impact Parameters for Wildland Fire (acres)

	Reservation Ridge Alternative Variation						Alternative II-F Comparable					
	ROW Clearing		Construction Disturbance		Operation Disturbance		ROW Clearing		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
Fire Regime												
Fire Regime I	26	<1	38	<1	15	<1	50	<1	62	<1	19	<1
Fire Regime II	-	-	-	-	-	-	-	-	-	-	-	-
Fire Regime III	169	<1	211	<1	70	<1	137	<1	167	<1	53	<1
Fire Regime IV	110	<1	138	<1	46	<1	157	<1	192	<1	63	<1
Fire Regime V	21	<1	25	<1	8	<1	7	<1	10	<1	3	<1
FRCC I, II, or III												
FRCC I	70	<1	88	<1	30	<1	77	<1	93	<1	30	<1
FRCC II	241	<1	307	<1	104	<1	262	<1	322	<1	104	<1
FRCC III	10	<1	12	<1	4	<1	11	<1	13	<1	4	<1
FBFM Class[1]												
NB	23	<1	19	<1	7	<1	41	<1	19	<1	6	<1
GR	104	<1	28	<1	9	<1	154	<1	52	<1	17	<1
GS	16	<1	132	<1	44	<1	15	<1	191	<1	63	<1
SH	6	<1	7	<1	2	<1	24	<1	28	<1	8	<1
TL	21	<1	29	<1	11	<1	25	<1	30	<1	9	<1
TU	165	<1	208	<1	70	<1	103	<1	124	<1	40	<1

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

Table 3.21-22 Summary of Region II Alternative Connector Impact Parameters for Wildland Fire (acres)

	Roan Cliffs Alternative Connector						Castle Dale Alternative Connector						Price Alternative Connector						Lynndyl Alternative Connector						IPP East Alternative Connector					
	ROW Clearing		Construction Disturbance		Operation Disturbance		ROW Clearing		Construction Disturbance		Operation Disturbance		ROW Clearing		Construction Disturbance		Operation Disturbance		ROW Clearing		Construction Disturbance		Operation Disturbance		ROW Clearing		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
Fire Regime																														
Fire Regime I	9	<1	10	<1	4	<1	1	<1	1	<1	--	--	110	<1	68	<1	15	<1	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire Regime III	8	<1	9	<1	3	<1	24	<1	16	<1	3	<1	113	<1	78	<1	19	<1	40	<1	28	<1	6	<1	--	--	--	--	--	--
Fire Regime IV	11	<1	13	<1	5	<1	22	<1	14	<1	3	<1	120	<1	83	<1	20	<1	409	<1	249	<1	55	<1	--	--	--	--	--	--
Fire Regime V	--	--	--	--	--	--	112	<1	74	<1	14	<1	26	<1	26	<1	9	<1	39	<1	22	<1	5	<1	68	<1	53	<1	9	<1
FRCC I, II, or III																														
FRCC I	6	<1	7	<1	3	<1	19	<1	13	<1	3	<1	96	<1	67	<1	17	<1	3	<1	4	<1	1	<1	--	--	--	--	--	--
FRCC II	16	<1	19	<1	7	<1	28	<1	19	<1	4	<1	138	<1	97	<1	24	<1	98	<1	66	<1	15	<1	--	--	--	--	--	--
FRCC III	6	<1	6	<1	2	<1	145	<1	100	<1	20	<1	138	<1	95	<1	23	<1	395	<1	231	<1	51	<1	68	<1	53	<1	9	<1
FBFM Class[1]																														
NB	2	<1	2	<1	1	<1	31	<1	21	<1	4	<1	6	<1	5	<1	1	<1	7	<1	5	<1	1	--	--	--	--	--	--	--
GR	9	<1	10	<1	4	<1	79	<1	56	<1	11	<1	16	<1	16	<1	5	<1	189	<1	112	<1	25	<1	43	<1	34	<1	6	<1
GS	16	<1	18	<1	7	<1	54	<1	36	<1	7	<1	281	<1	187	<1	45	<1	178	<1	106	<1	23	<1	16	<1	12	<1	2	<1
SH	2	<1	2	<1	1	<1	54	<1	37	<1	7	<1	63	<1	49	<1	14	<1	130	<1	83	<1	19	<1	9	<1	7	<1	1	<1
TL	--	--	--	--	--	--	--	--	--	--	--		9		6		2		--	--	--	--	--	--	--	--	--	--	--	--
TU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

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, when there is further use 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 majority of Series Compensation Station 1 – Design Option 3 is found in Fire Regime V. The bulk of Series Compensation Station 1 – Design Option 3 is located in FRCC III. FBFM classification is predominantly Grass-shrubs.

