3.16 WATER RESOURCES

This section addresses potential impacts to surface water and groundwater from the Preferred Route, Proposed Route, and Route Alternatives during construction, operations, and decommissioning.

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).

3.16.1 Affected Environment

This section describes the existing surface water features and groundwater that would be affected within the Analysis Area. 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 Route and Route Alternatives.

3.16.1.1 Analysis Area

The Project area is located across six river basins and several major surface watersheds, as shown on Figure 3.16-1. From east to west, they include the North Platte, White-Yampa, Great Divide-Upper Green, and Bear River watersheds in Wyoming. The North Platte is located east of the continental divide and ultimately discharges into the Missouri/Mississippi River systems. The White-Yampa and Green Rivers are tributaries to the Colorado River. The Bear River drainage is part of a closed basin system that ends in the Great Salt Lake.

The Bear River and Snake River watersheds are located in Idaho. The Snake River is part of the Columbia River system. In Idaho, surface water from natural drainages is extensively diverted into canals and drainage ditches for flood irrigation of crop land. These surface diversions are crossed by the transmission line routes, and are included in the evaluation of surface water crossings.

Groundwater occurs in several major aquifers throughout the Project area. Valleys within the eastern portion of Wyoming contain Tertiary and Cretaceous sandstone aquifers (Segments 1, 2, and 3). Western Wyoming is underlain by the northern portion of the Colorado Plateau aquifer (Segment 4). Southeast Idaho contains small Basin and Range valley fill aquifers (Segments 4 and 5). Southern and southwest Idaho is underlain by the Snake River Plain aquifer (Segments 5 through 10).

The Eastern Snake River Plain Aquifer is a sole-source aquifer. USEPA defines a sole- or principal-source aquifer as an aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas may have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend on the aquifer for drinking water. For convenience, all designated sole- or principal-source aquifers are referred to as “sole-source aquifers” (SSAs). The designation protects an area's groundwater resource by requiring USEPA to review certain proposed projects within the designated area. All proposed projects receiving federal funds are subject to review to ensure that they do not endanger the water source.

Shallow groundwater (14 feet deep or less) often occurs above the regional aquifers. The source of shallow groundwater is usually from infiltration from surface water sources. In Idaho, the quantity of shallow groundwater is enhanced by the widespread flood irrigation that occurs in agricultural areas. In some portions of the Project area, depth to groundwater is so shallow that facility foundations may extend into the groundwater. Effects are discussed below in Section 3.16.2.2, Effects Common to All Alternatives.

The Analysis Area for surface water and groundwater resources was defined in a GIS file by buffering the centerlines of the Proposed Route and Route Alternatives out 0.5-mile on either side of the centerlines 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 (changes in water quality, including sedimentation or temperature change) to surface or groundwater due to the Project would occur within 0.5 mile of the disturbance.

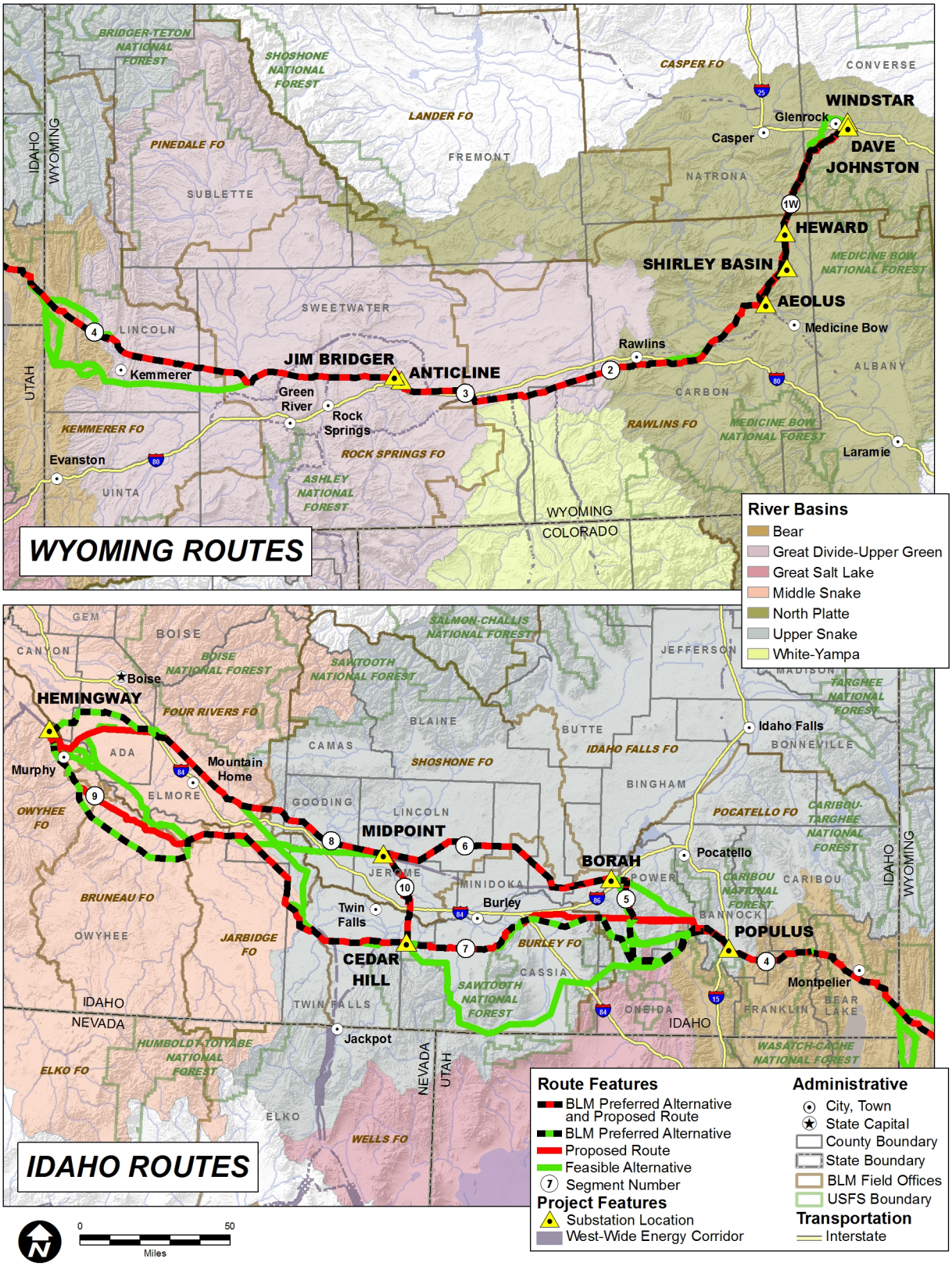

Figure 3.16-1. River Basins

3.16.1.2 Issues Related to Water Resources

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

- Whether there would be impacts to water quality from roads and other causes of erosion;
- Whether state water quality standards would be met;
- Whether beneficial uses would be affected;
- Determining which pollutants could enter waterbodies and what the impacts would be from them;
- What the impacts would be on drinking water, wells, and springs;
- Whether municipal water service to individual properties would be affected;
- What the handling procedures would be for hazardous materials near waterbodies and wells;
- Whether water would be drawn from surface waterbodies, and what the effects of that would be;
- What stormwater permits would be required, and whether their stipulations would be met;
- Whether there would be any impacts on water rights;
- What the impacts would be from sedimentation and temperature increases in sediment and temperature-impaired waterbodies;
- Whether there would be a risk of floods;
- Whether groundwater would be affected;
- Riparian vegetation removal for road and transmission line construction could cause erosion, resulting in sedimentation within surface water, and may cause an increase in temperature in streams, including but not limited to those already listed under the CWA 303(d) as temperature-impaired waterbodies; and
- Potential of structures located in flood-prone areas to impede or redirect flood flows.

3.16.1.3 Regulatory Framework

Federal and State

The CWA (33 U.S.C. § 1251 et seq., formerly the Federal Water Pollution Control Act of 1972), was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water.

- Point and non-point discharges are regulated by the NPDES permit process (CWA Section 402). NPDES permitting authority is administered by USEPA in Idaho and

WDEQ in Wyoming. Projects that disturb one or more acres are required to obtain a Construction General Permit (CGP). The CGPs require the development and implementation of a SWPPP. The SWPPP describes BMPs the Proponents would use to protect surface water from stormwater runoff.

- If hazardous materials, including fuels and lubricants, are used or stored in quantities exceeding certain minimal quantities, an SPCC Plan is required. Section 311(j)(1)(c) of the CWA contains the regulations preventing discharge of oil to surface water.
- Section 401 of the CWA requires that an applicant for a federal permit (in this case a 402 CGP in Idaho or a Section 404 permit in either state) to conduct any activity, including river or stream crossings during road, pipeline, or transmission line construction that may result in a discharge into a state waterbody must obtain a certificate from the Idaho Department of Environmental Quality (IDEQ) or WDEQ. This certification ensures that the proposed activity does not violate state and/or federal water quality standards.
- Section 404 of the CWA authorizes the USACE to regulate the discharge of dredged or fill material to the waters of the United States. Discharges are authorized through issuance of nationwide permits or individual permits for specific activities.
- Section 303(d) of the CWA requires states to establish total maximum daily load (TMDL) programs, which are approved by the USEPA for streams and lakes that do not meet certain water quality standards. In compliance with the federal CWA, the IDEQ and the WDEQ have identified Section 303(d) water quality limited streams and lakes for development of TMDL criteria. IDEQ's more recent analysis is summarized in "Idaho's 2010 Integrated Report" (IDEQ 2011). Wyoming's most recent analysis is summarized in the "Wyoming Water Quality Assessment and Impaired Waters List (2012 Integrated 303(b) and 303(d) Report)" (WDEQ 2012). IDEQ establishes TMDLs for impaired surface waters in Idaho. WDEQ is in the process of establishing TMDLs for impaired surface waters in Wyoming. A TMDL includes a quantitative assessment of water quality problems, contributing sources, and load reductions or control actions needed to restore and protect bodies of water. Stream segments within the Analysis Area have been identified on the 303(d) list as impaired due to either sedimentation (sediment-impaired streams) or high temperatures (temperature-impaired streams).

  IDEQ completes a subbasin (USGS fourth-field HUC-4) assessment by collecting additional data about impaired waterbodies and either recommends developing a TMDL or removing the waterbody from the list of impaired waters in the Integrated Report. IDEQ then determines water quality targets and develops TMDL allocations. IDEQ prepares an Implementation Plan for applicable subbasins to provide details of the actions needed to achieve load reductions to meet water quality standards. Projects and actions with the potential to affect water quality utilize BMPs, which are practices that have been found to be effective means of preventing or reducing pollution from nonpoint pollutant sources. For example, implementation plans have been prepared for Bear Lake subbasin (Smith and Banks 2008a) and the Northern Middle Bear River subbasin (Smith and Banks

2008b). The Project will comply with these implementation plans as applicable with the use of BMPs to eliminate or reduce impacts to water quality.

NPDES permits address point-source pollution to surface waters. Non-point source pollution is addressed by the application of BMPs, EPMs, and mitigation measures during the construction and operation of the proposed Project. BMPs recommended by IDEQ to protect water quality were compared to the Proponents' EPMs and Agency-recommended mitigation measures. EPMs and mitigation measures are generally compatible with the state BMPs.

The Upper Colorado Endangered Fish Recovery Program was established in 1988, and identifies conservation measures to minimize adverse effects to the endangered fishes and their critical habitat caused by a project's water depletions. Under this program, any amount of water removed from the Colorado River system is considered to be a depletion of water and requires formal consultation with the USFWS for downstream impacts to threatened and endangered species. To streamline the process, the USFWS will issue a tiered BO based on the amount of the depletion. *De minimis* depletions (less than 0.1 acre-foot/year) require no depletion fee. Small depletions (projects that would withdraw between 0.1 and 100 acre-feet/year) require no depletion fee. Any depletions greater than 100 acre-feet/year require a one-time depletion fee (for which this Project qualifies). However, the USFWS has indicated that if the entirety of this depletion is drawn from existing water rights that were considered under the programmatic BO (i.e., if the Proponents purchase existing water rights and only draw water in accordance with these existing water rights), this would constitute a historical withdrawal (Kantola 2010). Withdrawals of this nature would still require formal consultation with the USFWS, but would not require a depletion fee (Kantola 2010). If the entirety of water withdrawals cannot come from existing rights, then depletion impacts can be offset by accomplishment of activities necessary to recover the endangered fishes as specified under the Recovery Implementation Program Recovery Action Plan through a one-time contribution to the Recovery Program for new depletions greater than 100 acre-feet/year.

The Platte River Recovery Implementation Program (PRRIP), established in 1997, implements actions designed to assist in the conservation and recovery of the target species (whooping crane, least tern, piping plover, and pallid sturgeon) and their associated habitats along the central and lower Platte River in Nebraska through a basin-wide cooperative approach agreed to by the states of Wyoming, Nebraska, and Colorado, as well as the U.S. Department of the Interior. The PRRIP addresses the adverse impacts of existing and certain new water-related activities on the Platte River target species and associated habitats, and provides ESA compliance for effects to the target species. The State of Wyoming is in compliance with its obligations under the PRRIP. All water rights necessary to carry out the PRRIP are under each state's agency and granted under the state's water law and in keeping with state authorities and responsibilities for fish and wildlife. The Wyoming State Engineer's Office is responsible for determining if a water withdrawal is an existing or new water withdrawal and what level of withdrawal it constitutes. The level of withdrawal for a temporary industrial use would depend on the amount of depletion, and the existing conditions of the river at the time of the depletion. Furthermore, if the entirety of the withdrawal was

taken from existing rights (i.e., if the Proponents purchase existing water rights and only draw water in accordance with these existing water rights) then this would constitute an existing depletion as it relates to the Wyoming State Engineer's Depletion Report (Hoobles 2010). Unlike the Upper Colorado Endangered Fish Recovery Program, there is no depletion fee associated with the PRRIP.

EO 11988 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities."

