3.15 SOILS

This section addresses potential impacts to soils from the Preferred Route, Proposed Route, and Route Alternatives during construction, operations, and decommissioning. The primary reason to define impacts to soils is to reduce, minimize, or mitigate effects to soils from all phases of the Project. This section analyzes the potential impacts of the Project on soil erosion, soil compaction, and soil permanently removed from productivity due to the presence of roads and structures. In some cases, geologic features, such as landslides and shallow bedrock, could have an impact on soils. Those cases are also discussed in Section 3.14 – Geologic Hazards. Prime farmland is presented as a soil characteristic here and soil impacts to agricultural operations are also discussed in Section 3.18 – Agriculture. The discussion of hydric soils here supplements the broader discussion of wetlands found in Section 3.9 – Wetlands and Riparian Areas.

The BLM's Preferred Routes for each segment of the Project are listed below. Where applicable, the preferred route identified by another federal agency or a county or state government is also noted.

- **Segment 1W:** The BLM's Preferred Route is the Proposed Route (Figure A-2). This route is also the State of Wyoming's preferred route.
- **Segment 2:** The BLM's Preferred Route is the Proposed Route (Figure A-3). This route is also the State of Wyoming's preferred route.
- **Segment 3:** The BLM's Preferred Route is the Proposed Route, including 3A (Figure A-4). This route is also the State of Wyoming's preferred route.
- **Segment 4:** The BLM's Preferred Route is the Proposed Route (Figures A-5 and A-6) except within the Caribou-Targhee NF. The portion of this route in Wyoming is also the State of Wyoming's preferred route. The Forest Service's preferred route is the Proposed Route within the NF incorporating Alternative 4G (Figure A-6).
- **Segment 5:** The BLM's Preferred Route is the Proposed Route incorporating Alternatives 5B and 5E, assuming that WECC reliability issues associated with 5E are resolved (Figure A-7). Power County's preferred route is the Proposed Route incorporating Alternatives 5C and 5E (Figure A-7).
- **Segment 6:** The BLM's Preferred Route is the proposal to upgrade the line voltage from 345 kV to 500 kV (Figure A-8).
- **Segment 7:** The BLM's Preferred Route is the Proposed Route incorporating Alternatives 7B, 7C, 7D, and 7G (Figure A-9). The Proposed Route in the East Hills and Alternative 7G will be microsited to avoid sage-grouse PPH. Power and Cassia Counties' preferred route is Alternative 7K (Figure A-9).
- **Segment 8:** The BLM's Preferred Route is the Proposed Route incorporating Alternative 8B (Figure A-10). This is also IDANG's preferred route.
- **Segment 9:** The BLM's Preferred Route is the Proposed Route incorporating Alternative 9E, which was revised to avoid PPH and the community of Murphy (Figure A-11). Owyhee County's preferred route is Alternative 9D (Figure A-11).
- **Segment 10:** The BLM's Preferred Route is the Proposed Route (Figure A-12).

3.15.1 Affected Environment

This section discusses those aspects of the environment that could be impacted by the Project. It starts with a discussion of the Analysis Area considered, identifies the issues that have driven the analysis, and characterizes the existing conditions across the Proposed Action in Wyoming and Idaho.[1]

3.15.1.1 Analysis Area

The Project crosses several major soil orders (Figure 3.15-1). These soil orders closely match the physiographic regions (Figure 3.14-1). The mountainous parts of the Project area are slightly cooler than the valleys, receive more precipitation, and more readily support plant growth. The valley soils of southern Wyoming and Idaho support desert conditions, with less plant growth and infrequent summer precipitation. Soil found in the mountainous areas, including the Laramie Mountains in the northern part of Segment 1 and the mountainous areas in Segments 4 through 7 along the Idaho/Wyoming border and into southeast Idaho, consist mainly of Mollisols with minor areas of Inceptisols and Alfisols. The Order Mollisol includes a variety of soils formed mainly under grasslands. These soils have a strong organic component formed by the decomposition of grass and other vegetation, which results in very productive soils. These soils, if properly preserved or reclaimed, should be favorable for revegetation.

Soil in the valley portions of Segments 1, 2, and 3, and the Snake River Plain in portions of Segments 7, 8, 9, and 10 predominantly consist of Aridisols. Aridisols are found in dry climates, and contain subsurface horizons in which clay, calcium carbonate, silica, salts, and/or gypsum have accumulated. They are usually not suitable for agriculture unless irrigation water is provided. Revegetation in these areas may be more difficult due to lack of water, or revegetation may need to be initiated in a wetter portion of the year.

In the Green River Basin portion of Segment 4, soils consist predominantly of Entisols. Entisols are typically shallow or sandy, lacking in organic matter, and generally do not contain well-developed soil layers. The lack of water, scarce organic matter, and sandy soil conditions could require special considerations to complete revegetation in this portion of the Project.

The Analysis Area for soils was defined in a GIS file by buffering the centerlines of the Proposed Route and Route Alternatives 0.5 mile on either side and dissolving the buffers into a single polygon for each segment. This distance was used because it encompasses the area of greatest activity during construction and operations and it is estimated any Project impacts to Project soils would occur primarily within 0.5 mile of the disturbance.

[1] The Project no longer includes a route in Nevada.

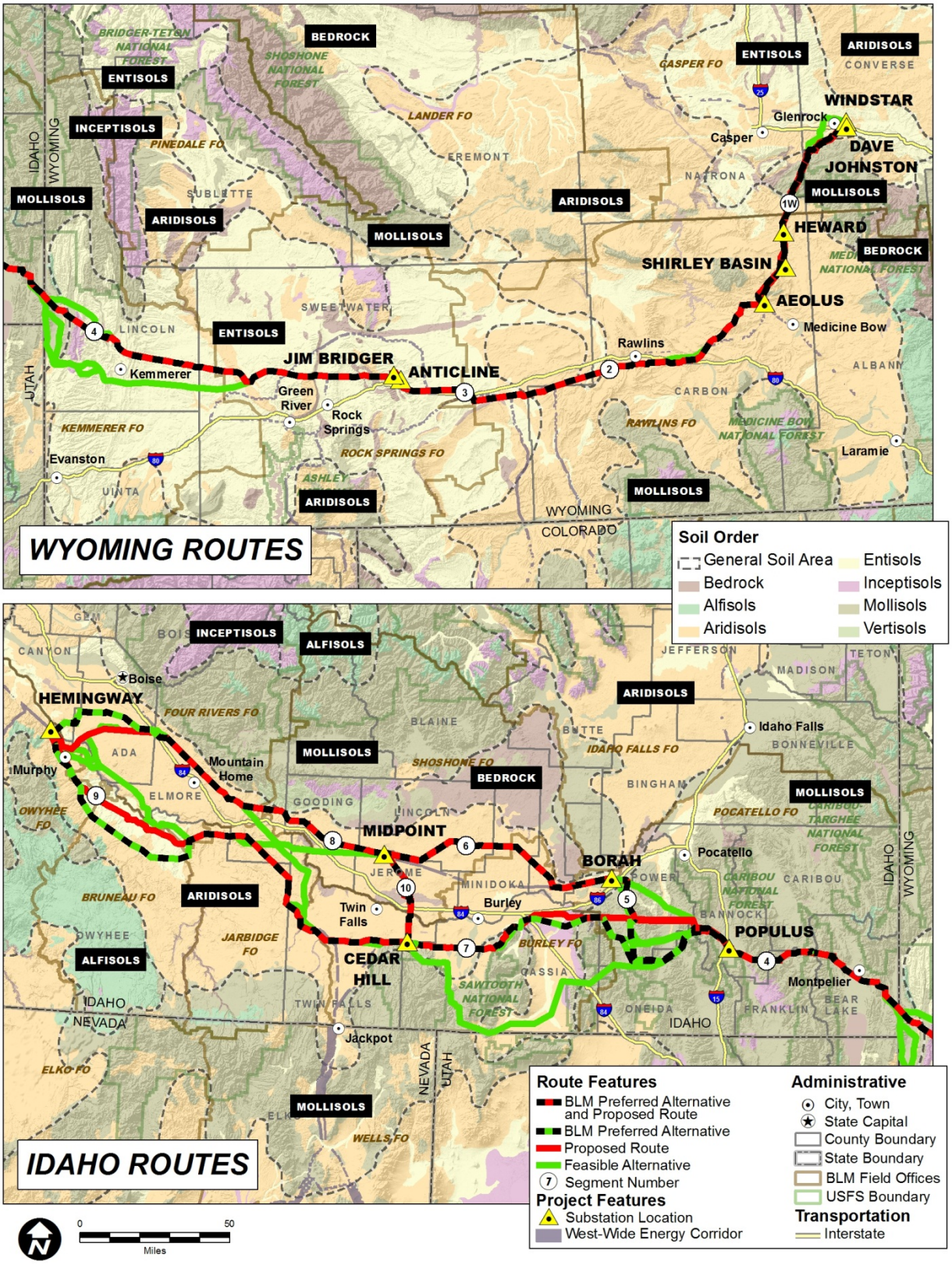

Figure 3.15-1. Major Soil Orders

3.15.1.2 Issues Related to Soils

The following soil related issues were brought up by the public during public scoping (Tetra Tech 2009) and comments on the Draft EIS, raised by federal and state agencies during scoping and agency discussions, or are issues that must be considered as stipulated in law or regulation:

- What would be the effect on soil erosion, and the potential for increased soil erosion from Project construction, operations, and decommissioning?
- What would be the effect on Project soils from compaction by vehicle and equipment traffic?
- What effect would topsoil disturbance have on soil productivity after construction and reclamation?

3.15.1.3 Regulatory Framework

Soil erosion is governed by regulations contained in USEPA's stormwater management regulations, derived as part of the CWA.

Environmental Protection Agency – Clean Water Act

Under the Clean Water Act, the NPDES stormwater program requires operators of construction sites one acre or larger (including smaller sites that are part of a larger common plan of development) to obtain authorization to discharge stormwater under an NPDES construction stormwater permit. The development and implementation of SWPPPs is the focus of NPDES stormwater permits for regulated construction activities.