Series Compensation Station 2 – Design Option 3 corresponds to Alternatives II-B and II-C. The majority of Series Compensation Station 2 – Design Option 3 is found in Fire Regime V. The bulk of Series Compensation Station 2 – Design Option 3 is located in FRCC III. FBFM classification is predominantly Grass.

Series Compensation Station 3 – Design Option 3 corresponds to Alternatives II-D and II-F. The majority of Series Compensation Station 3 – Design Option 3 is found in Fire Regime IV. The bulk of Series Compensation Station 3 – Design Option 3 is located in FRCC I. FBFM classification is predominantly Grass-shrubs.

Region II Conclusion

All Region II Alternatives would have similar potential for overall impact due to similarities in Fire Regime, FRCCs, and FBFM classes impacted. In terms of impacts on Fire Regime and FRCC, all alternatives would have a minor impact due to the relatively low amount of disturbance (<1 percent of the watershed). However, those alternatives crossing high elevation areas characterized by shrub or forested area (FBFM Class Shrub, Timber-Litter, and Timber-Understory) have the potential to substantially affect fire management. Additionally, Alternatives II-B, II-C, and II-E cross more pinyon-juniper, which presents higher wildland fire risk due to high tree densities, drought, and bark beetle infestation.

These forested areas pose more fire risk to the transmission line due to the potential for high severity crown fires that may develop in areas with heavy fuel loading. In general, the largest impact associated with any of the alternatives would be the required changes in agency fire management strategy and resulting risks and costs in these areas. Placement of transmission lines in these areas makes fire management more difficult due to difficulty in accessing these areas, combined with the requirement to protect this infrastructure in the event of either natural or human-caused starts. This prevents land management agencies from letting a fire burn safely to natural or engineered containment boundaries.

Impacts on costs of fire suppression cannot be precisely predicted for each alternative. However, the relative mileage of each alternative provides an indicator of relative cost in that increased mileage means increased need for suppression to protect infrastructure, as well as increased area where fire cannot be used as a tool to address reduced fuel loading. Accordingly, Alternative II-C would likely result in the greatest potential increases in fire suppression costs, followed by Alternatives II-B, II-E, II-F, II-D, II-A, and II-G (Agency Preferred), respectively (see specific mileages in analysis above). Please note that the mileages for II-A, II-D, II-E, II-F, and II-G are virtually identical (252 – 268 miles) and would result in no appreciable difference in suppression costs. Alternatives II-B and II-C are both significantly higher (346 to 365 miles) with concomitantly higher suppression costs.

3.21.6.4 Region III

Tables 3.21-23, **3.21-24**, and **3.21-25** provide a comparison of impacts associated with the alternative routes in Region III.

Table 3.21-23 Summary of Region III Alternative Route Impacts by Fire Regime

	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	
Fire Regime	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																
Fire Regime I	57	<1	26	<1	45	<1	26	<1	--	--	--	--	--	--	-	-
Fire Regime II	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
Fire Regime III	368	<1	642	<1	751	<1	614	<1	--	--	--	--	--	--	-	-
Fire Regime IV	1,131	<1	1,411	<1	1,162	<1	1,329	<1	--	--	--	--	--	--	-	-
Fire Regime V	3,935	<1	3,376	<1	3,738	<1	3,515	<1	--	--	--	--	--	--	-	-
Facilities																
Fire Regime I	30	<1	21	<1	24	<1	21	<1	6	<1	6	<1	5	<1	6	<1
Fire Regime II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	--
Fire Regime III	231	<1	380	<1	428	<1	367	<1	49	<1	80	<1	91	<1	78	<1
Fire Regime IV	741	<1	834	<1	697	<1	793	<1	161	<1	172	<1	145	<1	163	<1
Fire Regime V	2,276	<1	1972	<1	2,032	<1	1977	<1	497	<1	381	<1	378	<1	361	<1