As discussed in Section 3.9 – Wetlands and Riparian Areas, the NFS has identified AIZs based on a specific width on either side of a stream. These areas provide a buffer between a stream or waterbody and the upland areas, and can influence water quality. The Caribou NF has delineated about 63,000 acres of AIZ on its 1.1 million acres (Forest Service 2003e). The Sawtooth NF has delineated about 66,210 acres of AIZ on its 596,791 acres. Based on methodology provided by the Medicine Bow-Routt NFs, about 13,619 acres of WIZs on its174,300 acres has been delineated within the southern portion of the Douglas Ranger District. Land management agencies' plans (RMPs and Forest Plans) that have standards, guidelines, stipulations, or avoidance buffers for activity near surface waters would be adhered to.

State

The Idaho Stream Channel Protection Act requires that the stream channels of the state and their environment be protected against alteration for the protection of fish and wildlife habitat, aquatic life, recreation, aesthetic beauty, and water quality. The Act requires a stream channel alteration permit from IDWR before one can begin any work that would alter the stream channel. A stream channel alteration is defined as any activity that would obstruct, diminish, destroy, alter, modify, relocate, or change the natural existing shape or direction of water flow of any stream channel. This includes taking material out of the channel or placing material or structures in or across the channel where the potential exists to affect flow in the channel.

Under authority of the federal CWA, IDEQ has issued Water Quality Standards (IDAPA 58.01.02). The standards include a description of hydrologic units, a list of priority pollutants, a list of the water quality impaired streams within each subbasin, and the parameters for which the stream is impaired.

Beneficial uses are designated for specific waterbodies in Idaho and identified in subbasin assessments. Beneficial uses include cold water aquatic life, salmonid spawning, recreation, domestic, agricultural, or industrial water supply, wildlife habitat, and aesthetics. IDEQ collects data on individual waterbodies to compare to Idaho's water quality standards and support beneficial uses, and the findings are documented in the Integrated Report.

WDEQ maintains similar water quality standards (Water Quality Rules and Regulations, Chapter 1; WDEQ 2007) that also contain priority and non-priority pollutants, and water quality standards for Wyoming surface water. Wyoming has turbidity criteria for waters designated as fisheries or drinking water supplies (Class 2 waters). In accordance with Section 23(c)(2) of the Chapter 1 Surface Water Quality Standards, the administrator of the Water Quality Division may authorize temporary increases in turbidity above the numeric criteria in Section 23 (a) of the Standards in response to an individual application for a specific activity. It is not required to get this authorization; this Project crosses a number of Class 2 waters and BMPs will be implemented to minimize turbidity. However, authorization is recommended by WDEQ because there is a potential to exceed the turbidity criteria.

Local

To protect property purchases, some cities or counties may have floodplain and drainage regulations for floodplain development. These protections generally appear as part of city or county zoning ordinances. Where established, they typically prohibit floodplain development that would result in flooding of the development (i.e., within a 100-year floodplain), and prohibit floodplain development that would result in adverse flooding impacts on other property. For instance, floodplain encroachments that raise water levels on other property may be prohibited, as are diversions and concentrations of flow.

3.16.1.4 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 – Introduction, 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.

Surface Water

Stream Type

The USGS National Atlas of the United States, Streams and Waterbodies (USGS 2005b) was used to evaluate the number of surface waterbodies that would be crossed by the Project, including any natural or human-made surface water structure that would be crossed by roads associated with the Project. In order to identify water resources within the Analysis Area, estimates of stream flow along the transmission line were made using USGS regression models (Lowham 1988; Berenbrock 2002) created using data gathered from established stream gages. These models were used to estimate stream flow at ungaged sites within the Analysis Area. To estimate stream flow for streams without gages, these models inferred stream flows from gaged streamflow data along with independent variables such as drainage area, average annual precipitation, elevation, and basin slope. To check the accuracy of the data generated by the models, regional regression analysis was completed on each model to compare calculated data versus actual data with standard deviations reported for each model, for each region, and for each time period estimated. The models were then further refined to estimate

flows based on stream order within each sixth-field HUC with the assumption that estimated flows within the terminal order stream comprise a weighted average of the other stream orders. Therefore, first-order streams are assumed to constitute a larger portion of the total estimated flow of the drainage than higher order streams.

Estimates of flow presence (used to determine whether a culvert is necessary) were based on average 2-year recurrence intervals. Estimated stream flows were based on annual flow calculations in the case of the Wyoming base model and bi-annual flows for the Idaho base model. After the estimated flows were calculated for the terminal stream order within each HUC, determinations were made on the likelihood of encountering active flow at proposed crossings within that HUC. Natural streams were characterized as perennial, intermittent-dry, intermittent-wet, or ephemeral. Perennial streams included streams that contain water throughout the year except during periods of drought. Ephemeral streams included those that contain water only briefly and in direct response to precipitation or snowmelt; the beds of these types of streams are always above the water table of the adjacent region. Intermittent streams included those that contain water for extended periods but only at certain times of the year, such as when it receives seasonal flow from groundwater, springs or melting snow. The term intermittent-wet refers to intermittent streams that would be crossed while water is present based on the estimates of flow presence; intermittent-dry are those that would be crossed while they are likely dry. The database also counted human-made structures, such as ditches, aqueducts or canals, and artificial paths. These five surface waterbody types; perennial, intermittent-wet, intermittent-dry, ephemeral, and artificial listed in the USGS database were included in the analysis. Wetlands are not evaluated in this section and are addressed in Section 3.9 – Wetlands and Riparian Areas.

Surface Water Crossings

Section 2.5 of Appendix B of the POD (which is Appendix B of this EIS) describes vehicle access roads and the types of stream crossings that would be necessary for this Project. Three types of waterbody crossings, plus stream avoidance, are assumed for this Project as detailed in Section 1.5 of Appendix B of the POD and briefly summarized here. These types of crossings are proposed by the Proponents as stated in the POD (Appendix B). Stream crossing design and culvert placement on federal lands is subject to EPMs G-1 and WQA-24 for BLM-managed lands and G-2, WQA-25, and WQA-26 for NFS lands. See WQA-27 for non-federal lands. See Table 2.7-1 for a list of these and other mitigation measures (EPMs):

- **Type 1—Drive through:** Crossing of a channel with only minimal vegetation removal and no cut or fill needed. This is typical for much of the low-precipitation sagebrush country with rolling topography and streams that rarely flow with water. Ground-disturbing activities would comply with Agency-approved BMPs.
- **Type 2—Ford:** Crossing of a channel that includes grading and stabilization. Streambanks and approaches would be graded to allow vehicle passage and stabilized with rock or other erosion control devices. The streambed would in some areas be reinforced with coarse rock material, where approved by the land-management agency, to support vehicle loads, prevent erosion and minimize sedimentation into the waterway. The rock would be installed in the streambed

such that it would not raise the level of the streambed, thus allowing continued movement of water, fish, and debris. A ford crossing results in an average disturbance profile of 25 feet wide (along the waterbody) and 50 feet long (along the roadway) for 1,250 square feet or 0.03 acre at each crossing. Disturbance amount is estimated based on need to get equipment into the riparian area to build the 14-foot-wide travelway and protect it from erosion by adding armoring. Ground-disturbing activities would comply with Agency-approved BMPs.

- **Type 3—Culvert:** Culvert installation would include a stable road surface established over the culvert for vehicle passage. Culverts would be used on perennial streams and intermittent streams that are likely to have flow (Intermittent – wet). Whether flow is present at a particular stream crossing would be determined using a 2-year return interval; streams that are normally dry do not need a culvert. Culverts would be designed and installed under the guidance of a qualified engineer who, in collaboration with a hydrologist and aquatic biologist where required by the land-management agency, would recommend placement locations; culvert gradient, height, and sizing; and proper construction methods. Culvert design would consider bedload and debris size and volume. The minimum size of a culvert on the Caribou-Targhee NF is 1.2 times bankfull width, and is likely to be wider on stream types that are likely to readjust. The disturbance footprint for culvert installation is estimated to be 50 feet wide (along the waterbody) and 150 feet long (along the road) for 7,500 square feet or 0.17 acre at each crossing. Ground-disturbing activities would comply with Agency-approved BMPs. Construction would occur during periods of low water or normal flow. The use of equipment in streams would be minimized. All culverts would be designed and installed to meet desired riparian conditions, as identified in applicable unit management plans. Culvert slope would not exceed stream gradient. Typically, culverts would be partially buried in the streambed to maintain streambed material in the culvert. Sandbags or other non-erosive material would be placed around the culverts to prevent scour or water flow around the culvert. Adjacent sediment control structures such as silt fences, check dams, rock armoring, or riprap may be necessary to prevent erosion or sedimentation. Streambanks and approaches may be stabilized with rock or other erosion control devices. Culverts would be inspected and maintained annually for the life of the Project (estimated at 50 years or longer) for proper operation and to protect water quality. Channel reaches adjacent to culverts would also be monitored periodically throughout the life of the project to assure that stream channel stability is not being impacted by culverts (such as by aggradation/degradation/perching, erosion of downstream reaches, potential for road capture when plugged or potential for erosion of culvert fills at overflow), as such impacts are likely to impact water quality and may impact beneficial uses. Culverts would be replaced or reset to minimize effects if monitoring shows a need. If monitoring results show adverse impacts, the need for culvert replacement (upsizing) or resetting at higher or lower elevations to minimize effects would be addressed.
- **Avoid Crossing:** Where constructing a new waterbody crossing is impractical or would require a bridge or a very large (>48-inch-diameter) culvert, existing waterbody crossings would be used and access redesigned to avoid a new

crossing. All canals and ditches would be avoided by using existing crossings, as would all large perennial bodies like rivers.

For non-listed waterbodies or listed waterbodies that are dry, the crossing options include Type 1 through 3, requiring agency consultation for crossings on federal lands. For TMDL and 303(d) listed streams for sediment, additional erosion and sediment control devices such as hay bales and/or turbidity curtains would be used if flow is present during installation of in-stream structures. The installation of culverts constitutes the greatest disturbance to a stream, and in sensitive stream systems, these impacts may not be justifiable (IDEQ 2005). The specific loads and the stream conditions will dictate what type of stream crossing to employ. The performance of culverts and low-water stream crossings would be monitored for the life of the access road, and maintained, repaired, or replaced as necessary to protect water quality by minimizing erosion through the control of bank stability.

All waterbody and wetland disturbances would be completed under the terms of a USACE CWA Section 404 permit, the NPDES Construction Stormwater Permit (CWA 402), and State 401 water quality certification requirements that govern activities within any waters of the United States. In Idaho, there is an additional requirement for a stream channel alteration permit for activities in streambeds.

The Project at this stage of design does not identify exact locations of stream crossings. The type of crossing used would depend largely on the flow and stream channel conditions at the location and time of the crossing. All crossings, including temporary and permanent culverts, would be designed and installed to ensure the free flow of water and upstream and downstream passage of aquatic organisms, including all life stages of fish that are present or potentially present within the given reach. Construction and decommissioning of culverts would be carried out under a Construction General Permit required for stormwater operations, which includes the development of BMPs to protect surface water from stormwater runoff. BMPs to minimize sedimentation during construction would also be employed. All culverts would be inspected regularly for proper functioning.

Natural and man-made stream channels were analyzed to estimate the number of crossing types and included stream orders up to a seventh order system. Crossings were broken into five categories based on stream type and expected crossing type which include:

- Ephemeral – Dry Crossing
- Intermittent – Dry Crossing
- Intermittent – Wet Crossing
- Perennial – Culvert Installation
- Perennial – Avoid Waterway

To estimate the number and type of stream crossings, the Project GIS data file showing the indicative road layout was obtained from the Project engineer. The GIS roads layer was overlaid on the GIS file from the USGS database describing surface waterbodies. Several factors were used to estimate the road crossing types anticipated for the

Project. They included stream type (perennial, intermittent, ephemeral), and flow volume. The topographic maps in the GIS file were also reviewed to determine the degree of slope leading into drainages and the amount of drainage incisement, to predict crossings that might require cut and fill. After the number and types of stream crossings were initially estimated, the Project engineers were invited to review the estimates and to provide comments based on their past experience with similar utility projects in the general Project area. Based on the practical experience comments from the engineers, further refinements were made to the stream crossing type estimates. The centerlines of the Proposed Route and Route Alternatives in each segment were overlaid on the stream crossing GIS data file and the number of each crossing type was counted.

Similar methods were used to estimate the acreage of impacts that would occur due to waterbody crossings by roads. Disturbance areas along each waterbody crossing were designated based on the widths described above for the four types of waterbody crossings. These disturbance areas were compared with the GIS files for the locations of each proposed waterbody crossing type, in order to calculate the acreage of disturbance for road crossings.

Flood Hazard Rankings

FEMA and the OPS *National Disaster Study, National Pipeline Risk Index Technical Report* (1996) were used to evaluate the flood hazard rankings for the Analysis Area, construction disturbance area, and operations disturbance area. The OPS data provide flood hazard rankings for the United States, including those portions of Idaho and Wyoming near the Project. Soil type and flooding risk (based on FEMA mapping) were used to produce flood hazard rankings from zero to 100, where zero represents the lowest flood hazard and 100 represents the highest. Flood hazard rankings of 85 to 100 were assumed to have high risk from flooding, rankings between 70 and 84 were considered to have medium risk, and areas less than 70 were assigned a low risk.

To evaluate areas where flood risks may occur, the OPS GIS data file for flood risks was used to determine the areas of medium and high flood risks within the disturbance areas. The area (in acres) of medium and high flood risk within the disturbance areas was calculated and expressed as a percentage of disturbance area for the Proposed Route to Route Alternatives. The acreage of flood hazard areas occurring within the Analysis Area was summarized by segment.

Surface Water Diversions

Established by Executive Order, the State of Idaho via the University of Idaho has established a clearinghouse for geospatial data. This service (InsideIdaho) was reviewed to evaluate surface water diversions within the Analysis Area. Similar information for Wyoming was collected from their Water Resources Data System. Surface water diversions were not described by use. Most diversions are for irrigation; however, some may be potable water sources.