Most states, including Wyoming, are authorized to implement the stormwater NPDES permitting program. USEPA remains the permitting authority in a few states (including Idaho), territories, and on most land owned by Native American sovereign nations. For construction (and other land-disturbing activities) in areas where USEPA is the permitting authority, operators must meet the requirements of the USEPA Construction General Permit. In Wyoming, compliance with state requirements would be necessary for construction stormwater activities. The Wyoming stormwater program provides its own permits and requirements, although the program is modeled after the USEPA program.

Federal agencies have handbooks and other guidance documents that govern soil management that would be applicable in their jurisdiction. Applicable Forest Service Manuals (FSMs) and Forest Service Handbooks (FSHs) for evaluating soil conditions on NFS lands include the following:

- FSM 2550 Soil Management (Region 4; Forest Service 2011)
- FSH 2509.22 Soil and Water Conservation Practices Handbook (Region R1/R4; Forest Service 1988)
- FSH 2509.25 Watershed Conservation Practices Handbook (Region 2; Forest Service 2006)

Soil standards, goals, and guidelines are found in Forest Plans for the National Forests crossed by the Project including the following Plans:

- Caribou Forest Plan (Forest Service 2003a)
- Medicine Bow Forest Plan (Forest Service 2003b)
- 2012 Amended Sawtooth Forest Plan (Forest Service 2003c, as amended 2012)

BLM RMPs vary by BLM FO. Some RMPs contain quantitative soil requirements that would be applicable to the Project.

The BLM maintains a guidance document for permitting and drilling oil and gas wells. This document, called the Gold Book, also contains general standards for road construction and construction stormwater BMPs and is used as a guideline for construction activities on the Gateway West Project. The WWE Corridor PEIS (DOE and BLM 2008), a guidance document for location of preferred cross-country utility ROWs, references the BLM Gold Book as being useful for construction stormwater procedures for linear facilities. The State of Wyoming State Reclamation Policy and BLM's Rawlins District RMP (Appendix 36) also provide requirements for soil reclamation that would be complied with in the appropriate Project areas.

3.15.1.4 Methods

The environmental effects analyses completed for this assessment were conducted using readily available data and GIS files derived from preliminary centerline and component design for the Proposed Route and Route Alternatives (see Section 3.1 for details on development of these files). In all cases, after analysis of impacts was complete and where impacts were identified, Proponent-proposed measures to reduce impacts were reviewed for sufficiency. Where those measures were determined to be insufficient, additional measures were identified.

Soils data were obtained from the NRCS databases. The NRCS STATSGO database provides soil data on a state-wide basis. The STATSGO data were reviewed to identify soil factors that could affect soil erosion, soil compaction, or difficulty in re-establishing vegetation during Project reclamation. STATSGO data were available for all factors, except prime farmland in Wyoming. To attain Wyoming prime farmland information, the NRCS Soil Survey Geographic database (county-level soils database) was reviewed but no prime farmland was found to be present in the Wyoming portion of the Project. In general, prime farmland requires an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks. Its soils are permeable to water and air. Prime farmland is not excessively eroded or saturated with water for long periods of time, and it either does not flood frequently during the growing season or is protected from flooding. At least some of these conditions, especially a favorable growing season and adequate water, are typically deficient in southern Wyoming soils, hence the absence of prime farmland in the Wyoming portion of the transmission line routes.

In 2010, drilling began in Segments 1 through 4 to support geotechnical evaluations for transmission line structures. The drilling was conducted on BLM-managed, NFS, and

other public land, and private land where landowner permission was obtained. Total depths drilled ranged from 15 feet to 66.5 feet. Soil samples were collected to evaluate the engineering properties of soil and to classify soil using the Unified Soil Classification system. The physical and engineering properties of soil collected from drill holes were compared to properties noted in the STATSGO database. Where differences were found between the boring logs and the STATSGO database, they are noted in the text below. Additional drilling occurred in 2011 and 2012, and later drilling is also planned or anticipated. The project engineer will use the results of drilling and soil analyses to complete the geotechnical evaluations. The following methods were used to evaluate Project soil conditions.

Wind Erodibility

The STATSGO data for wind erodibility group were reviewed for each segment's Analysis Area. The STATSGO database divides wind erodibility potential into eight categories based on slope, soil type, and wind characteristics. It was assumed that groups 1 through 4 represent soils that are highly erodible, with wind erodibility ranging from greater than 310 tons per acre per year (T/A/Y – Group 1), to 86 T/A/Y – Group 4. Groups 5 through 8 range from 56 T/A/Y (Group 5) to Group 8 – 0 T/A/Y.

To assess the impacts to soil from wind erodibility, the centerlines of the Proposed Route and Route Alternatives in each segment were overlaid on the STATSGO wind erodibility GIS data file and the area for each wind erodibility group (in acres) was determined. Soils in Groups 1 through 4 (greater than or equal to 86 T/A/Y) were considered highly wind erodible. Highly wind erodible soils were expressed as a percentage of the total Analysis Area for the segment. To disclose overall impacts by segment, the area containing highly wind erodible soil was identified along the construction and operations disturbance areas of the Proposed Route and compared to the highly erodible soil areas for the construction and operations disturbance areas of the feasible alternatives.

Erosion Potential by K Factor

K Factor is a soil erodibility factor that measures a soil's potential to erode, and also the rate of runoff as measured compared to a "standard" condition. According to information provided on the U.S. Department of Energy, Pacific Northwest National Laboratory website (DOE 2003b), soil K Factors can range from 0.02 to 0.6. Therefore, low K values were assumed to range from 0.02 to 0.25, moderate K values from 0.25 to 0.37, and high K values greater than 0.37. The value of 0.37 and above was selected to define high K value because it was one of the values reported in the STATSGO GIS data file.

To assess the erodibility of soil, the centerlines of the Proposed Route and Route Alternatives in each segment were overlaid on the STATSGO K Factor GIS data file and the area for K Factor group (in acres) was determined. High K Factor soils were determined, and their area expressed as a percentage of the total Analysis Area for the segment. To disclose overall soil erodibility impacts by segment, the areas with high K Factor were identified within the construction and operations disturbance areas of the

Proposed Route and compared to the high K Factor areas in the construction and operations disturbance areas of the feasible alternatives.

Steep Slopes

Soil disturbance on steep slopes would be more prone to soil erosion. The Rawlins FO RMP (Albany, Sweetwater and Carbon Counties, Wyoming; BLM 2008a) indicates that approval is necessary for surface disturbances on slopes greater than 25 percent. To assess Project areas with steep slopes, a slope inclination of 25 percent or greater to define steep slopes was used. The centerlines of the Proposed Route and Route Alternatives in each segment were overlaid on the STATSGO GIS data file and the area with steep slopes (in acres) was determined. The area with steep slopes was expressed as a percentage of the total Analysis Area for the segment. To disclose the proportion of steep slopes by segment, the areas with steep slopes were identified within the construction and operations disturbance areas of the Proposed Route and compared to the steeply sloped areas in the construction and operations disturbance areas of the feasible alternatives.

Soil T Factor

The soil T Factor is an indicator of soil loss tolerance, or the amount of soil loss that can be tolerated for a soil to remain productive. Soils with a low T Factor would be more sensitive to the effects of erosion than soils with higher T Factors. The Forest Service Soil Management Handbook (Forest Service 1991b) presents an example threshold soil loss tolerance of 2 T/A/Y for deep soils or 1 T/A/Y for shallow soils; however, it indicates that actual soil loss tolerance standards may vary. The Caribou-Targhee NF has adopted these tolerances in their Forest Plan. In their RMP Final EIS, the High Desert District, Rawlins FO BLM states that soil loss should not exceed 2 T/A/Y following reclamation (BLM 2008a). Given the Forest Service and at least one BLM district guideline of 2 T/A/Y soil loss tolerance, the effects analysis herein utilized this soil loss tolerance of 2 T/A/Y as a guideline.

For the analysis, each segment Analysis Area was examined and the percent of area containing a low T Factor (≤ 2 T/A/Y) determined. To assess the areas with low soil loss tolerance, the centerlines of the Proposed Route and Route Alternatives in each segment were overlaid on the STATSGO T Factor GIS data file and the area for T Factor group (in acres) was determined. Low T Factor soils were expressed as a percentage of the total Analysis Area for the segment. To disclose overall impacts to low soil loss tolerance soils by segment, the areas with low T Factor were identified within the construction and operations disturbance areas of the Proposed Route and compared to the low T Factor areas in the construction and operations disturbance areas of the feasible alternatives.

Prime Farmland

According to the NRCS, prime farmland contains soils with the best physical and chemical characteristics for production of food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to

acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. The soils are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding (Forest Service 1991b).

The NRCS separates prime farmland into several categories. For this analysis, prime farmland with no restrictions, prime farmland when irrigated, and prime farmland when drained, were used to describe prime farmland. For the prime farmland analysis in this section, the centerlines of the Proposed Route and Route Alternatives in each segment were overlaid on the STATSGO Prime Farmland GIS data file. The prime farmland acreage was then determined, expressed as a percentage of the total Analysis Area for the segment. To disclose overall impacts to prime farmland by segment, the prime farmland areas were identified within the construction and operations disturbance areas of the Proposed Route and compared to the prime farmland areas in the construction and operations disturbance areas of the feasible alternatives. Section 3.18 – Agriculture presents further information on the Project's impacts to agriculture, including prime farmland.

Soil Compaction

The areas where compaction could occur are coincident to the disturbance acreage. Different soil types have different susceptibility to compaction; however, as a conservative measure, it was assumed that if the soil is disturbed by construction equipment or operations vehicles, there is at least some potential for soil compaction. Although all soil is susceptible to compaction to varying degrees, wet soils are more readily compacted than dry, and clay loam or finer soils with poor drainage characteristics were assumed to be highly compaction prone.

To assess the areas with highly compactable soil, the centerlines of the Proposed Route and Route Alternatives in each segment were overlaid on the STATSGO GIS data files showing clay loam or finer soil texture, and somewhat poorly drained to very poorly drained soil drainage characteristics. Soils meeting both the texture and drainage characteristics were defined as highly compactable, and the acreage of soils meeting these criteria was determined. The area of highly compactable soil (in acres) was expressed as a percentage of the total Analysis Area for the segment. To disclose overall impacts to highly compactable soils by segment, the highly compactable soil areas were identified within the construction and operations disturbance areas of the Proposed Route and compared to the highly compactable soil areas in the construction and operations disturbance areas of the feasible alternatives.