Table 3.21-24 Summary of Region III Alternative Route Impacts for FRCC I, II, or III

	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	
FRCC	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																
FRCC I	418	<1	592	<1	845	<1	610	<1	--	--	--	--	--	--	--	--
FRCC II	618	<1	322	<1	983	<1	297	<1	--	--	--	--	--	--	--	--
FRCC III	4,395	<1	4,485	<1	3,787	<1	4,521	<1	--	--	--	--	--	--	--	--
Facilities																
FRCC I	201	<1	310	<1	436	<1	328	<1	27	<1	50	<1	75	<1	55	<1
FRCC II	385	<1	213	<1	535	<1	199	<1	88	<1	50	<1	111	<1	47	<1
FRCC III	2,658	<1	2,654	<1	2,167	<1	2,601	<1	592	<1	534	<1	426	<1	500	<1

Table 3.21-25 Summary of Region III Alternative Route Impacts for FBFM Classes

	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	
FBFM Class[1]	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																
NB	477	<1	512	<1	802	<1	521	<1	--	--	--	--	--	--	--	--
GR	3,439	<1	3,599	<1	3,190	<1	3,693	<1	--	--	--	--	--	--	--	--
GS	1,016	<1	1,214	<1	1,262	<1	1,328	<1	--	--	--	--	--	--	--	--
SH	978	<1	680	<1	1,385	<1	686	<1	--	--	--	--	--	--	--	--
TL	16	<1	28	<1	1	<1	28	<1	--	--	--	--	--	--	--	--
TU	55	<1	58	<1	87	<1	58	<1	--	--	--	--	--	--	--	--
Facilities																
NB	293	<1	287	<1	471	<1	282	<1	69	<1	49	<1	96	<1	48	<1
GR	2,008	<1	2,064	<1	1,755	<1	2,067	<1	442	<1	389	<1	324	<1	369	<1
GS	662	<1	744	<1	748	<1	690	<1	151	<1	160	<1	159	<1	148	<1
SH	579	<1	402	<1	778	<1	398	<1	117	<1	83	<1	161	<1	83	<1
TL	12	<1	17	<1	1	<1	17	<1	3	<1	4	<1	0	<1	4	<1
TU	34	<1	45	<1	44	<1	45	<1	9	<1	12	<1	8	<1	12	<1

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

Alternative III-A (Applicant Proposed)

In Alternative III-A, the majority of the disturbance would occur in the desert shrub, grassland, sagebrush shrubland, and saltbush shrubland vegetation community types. 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. The majority of Alternative III-A is found within Fire Regime V. The bulk of Alternative III-A is located in FRCC III. FBFM classification is predominantly Grass, followed by Grass-Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction, and Operation and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative III-B

The majority of the disturbance would occur in the desert shrub, grassland, sagebrush shrubland, and saltbush shrubland vegetation community types. 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. The majority of Alternative III-B is found within Fire Regime V. The bulk of Alternative III-B is located in FRCC III. FBFM classification is predominantly Grass, followed by Grass-Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative III-C

The majority of the disturbance would occur in the desert shrub, grassland, sagebrush shrubland, and saltbush shrubland vegetation community types. 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. The majority of Alternative III-C is found within Fire Regime V. The bulk of Alternative III-C is located in FRCC III. FBFM classification is predominantly Grass, followed by Grass Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative III-D (Agency Preferred)

The majority of the disturbance would occur in the desert shrub, grassland, sagebrush shrubland, and saltbush shrubland vegetation community types. 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. The majority of Alternative III-D is found within Fire Regime V. The bulk of Alternative III-D is located in FRCC III. FBFM classification is predominantly Grass, followed by Grass-Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative Variations in Region III

Table 3.21-26 provides a comparison of impacts associated with the alternative variations in Region III.