To quantify the number of surface water diversions by Analysis Area, the Analysis Area was overlaid on the InsideIdaho GIS data file for surface water diversions and the number of diversions was counted. To compare the Proposed Route to Route

Alternatives, the number of surface water diversions was counted by alternative. The percent of surface water diversions by each segment or alternative was based on the number of diversions in the segment as compared to the number of diversions in the Analysis Area.

Total Maximum Daily Loads

Lists of waterbodies with TMDLs and 303(d) listed waterbodies were obtained from GIS files maintained by the IDEQ and WDEQ (IDEQ 2011; WDEQ 2012). To quantify the number of TMDL and 303(d) listed waterbodies by Analysis Area, the Analysis Area was overlaid on the IDEQ GIS database (there are no listed streams along the portion of the Project located in Wyoming) for impaired waterbodies, and the number of impaired waterbodies was counted for sediment and temperature TMDLs and 303(d) for sediment and temperature impairment. To compare the Proposed Route to Route Alternatives, the number of impaired waterbodies within the Analysis Area was counted by alternative. In addition, the number of road crossings of impaired waterbodies was counted by alternative and categorized by stream type.

The effects to TMDL and 303(d) listed sediment-impaired streams were further analyzed by comparing the GIS construction and operations disturbance areas to the location of impaired streams. To assess the effects on sediment-impaired streams, the GIS data file from IDEQ for impaired streams was overlaid on the GIS disturbance area file. Disturbance acreage within 500 feet of the impaired stream was noted. The 500-foot distance was selected because that distance should provide adequate buffer to place stormwater BMPs between the disturbance and the impaired stream to prevent further sediment degradation, and several RMPs include a 500-foot buffer to protect water quality in surface waterbodies (BLM 2008h). To compare the Proposed Route to Route Alternatives, the construction and operations disturbance areas within 500 feet of sediment-impaired streams were compared by alternative.

For TMDL and 303(d) listed temperature-impaired streams, the effects from removal of shading vegetation on temperature degradation were analyzed. To assess the effects on temperature-impaired streams, the GIS data file for impaired streams was overlaid on the GIS construction and operations disturbance area files. These files were then compared with the GIS files for woody vegetation, including the location of trees and shrubs. Acres of woody vegetation removed within 500 feet of the temperature impaired stream were calculated. The 500-foot distance was selected to be consistent with RMP buffers used to protect water quality.

Groundwater

Shallow Groundwater

The National Resource Conservation Service (NRCS) STATSGO database (Soil Survey Staff, NRCS) was used to identify shallow groundwater (14 feet deep or less) within the Analysis Area and disturbance areas. Shallow groundwater may complicate construction of footings of transmission line structures, which require foundations as deep as 32 feet. The GIS files of the Analysis Area and disturbance area were overlaid on the GIS file from the STATSGO database. To evaluate the possible interactions between shallow depth to groundwater and the Project, the acreage of the disturbance

footprint underlain by shallow depth to groundwater for the entire Proposed Route by segment and for those portions of each segment where Route Alternatives were proposed was identified. Acres of disturbance over shallow depth to groundwater areas were then compared for each segment by alternative. Acreage of shallow depth to groundwater areas within the Analysis Area were summarized by segment.

Water Wells

IDWR (2012) and the Wyoming State Engineer's Office databases (2012) were used to identify potable water wells and total water wells within the Analysis Area. To identify the number of water wells in the Analysis Area, the GIS file of the Analysis Area was overlaid on the GIS file from the Idaho and Wyoming water entities. The numbers of both potable water wells and total wells were determined by segment. To compare the number of wells between the Proposed Route and Route Alternatives, the numbers of total wells and potable wells within the 1-mile route buffer were counted by alternative.

Shallow bedrock (12 feet deep or less) within the Project area could require the use of blasting to set Project foundations. Blasting in shallow bedrock is more fully described in Section 3.14 – Geologic Hazards. Blasting in shallow bedrock could damage nearby structures, including wells. Wells within 200 feet of the blasting areas could be especially susceptible to damage. To assess the number of water wells within 200 feet of the blasting zones, the GIS file of the Analysis Area was overlaid on the GIS file from the Idaho and Wyoming water entities. The number of total wells within 200 feet of the Project centerline was determined by segment. To compare the number of wells within 200 feet of centerline between the Proposed Route and Route Alternatives, the number of total wells within 200 feet of centerline was counted by alternative.

Sole-source Aquifers

The USEPA Regions 8 and 10 Web sites (USEPA 2012) were searched to identify locations of SSAs. To identify the Project areas located within SSAs, the GIS file of the Analysis Area was overlaid on the GIS file from the USEPA database showing SSAs. The acreage of each Analysis Area within the SSA was calculated and presented as a percentage of the total Analysis Area by segment. To compare the effects on SSAs between the Proposed Route and Route Alternatives, the Analysis Area within SSAs was compared by alternative.

3.16.1.5 Existing Conditions

The Analysis Area is located in areas with perennial, intermittent, and ephemeral streams. Most of the surface waterbodies in Wyoming are natural waterways. In Idaho, there are thousands of stream diversions to support an extensive irrigation system that facilitates agriculture in the Bear River and Snake River Valleys. Groundwater occurs under most portions of the Analysis Area. The Project would not come into contact with groundwater deeper than 32 feet (i.e., the depth of the deepest structure foundations considered for this Project).

<u>Surface Water</u>

Project roads would cross many natural and human-made surface waterbodies. Table 3.16-1 presents the miles of streams located within each segment's Analysis Area. There are 5,090 miles of streams located within the Analysis Area. Segments 1, 4, 5, 7,

8, and 9 each have over 300 miles of streams in their respective Analysis Areas. However, the Analysis Area encompasses arid areas with low precipitation where average rainfall is about 10 inches per year. Most of the streams are ephemeral, fed by stormwater or snowmelt.

The miles of TMDL and 303(d) listed streams that are located in the Analysis Area are included in Table 3.16-1. The percentage of miles of TMDL and 303(d) listed streams for sediment compared to the miles of stream located within the respective segment analysis area is highest in Segment 10 (19 percent). The percentages of miles of TMDL and 303(d) listed streams for temperature are lower in all segments, ranging from zero to 15 percent. No temperature- or sediment-impaired streams were found in the Wyoming portion of the Project area.

Table 3.16-1. Water Resources in Analysis Area

Segment	Streams (miles)[1/]	TMDL or 303(d) listed Streams – Sediment (miles)	TMDL or 303(d) listed Streams –Temperature (miles)	Surface Water Diversions (total number)	Flood Areas Medium or High Risk (acres)[1/]	Shallow Groundwater (acres)
1W	395	–	–	4	7,907	–
2	275	–	–	–	10,009	–
3	138	–	–	–	3,247	–
4	1,015	17	15	159	38,580	14,706
5	362	45	2	275	30,440	2,539
6	2	–	–	5	343	–
7	794	54	3	1,117	28,141	10,223
8	441	39	8	1,270	29,543	–
9	577	39	17	1,058	42,509	–
10	47	9	1	169	2,006	–

1/ Mileages and acreages are rounded to nearest whole number.

This analysis identified a total of 4,057 surface water diversions within the Analysis Area (Table 3.16-1). The most diversions are found in Segments 7, 8, and 9. Although the purpose for diversions was not found in the InsideIdaho database, the majority of these likely support the extensive agricultural flood irrigation practices in southern Idaho.

Areas of medium to high flood risk are located within the Analysis Area. Segment 5 contains the highest ratio of acres of the Analysis Area located within medium to high flood hazard risks compared to miles of stream within the segment. This segment crosses several river valleys as well as a mountainous region, where there are numerous drainages.

Groundwater

Shallow groundwater is of limited extent within the Analysis Area (Table 3.16-1) Shallow groundwater (i.e., 14 feet deep or less) is found in Segments 4, 5, and 7.

The Project is located within only one SSA. The Eastern Snake River Plain (ESRP) Aquifer occurs in southern Idaho. Portions of Segments 5 through 10 are located on the ESRP. The ESRP Aquifer occupies about 10,800 square miles in southern Idaho and contains approximately one billion acre-feet of water. The aquifer is several hundred feet thick, with the most permeable zone located in the upper 200 to 300 feet. The

ESRP Aquifer is often overlain by other, shallower perched groundwater units, usually the result of infiltration from the extensive flood irrigation practices in the area. Miles of ESRP crossed by each segment and alternative are included in Table D.16-11 in Appendix D. Excavation for transmission line towers or other structures or blasting that could be required in areas of shallow bedrock (12 feet or less) could cause contact with shallow perched groundwater. However, given the size of this aquifer and the depth of productive units, the Project would not adversely impact this SSA to a large extent.

Groundwater is the major potable source in southern Idaho. Water wells and potable water wells are found in all portions of the Analysis Area (Table 3.16-2). Table 3.16-2 presents the total number of wells and the number of potable wells within the Analysis Area for each segment (i.e., along the Proposed Route and all Route Alternatives combined). Segment 8 has the greatest number of potable wells (444) within the Analysis Area, followed by Segment 9 (155 potable wells), Segment 7 (129 potable wells) and Segment 1W (106 potable wells). All other segments have fewer than 100 potable wells within the Analysis Area. Table 3.16-2 also indicates the number of those wells that would be located within 200 feet of shallow bedrock where blasting may be necessary.

Table 3.16-2. Wells within the Analysis Area and Wells near Potential Blasting Areas

Segment Number[1/]	Potable Water Wells	Potable Wells Within 200 Feet of Shallow Bedrock	Total Water Wells	Total Wells Within 200 Feet of Shallow Bedrock[2/]	Total Wells Within 200 Feet of Centerline in Shallow Bedrock[2/]
1W	106	2	163	3	–
2	19	–	86	–	–
3	6	4	124	102	1
4	56	8	222	128	6
5	80	6	109	9	–
6	4	4	7	7	1
7	129	46	254	80	14
8	444	333	569	418	22
9	155	121	240	193	6
10	59	14	90	17	2

1/ This table includes the total number of wells and number of potable wells within the buffered analysis area around each proposed transmission line segment and all of its alternatives. For a breakdown of potable wells along the Proposed Route and Route Alternatives, see Table D.16-10 in Appendix D.
2/ Shallow Bedrock included here is 12 feet deep or less.

3.16.2 Direct and Indirect Effects

This section is organized to present effects to surface water and groundwater resources from construction, then operations, followed by decommissioning activities for the proposed Project. Route Alternatives are analyzed in detail below in Section 3.16.2.3.

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. Amendments to the Medicine Bow Forest Plan would allow the Project to cross wetland habitat in Segment 1W and amendments to the Caribou Forest Plan would result in allowing the Project to cross AIZs in Segment 4. No impacts to water resources resulting from approving the amendments beyond the impacts of the Project are anticipated.

3.16.2.1 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 water resources 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, mining, agricultural, or other competing land uses. 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.

3.16.2.2 Effects Common to All Action Alternatives

Construction

Impacts to Surface Water

Access roads would need to cross streams as part of the proposed Project. There are no assigned site-specific crossing types. Road crossings were estimated based on the data available, and would depend on site-specific conditions at the site location. A summary of the percentage of the types of road crossings and stream types for the Proposed Route and the Preferred Route are included in Table 3.16-3. Most of the crossing types on the Proposed Route would be drive through crossings, estimated at 38 percent, followed by fords (34 percent), and 8 percent of the crossings would be culverts. Sensitive stream crossings (8 percent on the Proposed Route) would need additional mitigation measures (e.g., OM-20, Table 2.7-1), and 12 percent of the stream crossings would be avoiding perennial streams or artificial paths. Most of the crossing types on the Preferred Route would be drive through, estimated at 40 percent, followed by fords (35 percent), and culverts (9 percent). Sensitive stream crossings (8 percent

Table 3.16-3. Percentage of Crossing Type by Access Roads and Stream Type crossed by Access Roads on the Proposed Route and Preferred Route

Proposed Route		Preferred Route	
Road Crossing Type	**Percent[1/]**	**Road Crossing Type**	**Percent[1/]**
Drive through	38	Drive through	40
Ford	34	Ford	35
Culvert	8	Culvert	9
Sensitive (TMDL/303[d])	8	Sensitive (TMDL/303[d])	8
Avoid	12	Avoid	10
Stream Type	**Percent**	**Stream Type**	**Percent**
Ephemeral	68	Ephemeral	68
Intermittent Dry	14	Intermittent Dry	14
Intermittent Wet	4	Intermittent Wet	4
Perennial	6	Perennial	7
Artificial	9	Artificial	7

1/ Percentages are rounded to nearest whole number.

on the Proposed Route) would need additional mitigation measures (e.g., OM-20, see Table 2.7-1), and 10 percent of the stream crossings would be avoiding perennial streams or artificial paths.

Because the Project would be located in an arid area, most of the crossings would be ephemeral streams, representing 68 percent of the total along the Proposed Route. Intermittent dry streams would account for 14 percent of the types of streams crossed along the Proposed Route and intermittent wet streams would account for 4 percent of streams crossed along the Proposed Route. Human-made structures (canals, aqueducts, ditches, drains, channelized natural streams) or artificial waterways would be 9 percent of streams crossed, while perennial streams would account for only about 6 percent of the total along the Proposed Route. Along the Preferred Route, ephemeral streams would be 68 percent of the total streams crossed, intermittent dry streams would be 14 percent, intermittent wet streams would be 4 percent, and perennial streams would be 7 percent. Artificial waterways would be 7 percent of streams crossed along the Preferred Route.

Table D.16-1 in Appendix D shows the distribution of types of road crossings over different stream types by Proposed Route segments and the Route Alternatives. The number of crossings for TMDL and 303(d) listed streams are also included in Table D.16-1. Table D.16-6 identifies the types of streams that are crossed by segment and alternative.