Stony-Rocky Soil

The NRCS Soil Survey Manual (1993) defines soil particles as being less than 2 millimeters (mm) in diameter. Particles larger than 2 mm, including gravel, cobbles, stones, and boulders, are coarse fragments. Soil with at least 20 percent coarse fragments was defined as stony-rocky soil. Rocks greater than 75 mm include cobbles,

stones, and boulders. Stony-rocky soil could reduce vegetation success because gravel competes with plant roots for space and does not retain moisture as well as fine-grained soils. Soils containing large quantities of cobbles and larger rocks provide the same impediments to revegetation as gravel. They also interfere with mechanical cultivation equipment such as plows, soil augers, and seed drills.

To assess the impacts to revegetation efforts from stony-rocky soils, the centerlines of the Proposed Route and Route Alternatives in each segment were compared to the STATSGO GIS data file for soils containing greater than 20 percent by weight soil particles greater than 2 mm and the area of stony-rocky soils (in acres) was determined. The proportion of stony-rocky soils was expressed as a percentage of the total Analysis Area for the segment. To disclose overall impacts by segment, the area containing stony-rocky soils was identified along the construction and operations disturbance areas of the Proposed Route and compared to the stony-rocky soil areas for the construction and operations disturbance areas of the feasible alternatives.

Droughty Soil

Droughty soils contain a texture of sandy loam or coarser and are moderately to excessively well drained. Due to their low water-holding capacity, droughty soils may not hold enough water within the root zone to support plant life, making revegetation difficult. In the Project EPMs (see Table 2.7-1), the Proponents commit to mulching and stabilizing droughty soils to minimize wind erosion and conserve soil moisture (WQA-12). A soil was considered droughty if it has sandy loam or coarser texture, and drainage class of moderately to excessively well drained.

To assess the impacts to droughty soils, the centerlines of the Proposed Route and Route Alternatives in each segment were overlaid on the STATSGO GIS data files for soils with sandy loam or coarser texture and drainage class moderately to excessively well drained. The droughty soil acreage was then determined, and the acreage was expressed as a percentage of the total Analysis Area for the segment. To disclose the overall extent of droughty soil by segment, the droughty soil areas were identified within the construction and operations disturbance areas of the Proposed Route and compared to the droughty soil in the construction and operations disturbance areas of the feasible alternatives.

Shallow Bedrock

According to NRCS soil descriptions, shallow bedrock is defined as bedrock occurring within 20 inches of ground surface. Bedrock is considered as moderately deep between 20 and 40 inches, as deep from 40 to 60 inches, and as very deep if greater than 60 inches. The bedrock classifications from shallow to deep were examined and are referred to as “shallow bedrock” because they occur within 5 feet of ground surface, the area where most Project disturbance would occur. Blasting would be necessary in the footings of transmission line towers and possibly other structures, in areas where shallow bedrock would be encountered. This blasting could result in mixing of topsoil and subsoil, and an increase in the stony-rocky component in these areas, making revegetation difficult. The STATSGO database provided a category for bedrock of 51 inches below ground surface; therefore, the analysis here assumes that bedrock less

than 51 inches that is disturbed during construction could negatively affect revegetation efforts. The evaluation of bedrock in this section is strictly relative to a soil's ability to sustain revegetation. Section 3.14 – Geologic Hazards and Section 3.16 – Water Resources define shallow bedrock at a deeper level, and the effects presented in the other sections are relative to destabilizing geological hazards (Section 3.14) or blasting effects to groundwater wells (Section 3.16). This is the reason for the differing definitions of shallow bedrock and the different percentages of shallow bedrock in the Analysis Areas.

To assess the impacts to revegetation efforts from shallow bedrock, as defined above, the centerlines of the Proposed Route and Route Alternatives in each segment were compared to the STATSGO GIS data file for soil profiles listing bedrock at 51 inches or less below ground surface. The proportion of soil having shallow bedrock was expressed as a percentage of the total Analysis Area for the segment. To disclose overall shallow bedrock impacts by segment, the acreage of shallow bedrock was identified along the construction and operations disturbance areas of the Proposed Route and compared to the amount of soil containing shallow bedrock (in acres) for the construction and operations disturbance areas of the feasible alternatives.

Hydric Soil

Hydric soils are formed under saturation, flooding, or ponding for sufficient period to develop anaerobic characteristics in the upper soil horizon. Hydric soils, combined with surface water or shallow groundwater and indicative vegetation species, are necessary indicators of wetlands. Disturbance of hydric soils may result in decreased water storage capacity of soil, decreased soil porosity, and decreased ability to replace hydrophytic vegetation. The STATSGO database delineates hydric soils. The areas of hydric soil were reviewed in the Analysis Areas, and the amount of hydric soil was compared between the Proposed Route and feasible alternatives.

The estimated extent of wetlands, based strictly on vegetation mapping conducted for this project, is more fully discussed in Section 3.9 – Wetlands and Riparian Areas. Section 3.9 also contains mitigation measures proposed to protect wetlands and hydric soils. All areas estimated as wetlands in Section 3.9 presumably contain hydric soils. However, substantially more wetland acreage is estimated from the vegetation mapping when compared to the amount of hydric soils reported in the STATSGO database. The actual extent of wetlands (and therefore hydric soils) would be determined after a route has been selected.

To assess the areas with hydric soils based on the STATSGO data, the centerlines of the Proposed Route and Route Alternatives in each segment were overlaid on the STATSGO GIS data file for hydric soils and the acreage was determined. The hydric soil proportions were determined and their area expressed as a percentage of the total Analysis Area for the segment. To disclose overall impacts to hydric soils by segment, hydric soil areas were identified within the construction and operations disturbance areas of the Proposed Route and compared to hydric soil areas in the construction and operations disturbance areas of the feasible alternatives.

3.15.1.5 Existing Conditions

The Project area contains soils of several major soil orders, including Entisols, Aridisols, and Mollisols. Also included are small areas of Inceptisols and Alfisols in mountainous areas. The soil orders, and the physical characteristics listed in the Section 3.15.1.4 – Methods above, were used to summarize existing soil conditions. Table 3.15-1 presents soil factors that were used to characterize Project soil conditions.

Erosion Potential

The soil characteristics of wind erodibility, K Factor, and slope were used to evaluate erosion potential. All of the segments contain at least some soil with a high potential for wind erosion. Nearly all of the soils in Segments 3 and 6 are highly wind erodible (98 percent). Soils in Segments 2, 4, 9, and 10 have high wind erosion potential in at least 50 percent of their Analysis Areas. Only the Segment 5 Analysis Area contains a low percentage of wind erodible soil, 5 percent. The erosion potential (high K Factor) ranged from 3 percent for Segment 2 to 93 percent for Segment 7. K Factor data suggest that Segments 1 through 4 have much lower erosion potential compared to Segments 5 through 10. Segments 5 and 7 are much steeper than any of the other segments, with steep slopes over 30 percent of their area. The other segments range from 0 to 11 percent steep slopes. Taken collectively, all of the Analysis Areas contain at least one characteristic that would result in vulnerability to soil erosion. Segments 2, 3, 4, 6, 9, and 10 contain the highest potential for wind erosion. Segments 5, 7, 8, 9, and 10 contain high percentages of area with high erosion potential (K Factor). Segments 5 and 7 have the steepest slopes.

Soil Loss Tolerance

There are large areas with low soil loss tolerances in nearly all of the Analysis Areas. A review of T Factors within the Analysis Areas indicates that Segment 2 has no land designated as low soil loss tolerance, but all other segments contain moderate to high percentage of area with low soil loss tolerances. Segments 3, 4, 6, 8, and 9 contain low soil loss tolerances in 50 percent or greater of their areas.

Prime Farmland

Prime farmland soils provide an important economic base to southern Idaho. Dry land and irrigated farming covers the majority of private land in southern Idaho and 31 to 42 percent of Segments 5, 7, 8, 9, and 10 contain prime farmland. Much of the prime farmland in Idaho is currently used for farming. Areas of prime farmland soil that are not currently used would be good candidates for revegetation, provided the sites contain adequate moisture. A short growing season and lack of water result in the absence of prime farmland in Wyoming.

Soil Reclamation Potential

Several soil factors were used to evaluate the soil's potential for use in soil reclamation and revegetation, including soil order, soil compaction potential, stony-rocky soil, droughty soil, hydric soil, and depth to bedrock.

Table 3.15-1. Soil Factors in the Gateway West Analysis Area (percent of area)

Segment Number	Total Analysis Acreage	Erosion Factors			Sensitive Soils		Factors Affecting Reclamation				
		Highly Wind Erodible[1/]	High K Factor[2/]	Slope Greater Than 25%	Low T Factor[3/]	Prime Farmland[4/]	Highly Compaction Prone[5/]	Stony / Rocky[6/]	Droughty[7/]	Shallow Bedrock[8/]	Hydric Soil
1	81,331	36	7	7	7	–	–	7	43	7	–
2	68,521	72	3	–	–	–	–	–	72	–	–
3	33,391	98	23	1	73	–	–	1	78	66	–
4	224,082	55	41	11	51	–	2	28	62	40	5
5	99,696	5	91	36	37	36	–	38	40	8	–
6	1,305	98	2	–	75	18	–	–	98	47	–
7	211,643	23	93	30	43	42	–	32	43	15	–
8	159,463	39	72	–	69	31	–	1	52	16	–
9	225,769	52	56	1	58	36	–	10	45	41	–
10	22,361	53	78	–	41	34	–	19	40	20	–

1/ Includes wind erodibility groups ≥86 T/A/Y.
2/ Includes K Factors ≥ 0.37 T/A/Y.
3/ Includes T Factors ≤ 2 T/A/Y.
4/ Prime farmland data from STATSGO.
5/ Includes moderately to poorly drained soils with clay loam or finer textures.
6/ Includes soil with 20 percent or more by weight rocks ≥ 2 mm (gravel, cobbles, stones, or boulders).
7/ Includes sandy loam or coarser texture and moderately to excessively well drained soils.
8/ Includes exposed bedrock (from soil texture) and depth to bedrock ≤ 51 inches.