The Ox Valley East Alternative Variation would impact similar wildland fire impact parameters compared to those of Alternative III-A. 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 wildland fire impact parameters compared to those of Alternative III-A. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

The Pinto Alternative Variation would impact similar wildland fire impact parameters compared to those of Alternative III-A, however there would be additional impacts in the Fire Regime III and FRCC II under this variation. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Alternative Connectors in Region III

The Moapa Alternative Connector and Avon Alternative Connector would include minor disturbance acreage increases across the various wildland fire impact parameters crossed if constructed. **Table 3.21-27** summarizes impacts parameters associated with the alternative connectors in Region II. The majority of the connectors are found in Fire Regime V. The bulk of the connectors are located in FRCC III. The FBFM classifications range from Grass, Grass-Shrub, and Shrub.

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 3.21-28** summarizes impacts associated with the southern ground electrode system. Some locations might serve multiple alternative routes, while others could only be associated with a specific 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 majority of Series Compensation Station 1 – Design Option 2 is found in Fire Regime V. The bulk of Series Compensation Station 1 – Design Option 3 is located in FRCC III. FBFM classification is predominantly Shrub. Series Compensation Station 2 – Design Option 2 corresponds to Alternative III-C. The majority of Series Compensation Station 2 – Design Option 2 is found in Fire Regime IV. The bulk of Series Compensation Station 2 – Design Option 3 is located in FRCC III. FBFM classification is predominantly Shrub.

Series Compensation Station 3 – Design Option 2 corresponds to Alternative II-B. The majority of Series Compensation Station 3 – Design Option 2 is found in Fire Regime V. The bulk of Series Compensation Station 3 – Design Option 3 is located in FRCC III. FBFM classification is predominantly Grass.

Region III Conclusion

In Region III, the alternative with the most acres impacted is Alternative III-C. Alternative III-A would impact the least acreage. Although Alternative III-C has the greatest disturbance impact, overall impacts to wildland fire risk, and management would be similar between the alternatives, due to the similarities in Fire Regime, FRCCs, and FBFM classes crossed. Additionally, these similarities would result in identical alternative impacts related to potential increased suppression costs. Because of the relatively low amount of disturbance, and assuming the successful implementation of aforementioned mitigation, the overall impacts on wildland fire risk would be minor. However, the Pinto and Ox Valley variations would create greater potential impacts to fire management than other comparable alternative segments due to their relative isolation and the rugged terrain, particularly in Ox Valley.

Table 3.21-26 Summary of Region III Alternative Variation Impacts for Impact Parameters for Wildland Fire (acres)

	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
Fire Regime																																				
Fire Regime I	10	<1	10	<1	2	<1	7	<1	7	<1	3	<1	10	<1	10	<1	2	<1	7	<1	7	<1	3	<1	16	<1	13	<1	2	<1	6	<1	6	<1	2	<1
Fire Regime II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire Regime III	115	<1	125	<1	15	<1	58	<1	56	<1	45	<1	117	<1	121	<1	15	<1	58	<1	56	<1	42	<1	199	<1	172	<1	18	<1	59	<1	61	<1	15	<1
Fire Regime IV	158	<1	169	<1	49	<1	170	<1	170	<1	53	<1	163	<1	157	<1	49	<1	170	<1	170	<1	51	<1	221	<1	200	<1	84	<1	341	<1	310	<1	49	<1
Fire Regime V	16	<1	15	<1	13	<1	47	<1	49	<1	8	<1	31	<1	25	<1	13	<1	47	<1	49	<1	17	<1	96	<1	76	<1	10	<1	38	<1	37	<1	13	<1
FRCC I, II, or III																																				
FRCC I	--	--	1	<1	1	<1	--	--	--	--	--	--	--	--	1	<1	1	<1	--	--	--	--	--	--	18	<1	18	<1	5	<1	--	--	--	--	--	--
FRCC II	119	<1	135	<1	51	<1	97	<1	91	<1	22	<1	119	<1	128	<1	50	<1	97	<1	91	<1	22	<1	220	<1	192	<1	48	<1	87	<1	81	<1	21	<1
FRCC III	180	<1	182	<1	56	<1	181	<1	184	<1	54	<1	201	<1	183	<1	59	<1	181	<1	184	<1	54	<1	277	<1	239	<1	59	<1	353	<1	327	<1	91	<1
FBFM Class[1]																																				
NB	2	<1	1		--	--	4	<1	5	<1	2	<1	1	<1	1	<1	--	--	4	<1	5	<1	2	<1	18	<1	14	<1	3	<1	4	<1	6	<1	2	<1
GR	24	<1	34	<1	15	<1	13	<1	18	<1	7	<1	24	<1	33	<1	15	<1	13	<1	18	<1	7	<1	68	<1	55	<1	13	<1	31	<1	36	<1	12	<1
GS	200	<1	201	<1	65	<1	157	<1	152	<1	40	<1	216	<1	197	<1	66	<1	157	<1	152	<1	40	<1	225	<1	201	<1	51	<1	208	<1	196	<1	54	<1
SH	52	<1	57	<1	18	<1	94	<1	94	<1	27	<1	59	<1	59	<1	19	<1	94	<1	94	<1	27	<1	189	<1	164	<1	41	<1	189	<1	166	<1	44	<1
TL	16	<1	19	<1	7	<1	8	<1	7	<1	2	<1	15	<1	16	<1	6	<1	8	<1	7	<1	2	<1	14	<1	13	<1	3	<1	6	<1	5	<1	1	<1
TU	7	<1	8	<1	3	<1	6	<1	5	<1	1	<1	6	<1	6	<1	2	<1	6	<1	5	<1	1	<1	18	<1	15	<1	3	<1	6	<1	5	<1	1	<1