The construction of Project components (e.g., transmission line structures, substations, pull sites, multipurpose yards, fly yards, and access roads) would require excavation, grading, and the subsequent removal of vegetation. In areas where the transmission line would cross forested riparian areas, tree heights would need to be kept below the transmission line for safety and maintenance reasons (see Section 3.6 – Vegetation Communities). Riparian areas would be avoided by 500 feet to the extent possible. Transmission structures would not be constructed within river or spring habitats, as avoiding placing structures within these areas is a standard engineering practice. Areas under the transmission line would not be cleared of tall vegetation during initial construction or during ROW maintenance if the distance between the conductor and the

top of mature trees or shrubs is greater than 50 feet (e.g., a canyon or ravine crossing with high ground clearance at mid-span). At this time the exact number and location of where the conductor clearances would be greater than 50 feet is uncertain; therefore, impact values for forest and riparian clearing have conservatively calculated ROW impacts as a complete removal of forested vegetation within the ROW, regardless of conductor clearance height. This means that the impact values reported for ROW maintenance are an overestimate of the true impacts that would actually occur, as forested vegetation (including riparian areas) would not be maintained along the entire ROW if the top of mature vegetation is 50 feet or more below the transmission line.

Short-term effects include soil disturbances that increase soil erosion (or water runoff in areas with compacted soils) and result in an increase in suspended sediments within adjacent waterbodies (Naiman and Bilby 1998). These impacts would be greatest where waterbodies would be crossed by roads due to the extent of direct disturbances to banks and riparian vegetation.

Long-term effects of removal of riparian vegetation include reduced stream summer shading, LWD input, terrestrial organic input, as well as increased bank instability, and erosion potential. In areas where the roots of riparian vegetation are the primary bank stabilizing force, loss of riparian vegetation can result in stream migration. Erosion, sedimentation, and stream stability would be minimized with the use of BMPs as well as the revegetation efforts described in Section 3.6 – Vegetation Communities, and Section 3.15 – Soils.

Impacts resulting from the spanning of waterbodies by the transmission line would primarily result from ROW vegetative clearing and maintenance of tree heights. Effects from the spanning of waterbodies by the transmission line would be mitigated to minimize or eliminate changes in sedimentation or water quality.

Loss of riparian vegetation and trees along the transmission line crossings may reduce shade, and therefore have a potential to cause a slight localized increase in temperature (immeasurable on most perennial streams). However, even though gaps in canopy cover can result in an immediate increase in stream temperature, stream temperatures do not continue to increase at an accelerated rate as canopy cover resumes downstream (Danehy et al. 2005). Vegetation removal associated with crossings in forested settings is expected to be minimal and localized, without an overall increase in stream temperatures.

Temperature changes from loss of riparian vegetation are likely to be varied among streams. Most studies on temperature changes have been done on forest timber harvest where large clearing has occurred. A study in southern Appalachian ecosystems of riparian buffer widths on stream water quality after forest management activities resulted in water temperature increases in the summer months in streams with no buffer zones (Clinton 2011). With a buffer of 10 m or larger, forest management activities did not have a significant effect on water quality, including temperature, total suspended solids, and chemistry (Clinton 2011). A study of temperature effects in small headwater streams in western Washington due to forest harvest showed highly variable responses between clear-cut streams, buffered streams, and patch-buffered streams (Janisch et al. 2012). Stream temperature increases were small (average daily

maximum temperature in the clear-cut streams increased by 1.5°C), and the amount of canopy cover retained in the riparian buffer was not a strong variable, but length of surface flow and substrate appeared to be more influential (Janisch et al. 2012). Effects of smaller clearings on stream temperature have been studied little, although some relevant studies along pipeline ROWs have been reported. Blais and Simpson (1997) found in a 3-year study in coldwater streams in New York State following ROW clearing for a pipeline that no short- or long-term impacts occurred to water temperature.

The majority of the Analysis Area consists of low grassland and shrub environments; therefore, the majority of stream crossings would occur outside of forested areas (see Section 3.6 – Vegetation Communities). Minimal research has been conducted regarding the effects of riparian vegetation removal on stream temperatures in shrub-steppe ecosystems. Disregarding the influence of groundwater or low-order tributaries, stream temperatures in shrub-steppe systems can be expected to be generally higher than those of forested systems, due to a lack of canopy cover. Furthermore, existing canopy cover likely has a limiting effect within shrub-steppe systems due to its minimal contribution of shade; as shrub canopy cover is typically concentrated only along the edges of a stream (i.e., when the sun is directly overhead it is imparting maximum solar radiance directly onto the middle / deeper portions of the stream). Based on this, changes in stream temperature related to riparian vegetation removal in shrub-steppe systems is likely to be immeasurable. However, in order to further limit the potential impact on adjacent water resources (related to the initial clearing of riparian vegetation in the ROW), the EPMs WET-1, TESWL-1, and WQA-25 will be implemented.

Impacts to waterbodies from road crossings would depend on the type of crossing. Table D.16-1 in Appendix D presents an estimate of the number and type of road crossings that are expected to occur, by segment and alternative. These road crossings could result in a potential for short-term localized increases in erosion and surface water sedimentation, as well as direct impacts to streambanks and adjacent vegetation. These impacts would be greatest in areas that contain forested riparian vegetation; however, the Project has been routed to avoid these areas to the extent practical.

As listed in Table D.16-1 and summarized in Table 3.16-3, drive-through crossings on ephemeral or intermittent dry streams account for 38 percent of the total crossings on the Proposed Route and 40 percent of the total crossings on the Preferred Route. One impact to stream habitat from drive-through crossings is sedimentation, as sediment loosened during drive-throughs while the channel is dry would become suspended when flow did commence. Erosion of streambanks may also occur. Erosion effects would be minimized with erosion control measures as needed. Drive-through crossings could also disturb and disrupt appropriate substrate habitat for some aquatic fauna.

Ford crossings on ephemeral or intermittent dry streams account for 34 percent of the total crossings on the Proposed Route and 35 percent of the total crossings on the Preferred Route. Sedimentation impacts from dry ford crossings may result when water is present. Sedimentation impacts would be minimized with sediment control devices. Erosion of streambanks may occur from dry ford crossings, and effects would be

minimized with erosion control measures. Another impact would be disturbance of suitable substrate habitat for some aquatic fauna, if present.

The installation of culverts on intermittent and perennial streams account for 8 percent of the total crossings on the Proposed Route and 9 percent of the total crossings on the Preferred Route. Culverts require in-stream work that may temporarily cause an increase in localized erosion and sedimentation in the waterbody at the construction site with sedimentation effects extending downstream. Other impacts from culverts would include scouring, changes in channel geometry and gradient, aggradation or degradation of the stream channel, and changes to habitat for aquatic fauna.

The following EPMs would be implemented to reduce the impact of road crossings on aquatic resources:

WQA-23 Avoid placement of road bed material in channels (perennial, intermittent or ephemeral). Road bed material contains considerable fines that would create sedimentation in coarse cobble dominated stream channels. Even in seasonally dry reaches those fines could be transported during flow periods and negatively impact fish spawning reaches below.

WQA-24 On federal lands, consult with appropriate land management agency staff prior to siting and design for stream crossings (location, alignment, and approach for culvert, drive-through, and ford crossings). This may include a hydrologist, engineer and, for perennial and many intermittent streams, an aquatic biologist.

In addition, the Proponents would implement VEG-2 (in Section 3.6 – Vegetation Communities), which requires that access roads be constructed and sited in such a way as to minimize the number of trees that would need to be removed. To reduce the impacts of unavoidable waterbody crossings by roads, VEG-3 (in Section 3.6 – Vegetation Communities) as well as SOIL-6 and SOIL-7 (in Section 3.15 – Soils), which establish restoration efforts that would need to be conducted in order to re-establish pre-construction conditions along these waterbodies, would also be implemented.

Some of the road crossings would include the installation of a culvert (see Table D.16-1 in Appendix D). If culverts are designed or installed improperly, they can isolate wetlands, reduce water flow, change a stream's hydrodynamics, and impede fish passage. Therefore, all culverts would be designed and installed to ensure the continued free flow of water, as well as to allow both the upstream and downstream movement of aquatic organisms. The Proponents would conduct construction and decommissioning of multiple culverts, likely disturbing over 1 acre, and therefore obtain a CGP required for stormwater operations; which includes the development of BMPs to protect water from stormwater runoff. BMPs would also be employed to minimize sedimentation to waterbodies due to construction activities. In addition, culverts would be inspected regularly by staff approved by the applicable land-management agencies (permanent culverts inspected annually during operations) to ensure that they are not plugged and are functioning properly. The Proponents' responsibility for inspecting culverts, as well as conducting all necessary repairs, would continue as long as the culverts are present within the watershed (this would continue for the life of the Project).

The BLM and Forest Service have specific requirements regarding culvert design and installation on lands they manage. The Proponents would consult with the Forest Service and BLM prior to construction regarding design, layout, and decommissioning requirements for each culvert that would be located on federal lands. All culverts located on federally managed lands would be constructed in accordance with the applicable federal agencies' management plan standards. In all other areas where more restrictive regulations are not in place, the culvert specifications outlined in Appendix B would be used. The following EPMs regarding culverts on NFS lands will be implemented.

WQA-25 All culverts on NFS lands, both permanent and temporary, shall be designed and installed to meet desired conditions for riparian and aquatic species as identified in the applicable Forest Plan. Culverts should not be hydraulically controlled. Hydraulically controlled culverts create passage problems for aquatic organisms. Culvert slope should not exceed stream gradient and should be designed and implemented (typically by partial burial in the streambed) to maintain streambed material in the culvert.

WQA-26 Culvert sizing on NFS lands shall comply with Guidance for Aquatic Species Passage Design, Forest Service Northern Region & Intermountain Region (Forest Service 2003f).

The Proponents have also adopted the following EPM for non-federally managed land:

WQA-27 On non-federal lands, culvert placement should comply with state BMPs.

As part of the SWPPP (see Appendix B), the Proponents have proposed the following EPMs related to prevention of erosion and sedimentation:

WQA-1 The appropriate NPDES permits for construction activities that disturb 1 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, laydown areas) and substations.

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

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 SWPPP.

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-28 Migration of construction-related sediment to all adjacent surface waterbodies will be prevented.

Based on the implementation of this SWPPP, direct and indirect impacts to water resources from erosion and sedimentation are expected to be minor and would be limited to temporary soil disturbance at sites where BMPs are installed. An additional EPM to reduce compaction (SOIL-2) is found in Section 3.15 – Soils. Reclamation, however, would take a number of years to implement, depending on the habitat type impacted, and the beneficial functions of streamside vegetation, such as shading and bank stability, will not recover immediately.

Construction of access roads and stream crossings would result in impacts to TMDL and 303(d) listed sediment-impaired streams due to soil disturbance during construction, but this would be minimized by the BMPs and EPMs discussed above. Named streams and unnamed tributaries that have TMDLs for sediment or temperature or are on the 303(d) list for sediment or temperature are included in Table D.16-13 in Appendix D.

TMDL and 303(d) listed temperature-impaired streams would also be impacted during construction. Any crossings of these streams that occur at points that do not currently contain forested vegetation (which serves as summer stream shade) would not have a measurable impact to average stream temperatures. However, as discussed above, tree removal would be necessary in forested riparian areas in order to provide clearance for energized lines, and this tree removal could contribute to increases in stream temperatures if substantial areas are cleared. The Proposed Route does not include removal of woody vegetation within 500 feet of impaired streams; however, some alternative routes would require removal of small areas. Table 3.16-4 includes the

Table 3.16-4. Acres of Woody Vegetation within 500 Feet of Temperature Impaired Streams Impacted by Construction and Operations Disturbance

		Construction Disturbance			Operations Disturbance		
Segment Number	**Proposed Alternative or Route Name**	**TMDL and 303(d) Listed Temperature (acres)**	**%**	**Total Acres**	**TMDL and 303(d) Listed Temperature (acres)**	**%**	**Total Acres**
7	Alternative 7K	1.6	0.1	2,859	0.2	0.1	382
8	Alternative 8B	0.008	<0.1	916	–	–	69
9	Alternative 9D	0.003	<0.1	1,047	0.000004	<0.1	84
	Alternative 9F	0.003	<0.1	1,165	0.000004	<0.1	93
	Alternative 9G	0.003	<0.1	1,058	0.000004	<0.1	87
	Alternative 9H	0.003	<0.1	1,163	0.000004	<0.1	96

1/ Total acres of surface disturbance along riparian areas.

number of acres of woody vegetation that would be impacted due to construction and operations disturbance within 500 feet of a TMDL or 303(d) listed stream for temperature. Alternatives in Segments 7, 8, and 9 include removal of woody vegetation within 500 feet of a temperature-impaired stream.

Alternative 7K would impact 1.6 acres of woody vegetation during construction and 0.2 acre during operations. Alternative 8B would impact less than 0.01 acre during construction. Alternative 8B would not impact woody vegetation for operations. The construction impact area is due to the tower pad construction disturbance buffer area that would be revegetated after completion of construction. Route Alternatives within Segment 9 would impact less than 0.01 acre of woody vegetation within 500 feet of temperature impaired streams.

Accidental spills or disposal of harmful materials used during construction could wash into and pollute surface water. Materials that could contaminate water resources include lead-based paint flakes, diesel fuel, gasoline, lubrication oil, cement slurry, hydraulic fluid, antifreeze, transmission fluid, lubricating grease, or other toxic fluids. Downstream beneficial uses could be adversely affected if these chemicals enter into waterbodies. The Project SPCC Plan (see Appendix B) would include procedures for promptly reporting and cleaning up spills generated during construction. The Proponents have committed to EPMs that include measures for temporary and permanent erosion and sediment controls to be used during construction, operations, and maintenance of the Project, as well as an SWPPP (WQA-1 through WQA-12 and WQA-28 in Appendix B and Table 2.7-1). The EPMs would also include measures for spill prevention practices, requirements for refueling and equipment operation near waterbodies, procedures for emergency response and incident reporting, and training requirements. Actions taken in accordance with these EPMs should assist in mitigation of impacts to surface water. In addition, EPM SOIL-1 (in Section 3.15 – Soils), which creates additional requirements for the SWPPP, would help minimize potential impacts.

Water would be necessary for construction of the transmission lines and associated facilities. Water would be used for mixing of portland cement concrete as well as for dust control on service or access roads. Water usage for dust control provides a benefit by preventing air quality degradation. The Proponents have stated the required water will be procured from municipal sources, from commercial sources, or under a temporary water use agreement with landowners holding existing water rights. No new water rights will be required (see Appendix B). If the entirety of this water use was diverted from existing rights, there would be no depletion of water beyond existing depletions related to existing water rights (Kantola 2010; Hoobles 2010).