A review of the STATSGO soil data indicates that highly compaction-prone soil is rare. Two percent of Segment 4 contains highly compaction-prone soil; otherwise, it was absent in all other segments. The sandy desert soils found in most of the Project area are not especially prone to compaction.

The greatest percentage of stony-rocky soil in the Analysis Area is present in Segments 4, 5, and 7 with stony-rocky soils covering 28 to 38 percent of the Analysis Areas. The other segments contain less than 20 percent stony-rocky soil. Fourteen soil borings were drilled where no gravel was noted on the boring logs, despite being identified by STATSGO as stony-rocky soil. Two boreholes contained gravel soils, although STATSGO did not identify stony-rocky soil. These differences suggest that the actual percentage of stony-rocky soil may be slightly different than that reported here and in Table 3.15-1.

Shallow bedrock is found in all segments except Segment 2. Droughty soil is common throughout the Project. Segments 2, 3, 4, 6, and 8 contain at least 50 percent droughty soil. According to the STATSGO database, hydric soils are not common in the Analysis Area; they are found only in 5 percent of the area of Segment 4. However, future Project wetland delineations would probably result in the discovery of additional hydric soil acreage.

Permanent Soil Loss

The acreage of permanent soil loss equals the operations disturbance area (the area beneath the Project structures and access roads). For the Proposed Route, the permanent soil loss is estimated at 2,404 acres, approximately 0.2 percent of the Analysis Area.

3.15.2 Direct and Indirect Effects

This section is organized to present effects to soils from construction, then operations, followed by decommissioning activities for the proposed Project. Route Alternatives are analyzed in detail in Section 3.15.2.3.

EPMs are presented in detail within this section only if it is the first time they have been discussed in Chapter 3; all other measures are referenced or summarized. A comprehensive list of all EPMs and the land ownership to which they apply can be found in Table 2.7-1 of Chapter 2.

Plan Amendments

Proposed amendments to BLM RMPs and MFPs are summarized in Table 2.2-1 of Chapter 2, while BLM plan amendments associated with other routes are summarized in Table 2.2-2. BLM plan amendments are discussed in detail in Appendices F-1 and G-1. Proposed amendments to Forest Plans are summarized in Table 2.2-3 of Chapter 2 and discussed in detail in Appendices F-2 and G-2. Amendments are needed to permit the Project to cross various areas of BLM-managed land and NFS lands. Effects described for areas requiring an amendment in order for the Project to be built would only occur if the amendment were approved. Amendments that alter land management designations could change future use of these areas. No amendments

specific to soils are proposed for the Project and no impacts to soils resulting from approving the amendments beyond the impacts of the Project are anticipated.

3.15.2.1 No Action Alternative

Under the No Action Alternative, the BLM would not issue a ROW grant to the Proponents of Gateway West and the Project would not be constructed across federal lands. No land management plans would be amended to allow for the construction of this Project. No Project-related impacts to soils would occur; however, impacts would continue as a result of natural events (such as fire, drought, and severe weather) as well as from existing and planned developments within the Analysis Area and from other projects, including wind farms, oil and gas extraction, and coal, trona, and phosphate mines. The demand for electricity, especially for renewable energy, would continue to grow in the Proponents' service territories. If the No Action Alternative is implemented, the demand for transmission services, as described in Section 1.3, Proponents' Objectives for the Project, would not be met with this Project and the area would have to turn to other proposals to meet the transmission demand. Under the No Action Alternative, impacts similar to those described below may occur due to new transmission lines built to meet the increasing demand in place of this Project.

3.15.2.2 Effects Common to All Action Alternatives

Construction

Construction Erosion Effects

Project construction activities that would affect soils include clearing, grubbing, and grading along the ROW and at additional temporary workspaces; trenching; backfilling; excavating; and construction of permanent structures, such as transmission line towers, access and service roads, co-generation sites, and substations. The total Project construction disturbance area consists of approximately 18,255 acres, which is approximately 1.6 percent of the Analysis Area. The construction disturbance area was calculated by establishing an assumed construction disturbance area around all Project features, such as transmission line towers, regeneration sites, substations, multipurpose yards, laydown yards, and access roads. This predicted area was entered into a GIS database and compared to the areas of the various soil factors used for the soils analyses described in Section 3.15.1.4. The estimated soil effects within the construction disturbance area are presented in Table D.15-1 in Appendix D. Ground clearing during construction would increase the potential for erosion. Certain soils within the Project area would be more sensitive to soil impacts, including soils with a low soil loss tolerance, and soils qualifying as prime farmland. Removal of protective vegetation would expose soil to potential wind and water erosion. The construction acreage is larger than the operations area due to the need for tower erection areas at each structure, laydown yards, multipurpose yards, and wire-pulling/splicing sites. The areas used only for construction would be reclaimed as soon as possible, which may include regrading to original land contours, topsoil replacement, and revegetation.

Access roads are included as disturbances that could result in increased erosion. The amount of erosion from disturbances is a factor of climate factors (precipitation, wind,

etc.). Effective use of construction stormwater BMPs, and compliance with the soil EPMs stated below and in the Proponents' POD would be used to reduce the effects of erosion. Service roads used for construction and operations would also be reclaimed to minimize erosion potential.

Portions of all Segments except Segment 2 contain areas with low soil loss tolerance, defined as soil loss tolerance less than or equal to 2 T/A/Y. EPMs and Agency-proposed mitigation measures would be used to minimize soil losses. When effectively used, these would ensure that soil loss is minimized and soil loss tolerances would meet applicable RMP and Forest Plan guidelines.

Prior to construction, wetland delineations would be necessary in areas crossing or adjacent to assumed wetlands. At that time, the amount of hydric soils/wetlands would be re-evaluated and measures would be implemented to preserve or reclaim those acreages during construction and operation. The procedures presented in the Framework Reclamation Plan (see Appendix B) and EPMs included in Table 2.7-1 would be used to minimize effects to hydric soils and wetlands.

Reclamation would be necessary in disturbed soil areas. The Proponents' POD (see Appendix B) contains a Framework Reclamation Plan that the Proponents would use for Project reclamation. The Framework Reclamation Plan and the EPMs presented in Table 2.7-1 also contain many BMPs that would be used during Project construction, operations, and reclamation. Erosion in all areas could be exacerbated unless revegetation efforts are implemented as soon as possible following disturbance.

Construction on Sensitive Soils

For the effects analysis, soils with low soil loss tolerances and prime farmland soils were combined and considered as sensitive soils due to the special characteristics that separate them from other Project soils. Potential soil impacts to prime farmland from transmission line construction include soil erosion, damage to agricultural land drainage and irrigation systems, mixing of topsoil and subsoil, potential loss of topsoil, and soil compaction. Prime farmland within the construction zone would be unavailable to agriculture during the construction interval. Construction on soil with low soil loss tolerance may cause erosion. If blasting is necessary for placement of foundations, the rocky component of soils may increase in blasting areas. Based on all of the soil factors, it appears that accounting for droughty, rocky conditions would be most critical to successful revegetation.

It may be necessary to build construction access roads on sensitive soil areas, including highly erosive soils, steep slopes or near NHT trails. These construction roads would be restored and an alternative access route would be designated for operations.

The reclamation measures presented in the Framework Reclamation Plan (see Appendix B) and EPMs in Table 2.7-1 would keep soil losses to a minimum. Areas not also used for operations would be reclaimed as soon as possible following construction.

Soil Compaction

Soil compaction would occur in the construction disturbance area from driving vehicles and heavy equipment over the soil. Areas under roadways, structures, and high-use areas would be most affected. Some soils, such as very fine-grained, poorly drained soil have the greatest potential for soil compaction; however, all soil would have some potential for soil compaction, and compacted soil would need to be ripped, loosened, or otherwise treated using BMPs at the end of the Project to restore their productivity.

Accidental Spills

During construction, use of trucks, heavy equipment, or stored supplies could result in accidental discharge of fuel, lubricants, automotive fluids, or other chemicals. Although the potential exists, these chemical releases would be accidental, occasional, and of limited extent. BMPs for construction housekeeping, spill prevention, and cleanup would be used to prevent and remediate accidental chemical releases. Therefore, chemical releases would not result in widespread or long-term effects to Project soils.

The Proponents have identified and are committed to implementing extensive EPMs related to controlling soil erosion in accordance with NPDES requirements and spill prevention and containment in accordance with industry standards. These EPMs are listed in Table 2.7-1 and are included below.

WQA-1 The appropriate NPDES permits for construction activities that disturb one acre or more of land will be obtained from the Department of Environmental Quality and USEPA or their designees.

WQA-4 The SWPPPs will be modified as necessary to account for changing construction conditions.

WQA-5 The SWPPPs will identify areas with critical erosion conditions that may require special construction activities or additional BMPs to minimize soil erosion.

WQA-6 Stormwater BMPs will be maintained on all disturbed lands during construction activities, as described in the SWPPP.

WQA-7 Approved sediment and erosion control BMPs will be installed and maintained until disturbed areas meet final stabilization criteria.

WQA-8 Temporary BMPs will be used to control erosion and sediment at staging areas (equipment storage yards, fly yards, lay down areas) and substations.

WQA-9 The construction schedule may be modified to minimize construction activities in rain-soaked or muddy conditions.

WQA-10 Damaged temporary erosion and sediment control structures will be repaired in accordance with the SWPPP.

WQA-11 Upon completion of construction, permanent erosion and sediment BMPs will be installed along the transmission line within the ROW, at substations, and at related facilities in accordance with the SWPPPs.

WQA-12 In areas of droughty soils, the soil surfaces will be mulched and stabilized to minimize wind erosion and to conserve soil moisture in accordance with the SWPPPs.

WQA-13 Construction industry standard practices and BMPs will be used for spill prevention and containment.

WQA-14 Construction spills will be promptly cleaned up and contaminated materials hauled to a disposal site that meets local jurisdictional requirements.

WQA-15 All staging areas will contain fueling areas with containment. Where fueling must be conducted along the ROW, the plan will specify BMPs.