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

Table 3.21-27 Summary of Region III Alternative Connector Impacts for Impact Parameters for Wildland Fire

	Moapa Alternative Connector						Avon Alternative Connector						Arrowhead Alternative Connector					
	ROW Clearing		Construction Disturbance		Operation Disturbance		ROW Clearing		Construction Disturbance		Operation Disturbance		ROW Clearing		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
Fire Regime																		
Fire Regime I	--	--	--	--	--	--	--	--	--	--	--	--	2	<1	2	<1	--	--
Fire Regime II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire Regime III	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime IV	--	--	--	--	--	--	17	<1	10	<1	2	<1	--	--	--	--	--	--
Fire Regime V	241	<1	156	<1	29	<1	138	<1	88	<1	16	<1	25	<1	28	<1	5	<1
FRCC I, II, or III																		
FRCC I	--	--	--	--	--	--	6	<1	4	<1	1	<1	--	--	--	--	--	--
FRCC II	17	<1	9	<1	2	<1	--	--	--	--	--	--	--	--	--	--	--	--
FRCC III	224	<1	147	<1	27	<1	148	<1	94	<1	18	<1	26	<1	29	<1	5	<1
FBFM Class[1]																		
NB	33	<1	23	<1	4	<1	2	<1	1	<1	--	--	15	<1	16	<1	3	<1
GR	213	<1	140	<1	26	<1	102	<1	66	<1	12	<1	29	<1	32	<1	5	<1
GS	20	<1	11	<1	2	<1	7	<1	5	<1	1	<1	4	<1	5	<1	1	<1
SH	3	<1	2	<1	--	<1	45	<1	27	<1	5	<1	--	--	1	<1	--	--
TL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TU	--	--	--	--	--	--	--	--	--	--	--	--	1		1		--	--

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

Table 3.21-28 Summary of Region III Alternative Ground Electrode System Construction Impact Parameters to Wildland Fire (acres)

	Mormon Mesa –Carp Elgin Rd (Alternative III-A)	Halfway Wash – Virgin River (Alternative III-A)	Halfway Wash East (Alternative III-A)	Mormon Mesa-Carp Elgin Rd (Alternative III-B)	Halfway Wash – Virgin River (Alternative III-B)	Halfway Wash East (Alternative III-B)	Meadow Valley 2 (Alternative III-C)	Delta (Design Option 2)
Fire Regime								
Fire Regime I	–	–	–	–	–	–	–	<1
Fire Regime II	-	-	-	-	-	-	-	-
Fire Regime III	–	–	–	–	–	–	–	11
Fire Regime IV	–	–	–	–	–	–	–	10
Fire Regime V	85	74	96	96	81	106	136	95
FRCC I, II, or III								
FRCC I	<1	–	–	<1	–	–	<1	16
FRCC II	–	–	–	–	–	–	3	9
FRCC III	85	74	96	96	81	106	133	90
FBFM Class[1]								
NB	--	1	16	--	30	27	17	24
GR	--	9	1	--	2	1	<1	21
GS	--	<1	<1	--	2	<1	<1	<1
SH	--	<1	--	--	--	--	--	1
TL	--	<1	--	--	--	--	<1	<1
TU	--	--	--	--	--	--	--	--