The water estimates for transmission line construction along all segments would be about 4,200 to 9,600 gallons per day (see Table D.16-12 in Appendix D), or about one to two large water truckloads per day (a typical construction water truck holds approximately 4,000 to 5,000 gallons). The water estimates for all segments are dependent on a number of factors (weather, soil type, length of construction, construction sequencing, and others) and the actual construction water usage would likely vary from these preliminary estimates. Water use for substation construction would range from an estimated total of 1 million gallons (3 acre-feet) at Heward to 19

million gallons (58.8 acre-feet) at Anticline (see Table B-12, Appendix B). Water used from the North Platte River and Colorado River basins would be under consultation with the USFWS (see Section 3.7 – Special Status Plants, and Section 3.11 – Special Status Wildlife and Fish Species). EPM TESWL-12 is required to comply with the USFWS tiered BO under the Upper Colorado Endangered Fish Recovery Program, due to the water withdrawals from the Colorado River (as initially described in Section 3.7 – Special Status Plants). This measure would be applied Project-wide regardless of land ownership.

Impacts to Groundwater

Due to the shallow excavations required for Project foundations it is unlikely that this Project would affect groundwater to a large extent. Shallow groundwater of 14 feet or less is present only in Segments 4, 5, and 7. Any impacts to groundwater would be of short duration and consist mainly of temporary sedimentation. Excavations for transmission line structures may contact shallow groundwater; however, the groundwater contact would be unlikely to adversely impact this resource, unless an accidental chemical spill occurs near an open excavation. The Proponents have committed that materials such as fuels, other petroleum products, chemicals, and hazardous materials including wastes would be located in upland areas at least 500 feet away from streams, 400 feet for public wells, and 200 feet from private wells. The Proponents would adhere to state requirements for containment of hazardous materials. Typically, contact with construction equipment would not impact groundwater quality except to increase turbidity temporarily, and only in a limited area.

The Project could temporarily impact water quality in potable water wells to a limited extent from excess sediment influx into the potable water wells located near Project excavations. The greatest risk to water wells of any use would be from damage that could occur during blasting of shallow bedrock. Many wells in southern Idaho are constructed as an “open hole,” meaning they are not cased along their entire interval. If nearby blasting causes the dislodging of a rock from the boring sidewall, the rock can fall down the well and trap the submersible pump. This could result in temporary or permanent damage to the well. The effects of well damage could be loss of a potable water supply or loss of irrigation water flow to farmlands. In the Proponents’ Blasting Plan (as required by EPM BLA-1 in Section 3.14 – Geologic Hazards), damage to nearby wells would be repaired or replaced. If access is given by well owners, the Proponents propose to conduct pre-blast and post-blast inspections of wells within 200 feet of blasting areas.

Construction dewatering could result in a local and temporary drawdown of groundwater levels, temporarily (i.e., during the withdrawal) reducing the yield of nearby shallow water wells and potentially adjacent surface water systems (such as wetlands; see Section 3.9 – Wetlands and Riparian Areas). In addition, blasting or drilling for tower foundations could reduce flows in wells and springs. However, water supply wells are typically deeper than the proposed maximum excavation depth of 32 feet, so a temporary drawdown limited to that depth is unlikely to affect water yield.

In no case would groundwater removed during construction be discharged to surface waters or storm drains without first obtaining any applicable permits or without approval of the applicable federal land-managing agency.

Operations

Impacts to Surface Water

The impacts from Project operations on surface water would be less in magnitude as compared to the impacts from construction, but longer in duration. The disturbed area of operations would be about approximately 30 percent of the construction area disturbance. For this reason, the erosion effects in the operation area should be less than for construction areas, but would persist for a much longer time. Potential impacts to surface water from road crossings include erosion of streambanks and sedimentation of road runoff from stormwater. Culverts may get blocked by debris in streams and cause water to back up and flood areas. Use of roads during maintenance activities may promote erosion. 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.

Some of the streams that would be crossed by the Project have delineated 100-year floodplains or flood hazard areas designated by FEMA. Flood hazard areas include streams in the North Platte River drainage near Windstar Substation, the Green River and tributaries in Sweetwater County (Segment 4), the Bear River in Oneida County, and tributaries of the Snake River in southern Idaho. The 100-year floodplain is the area that would be inundated by a flood with a recurrence interval of once in 100 years, on average. The Project would be designed to withstand flooding during all its phases. Building is permitted in flood-prone areas with certain restrictions. For instance, buildings are to be elevated such that the lowest floor is above the 100-year flood level, and an area of the watercourse is typically set aside for flow conveyance (the floodway). Since floodplain mapping is usually done as an aid to local governments in urban areas or areas that are expected to be prone to urbanization, most watercourses in non-urban areas are not mapped even though they may be subject to substantial flood hazards. It is reasonable to assume that all watercourses that convey natural flows, whether mapped as floodplains, flood hazard areas, or not, present some level of flood hazard. The flood hazard is not limited to inundation; bank erosion and bed scour (a lowering or destabilization of the channel bed during a flow event) are also hazards that can occur due to flooding. On lands with restrictions in building within 100-year floodplains, requirements in Forest Plans/RMPs will apply.

Encroachment of a Project structure into a flood path could result in flooding of or erosion damage to the encroaching structure, diversion of flows and increased flood risk for adjacent property, or increased erosion on adjacent property. Impacts are likely to occur only where transmission structures or other permanent Project features are constructed in or closely adjacent to a watercourse; this will not occur per standard engineering practices. All structures within a flood hazard area subject to scour or lateral movement of a stream channel would be protected by burial beneath the 100-

year scour depth, setbacks from the channel bank, or bank protection. Structures impacted from floods would be maintained or replaced.

The number of acres of operations disturbance located in medium- to high-risk flood zones is less than 20 percent of the total operations disturbance area. The Project includes small footprint structures; the permanent footprint of each structure adds up to a small percentage of the high-risk flood hazard area. A majority of the operations disturbance is access roads and maintenance of the ROW. Therefore, the Project is not likely to measurably impact flood flows. However, flood flows could impact the Project structures and roads. Therefore, Project structures would be placed to avoid impacts from floods, if possible. Structures would be designed to withstand impacts from flood waters.

Impacts to Groundwater

Groundwater would not be directly impacted during transmission line operation because all operations activities would occur above the ground surface, and there would be measures in place to protect against chemical spills (see Appendix B). During operations, insulating mineral oil is used in some electrical equipment at substations, such as transformers, and some reactors and circuit breakers. The Proponents' POD indicates that oil-filled equipment would be placed within secondary containment structures to ensure that oil spills would not impact soil or groundwater. The containment structures take many forms, depending on site requirements, environmental conditions, and regulatory restrictions. Different varieties of containment structures include artificially lined sumps of sufficient volume to contain oil spills, and oil-water separators. The Proponents would adhere to state requirements for containment of hazardous materials. Because of the corrective measures built into the Project plan (Appendix B), chemical spills are not further discussed here.

Decommissioning

During decommissioning, all structures would be removed. Land managers or property owners would be contacted about the final disposition of roads installed for the Project. Reclamation would include recontouring to blend with the surrounding landscape and decompaction of soils and revegetation. The effects from soil disturbances and water effects during decommissioning would be similar to those of construction, and are not discussed in detail separately.

Groundwater would not be affected during transmission line decommissioning. Foundations would be abandoned in place, or cut off below ground surface and buried. This makes contact with groundwater less likely than during construction.

3.16.2.3 Comparison of Alternatives by Segment

Tables D.16-1 through D.16-15 in Appendix D show the effects to surface water and groundwater resources for the Proposed Route and as well as a comparison between Route Alternatives and the comparison portion of the Proposed Route (i.e., the portion of the Proposed Route that starts and ends at the same nodes as the Route Alternative). Effects to surface water and groundwater resources from the Preferred Route were calculated by taking the Proposed Route total length, subtracting out the comparison portions for applicable alternatives, and adding in the values for the

applicable alternatives that comprise the Preferred Route. Effects are discussed in the following sections for each segment.

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 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.

Construction

Surface Water

There would be 230 surface water crossings on the Preferred/Proposed Route for Segment 1W(a) access roads. Segment 1W(a) would require an estimated 93 drive-through crossings, 101 fords, and 29 culverts for a total of 2 acres of disturbance in addition to the average road disturbance (Table D.16-1 in Appendix D). Of the 230 crossings, 67 percent are non-listed ephemeral streams and there are no TMDL or 303(d) listed streams (Table D.16-6 in Appendix D). Alternative 1W(a)-B contains fewer culverts than the comparison portion of the Preferred/Proposed Route.

There would be 185 surface water crossings on the Preferred/Proposed Route for Segment 1W(c) access roads. Segment 1W(c) would require an estimated 83 drive-through crossings, 80 fords, and 12 culverts for a total of 1 acre of disturbance in addition to the average road disturbance (Table D.16-1 in Appendix D). Of the 185 crossings, 65 percent are of non-listed ephemeral streams and there would be no TMDL or 303(d) listed streams crossed (Table D.16-6 in Appendix D).

A total of 153 acres of construction disturbance for Segment 1W(a) would be located within 500 feet of perennial or intermittent streams or 20 percent of the disturbance area, and 49 acres would be located within 100 feet of ephemeral streams (6 percent of the disturbance area (Table D.16-14 in Appendix D). Alternative 1W(a)-B would have 13 fewer acres of disturbance within 500 feet of perennial or intermittent streams and 1 more acre within 100 feet of ephemeral streams than the comparison portion of the Preferred/Proposed Route. A total of 193 acres of construction disturbance for Segment 1W(c) would be located within 500 feet of perennial or intermittent streams or

20 percent of the disturbance area, and 63 acres would be located within 100 feet of ephemeral streams (7 percent of the disturbance area; Table D.16-14 in Appendix D).

Approximately 11 percent of the construction disturbance area would be located within the moderate- and high-risk flood zone in Segment 1W(a) (Table D.16-2). Alternative 1W(a)-B has a lower percent of disturbance area located within a flood zone than the comparison portion of the Preferred/Proposed Route. Approximately 7 percent of the construction disturbance area would be located within the moderate- and high-risk flood zone in Segment 1W(c) (Table D.16-2).

There are three surface water diversions within 0.5 mile of Segment 1W(a) and two surface water diversions within 0.5 mile of Segment 1W(c). There are no surface water diversions within 0.5 mile of either Alternative 1W(a)-B or the comparison portion of the Preferred/Proposed Route (Table D.16-5 in Appendix D).

Medicine Bow-Routt National Forests Crossed by Segment 1W
Table 3.16-5 contains the number of stream crossings on NFS land. The Segment 1W(a) Preferred/Proposed Route would include 16 stream crossings on the Medicine Bow-Routt NFs (Table 3.16-5). Of these 16 crossings, all would be of ephemeral streams. There are no TMDL or 303(d) listed streams located on NFS lands. The Segment 1W(c) Preferred/Proposed Route would include 10 ephemeral stream crossings and 5 intermittent dry crossings. See Section 3.9 – Wetlands and Riparian Areas for effects on riparian zones. With the application of the SWPPP and Reclamation, Revegetation, and Maintenance Plan, construction is not expected to result in a reduction or loss of function for the streams within the Project area, due to the revegetation efforts and the measures to restrict sedimentation input to waterbodies. Site-specific crossing plans and measures to mitigate impacts will be submitted to the Medicine Bow-Routt NFs for approval prior to construction in these areas.

Table 3.16-5. Number of Stream Crossings by Access Roads in National Forests

Segment or Alternative[1/]	Perennial	Intermittent – Wet	Intermittent – Dry	Ephemeral	Total Crossings
Segment 1W(a) Preferred/Proposed – Total Length	–	–	–	16	16
Segment 1W(c) Preferred/Proposed – Total Length	–	–	5	10	15
Segment 4 Proposed – Total Length[2/]	4	–	10	–	14
Segment 4 Proposed – Comparison portion for Alternative 4G[2/]	–	–	5	–	5
Alternative 4G[2/]	–	–	3	–	3
Alternative 7K	5	3	21	47	76

1/ Segment 1W: Medicine Bow-Routt National Forests (NFs); Segment 4: Caribou-Targhee NF; Segment 7: Sawtooth NF
2/ Based on the Caribou-Targhee NF stream layers.

Groundwater

The overall risk to groundwater from construction and operations of Segment 1W and its alternative would be low because shallow groundwater does not underlie this segment (Table D.16-7 in Appendix D). Segment 1W(a) would contain 24 potable water wells

and Segment 1W(c) would contain 56 potable water wells within 0.5 mile of the Preferred/Proposed Route (Table D.16-10 in Appendix D). There would be more wells located near Alternative 1W(a)-B than the comparison portion of the Preferred/Proposed Route (37 wells versus 22 wells, respectively; Table D.16-10 in Appendix D). There are no wells in the Segment 1W Analysis Area that would be located in shallow bedrock within 200 feet of the route centerline (Table 3.16-2).

Construction water usage for Segment 1W(a) would consist of approximately 1,730,000 gallons (5.3 acre-feet) over approximately 12 months of construction. Alternative 1W(a)-B would use a comparable amount of water as the comparison portion of the Preferred/Proposed Route (Table D.16-12 in Appendix D). Construction water usage for Segment 1W(c) would consist of approximately 1,560,000 gallons (4.8 acre-feet) over approximately 10 months of construction.

Operations

Segment 1W(a) would include 40 acres of operations disturbance area within 500 feet of perennial streams or 23 percent of the operations disturbance area, and 10 acres within 100 feet of ephemeral streams or 6 percent of the operations disturbance area (Table D.16-15 in Appendix D). Alternative 1W(a)-B would have 2 fewer acres of disturbance (6 acres vs. 8 acres) within 500 feet of perennial streams and the same 1 acre within 100 feet of ephemeral streams as the comparison portion of the Preferred/Proposed Route.