WQA-16 If an upland spill occurs during construction, berms will be constructed with available equipment to physically contain the spill. Absorbent materials will be applied to the spill area. Contaminated materials will be excavated and temporarily placed on and covered by plastic sheeting in a containment area a minimum of 100 feet away from any wetland or waterbody, until proper disposal is arranged.

WQA-17 If a spill occurs which is beyond the capability of on-site equipment and personnel, an Emergency Response Contractor will be identified and available to further contain and clean up the spill.

The Agencies have identified and the Proponents have adopted the following EPMs to provide additional protection of soils during construction:

SOIL-1 The Wyoming BLM State Reclamation Policy and applicable Agency management plan requirements for soil management will be followed on federal lands in the state of Wyoming.

SOIL-2 The Proponents will submit a Compaction Monitoring Plan for review and Agency approval prior to construction that specifies the conditions under which construction will either not start or will be shut down due to excessively wet soils. Conditions will be measurable in the field and easy to demonstrate to construction workers.

SOIL-4 Detrimental soil disturbance such as compaction, erosion, puddling, and displacement will be minimized through implementing measures identified in the SWPPP. Measures may include road ripping, frequent waterbars, cross-ditching (e.g., rolling dips), or other methods to reduce compaction while preventing gully formation. Ripping pattern should be altered to a crossing, diagonal, or undulating pattern of tine paths to avoid concentrated runoff patterns that can lead to gullies.

SOIL-5 The Proponents are responsible for monitoring to ensure soil protection is achieved, and providing a monitoring report on reseeding success and/or other methods to stabilize soils to the Forest Service by the end of each growing season for areas on NFS lands for 3 years or until requirements are met for the applicable permit.

SOIL-6 Reclamation of all temporary disturbances on NFS lands (such as road cuts) should include replacement of material to original contours and re-compaction to pre-existing compaction percentage (which should be identified during reclamation at adjacent locations to the disturbance). Guidelines for streambank re-compaction to maximize vegetative regrowth and mechanical stability are covered in USACE publication ERDC TN-EMRRP-SR-26 (Goldsmith et al. 2001).

SOIL-7 In order to meet Forest Plan Soil Standards on NFS lands, the Reclamation and Revegetation Plan will describe on-site restoration using topsoil salvaging.

Operations

Operations Erosion Effects

The erosional effects from Project operations would consist of soil disturbances necessary to maintain the transmission lines in working order and conduct necessary repairs. Stormwater BMPs, including erosion and sediment control structures, as well as new culverts would require inspection, maintenance, and repair through the operational life of the Project to minimize soil erosion or sedimentation to surface water. The Proposed Route operations disturbance area is about 2,404 acres, or approximately 13 percent of the construction area disturbance. Due to the smaller size of the operations area, the erosion effects in this area would be much less than for the construction area but would last for a much longer time. The operations area consists of buffered areas surrounding transmission line towers, regeneration sites, substations, access roads, and other areas that would remain during Project operations. The predicted operations area was entered into a GIS database and compared to the areas of the various soil factors used for the soil analyses using the methods described in Section 3.15.1.4. The estimated effects to soil within operations disturbance areas are presented in Table D.15-2, Appendix D.

The treatment of soils in the operations area would result in more stable soil conditions than those found during construction. For instance, substations would be covered with free draining rock, which would isolate native soil from erosive conditions. Roads retained for operations would be seeded with a grass mix and allowed to revegetate and thereby minimize the surface exposed to erosive conditions. For normal maintenance activities, an 8-foot portion of the road would be used and vehicles would drive over the vegetation. For non-routine maintenance requiring access by larger vehicles, the full width of the access road may be used. Access roads would be repaired, as necessary, but not be routinely graded again to minimize impact to vegetation. Table 2.7-1 includes EPMs that specify that stormwater protection measures would be employed to minimize erosion and sedimentation to surface water.

Sensitive Soil Effects

Reclamation after construction would minimize effects to soils with low soil loss tolerance during the operations phase of the Project. The area of loss of prime farmland would be less than during construction but for a longer time interval, 50 years compared to 2 years for construction.

Soil Compaction

No additional soil compaction would occur during Project operations. Vehicle travel would occur predominantly on established access roads.

Permanent Soil Loss

The area under the footprint of structures would result in a long-term loss of that acreage to other productive soil uses. Structures in the operations area were considered to result in "permanent" soil loss. However, it is not really permanent, and following Project decommissioning, those areas would be reclaimed for other beneficial uses. The acreage of permanent soil loss would depend on the route alternatives selected; the longer the route, the more acres of soil that would be permanently removed from production.

The Proponents have identified and are committed to implementing extensive EPMs related to controlling soil erosion in accordance with NPDES requirements and spill prevention and containment in accordance with industry standards. These EPMs are listed in Table 2.7-1 and in the preceding section.

Decommissioning

Decommissioning would result in temporary soil effects of approximately the same magnitude as during construction; therefore, the same practices used during construction to minimize effects to the soil would be used during decommissioning activities. All transmission line structures and associated features would be removed, and disturbed areas would be reclaimed. Based on the descriptions of soil orders, the Mollisols found in Segments 1, 4, 5, and 7 were assumed to be most suitable for reclamation and revegetation, given the assumed slightly wetter, cooler climate in these segments; existing grassy vegetation; and the organic content of these soils. Variations in soil properties, including wind and water erosion potential, soil moisture, texture, and drainage characteristics, would cause soils to be affected differently in regard to erosion potential, compaction potential, and their suitability for reclamation and revegetation.

Decommissioning activities would include excavation to remove structures. This temporarily exposes bare soil to erosional effects. Grading may occur to restore natural land contours, or to spread stockpiled topsoil onto reclaimed land. Reclaimed roads would be ripped to reduce compaction. During decommissioning, those areas with "permanent" topsoil removal would be reclaimed, and revegetated to pre-construction conditions. These activities would result in temporary exposure of bare soil to increased erosion.

The Agencies have identified and the Proponents have adopted the following EPM to protect soils during decommissioning:

SOIL-3 During decommissioning, some obviously compacted areas, such as established service roads, will require loosening prior to revegetation. If necessary to re-establish vegetation, the Proponents will use a ripper blade, till, or similar instrument to loosen the surface soil layer.

3.15.2.3 Comparison of Alternatives by Segment

This section details the differences among alternatives for soils effects from Project construction, operations, and decommissioning. Tables D.15-1 and D.15-2 in Appendix D present the results of soil analyses for the Proposed Route and Route Alternatives.

Segment 1W

The preferred routes in Segment 1W are as follows:

Segment	Preferred Route	Agency
Segment 1W(a)	Proposed Route (Figure A-2)	BLM and State of Wyoming
Segment 1W(c)	Proposed Route (Figure A-2)	BLM and State of Wyoming

Segment 1W is composed of Segments 1W(a) and 1W(c), both of which consist of single-circuit 230-kV transmission lines. Generally, Segment 1W(a) would be a new 73.8 mile-long transmission line, and 1W(c) would involve reconstruction of a 73.6-mile-long portion of the existing Dave Johnston – Rock Springs 230-kV transmission line. However, in the area approximately 5 miles to the north and to the south of Ice Cave Mountain, the lines shift east to avoid the ice cave. In this area, 1W(a) would be the reconstruction of the existing line and 1W(c) would be the new line. Segment 1W(a) has one alternative, Alternative 1W(a)-B, which is located north and west of the town of Glenrock and was the Proponents' initial proposal. However, the Preferred/Proposed Route was revised following the Draft EIS public comment period in order to avoid the more populated area around Glenrock. Figure A-2 in Appendix A shows the location of the Segment 1W routes.

As shown in Table D.15-1, construction of the proposed Segment 1W(a) would disturb approximately 775 acres. The construction disturbance area of proposed Segment 1W(c) would be 956 acres. Alternative 1W(a)-B would be longer than the comparison portion of the Segment 1W(a) Preferred/Proposed Route and mostly parallel to 1W(c). As a result, the disturbance effects associated with construction of Alternative 1W(a)-B would be greater than for the comparison portion of the Preferred/Proposed Route (see Table D.15-1).

As shown in Table D.15-2, the operations areas of Segment 1W(a) and 1W(c) Preferred/Proposed Routes would result in the permanent disturbance of 177 acres and 124 acres of soil, respectively. As described in the previous paragraph relating to construction, Alternative 1W(a)-B would result in a larger disturbance acreage during operations than the comparison portion of the Preferred/Proposed Route because it is longer.

Approximately 38 percent of the soil in Segment 1W(a) is considered droughty and soils are moderately wind erodible. As noted in Section 3.15.2.2 and shown in Table D.15-1, decommissioning and reclamation would result in temporary soil disturbance of approximately the same magnitude as during construction. The final step of reclamation would restore the areas to pre-construction conditions and mitigate future soil impacts. The droughty portions of the alternative would make reclamation challenging.

Medicine Bow-Routt National Forests Soil

A small portion of Segment 1W would be located on the Medicine Bow-Routt NFs (see Tables D.15-3 and D-15-4). The construction and operations phases of the Preferred/Proposed Route for Segment 1W(a) would affect 16 acres and 3 acres, respectively. The Preferred/Proposed Route for Segment 1W(c) would affect 24 acres and 3 acres, respectively. None of the soils crossed on the Medicine Bow-Routt NFs acreage are highly erodible. There would be a long-term loss of productivity on 3 acres of NFS land for the Segment 1W(a) Preferred/Proposed Route and on 3 acres for the Segment 1W(c) Proposed Route. Alternative 1W(a)-B is not located in the Medicine Bow-Routt NFs.

When reviewing all of the soil factors, the Proposed Route in combination with Alternative 1W(a)-B would result in the least overall impacts to soil in Segment 1W(a), mainly due to fewer erosional effects, more favorable reclamation properties, and less shallow bedrock.

Segment 2

The preferred route in Segment 2 is as follows:

Preferred Route	Agency
Proposed Route (Figure A-3)	BLM and State of Wyoming

Segment 2 consists of one single-circuit 500-kV transmission line between the proposed Aeolus Substation and the location of the originally planned Creston Substation near Wamsutter, Wyoming (a new substation at Creston is no longer needed due to changes in anticipated demand for oil and gas field electricity). The Preferred/Proposed Route has been revised to incorporate Alternative 2C, as analyzed in the Draft EIS. Segment 2 would be approximately 91.9 miles long. Alternative 2A is being considered by the BLM because this alternative route is within the WWE corridor. Alternative 2B was initially the Proponents' Proposed Route before they responded to local suggestions and relocated the Proposed Route farther to the south. Figure A-3 in Appendix A shows the location of the Segment 2 routes.