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

3.21.6.5 Region IV

Tables 3.21-29, **3.21-30**, and **3.21-31** provide a comparison of impacts associated with the alternative routes in Region IV.

Alternative IV-A (Applicant Proposed and Agency Preferred)

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, riparian, and saltbush shrubland, woody riparian and wetlands community types. 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. The majority of Alternative IV-A is found within Fire Regime V. The bulk of Alternative IV-A is located in FRCC III. FBFM classification is predominantly Grass and Grass-Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Table 3.21-29 Summary of Region IV Alternative Route Impacts by Fire Regime

	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												
Fire Regime I	5	<1	6	<1	7	<1	--	--	--	--	--	--
Fire Regime II	-	-	-	-	-	-	-	-	-	-	-	-
Fire Regime III	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime IV	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime V	625	<1	454	<1	490	<1	--	--	--	--	--	--
Facilities												
Fire Regime I	4	<1	4	<1	7	<1	1	<1	1	<1	2	<1
Fire Regime II	-	-	-	-	-	-	-	-	-	-	-	-
Fire Regime III	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime IV	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime V	451	<1	300	<1	342	<1	100	<1	68	<1	76	<1

Table 3.21-30 Summary of Region IV Alternative Route Impacts for FRCC I, II, or III

	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												
FRCC I	--	--	--	--	--	--	--	--	--	--	--	--
FRCC II	33	<1	38	<1	33	<1	--	--	--	--	--	--
FRCC III	591	<1	407	<1	451	<1	--	--	--	--	--	--
Facilities												
FRCC I	--	--	--	--	--	--	--	--	--	--	--	--
FRCC II	15	<1	19	<1	14	<1	--	--	--	--	--	--
FRCC III	436	<1	274	<1	325	<1	--	--	--	--	--	--

Table 3.21-31 Summary of Region IV Alternative Route Impacts for FBFM Classes

	Construction Disturbance						Operation Disturbance					
	Alternative IV-A		Alternative IV-B		Alternative IV-C		Alternative IV-A		Alternative IV-B		Alternative IV-C	
FBFM Class[1]	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												
NB	85	<1	124	<1	201	<1	--	--	--	--	--	--
GR	274	<1	360	<1	364	<1	--	--	--	--	--	--
GS	365	<1	304	<1	305	<1	--	--	--	--	--	--

Table 3.21-31 Summary of Region IV Alternative Route Impacts for FBFM Classes

	Construction Disturbance						Operation Disturbance					
	Alternative IV-A		Alternative IV-B		Alternative IV-C		Alternative IV-A		Alternative IV-B		Alternative IV-C	
FBFM Class[1]	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV
SH	33	<1	26	<1	23	<1	--	--	--	--	--	--
TL	--	--	1	<1	1	<1	--	--	--	--	--	--
TU	14	<1	5	<1	7	<1	--	--	--	--	--	--
Facilities												
NB	63	<1	113	<1	148	<1	17	<1	25	<1	25	<1
GR	184	<1	241	<1	242	<1	42	<1	53	<1	51	<1
GS	270	<1	192	<1	214	<1	58	<1	41	<1	47	<1
SH	19	<1	15	<1	11	<1	4	<1	4	<1	2	<1
TL	--	--	--	--	1	<1	--	--	--	--	--	--
TU	11	<1	4	<1	6	<1	3	<1	1	<1	2	<1

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

Alternative IV-B

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 the barren/sparsely vegetated, cliff and canyon, herbaceous wetland, riparian, saltbush shrubland, and woody riparian and wetland community types. 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. The majority of Alternative IV-B is found within Fire Regime V. The bulk of Alternative IV-B is located in FRCC III. FBFM classification is predominantly Grass and Grass Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative IV-C

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 the barren/sparsely vegetated, cliff and canyon, herbaceous wetland, riparian, saltbush shrubland, and woody riparian and wetland vegetation community types. 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. The majority of Alternative IV-C is found within Fire Regime V. The bulk of Alternative IV-C is located in FRCC III. FBFM classification is predominantly Grass and Grass Shrub.