Approximately 19 and 15 percent of the operations disturbance area would be located within the moderate- and high-risk flood zone for Segment 1W(a) and 1W(c), respectively (Table D.16-3 in Appendix D). Alternative 1W(a)-B would have a lower percent of disturbance area located within a flood zone than the comparison portion of the Preferred/Proposed Route.

The operations disturbance area would not overlay shallow groundwater (Table D.16-8 in Appendix D).

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.

Construction

Surface Water

There would be 192 surface water crossings by access roads on the Preferred/ Proposed Route that would require an estimated 98 drive-through crossings, 72 fords, and 18 culverts for a total of less than 1 acre of disturbance in addition to the average road disturbance (Table D.16-1 in Appendix D). Of the 192 crossings, 90 percent would be non-listed ephemeral streams and there would be no TMDL or 303(d) listed streams (Table D.16-6 in Appendix D). Alternative 2B contains fewer crossings than the comparison portion of the Preferred/Proposed Route (Table D.16-1 in Appendix D).

A total of 58 acres of construction disturbance for this segment would be located within 500 feet of perennial or intermittent streams or 3 percent of the construction disturbance area, and 99 acres would be located within 100 feet of ephemeral streams or 6 percent of the disturbance area (Table D.16-14 in Appendix D). Alternative 2B would have approximately 5 fewer acres of disturbance within 500 feet of perennial or intermittent streams but 4 more acres within 100 feet of ephemeral streams than its comparison portion.

Approximately 11 percent of the construction disturbance area would be located within the moderate- and high-risk flood zone (Table D.16-2 in Appendix D). Both Alternatives 2A and 2B would have higher percentages of disturbance area located within a flood zone than the comparison portion of the Preferred/Proposed Route.

There would be no surface water diversions within 0.5 mile of this segment's Preferred/Proposed Route or Alternatives (Table D.16-5 in Appendix D).

Groundwater

The effects to groundwater in Segment 2 would be low because shallow groundwater does not underlie this segment (Table D.16-7 in Appendix D). There would be 7 potable water wells within 0.5 mile of the proposed Segment 2 (Table D.16-10 in Appendix D). There would be more wells located near Alternative 2B than the comparison portion of the Preferred/Proposed Route (12 wells and 5 wells, respectively), and a lower number located near Alternative 2A (4 wells) than the comparison portion (Table D.16-10 in Appendix D). There would be no wells located in shallow bedrock (Table 3.16-2); therefore, there would not be blasting near wells, and construction damage to the wells would not be expected under the Preferred/Proposed Route or any of the Route Alternatives

An estimated 2,730,000 gallons (8.4 acre-feet) of water would be used for construction of the Preferred/Proposed Route over a 12-month period. Both Route Alternatives would use a similar amount of water as their comparison portions of the Preferred/Proposed Route (Table D.16-12 in Appendix D).

Operations

This segment would include 25 acres (10 percent) of operations disturbance area within 500 feet of perennial or intermittent streams, and 13 acres (5 percent) within 100 feet of ephemeral streams (Table D.16-15 in Appendix D). Alternatives 2A and 2B would have 2 fewer acres of disturbance within 500 feet of perennial or intermittent streams and

1 more acre within 100 feet of ephemeral streams than their respective comparison portions of the Preferred/Proposed Route.

Approximately 27 percent of the operations disturbance area would be located within the moderate- and high-risk flood zone (Table D.16-3 in Appendix D). Alternative 2B would have lower percentage of disturbance area located within a flood zone than the comparison portion of the Preferred/Proposed Route. The operations disturbance area would not overlay shallow groundwater (Table D.16-8 in Appendix D).

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.

Construction

There would be 96 stream crossings by access roads in Segment 3, requiring 45 drive-through crossings, 38 fords, and 7 culverts on Segment 3 Preferred/Proposed Route (Table D.16-1 in Appendix D). Approximately 67 percent of the crossings would be non-listed ephemeral drainages (Table D.16-6 in Appendix D). There would be no TMDL and 303(d) listed streams crossed by this segment. There would be 14 stream crossings by access roads in Segment 3A Preferred/Proposed Route, requiring 8 drive-through crossings, 4 fords, and 1 culvert (Table D.16-1 in Appendix D).

There would be no surface water diversions along this segment (Table D.16-5 in Appendix D). Approximately 7 percent of the construction disturbance area would be located within a moderate- to high-risk flood hazard area (Table D.16-2 Appendix D).

A total of 87 acres of construction disturbance for this segment would be located within 500 feet of perennial or intermittent streams or 10 percent of the construction disturbance area, and 42 acres would be located within 100 feet of ephemeral streams or 5 percent of the disturbance area (Table D.16-14 in Appendix D).

Six potable water wells would be located within the Segment 3 Analysis Area and 1 within 200 feet of the centerline in shallow bedrock and therefore at risk of damage during blasting (Table 3.16-2). Over an estimated 14-month construction period, an estimated 1,670,000 gallons (5.1 acre-feet) of water would be required for Segment 3 and, over a 2-month construction period, an estimated 186,000 gallons (0.6 acre-feet) of water would be required for Segment 3A (Table D.16-12 in Appendix D).

Operations

The operations disturbance area would not overlay shallow groundwater (Table D.16-8 in Appendix D). Segment 3 would include 10 acres of operations disturbance area within 500 feet of perennial or intermittent streams, or 7 percent of the operations disturbance area. Approximately 15 acres would be located within 100 feet of ephemeral streams, or 11 percent of the operations disturbance (Table D.16-15 in Appendix D). Approximately 4 percent of the operations disturbance area would be located within the moderate- and high-risk flood zone (Table D.16-3 in Appendix D).

Segment 3A would include 1 acre of operations disturbance area within 500 feet of perennial or intermittent streams, or 8 percent of the operations disturbance area for this segment. Approximately 1 acre would be located within 100 feet of ephemeral streams, or 8 percent of the operations disturbance area (Table D.16-15 in Appendix D).

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 BLM-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 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 (it is located within Sections 1 and 2, Township 12 South, Range 41 East in Idaho). Figures A-5 and A-6 in Appendix A show the location of the Segment 4 routes in Wyoming and Idaho, respectively.

Construction

Surface Water

There would be 442 surface water crossings by access roads on the BLM-Preferred/Proposed Route that would require an estimated 160 drive-through crossings, 185 fords, and 37 culverts for a total of 3 acres of disturbance in addition to the average road disturbance (Table D.16-1 in Appendix D). Of the 442 crossings, 50 percent would be non-listed ephemeral streams and there are 5 TMDL or 303(d) listed ephemeral

streams for sediment (Table D.16-6 in Appendix D). Alternative 4F would contain fewer stream crossings, fords, and drive-through crossings but 2 more culverts than the comparison portion of the Preferred/Proposed Route (Table D.16-1 in Appendix D).

A total of 563 acres of construction disturbance for this segment would be located within 500 feet of perennial or intermittent streams or 15 percent of the construction disturbance area, and 168 acres would be located within 100 feet of ephemeral streams or 4 percent of the disturbance area (Table D.16-14 in Appendix D). All alternatives would have fewer acres of disturbance within 500 feet of perennial or intermittent streams than the comparison portion of the Preferred/Proposed Route; however, all alternatives would have more acres within 100 feet of ephemeral streams than the comparison portion of the Proposed Route. Alternatives 4B, 4C, 4D, and 4E would have 1 acre less (5 acres) located within 500 feet of a TMDL or 303(d) listed stream for sediment.

There is no woody vegetation that is located within 500 feet of a temperature-impaired stream that would be disturbed due to construction of the Preferred/Proposed Route (Table 3.16-4).

Approximately 16 percent of the construction disturbance area would be located within the moderate- and high-risk flood zone (Table D.16-2 in Appendix D). All alternatives have less acreage located within a flood zone than the comparison portion of the Preferred/Proposed Route.

There would be 127 surface water diversions within 0.5 mile of this segment. All alternatives would have more surface water diversions than the comparison portion of the Preferred/Proposed Route except for Alternative 4F, which has the same number (10; Table D.16-5 in Appendix D).

Caribou-Targhee National Forest Crossed by Segment 4

There are two routes considered across the Caribou-Targhee NF (i.e., the Proposed Route and Alternative 4G). The Forest Service soils assessment, which was completed in October 2012, identified steep slopes and potentially unstable soils along a portion of the Proposed Route that crosses the Caribou-Targhee NF (in Sections 1 and 2, Township 12 South, Range 41 East). The Forest Service therefore identified an alternative route that avoids these 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 (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-Targhee NF would be 9.4 miles long and impact a total of 356 acres of land (28 acres more than the comparison portion of the Proposed Route).

The Proposed Route along this segment would include 4 perennial stream crossings on the Caribou-Targhee NF, as well as 10 intermittent channel crossings. Alternative 4G would cross 5 fewer intermittent channels than the comparison portion of the Proposed Route. There are no TMDL or 303(d) listed streams located on NFS lands that would be crossed by access roads.

See Section 3.9 – Wetlands and Riparian Areas for effects on riparian zones. With the application of the SWPPP and Reclamation, Revegetation, and Maintenance Plan, construction is not expected to result in a reduction or loss of function for the streams within the Project area, due to the revegetation efforts and the measures to restrict sedimentation input to waterbodies. Site-specific crossing plans and measures to mitigate impacts will be submitted to Caribou-Targhee NF for approval prior to construction in these areas.

Groundwater

Of the total number of wells within the Segment 4 Analysis Area, 58 percent would occur in shallow bedrock, and 6 wells would be within 200 feet of the route centerline and in shallow bedrock (Table 3.16-2). There would be 36 potable water wells within 0.5 mile of the proposed Segment 4 (Table D.16-10 in Appendix D). All Route Alternatives would have more potable wells within 0.5 mile than the comparison portion of the Preferred/Proposed Route, the greatest number being under Alternative 4C (15 potable wells). Therefore, the potential for well damage would be greater under the Route Alternatives than the Preferred/Proposed Route.

Approximately 6 percent of the Segment 4 Analysis Area is underlain by shallow groundwater (less than or equal to 14 feet deep; Table D.16-7 in Appendix D). Alternatives 4B and 4D would affect more acres of shallow groundwater during construction than the Preferred/Proposed Route. However, given its rarity along the segment and the Project SPCC Plan (Appendix B), risk of accidental contamination or sedimentation of groundwater during construction would be low.

Segment 4, the longest segment, would be constructed over a 2-year period and would require an estimated 5,900,000 gallons (18.1 acre-feet) of construction water. The Route Alternatives would use a comparable amount of water as the comparison portion of the Preferred/Proposed Route (Table D.16-12 in Appendix D).

Operations

The Segment 4 Preferred/Proposed Route would include 75 acres of operations disturbance area within 500 feet of perennial or intermittent streams, or 14 percent of the operations disturbance area. Approximately 27 acres would be located within 100 feet of ephemeral streams, or 5 percent of the operations disturbance (Table D.16-15 in Appendix D). Alternatives 4C and 4E would have less acres of disturbance within 500 feet of perennial and intermittent streams. Alternative 4F would have the same number of acres of disturbance within 500 feet of perennial and intermittent streams, and the same number of acres of disturbance within 100 feet of ephemeral streams as the comparison portion of the Preferred/Proposed Route. All alternatives would have about the same acres of disturbance within 500 feet of a TMDL or 303(d) listed stream for sediment.

There is no woody vegetation located within 500 feet of a temperature-impaired stream that would be disturbed due to operations of the Preferred/Proposed Route or alternatives (Table 3.16-4).

Approximately 12 percent of the operations disturbance area would be located within the moderate- and high-risk flood zone (Table D.16-3 in Appendix D). All the

alternatives would have similar acreage and all would have less disturbance area located within a flood zone than the comparison portion of the Preferred/Proposed Route.

There would be shallow groundwater in approximately 4 percent of the operations disturbance area of this segment (Table D.16-8). Alternative 4F would have similar acreage of shallow groundwater as the comparison portion, and all other alternatives would have a larger number of acres of operations disturbance in areas containing shallow groundwater than the comparison portion of the Preferred/Proposed Route.

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 Alternative 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.

Construction

Surface Water

There would be 170 surface water crossings by access roads on the Proposed Route that would require an estimated 71 drive-through crossings, 31 fords, and no culverts for a total of 1 acre of disturbance in addition to the average road disturbance (Table D.16-1 in Appendix D). Of the 170 crossings, 60 percent would be non-listed ephemeral streams and there would be 64 TMDL or 303(d) listed streams for sediment (Table D.16-6 in Appendix D). There would be 191 surface water crossings by access roads on the Preferred Route that would require an estimated 96 drive-through crossings, 85 fords, and 6 culverts for a total of 1 acre of disturbance in addition to the average road disturbance. Of the 191 crossings, 66 percent would be non-listed ephemeral streams and there would be 36 crossings of TMDL or 303(d) listed streams for sediment. Alternatives 5C and 5D would contain fewer stream crossings, drive-through crossings, and fords than the respective comparison portions of the Proposed Route (Table D.16-1 in Appendix D).

Less than 1 acre of construction disturbance for the Proposed Route would be located within 500 feet of perennial or intermittent streams, 127 acres would be located within 100 feet of ephemeral streams, and 193 acres would be within 500 feet of a TMDL or 303(d) listed stream for sediment (Table D.16-14 in Appendix D). Approximately 97 acres of construction disturbance for the Preferred Route would be located within 500 feet of perennial or intermittent streams, 144 acres would be within 100 feet of ephemeral streams, and 174 acres of disturbance within 500 feet of a TMDL or 303(d) listed stream for sediment. Alternative 5E would have no disturbance within 500 feet of perennial or intermittent streams, the same as the comparison portion of the Proposed Route, and 1 less acre within 100 feet of ephemeral streams than the comparison portion of the Proposed Route, and no acres of disturbance within 500 feet of a TMDL or 303(d) listed stream for sediment.

There would be no woody vegetation located within 500 feet of a temperature-impaired stream that would be disturbed due to construction of the Preferred Route, Proposed Route, or Route Alternatives (Table 3.16-4).