As shown in Table D.15-1, Segment 2 construction would disturb approximately 1,778 acres of soil. The Preferred/Proposed Route and Route Alternatives would be highly wind erodible, with 63 percent of the Preferred/Proposed Route considered highly wind erodible. Segment 2 would not contain soil with low soil loss tolerance, and no prime farmland would be present. About 63 percent of the soils would be considered droughty. The STATSGO data did not define any Segment 2 soil as stony-rocky. Overall, there would be little difference with respect to soil disturbance impacts between

the Preferred/Proposed Route for Segment 2 and Alternatives 2A and 2B. The soil conditions would be similar because the routes would be in relative close proximity to each other. Alternative 2B would result in slightly less disturbance than the comparison portion of the Preferred/Proposed Route because it is shorter in length. The differences in soil effects between the Route Alternatives and the Preferred/Proposed Route would be minor.

As shown in Table D.15-2, the Segment 2 operations area would comprise 245 acres. The disturbed area associated with operations in all of the alternatives would be approximately the same as in the respective comparison portion of the Preferred/Proposed Route. This is because their lengths would be nearly identical.

The Segment 2 operations area would contain 39 percent droughty soil, which would affect the success of reclamation. Rocky soils and shallow bedrock were not noted in the STATSGO database. However, some rocky soils or shallow bedrock may be present that could negatively affect the success of reclamation or require a modification of reclamation strategy. As noted in Section 3.15.2.2, decommissioning and reclamation would result in temporary soil disturbance of approximately the same magnitude as during construction as shown in Table D.15-1. As noted in the preceding construction paragraph, there would be little difference between the disturbance footprint of the Preferred/Proposed Route for Segment 2 or any of the alternatives, although Alternative 2B would result in a slightly less acreage. There would be less difference during decommissioning than construction because the overall lengths are nearly identical. The droughty nature of the soils throughout Segment 2 would make restoration challenging. No NFS land would be present in Segment 2.

Segment 3

The preferred route in Segment 3 is as follows:

Preferred Route	Agency
Proposed Route, including 3A (Figure A-4)	BLM and State of Wyoming

A single-circuit 500-kV line would link the former location of the Creston Substation, approximately 2.1 miles south of Wamsutter, Wyoming, to the proposed Anticline Substation near the existing Jim Bridger Power Plant. Segment 3 would be approximately 45.9 miles long. This segment also includes a 5.1-mile segment of 345-kV line to connect to the existing Jim Bridger Power Plant Substation (Segment 3A). There are no alternatives proposed along Segment 3. Figure A-4 in Appendix A shows the location of the Segment 3 routes.

As shown in Table D.15-1 in Appendix D, Segment 3 construction (Segments 3 and 3A) would disturb about 892 acres. All of the soil in Segment 3 would be highly wind erodible and 74 percent would be droughty. A total of 26 percent would have a high K factor, indicative of high erosion potential. About 69 percent of soils would have a low soil loss tolerance, and 64 percent would overlie shallow bedrock. There would be no prime farmland in Segment 3. Most of the soils in the Preferred/Proposed Route for Segment 3 would be subject to wind erosion and they are not well-suited to support good vegetative cover. There are no Route Alternatives in Segment 3/3A. The nature

of the soils in Segment 3 makes it especially important that disturbance during construction be minimized and as much acreage as possible be restored when construction is complete.

Operations of the Preferred/Proposed Route in Segment 3 (Segments 3 and 3A) would result in a disturbance area of 152 acres. As during construction, all of the soils in this segment would be susceptible to wind erosion. It will be important to minimize traffic during operations to reduce soil erosion potential and maintain the vegetation in restored construction areas.

About 47 percent of Segment 3 would be considered droughty. The soil would not be very rocky, but 41 percent of the Analysis Area would be occupied by shallow bedrock. As noted in Section 3.15.2.2 and shown in Table D.15-1, decommissioning and reclamation would result in temporary soil disturbance of approximately the same magnitude as during construction. The droughty characteristics of the soils in the Preferred/Proposed Route for Segment 3 would make restoration of disturbed areas following decommissioning challenging. Therefore, as during construction, disturbance of soils should be minimized. No NFS land would be present in Segment 3.

Segment 4

The preferred routes in Segment 4 are as follows:

Preferred Route	Agency
Proposed Route (Figures A-5 and A-6) except within the Caribou-Targhee NF (see below)	BLM, State of Wyoming, and Lincoln County
Proposed Route within the NF incorporating Alternative 4G (Figure A-6)	Forest Service

Segment 4 would link the proposed Anticline Substation and the existing Populus Substation near Downey, Idaho, with a single-circuit 500-kV line. Its proposed length is approximately 197.6 miles. The Segment 4 Preferred/Proposed Route was revised to follow Alternative 4A, as analyzed in the Draft EIS, based on public comments. This segment generally follows an existing transmission line corridor. Segment 4 has five Route Alternatives in the middle portion of its route; however, the first 52 miles to the east and the last 61 miles to the west (in Idaho) do not have any route alternatives. The middle section of the Preferred/Proposed Route, for which alternatives are presented, is approximately 85.2 miles long, and its alternatives vary from approximately 87.5 to 102.2 miles long. Alternatives 4B through 4E were proposed by the BLM Kemmerer FO (with input from various cooperating agencies), with the intent to avoid impacts to cultural resources to the extent practical. Alternative 4F was proposed by the Proponents to avoid impacts to cultural resources while still remaining north of the existing Bridger Lines. Alternative 4G was proposed by the Forest Service in order to avoid unstable soils identified along the Proposed Route during the 2012 soil assessment (located within Sections 1 and 2, Township 12 South, Range 41 East). Figures A-5 and A-6 in Appendix A show the location of the Segment 4 routes in Wyoming and Idaho, respectively.

As shown in Table D.15-1, construction of the Preferred/Proposed Route for Segment 4 would disturb approximately 3,890 acres. About 62 percent of Segment 4 soils are droughty and 49 percent are highly wind erodible. About 45 percent of the soils would

have a low soil loss tolerance and about 45 percent would be highly erodible. Segment 4 would contain the only highly compactable soil along the entire transmission line, although the percentage of soil in this category would be only 4 percent, consisting of 145 acres located in the Bear River drainage. As noted above, the Route Alternatives for the Segment 4 Preferred/Proposed Route would be located in the middle portion and either increase the segment length by 2.3 miles (Alternative 4F) or increase the length by 15 to 17 miles (Alternatives 4B, 4C, 4D, and 4E). The Preferred/Proposed Route and each of the alternatives would have similar soil characteristics. The relative construction disturbance acreages in each soil factor category are listed in Table D.15-1 and tend to be proportional to the lengths of each alternative, with the Preferred/Proposed Route generally having the least disturbed acreages in the critical soil factors. The one exception is that the comparison portion of the Preferred/Proposed Route would have a higher acreage of areas with slopes greater than 25 percent than all but Alternative 4F. However, these areas only represent about 2 percent of the construction disturbance area.

According to the NRCS STATSGO database, hydric soils would be found only in Segment 4 and only in about 5 percent of the Analysis Area. The area of hydric soils predicted by STATSGO is strongly underestimated, based on the wetland analysis in Section 3.9 – Wetlands and Riparian Areas, which assumes wetlands or riparian areas are present in all segments except Segment 10. The quantity of wetlands/hydric soils would be determined after the routes have been established by conducting wetland delineations. All hydric soils would be preserved where possible or reclaimed using measures described in Section 3.9.

As shown in Table D.15-2, operations of the Preferred/Proposed Route would result in soil disturbance on approximately 529 acres. The areas impacted by operations for the Preferred/Proposed Route and Route Alternatives would be proportional to the relative lengths. Since the lengths vary by 5 percent less to 12 percent more than the comparison portion of the Preferred/Proposed Route, the disturbed acreages would vary by similar percentages. The Preferred/Proposed Route would have the least amount of soil disturbance, followed by Alternative 4F; the longer alternatives (4B, 4C, 4D, and 4E) would have the greatest amount of disturbance.

As noted in Section 3.15.2.2, decommissioning and reclamation would result in temporary soil disturbance of approximately the same magnitude as during construction as shown in Table D.15-1. The droughty characteristics of much of the soil in Segment 4 would make restoration of disturbed areas following decommissioning challenging. Therefore, as during construction, disturbance of soils should be kept to the minimum extent possible. The disturbance areas during construction and operations would be proportional to the relative lengths of the Preferred/Proposed Route and each Route Alternative.

A review of all the soil factors indicates Alternative 4F would have the least disturbance, followed by the Preferred/Proposed Route, and then the longer alternatives (4B through 4E).

Caribou-Targhee National Forest Soil

There are two routes considered across the Caribou-Targhee NF (i.e., the Proposed Route discussed above, as well as Alternative 4G). The Forest Service soils assessment, which was completed in 2012, identified steep slopes and potentially unstable soils along a portion of the Proposed Route that crosses the Caribou-Targhee NF (i.e., in Sections 1 and 2, Township 12 S, Range 41 E). The field notes for the soil assessments indicated that almost all of the soil in the area is stony-rocky; soil loss tolerance is low (ranging from 1 to 2 T/A/Y); and sandy loam soils within the NF are considered droughty and will require special mitigation for reclamation (Green 2012). The Forest Service therefore identified an alternative route that avoids these unstable areas (referred to as Alternative 4G). Alternative 4G is 2.6 miles long compared to 2.3 miles for the comparison portion of the Proposed Route (see Figure 2.4-3 in Chapter 2). The Forest Service's Preferred Route for the portion of Segment 4 within the Caribou-Targhee NF is the Proposed Route with the inclusion of Alternative 4G. The Forest Service's Preferred Route for the ROW on the Caribou NF would be 9.4 miles long and impact a total of 3 acres of soil with an high erosion hazard level and 24 acres with an moderately high erosion level; while the Proposed Route would impact 8 acres of soils with a high erosion hazard level and 20 acres with an moderately high erosion hazard level on the Caribou-Targhee NF (based on the Caribou-Targhee NF's soil data layers; see Table D.15-3).