Impacts and mitigation would be the same as described in Section 3.21.6.1, Impacts from Terminal Construction and Operation, and Section 3.21.6.2, Impacts Common to All Alternative Routes and Associated Components.

Alternative Variations in Region IV

The Marketplace Alternative Variation would impact the similar wildland fire parameters as compared to Alternative IV-B. Implementation and effects of mitigation measures would be the same as described for Alternative I-A.

Table 3.21-32 provides a comparison of impacts associated with the alternative variations in Region IV.

Table 3.21-32 Summary of Region IV Alternative Variation Impact Parameters for Wildland Fire

	Marketplace Alternative Variation (Alternative IV-B)						Alternative IV-B Comparable					
	ROW Clearing		Construction Disturbance		Operation Disturbance		ROW Clearing		Construction Disturbance		Operation Disturbance	
	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV	Acres	% of Region IV
Fire Regime												
Fire Regime I	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime II	-	-	-	-	-	-	-	-	-	-	-	-
Fire Regime III	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime IV	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime V	134	<1	91	<1	16	<1	119	<1	55	<1	7	<1
FRCC I, II, or III												
FRCC I	--	--	--	--	--	--	--	--	--	--	--	--
FRCC II	--	--	--	--	--	--	--	--	--	--	--	--
FRCC III	134	<1	91	<1	16	<1	119	<1	55	<1	7	<1
FBFM Class[1]												
NB	5	<1	4	<1	1	<1	5	<1	7	<1	2	<1
GR	47	<1	33	<1	6	<1	48	<1	26	<1	4	<1
GS	104	<1	69	<1	12	<1	107	<1	48	<1	6	<1
SH	--	--	--	--	--	--	--	--	--	--	--	--
TL	--	--	--	--	--	--	--	--	--	--	--	--
TU	2	<1	2	<1	--	--	--	--	--	--	--	--

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.

Alternative Connectors in Region IV

All the Alternative Connectors in Region IV would include minor surface disturbance increases for the wildland fire parameters. **Table 3.21-33** summarizes impacts and advantages associated with the alternative connectors in Region IV. The majority of the connectors are found in Fire Regime V. The bulk of the connectors are located in FRCC III. The FBFM classification ranges from Grass, Grass-Shrub, and Shrub.

Region IV Conclusion

In Region IV, the alternative resulting in the most acres of vegetation impacted is Alternative IV-C, while Alternative IV-A would impact the least acreage. Impacts to wildland fire risk, and management would be similar between the Alternatives, due to the similarities in Fire Regime, FRCCs, and FBFM classes crossed. Additionally, these similarities would result in identical alternative impacts related to potential increased suppression costs. Because most of the disturbance would occur in areas that are already in FRCC III, disturbance from the proposed alternatives would have a minor to negligible impact on FRCCs and resulting fire risk or behavior. Additionally, because the terrain in Region IV would be relatively easy to access through existing roads and proposed Project access routes, the alternatives would have a negligible impact on the existing ability of land management agencies to manage fire.

3.21.6.6 Residual Impacts

Residual impacts would include changes in Fire Regime, FRCCs, and FBFM classes. Vegetation recovery to similar cover and species composition after implementation of a reclamation program is expected to occur at varying rates as described in Section 3.5, Vegetation. The invasion and spread of noxious and invasive weed species could result in long-term changes in Fire Regime, FRCCs, and FBFM classes. Noxious weed and invasive species may persist over the long term regardless of the implementation of control programs.