Approximately 37 percent of the construction disturbance area would be located within the moderate- and high-risk flood zone along the Proposed Route (Table D.16-2 in Appendix D). Approximately 32 percent of the construction disturbance area would be located within the moderate- and high-risk flood zone along the Preferred Route. Alternative 5C would have a slightly lower percentage of disturbance area located within a flood zone than the comparison portion of the Proposed Route.

There would be 119 surface water diversions within 0.5 mile of the Proposed Route and 113 such diversions within 0.5 mile of the Preferred Route. Alternatives 5A, 5B, and 5E would have fewer surface water diversions than the comparison portions of the Proposed Route (Table D.16-5 in Appendix D).

Groundwater

Approximately 2 percent of the Proposed Route would be underlain by shallow groundwater (Table D.16-7 in Appendix D) and no areas of the Preferred Route would be underlain by shallow groundwater. Acres of disturbance to areas with shallow groundwater during construction would be less under Alternatives 5A and 5B than the comparison portions of the Proposed Route (Table D.16-7 in Appendix D). Alternatives 5D and 5E would not cross areas of shallow groundwater. Given its rarity along the segment and the Project SPCC Plan (Appendix B), risk of accidental contamination or sedimentation of groundwater during construction would be low.

The Proposed Route would cross 3.1 miles of the ESRP Aquifer, or about 6 percent of the Proposed Route length (Table D.16-11 in Appendix D). The Preferred Route would cross 2.7 miles of the ESRP Aquifer, or about 4 percent of the Preferred Route length. This Project would be almost entirely above ground and the productive portion of this aquifer is much deeper than any Project foundation. Alternatives 5D and 5E would also cross this aquifer to a lesser extent as the comparison portion of the Proposed Route.

Approximately 8 percent of all the wells in the Analysis Area for Segment 5 are in shallow bedrock and none within 200 feet of the route centerline; therefore, risk of well damage due to blasting along Segment 5 would be low (Table 3.16-2). There would be

40 potable water wells within 0.5 mile of the Proposed Route (Table D.16-10) and 38 potable water wells within 0.5 mile of the Preferred Route. Alternatives 5A, 5C, and 5E would have a fewer number of potable wells within 0.5 mile of the alternatives as the comparison portions of the Proposed Route (Table D.16-10 in Appendix D). Therefore, risk of well damage would be lower under these alternatives.

Project construction of the Proposed Route would require about 1,600,000 gallons (5.0 acre-feet) of water over a 13-month period (Table D.16-12 in Appendix D). Construction of the Preferred Route would require about 2,130,000 gallons (about 6.5 acre-feet) of water over a 17-month period. The Route Alternatives would use about the same amount of water as the comparison portion of the Proposed Route (Table D.16-12 in Appendix D).

Operations

The Proposed Route would include less than 1 acre of operations disturbance area within 500 feet of perennial or intermittent streams, 22 acres within 100 feet of ephemeral streams, and 29 within 500 feet of TMDL or 303(d) listed streams for sediment (Table D.16-15 in Appendix D). The Preferred Route would include 19 acres of operations disturbance area within 500 feet of perennial or intermittent streams, 21 acres within 100 feet of ephemeral streams, and 22 acres within 500 feet of TMDL or 303(d) listed streams for sediment. Alternative 5E would have the same number of acres of disturbance within 500 feet of perennial and intermittent streams (zero acres), within 100 feet of ephemeral streams (less than 1 acre), and within 500 feet of a TMDL or 303(d) listed stream for sediment (zero acres) as the comparison portion of the Proposed Route (Table D.16-15).

There would be no woody vegetation located within 500 feet of a temperature-impaired stream that would be disturbed due to operations of the Proposed Route or Route Alternatives (Table 3.16-4).

For the Proposed Route, approximately 29 percent of the operations disturbance area would be located within the moderate- and high-risk flood zone (Table D.16-3 in Appendix D). Approximately 27 percent of the operations disturbance area for the Preferred Route would be located within the moderate- and high-risk flood zone. Alternative 5C would have a lower percentage of disturbance area located within a flood zone than the comparison portion of the Proposed Route.

There would be shallow groundwater in approximately 2 percent of the operations disturbance area of the Proposed Route (Table D.16-8). The Preferred Route would not overlay shallow groundwater. Alternatives 5A and 5B would have a fewer number of acres of disturbance to areas with shallow groundwater than the Proposed Route (Table D.16-8 in Appendix D). There would be no underlying shallow groundwater in Alternatives 5B, 5D, or 5E.

Segment 6

The BLM's 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 Proposed Route for Segment 6.

Construction

Surface Water

A total of zero acres of construction disturbance for this segment would be located within 500 feet of perennial or intermittent streams, within 100 feet of ephemeral streams, or within 500 feet of a TMDL or 303(d) listed stream for sediment (Table D.16-14 in Appendix D). Approximately 32 percent of the construction disturbance area would be located within the moderate- and high-risk flood zone (Table D.16-2 in Appendix D). There would be five surface water diversions within 0.5 mile of this segment (Table D.16-5 in Appendix D).

Groundwater

The Preferred/Proposed Route would have four potable water wells within 0.5 mile of the centerline (Table D.16-10 in Appendix D). The entire length of the Preferred/Proposed Route (0.5 mile) would cross the ESRP Aquifer (Table D.16-11 in Appendix D).

Operations

This segment would include zero acres of operations disturbance area within 500 feet of perennial or intermittent streams, within 100 feet of ephemeral streams, or within 500 feet of a TMDL or 303(d) listed stream for sediment (Table D.16-15 in Appendix D). Approximately 30 percent of the operations disturbance area would be located within the moderate- and high-risk flood zone (Table D.16-3 in Appendix D). The operations disturbance area for Segment 6 would not overlay shallow groundwater (Table D.16-8 in Appendix D).

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. Route 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.

Construction

Surface Water

There would be 259 surface water crossings by access roads on the Proposed Route that would require an estimated 56 drive-through crossings, 76 fords, and 29 culverts for a total of 2 acres of disturbance in addition to the average road disturbance (Table D.16-1 in Appendix D). Of the 259 crossings, 42 percent would be non-listed ephemeral streams and there would be 57 crossings of TMDL or 303(d) listed ephemeral streams for sediment (Table D.16-6 in Appendix D). There would be 278 surface water crossings by access roads on the Preferred Route that would require an estimated 69 drive-through crossings, zero fords, and 45 culverts. Of the 278 crossings, 56 percent would be non-listed ephemeral streams and there would be 32 crossings of TMDL or 303(d) listed ephemeral streams for sediment. Alternatives 7F and 7G would contain fewer stream crossings than the comparison portion of the Proposed Route (Table D.16-1 in Appendix D).

A total of 119 acres of construction disturbance for the Proposed Route would be located within 500 feet of perennial or intermittent streams or 5 percent of the construction disturbance area, 130 acres would be located within 100 feet of ephemeral streams or 6 percent of the disturbance area, and 201 acres would be located within 500 feet of a TMDL or 303(d) listed stream for sediment (Table D.16-14 in Appendix D). A total of 225 acres of construction disturbance for the Preferred Route would be located within 500 feet of perennial or intermittent streams, 145 acres within 100 feet of ephemeral streams, and 183 acres within 500 feet of a TMDL or 303(d) listed stream for sediment. Alternative 7G would have zero acres of disturbance within 500 feet of perennial or intermittent streams, same as the comparison portion, and 2 fewer acres within 100 feet of ephemeral streams than the comparison portion of the Proposed Route.

The Preferred Route, Proposed Route, and most of the Route Alternatives do not include disturbance due to construction of woody vegetation within 500 feet of a temperature-impaired stream (Table 3.16-4). Alternative 7K would include 1.6 acres of disturbance of woody vegetation within 500 feet of two temperature-impaired streams: Cold Creek and Dry Creek (Table D.16-13 in Appendix D).

Approximately 20 percent of the construction disturbance area would be located within the moderate- and high-risk flood zone for the Proposed Route (Table D.16-2 in Appendix D). Approximately 17 percent of the construction disturbance area for the Preferred Route would be located within the moderate- and high-risk flood zone. All of

the Route Alternatives would have the same or a lower percentage of disturbance area located within a flood zone than the comparison portions of the Proposed Route except for Alternative 7D.

There would be 693 surface water diversions within 0.5 mile of the Proposed Route (Table D.16-5 in Appendix D) and 733 such diversions within 0.5 mile of the Preferred Route. Alternatives 7B, 7D, 7E, 7F, and 7K would have a lower number of surface water diversions than the comparison portions of the Proposed Route (Table D.16-5 in Appendix D).

Sawtooth National Forest Crossed by Alternative 7K
Alternative 7K would include 76 stream crossings on the Sawtooth NF (Table 3.16-5). Of these 76 stream crossings, 5 would be perennial, 3 would be intermittent-wet, 21 would be intermittent-dry, and 47 would be ephemeral. There would be three TMDL or 303(d) listed streams located on NFS lands along Alternative 7K: Dry Creek, Goose Creek, and Cold Creek, are perennial and listed for temperature. See Section 3.9 – Wetlands and Riparian Areas for effects on riparian zones. With the application of the SWPPP and Reclamation, Revegetation, and Maintenance Plan, construction is not expected to result in a reduction or loss of function for the streams within the Project area, due to the revegetation efforts and the measures to restrict sedimentation input to waterbodies. Site-specific crossing plans and measures to mitigate impacts will be submitted to Sawtooth NF for approval prior to construction in these areas.

Groundwater

Approximately 11 percent of the Proposed Route would be underlain by shallow groundwater (Table D.16-7 in Appendix D) and 9 percent of the Preferred Route would be underlain by shallow groundwater. Alternatives 7A, 7B, and 7K would include disturbance effects to areas with shallow groundwater during construction, and all alternatives would have fewer acres than the comparison portions of the Proposed Route (Table D.16-7 in Appendix D). However, given its rarity along the segment and the Project SPCC Plan (Appendix B), risk of accidental contamination or sedimentation of groundwater during construction would be low.

About 29 miles of Segment 7 Proposed Route would cross the ESRP Aquifer (Table D.16-11 in Appendix D) and 30 miles of the Preferred Route would cross the aquifer. Alternatives 7E, 7F, and 7K would cross fewer miles of the aquifer than the comparison portion of the Proposed Route (Alternative 7F would not cross it at all). Alternative 7G would cross more miles of the aquifer than the comparison portion of the Proposed Route.

Roughly 31 percent of all the water wells in the Segment 7 Analysis Area would occur with shallow bedrock, 14 of which would be within 200 feet of the centerline and thus at most risk of damage due to blasting (Table 3.16-2). Approximately 89 potable water wells would be located within 0.5 mile of the Proposed Route (Table D.16-10 in Appendix D) and 102 potable wells would be located within 0.5 mile of the Preferred Route. The Analysis Area of Alternatives 7A, 7C, 7D, and 7G would contain more potable water wells than the analysis area of comparison portion of the Proposed

Route. The Analysis Area of Alternatives 7E, 7F, and 7K would contain fewer potable wells than the comparison portion of the Proposed Route.

Construction of the Proposed Route along Segment 7 would require about 3,500,000 gallons (10.8 acre-feet) of water over a 16-month period (Table D.16-12 in Appendix D). Construction of the Preferred Route along Segment 7 would require about 3,870,000 gallons (11.9 acre-feet) of water over an 18-month period. The Route Alternatives would use about the same amount of water during construction as the comparison portion of the Proposed Route (Table D.16-12 in Appendix D).

Operations

The Proposed Route would include 14 acres of operations disturbance area within 500 feet of perennial or intermittent streams, or 5 percent of the operations disturbance area (Table D.16-15 in Appendix D). Approximately 20 acres would be located within 100 feet of ephemeral streams, or 8 percent of the operations disturbance and 28 acres within 500 feet of TMDL or 303(d) listed streams for sediment (Table D.16-15 in Appendix D). The Preferred Route would include 31 acres of operations disturbance area within 500 feet of perennial or intermittent streams, 20 acres within 100 feet of ephemeral streams, and 24 acres within 500 feet of TMDL or 303(d) listed streams for sediment. Alternatives 7C, 7D, 7E, 7F, and 7G would have similar acres of disturbance within 500 feet of perennial and intermittent streams, similar acres within 100 feet of ephemeral streams, and zero acres or less than 1 acre of disturbance within 500 feet of TMDL or 303(d) listed streams for sediment as compared to the comparison portions.

The Preferred Route, Proposed Route, and most of the Route Alternatives would not include operations disturbance due of woody vegetation within 500 feet of a temperature-impaired stream (Table 3.16-4). Alternative 7K would include 0.3 acre of disturbance of woody vegetation.

Approximately 15 percent of the operations disturbance area would be located within the moderate- and high-risk flood zone of the Proposed Route (Table D.16-3 in Appendix D) and 13 percent of the operations disturbance area would be located within the moderate- and high-risk flood zone of the Preferred Route. Alternatives 7E, 7F, and 7G would not include operations disturbance area within a flood zone. Alternatives 7A, 7B, and 7K would include less operations disturbance within a flood zone than the comparison portions of the Proposed Route.

There would be shallow groundwater in approximately 9 percent of the operations disturbance area of the Proposed Route (Table D.16-8 in Appendix D) and 8 percent of the operations disturbance area of the Preferred Route. Alternatives 7C, 7D, 7E, 7F, and 7G would not overlay shallow groundwater. Alternatives 7A, 7B, and 7K would overlay shallow groundwater and have less acreage of shallow groundwater than the comparison portions of the Proposed Route (Table D.16-8 in Appendix D).

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.

Construction

Surface Water

There would be 266 surface water crossings by access roads on the Proposed Route that would require an estimated 121 drive-through crossings, 71 fords, and 4 culverts for a total of 1 acre of disturbance in addition to the average road disturbance (Table D.16-1 in Appendix D). Of the 266 crossings, 59 percent are non-listed ephemeral streams and there are 36 TMDL or 303(d) listed ephemeral streams for sediment (Table D.16-6 in Appendix D). There would be 221 surface water crossings by access roads on the Preferred Route that would require an estimated 92 drive-through crossings, 190 fords, and 4 culverts. Of the 221 crossings, 57 percent are non-listed ephemeral streams and there are 31 TMDL or 303(d) listed ephemeral streams for sediment (Table D.16-6 in Appendix D). Alternatives 8A and 8B contain fewer stream crossings, fewer fords, and fewer drive-through crossings, and the same or fewer number of culverts than the comparison portion of the Proposed Route.