Segment 5

The preferred routes in Segment 5 are as follows:

Preferred Route	Agency
Proposed Route incorporating Alternatives 5B and 5E[1/] (Figure A-7)	BLM
Proposed Route incorporating Alternatives 5C and 5E (Figure A-7)	Power County

1/ Assumes that Western Electricity Coordinating Council reliability issues associated with 5E are resolved.

Segment 5 would link the Populus and Borah Substations with a single-circuit 500-kV line that would be approximately 55.7 miles long. There are five Route Alternatives to portions of the Proposed Route in Segment 5. Alternatives 5A and 5B were proposed by the BLM to avoid crossing the Deep Creek Mountains. Alternative 5C, which crosses the Fort Hall Indian Reservation, was proposed as the preferred route by Power County; however, the Fort Hall Business Council has voted not to permit the Project across the Reservation. Alternative 5D was originally the Proponents' Proposed Route. Alternative 5E was proposed by Power County as an alternative approach to the Borah Substation. The BLM has identified a Preferred Route that includes portions of the Proposed Route with Alternatives 5B and 5E (with the assumption that reliability issues associated with 5E can be resolved). The Segment 5 Preferred Route is 73.3 miles long, compared to 55.7 miles for the Proposed Route. Figure A-7 in Appendix A shows the location of the Segment 5 routes.

As shown in Table D.15-1, the Proposed Route for Segment 5 construction would disturb about 1,179 acres. Soils in this segment would have low wind erodibility, but would be predominantly highly susceptible to water erosion. Approximately 46 percent of soils would be droughty, and 38 percent would possess low soil loss tolerance. About 39 percent of Segment 5 routes would consist of stony-rocky soils. Steep slopes

occupy 30 percent of the Analysis Area, the highest percentage of any segment. Prime farmland makes up 40 percent of the Analysis Area. The disturbance areas during construction of Segment 5 and each alternative are listed on Table D.15-1. The soils in the Route Alternatives would be similar to the soils in the Proposed Route; therefore, the impacts would be mostly proportional to the lengths of the various routes. However, Alternatives 5A and 5B would increase the area with steep slopes, whereas Alternatives 5C and 5D would reduce that area compared to the Proposed Route. This is important because the combination of steep slopes and the large percentage of soils that are susceptible to water erosion, which is aggravated by steeper slopes, would indicate that Alternative 5C has the least potential propensity for soil erosion. The least impact overall would result from the combination of the eastern portion of Segment 5 up to where Alternative 5C begins, then follow Alternative 5C to 5E, and then to the Borah Substation. The longest route with the greatest disturbance area would be Alternative 5B. Also, Alternatives 5A and 5B would traverse substantially more prime farmland than the comparison portion of the Proposed Route or Alternative 5C. Alternatives 5D and 5E would be minor adjustments to the western portions of the Proposed Route and would not have distinguishable soil impacts compared to the Proposed Route except that Alternative 5D has only 3 acres of steep slopes, compared to 37 acres for the Proposed Route.

The Segment 5 Preferred Route is 73.3 miles long, compared to 55.7 miles for the Proposed Route. Construction of the Preferred Route would affect 1,551 acres within the construction disturbance area and 193 acres in the operations disturbance area, compared to 1,179 acres and 191 acres, respectively, for the Proposed Route. In general, the greater the acreage of disturbance areas, the greater the effects to soils. Therefore, the effects to soil from the Preferred Route would likely be greater than the soil effects from the Proposed Route.

Operations in Segment 5 would result in disturbance of 169 acres, 29 percent of which is in prime farmland. Table D.15-2 details the disturbance acreages for Segment 5 and the alternatives that would be maintained during operations. The greatest difference between these would be the amount of prime farmland disturbed. As noted in the previous paragraph, Alternative 5C would be the most favorable because it would have the least disturbance to prime farmland and the least amount of steep slopes. Alternatives 5A and 5B result in the most disturbance to prime farmland. Alternatives 5D and 5E would be minor adjustments to the western portions of the Proposed Route and would not have distinguishable soil impacts compared to the Proposed Route.

As noted in Section 3.15.2.2 and shown in Table D.15-1, decommissioning and reclamation would result in temporary soil disturbance of approximately the same magnitude as during construction. The droughty characteristics, steep slopes and soils subject to water erosion in the Proposed Route and Route Alternatives for Segment 5 would make restoration of disturbed areas following decommissioning challenging. Therefore, disturbance of soils should be minimized to the extent possible during restoration. The disturbance areas during construction and operations would be proportional to the relative lengths of the Proposed Route and each alternative. However, as noted above, Alternative 5C would have the least area of steep slopes and be shortest overall. Therefore, this alternative would result in the least disturbance and

be the most readily restored compared to either the Proposed Route or the longer alternatives.

Segment 6

The Preferred Route in Segment 6 is as follows:

Preferred Route	Agency
The proposal to upgrade the line voltage from 345-kV to 500-kV (Figure A-8)	BLM

Segment 6 is an existing transmission line linking the Borah and Midpoint Substations; it is now operated at 345 kV but would be changed to operate at 500 kV. This segment has no Route Alternatives. Existing support structures would be used and impacts would be limited to within approximately 0.25 mile from each substation to allow for moving the entry point into the substation to the new 500-kV bay. Changes at the Borah and Midpoint Substations would allow Segment 6 to be operated at 500 kV. Figure A-8 in Appendix A shows the Preferred/Proposed Route for Segment 6.

Construction activities would disturb 65 acres of highly wind erodible, droughty soil with low soil loss tolerance. The permanent soil loss would be equivalent to the operations disturbance area, approximately 61 acres. Segment 6 has no alternatives and would affect no NFS land.

Segment 7

The preferred routes in Segment 7 are as follows:

Preferred Route	Agency
Proposed Route incorporating Alternatives 7B, 7C, 7D, and 7G (Figure A-9). The Proposed Route in the East Hills and Alternative 7G will be microsited to avoid Preliminary Priority Sage-grouse Habitat (PPH).	BLM
Alternative 7K (Figure A-9)	Power and Cassia Counties

Segment 7 would link the Populus Substation and the proposed Cedar Hill Substation with a single-circuit 500-kV line that would be approximately 118.2 miles long. Several alternatives to the Proposed Route are being considered. Alternatives 7A and 7B have been proposed by the BLM to avoid crossing the Deep Creek Mountains. Alternatives 7C, 7D, 7E, 7F, and 7G were proposed by local landowners to avoid private agricultural lands. Alternative 7K (also called the Goose Creek Alternative) was identified during the public comment period as a shorter alternative to the Proposed Route than either 7I or 7J (refer to Chapter 2 of the Draft EIS for a description of these routes). The alignment for 7K was developed in cooperation with Cassia County. Alternatives 7H, 7I, and 7J, which were analyzed in the Draft EIS, are no longer under consideration. The BLM has identified a Preferred Route that includes portions of the Proposed Route with Alternatives 7B, 7C, 7D, and 7G. The Segment 7 Preferred Route is 130.2 miles long, compared to 118.2 miles for the Proposed Route. Figure A-9 in Appendix A shows the location of the Segment 7 routes.

As shown in Table D.15-1, construction of the Proposed Route for Segment 7 would disturb 2,252 acres. There would be a relatively low percentage of soils subject to high wind erodibility (21 percent), but 96 percent would be considered highly susceptible to

water erosion, and 33 percent have a low soil loss tolerance. Prime farmland makes up 57 percent of the Segment 7 Analysis Area and 40 percent of the soils are droughty. Steep slopes would occur in 23 percent of the area, second only to Segment 5. The disturbance areas during construction of the Proposed Route and Route Alternatives are listed on Table D.15-1 in Appendix D. The soils in the Route Alternatives would be similar to the soils in the Proposed Route; therefore, the impacts would be mostly proportional to the lengths of the various routes. Alternatives 7A and 7B, when compared to their equivalent portion of the Proposed Route, would be longer and proportionately increase the areas falling in steeper slopes with erosion susceptible soils. They would be less favorable than the comparison portion of the Proposed Route. Alternatives 7C, 7D, 7E, 7F, and 7G would be relatively minor adjustments to the Proposed Route. With the exception of Alternative 7F, which would disturb only about 37 percent of the prime farmland acreage as the comparison portion of the Proposed Route, there would be only minor differences to the impacts on soils during construction for these alternatives. Alternative 7K is approximately 30 miles longer (an extra 25 percent) than the comparison portion of the Proposed Route, and contains proportionally greater impacts in erodible soils and steep slopes. However, Alternative 7K would affect only 58 percent of the prime farmland that the comparison portion of the Proposed Route would affect, and contains less soil containing shallow bedrock. The Proposed Route in combination with Alternative 7F would result in the least overall impacts to soils during construction.

The Segment 7 BLM Preferred Route is 130.2 miles long, compared to 118.2 miles for the Proposed Route. Construction of the Preferred Route would affect 2,554 acres within the construction disturbance area and 284 acres in the operations disturbance area, compared to 2,252 acres and 265 acres, respectively, for the Proposed Route. Compared to the Proposed Route, the larger affected area in the Preferred Route would likely result in more effects to soils.

During operations, the Proposed Route would disturb 265 acres of land, 43 percent of which is prime farmland. The effects to agricultural land are further discussed in Section 3.18 – Agriculture. Table D.15-2 in Appendix D details the operations disturbance acreages for the Proposed Route and Route Alternatives. For the same reasons discussed for construction impacts, the Proposed Route in combination with Alternative 7F would result in the least overall impacts to soils during operations. The alternatives would all be longer and would increase the disturbance acreages in proportion to their relative lengths.

As noted in Section 3.15.2.2 and shown in Table D.15-1, decommissioning and reclamation would result in temporary soil disturbance of approximately the same magnitude as during construction. The droughty characteristics, steep slopes and soils subject to water erosion in Segment 7 would make restoration of disturbed areas following decommissioning challenging. Therefore, disturbance of soils should be kept to the minimum extent possible during restoration. For the same reasons discussed for construction impacts, the Proposed Route in combination with Alternative 7F would result in the least overall operations impacts to soils.