Vegetation management activities could result in long-term reductions in fuel loads and changes in wildland fire behavior. 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 the conversion of woodlands 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 wildland fire risk. However, it should be noted that mitigation measures would not be able to preclude the need for impacted land management agencies to change their long-term fire management strategy in areas where the proposed transmission line is not co-located with existing transmission lines (approximately 320 miles [44 percent] of the entire project length for the Agency Preferred Alternative). In those areas, the long-term changes in land use agency fire management strategy would include the inability to use prescribed fire and wildland fire as a management tool in the vicinity of the transmission line, and the requirement to prioritize the suppression of fires that threaten that transmission line.

3.21.6.7 Irreversible and Irretrievable Commitment of Resources

Alterations of fire ecology that increase ignition risk, impact fire management, and alter fire intensity or severity to hotter, larger fires may persist during the life of the Project, resulting in an irretrievable loss of vegetation resources and increased risk to public property and safety. However the risks associated with this occurring are minor due to the relatively low amount of impact from the Project. Additionally, these impacts would be reversible by the successful vegetation management of these areas to reduce wildland fire risk.

Alternatives constructed in high elevation areas that are relatively inaccessible and/or subject to high dead and standing fuel loading would constitute an irreversible risk to the transmission line during operation. It also would constitute an irreversible impact on fire management in these areas by creating a need to incorporate the protection of infrastructure into fire management scenarios. These impacts would be irretrievable until the Project is decommissioned. Irreversible commitments also could result from construction and operation impacts in areas that are currently FRCC I if restoration efforts are unsuccessful. This can result in increases in fire frequency and potentially in fire severity, particularly in areas prone to invasion by annual grasses (e.g., cheatgrass).

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

For all alternatives, Project-related impacts that may affect long-term productivity include any impacts from wildland fire events, and constraints that impact long-term fire management or fire behavior. These could include areas where the transmission line is constructed in high-elevation low-accessible areas or in areas of Condition Class I. Preventing this from affecting long-term productivity would largely depend on the effectiveness of restoration efforts in FRCC areas and coordinated agency and applicant fire planning to address fuel loading and access issues in high fire risk areas.

3.21.6.9 Impacts to Wildland Fire 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 wildland fire resources associated with the development of the proposed Project would not occur.

Table 3.21-33 Summary of Region IV Alternative Connector Impact Parameters for Wildland Fire (acres)

	Sunrise Mountain Alternative Connector						Lake Las Vegas Alternative Connector						Three Kids Mine Alternative Connector						River Mountains Alternative Connector						Railroad Pass Alternative Connector					
	ROW Clearing		Construction Disturbance		Operation Disturbance		ROW Clearing		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 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
Fire Regime																														
Fire Regime I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime II	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime III	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime IV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fire Regime V	18	<1	22	<1	4	<1	65	<1	67	<1	18	<1	86	<1	89	<1	24	<1	133	<1	152	<1	54	<1	36	<1	36	<1	8	<1
FRCC I, II, or III																														
FRCC I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FRCC II	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8	<1	9	<1	3	<1	--	--	--	--	--	--
FRCC III	18	<1	22	<1	4	<1	63	<1	65	<1	18	<1	86	<1	89	<1	24	<1	124	<1	142	<1	51	<1	35	<1	35	<1	8	<1
FBFM Class[1]																														
NB	15	<1	18	<1	3	<1	7	<1	8	<1	2	<1	6	<1	6	<1	2	<1	5	<1	6	<1	2	<1	6	<1	8	<1	2	<1
GR	23	<1	28	<1	4	<1	24	<1	25	<1	7	<1	35	<1	36	<1	10	<1	26	<1	30	<1	11	<1	34	<1	35	<1	8	<1
GS	5	<1	6	<1	1	<1	42	<1	42	<1	11	<1	53	<1	55	<1	15	<1	88	<1	98	<1	34	<1	23	<1	24	<1	6	<1
SH	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25	<1	29	<1	10	<1	--	--	--	--	--	--
TL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TU	--	--	--	--	--	--	1	<1	1	<1	--	--	1	<1	1	<1	--	--	2	<1	2	<1	1	<1	1	<1	1	<1	--	--

[1] NB – Unburnable areas; GR – Grass; GS – Grass-shrubs; SH – Shrubs; TL – Timber-Litter; TU – Timber-Understory.