A total of 98 acres of construction disturbance for the Proposed Route would be located within 500 feet of perennial or intermittent streams or 4 percent of the construction disturbance area, 108 acres would be within 100 feet of ephemeral streams or 4 percent of the disturbance area, and 124 acres within 500 feet of TMDL or 303(d) listed streams for sediment (Table D.16-14 in Appendix D). Approximately 87 acres of construction disturbance for the Preferred Route would be located within 500 feet of perennial or intermittent streams, 108 acres within 100 feet of ephemeral streams, and 167 acres

within 500 feet of TMDL or 303(d) listed streams for sediment. Alternative 8C would have fewer acres of disturbance within 500 feet of perennial or intermittent streams and fewer acres within 100 feet of ephemeral streams, and the same number of acres disturbance within 500 feet of a TMDL or 303(d) listed stream for sediment than the comparison portion of the Proposed Route.

Zero acres of woody vegetation located within 500 feet of a temperature-impaired stream would be disturbed due to construction along the Proposed Route (Table 3.16-4). Only Alternative 8B would include construction disturbance within the 500-foot buffer with 0.01 acre disturbed. No other alternatives or comparison portions would contain disturbance of woody vegetation within 500 feet of a temperature-impaired stream.

Approximately 15 percent of the construction disturbance area would be located within the moderate- and high-risk flood zone for the Proposed Route (Table D.16-2 in Appendix D) and 17 percent of the construction disturbance area for the Preferred Route would be located within the moderate- and high-risk flood zone. Alternative 8E would have 12 percent less disturbance area located within a flood zone than the comparison portion of the Proposed Route.

There would be 324 surface water diversions within 0.5 mile of the Proposed Route (Table D.16-5 in Appendix D) and 485 such diversions within 0.5 mile of the Preferred Route. All alternatives would have a higher number of surface water diversions than the comparison portion of the Proposed Route (Table D.16-5 in Appendix D).

Groundwater

Approximately 73 percent of all the wells in the Segment 8 Analysis Area are located in shallow bedrock, 22 of which are within 200 feet of the centerline and would be most at risk of damage due to blasting (Table 3.16-2). Along the Segment 8 Proposed Route there would be 201 potable water wells within 0.5 mile of the Proposed Route (Table D.16-10 in Appendix D) and 237 potable water wells within 0.5 mile of the Preferred Route. All of the Route Alternatives would have more potable water wells within 0.5 mile than the comparison portions of the Proposed Route except for Alternative 8E. Therefore, risk of well damage due to blasting would be higher under any of the Route Alternatives than the comparison portions of the Proposed Route except for Alternative 8E.

The construction disturbance area for the Preferred Route, Proposed Route, and the Route Alternatives would not overlay shallow groundwater (Table D.16-7 in Appendix D). The Segment 8 Proposed Route and Preferred Route would cross 42 miles of the ESRP Aquifer, or about 32 percent of their respective lengths (Table D.16-11 in Appendix D). This Project would be almost entirely above ground and the productive portion of this aquifer is much deeper than any Project foundation. Alternative 8A would cross fewer miles of the aquifer than the comparison portion of the Proposed Route. No other alternatives would cross the aquifer.

Project construction along the Proposed Route would require about 3,800,000 gallons (11.7 acre-feet) of water over a 15-month period (Table D.16-12 in Appendix D). Project construction along the Preferred Route would require about 3,820,000 gallons (11.7 acre-feet) of water over a 14-month period. The Route Alternatives would use

about the same amount of water as their comparison portions of the Proposed Route except for Alterative 8E due to its longer length, which would require approximately 328,000 more gallons (1 acre-feet) than needed for the comparison portion (Table D.16-12 in Appendix D).

Operations

The Proposed Route would include 12 acres of operations disturbance area within 500 feet of perennial or intermittent streams or 5 percent of the operations disturbance area, 15 acres would be located within 100 feet of ephemeral streams or 6 percent of the operations disturbance, and 13 acres would be located within 500 feet of TMDL or 303(d) listed streams for sediment (Table D.16-15 in Appendix D). The Preferred Route would include 11 acres of operations disturbance area within 500 feet of perennial or intermittent streams, 12 acres within 100 feet of ephemeral streams, and 16 acres within 500 feet of TMDL or 303(d) listed streams for sediment. Alternatives 8A and 8B would have fewer acres of disturbance within 500 feet of perennial and intermittent streams, and within 100 feet of ephemeral streams, but more acres of disturbance within 500 feet of TMDL or 303(d) listed streams for sediment than the comparison portions of the Proposed Route.

There is no woody vegetation located within 500 feet of a temperature-impaired stream that would be disturbed due to operations of the Preferred Route, Proposed Route, or Route Alternatives (Table 3.16-4).

Approximately 16 percent of the operations disturbance area for the Proposed Route would be located within the moderate- and high-risk flood zone (Table D.16-3 in Appendix D) and approximately 17 percent of the operations disturbance area for the Preferred Route would be located within the moderate- and high-risk flood zone. Alternatives 8A and 8E would have a lower percentage of disturbance area located within a flood zone than the comparison portions of the Proposed Route.

The Segment 8 Preferred Route, Proposed Route, and Route Alternatives operations disturbance area would not overlay shallow groundwater (Table D.16-8 in Appendix D).

Segment 9

The preferred routes in Segment 9 are as follows:

Preferred Route	Agency
Proposed Route incorporating Alternative 9E, 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 which skirts the Jarbidge and Owyhee Military Operating Areas to the north, then follows the WWE corridor just north of the Saylor Creek Air Force Range, passing through Owyhee County before entering 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/F uses the same path as Alternative 8E in Segment 8; therefore, 8E and 9D/F 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

Surface Water

There would be 322 surface water crossings by access roads on the Proposed Route that would require an estimated 109 drive-through crossings, 90 fords, and 24 culverts for a total of 2 acres of disturbance in addition to the average road disturbance (Table D.16-1 in Appendix D). Of the 322 crossings, 59 percent would be non-listed ephemeral streams and there would be 15 crossings of TMDL or 303(d) listed streams for sediment and 5 crossings of TMDL or 303(d) listed streams for temperature (Table D.16-6 in Appendix D). There would be 195 surface water crossings by access roads on the Preferred Route that would require an estimated 108 drive-through crossings, 6 fords, and 27 culverts. Of the 195 crossings, 64 percent would be of non-listed ephemeral streams and there would be 34 crossings of TMDL or 303(d) listed streams for sediment and 10 crossings of TMDL or 303(d) listed streams for temperature. All Route Alternatives would have fewer stream crossings than their comparison portions, with Alternative 9G having 28 fewer drive-throughs, 22 fewer fords, and 11 fewer culvert crossings than the comparison portion.

A total of 171 acres of construction disturbance for this segment would be located within 500 feet of perennial or intermittent streams or 5 percent of the construction disturbance area, 111 acres would be within 100 feet of ephemeral streams or 3 percent of the disturbance area, and 141 acres would be within 500 feet of TMDL or 303(d) listed streams for sediment (Table D.16-14 in Appendix D). Approximately 156 acres of construction disturbance for the Preferred Route would be located within 500 feet of perennial or intermittent streams, 142 acres within 100 feet of ephemeral streams, and 193 acres within 500 feet of TMDL or 303(d) listed streams for sediment. Alternative 9G would have a total of 35 fewer acres of disturbance within 500 feet of perennial or intermittent streams, 29 fewer acres within 100 feet of ephemeral streams, and 1 less acre of disturbance area within 500 feet of a TMDL or 303(d) listed stream for sediment than the comparison portion of the Proposed Route.

Less than 0.1 acre of woody vegetation located within 500 feet of a temperature-impaired stream would be disturbed due to construction of Alternatives 9D, 9F, 9G, or 9H, and no acres would be disturbed in the Proposed Route or any other Route Alternative (Table 3.16-4).

Approximately 19 percent of the construction disturbance area would be located within the moderate- and high-risk flood zone for the Proposed Route (Table D.16-2 in Appendix D) and the Preferred Route. All Route Alternatives would have similar percentages disturbance area located within a flood zone as their comparison portions of the Proposed Route.

There would be 562 surface water diversions within 0.5 mile of the Proposed Route (Table D.16-5 in Appendix D) and 434 surface water diversions within 0.5 mile of the Preferred Route. Alternatives 9D, 9E (revised), 9F, 9G, and 9H would have fewer surface water diversions than the comparison portion of the Proposed Route (Table D.16-5 in Appendix D).

Groundwater

The construction disturbance area for the Proposed Route, Preferred Route, and the Route Alternatives would not overlay shallow groundwater (Table D.16-7 in Appendix D). Approximately 8.4 miles, or 5 percent, of the Proposed Route along Segment 9 would be located on the ESRP Aquifer (Table D.16-11 in Appendix D) and 8.4 miles of the Preferred Route would be located on the aquifer. Alternative 9A would cross fewer miles than the comparison portion of the Proposed Route. No other alternative would cross the aquifer (Table D.16-11 in Appendix D).

Approximately 80 percent all the wells within the Segment 9 Analysis Area would occur over shallow bedrock; six of the wells would be within 200 feet of the centerline and would be most at risk of damage from blasting (Table 3.16-2). Along the Proposed Route there would be 91 potable water wells within 0.5 mile of the centerline (Table D.16-10 in Appendix D). Along the Preferred Route there would be 52 potable water wells within 0.5 mile of the centerline. More wells would be located near Alternatives 9B and 9C than the comparison portions of the Proposed Route, and fewer wells would be near Alternatives 9A, 9D, 9E (revised), 9F, 9G, and 9H (Table D.16-10 in Appendix D). Thus, the potential for well damage due to blasting would be greater than the comparison portion of the Proposed Route under Alternatives 9B and 9C, and less than the comparison portion of the Proposed Route under Alternatives 9A, 9D, 9E, 9F, 9G, and 9H.

The Proposed Route would be constructed over a 17-month period and would require an estimated 4,700,000 gallons (14.3 acre-feet) of construction water (Table D.16-12 in Appendix D). The Preferred Route would be constructed over an 18-month period and would require an estimated 4,900,000 gallons (15.1 acre-feet) of construction water. All of the alternatives would use about the same amount of water as the comparison portion of the Proposed Route (Table D.16-12 in Appendix D).

Operations

The Proposed Route would include 21 acres of operations disturbance area within 500 feet of perennial or intermittent streams or 6 percent of the operations disturbance area, approximately 17 acres would be within 100 feet of ephemeral streams or 5 percent of the operations disturbance, and 14 acres would be within 500 feet of TMDL or 303(d) listed streams for sediment (Table D.16-15 in Appendix D). The Preferred Route would include 22 acres of operations disturbance area within 500 feet of perennial or

intermittent streams, 22 acres within 100 feet of ephemeral streams, and 24 acres within 500 feet of TMDL or 303(d) listed streams for sediment. Alternative 9B would have a total of 7 fewer acres of disturbance within 500 feet of perennial and intermittent streams and the same acres within 100 feet of ephemeral streams, and 1 less acre of disturbance within 500 feet of a TMDL or 303(d) listed stream for sediment than the comparison portion of the Proposed Route.

Less than 0.1 acre of woody vegetation located within 500 feet of a temperature-impaired stream would be disturbed due to operations of Alternatives 9D, 9F, 9G, or 9H, and no acres would be disturbed due to the Preferred Route, Proposed Route, or any other alternative (Table 3.16-4).

Approximately 18 percent of the operations disturbance area of the Proposed Route would be located within the moderate- and high-risk flood zone (Table D.16-3 in Appendix D), and 19 percent of the operations disturbance area of the Preferred Route would be located within the moderate- and high-risk flood zone. All the alternatives have percentages of disturbance area located within a flood zone similar to those of the comparison portion of the Proposed Route.

The operations disturbance area for the Proposed Route, Preferred Route, and Route Alternatives would not overlay shallow groundwater (Table D.16-8 in Appendix D).

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.

Construction

Surface Water

There would be 26 surface water crossings by access roads on the Preferred/Proposed Route (Table D.16-1 in Appendix D) and, of those, 10 would be artificial waterways that would need to be avoided while 8 would be non-listed ephemeral streams (Table D.16-6 in Appendix D).

A total of 30 acres of construction disturbance for the Preferred/Proposed Route would be located within 500 feet of perennial or intermittent streams, 9 acres within 100 feet of ephemeral streams, and 28 acres within 500 feet of TMDL or 303(d) listed streams for sediment (Table D.16-14 in Appendix D). Approximately 6 percent of the construction disturbance area of the Preferred/Proposed Route would be located within the moderate- and high-risk flood zone (Table D.16-2 in Appendix D). There would be 169

surface water diversions within 0.5 mile of the Preferred/Proposed Route (Table D.16-5 in Appendix D).

Groundwater

Of all the wells within the Segment 10 Analysis Area, approximately 19 percent would occur in shallow bedrock and two of the wells would be within 200 feet of the route centerline (Table 3.16-2); therefore, the risk of well damage along this segment would be low. The Preferred/Proposed Route would have 59 potable water wells within 0.5 mile of the centerline (Table D.16-10 in Appendix D). The entire length of the Preferred/Proposed Route (34.4 miles) would cross the ESRP Aquifer (Table D.16-11 in Appendix D). Construction along Segment 10 would be expected to take 10 months and require about 1,000,000 gallons (3.1 acre-feet) of construction water (Table D.16-12 in Appendix D).

Operations

This segment would include 1 acre of operations disturbance area within 500 feet of perennial or intermittent streams, 1 acre within 100 feet of ephemeral streams, and 2 acres within 500 feet of TMDL or 303(d) listed streams for sediment (Table D.16-15 in Appendix D). Approximately 6 percent of the operations disturbance area of the Preferred/Proposed Route would be located within the moderate- and high-risk flood zone (Table D.16-3 in Appendix D). The operations disturbance area for Segment 10 would not overlay shallow groundwater (Table D.16-8 in Appendix D).