In comparing all of the soil factors, the Proposed Route in combination with Alternative 7F would result in the least overall impacts to soils. All of the alternatives would be longer than the comparison portion of the Proposed Route and would, therefore, increase soil disturbance proportionally. Only Alternative 7K would affect soils on the Sawtooth NF.

Sawtooth National Forest Soil

The Preferred and Proposed Routes would not cross the Sawtooth NF; however, Alternative 7K would disturb 230 acres of Sawtooth NF land during construction and 38 acres during operations. Approximately 227 acres and 37 acres, respectively, would be located in areas with low soil loss tolerance; approximately 123 acres and 21 acres, respectively, would be rated as highly erodible. Selection of Alternative 7K would result in the permanent loss of soil productivity on approximately 38 acres of Sawtooth NF land.

Segment 8

The preferred routes in Segment 8 are as follows:

Preferred Route	Agency
Proposed Route incorporating Alternative 8B (Figure A-10)	BLM and IDANG

Segment 8 would link the Midpoint and Hemingway Substations. This 131.5-mile single-circuit 500-kV transmission line would stay north of the Snake River generally parallel to an existing 500-kV transmission line, before ending at the Hemingway Substation. There are five Route Alternatives to the Proposed Route. Alternative 8A follows the WWE corridor but crosses the Snake River and I-84 twice (while the Proposed Route would stay north of this area). Alternatives 8B and 8C were originally proposed by the Proponents as parts of the Proposed Route but were later dropped from the Proposed Route to avoid planned developments near the cities of Kuna and Mayfield, respectively. Alternative 8D would rebuild a portion of an existing 500-kV transmission line to move it away from the National Guard Maneuver Area. Alternative 8D would be constructed within the ROW currently occupied by the existing line. Alternative 8E was proposed by the BLM in order to avoid crossing the Halverson Bar non-motorized portion of a National Register Historic District (see the discussion of 8E under Segment 9). The BLM has identified a Preferred Route that includes portions of the Proposed Route with Alternative 8B and generally avoids the SRBOP. The Segment 8 Preferred Route is 132.0 miles long, compared to 131.5 miles for the Proposed Route. Figure A-10 in Appendix A shows the location of the Segment 8 routes.

As shown in Table D.15-1, construction of the Proposed Route for Segment 8 would disturb about 2,518 acres. A total of 27 percent of the Analysis Area is highly wind erodible, and 73 percent is highly susceptible to water erosion. About 60 percent of the soils in the Proposed Route are droughty. Low soil loss tolerance soil makes up 82 percent of the Analysis Area and 19 percent is prime farmland. The disturbance areas during construction of Segment 8 and each alternative are listed on Table D.15-1. The soils in the Route Alternatives would be similar to the soils in the Proposed Route;

therefore, the impacts would be mostly proportional to the lengths of the various routes. Alternative 8A would replace the first 51.9 miles of the Proposed Route with a 53.6-mile alternative route. The soil impacts between these two routes would be substantially different with respect to the acreages with low soil loss tolerance and prime farmland. For both soil conditions, Alternative 8A would have substantially less impact to these soil conditions. Alternative 8B would be generally less favorable than the comparison portion of the Proposed Route, containing over three times the acreage of prime farmland. Alternatives 8C and 8D would have similar impacts on soils as the comparison portion of the Proposed Route. Alternative 8E would contain more acres, including more highly erodible acres and more acres of droughty soil. However, there would be slightly less shallow bedrock in Alternative 8E than in the comparison portion of the Proposed Route. The route with the least impact to soils during construction would be Alternative 8A in combination with the Proposed Route from the end of Alternative 8A to Hemingway.

Construction of the Preferred Route would affect 2,535 acres within the construction disturbance area and 231 acres in the operations disturbance area, compared to 2,518 acres and 249 acres, respectively, for the Proposed Route. Due to the similar mileages and disturbance acreages, effects to soils from the Preferred Route would likely be similar to the effects from the Proposed Route.

During operations, the Proposed Route would disturb 248 acres, 18 percent of which would be prime farmland. Table D.15-2 in Appendix D details the operations disturbance acreages for Segment 8 and its alternatives. For the same reasons discussed for construction impacts, the Proposed Route in combination with Alternative 8A at the eastern end would result in the least overall operations impacts to soils. All of the alternatives except Alternatives 8A and 8C contain slightly greater impacts to prime farmland than the comparison portions of the Proposed Route during the operational life of the Project.

As noted in Section 3.15.2.2 and shown in Table D.15-1, decommissioning and reclamation would result in temporary soil disturbance of approximately the same magnitude as during construction. The droughty soils found mainly in the Proposed Route and Alternatives 8A and 8B would make restoration challenging. As noted in the construction paragraph above, the overall route with the least impact on soils would be Alternative 8A in combination with the remainder of Segment 8. Apart from the reduced acreages in Alternative 8A compared to the comparison portion of the Proposed Route, however, the remaining alternatives would not be substantially different from the Proposed Route. No NFS land would be crossed in Segment 8.

Segment 9

The preferred routes in Segment 9 are as follows:

Preferred Route	Agency
Proposed Route incorporating Alternative 9E, which was revised to avoid PPH and Murphy (Figure A-11)	BLM
Alternative 9D (Figure A-11)	Owyhee County

Segment 9 would link the Cedar Hill and Hemingway Substations with a 162.2-mile single-circuit 500-kV transmission line that skirts the Jarbidge and Owyhee Military Operating Areas to the north, then follows the WWE corridor just north of the Saylor Creek Air Force Range, passing through Owyhee County before entering the Hemingway Substation. There are eight Route Alternatives proposed. Alternative 9A was the Proponents' Proposed Route until that route was revised to avoid the Hollister area. Alternative 9B is being considered by the BLM because it follows the WWE corridor and parallels existing utility corridors. Alternative 9C was the Proponents' Proposed Route until that route was revised to avoid the Castleford area. Alternatives 9D through 9G were proposed by the Owyhee County Task Force in order to reduce impacts to private land. Alternatives 9F and 9H were proposed to avoid crossing the non-motorized area south of C.J. Strike Reservoir and as an alternate route if Alternative 8E is selected. The BLM has identified a Preferred Route that includes portions of the Proposed Route with Alternative 9E. Figure A-11 in Appendix A shows the location of the Segment 9 routes. A portion of Alternative 9D/9F uses the same path as Alternative 8E in Segment 8; therefore, 8E and 9D/9F could not both be selected. Alternative 9E has been revised to avoid sage-grouse PPH and to incorporate a recommended route change submitted by Owyhee County that avoids a planned subdivision near Murphy. The Segment 9 Preferred Route is 171.4 miles long, compared to 162.2 miles for the Proposed Route.

Construction of the Preferred Route would affect 3,352 acres within the construction disturbance area and 379 acres in the operations disturbance area, compared to 3,293 acres and 360 acres, respectively, for the Proposed Route. Due to its longer mileage, and greater disturbance acreages, effects to soils from the Preferred Route would likely be greater than the effects from the Proposed Route.

As shown in Table D.15-1 in Appendix D, construction of the Proposed Route for Segment 9 would disturb 3,293 acres. Just under half of soils in this segment would be highly susceptible to wind and water erosion. Some 65 percent of the soils would have a low soil loss tolerance, approximately one-third of the soils would be prime farmland, and about 55 percent of the soils would be droughty. Shallow bedrock would underlie 43 percent of the Proposed Route.

The disturbance areas during construction of the Proposed and Alternative Routes are listed on Table D.15-1 in Appendix D. The soils in the Route Alternatives would be similar to the soils in the Proposed Route; therefore, the impacts would be mostly proportional to the lengths of the various routes. With the exception of Alternative 9E (revised), which would be about 9 miles longer than the comparison portion of the Proposed Route, all of the alternatives would be essentially the same length and therefore have mostly similar soil impacts as their comparison portions of the Proposed Route.

However, all of the alternatives would impact more prime farmland than the Proposed Route. Therefore, with respect to sensitive soils, the Proposed Route would have the least impact.

During operations, the Proposed Route would affect 360 acres, of which 28 percent would be prime farmland. Table D.15-2 details the operations disturbance acreages for the Segment 9 Proposed Route and Route Alternatives. For the same reasons discussed for construction impacts, the Proposed Route would be the most favorable route. This distinction is primarily based on less disturbance to prime farmland and, in the case of Alternative 9E, less overall disturbance due to its shorter length.

As noted in Section 3.15.2.2 and shown in Table D.15-1, decommissioning and reclamation would result in temporary soil disturbance of approximately the same magnitude as during construction. The droughty soils found along the Proposed Route and its alternatives would make restoration challenging. As noted in the construction paragraph above, the Proposed Route would result in less soil impacts during decommissioning and reclamation than any of the five alternatives. No NFS land would be crossed in Segment 9.

Segment 10

The BLM's Preferred Route in Segment 10 is as follows:

Preferred Route	Agency
Proposed Route (Figure A-12)	BLM

Segment 10 would link the Cedar Hill and Midpoint Substations with a 34.4-mile single-circuit 500-kV line. Segment 10 would follow a WWE corridor for most of the route. The Preferred/Proposed Route would also be adjacent to the existing 345-kV line most of this length and has been sited to follow the same alignment of the planned SWIP. Either the SWIP or Gateway West would be built, but not both. There are no Route Alternatives proposed along this segment. Figure A-12 in Appendix A shows the location of the Preferred/Proposed Route in Segment 10.

As shown in Table D.15-1, construction of the Preferred/Proposed Route for Segment 10 would disturb 670 acres. This segment would have wind and water erosion susceptible soils. Low soil loss tolerance soil occupies 43 percent of the Analysis Area, prime farmland covers 27 percent, and 40 percent of the soils are droughty. There are no alternatives to compare and contrast with the Preferred/Proposed Route.

As shown in Table D.15-2 in Appendix D, Preferred/Proposed Route operations would result in a soil disturbance of 74 acres, 18 percent of which would be prime farmland. There are no alternatives to compare and contrast with the Preferred/Proposed Route.

Similar to all segments with droughty soils, restoration of areas to their original condition would be challenging. There are no alternatives to compare and contrast with the Preferred/Proposed Route. No NFS land would be crossed in Segment 10.