
Water Resources Specialist Report

Garkane Energy Cooperative, Inc. Tropic to Hatch 138 kV Transmission Line

Prepared For:

U.S. Forest Service – Dixie National Forest
National Park Service – Bryce Canyon National Park
Bureau of Land Management – Kanab Field Office
Bureau of Land Management – Grand Staircase-Escalante National Monument

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WATER RESOURCES SPECIALIST REPORT

1.1. INTRODUCTION

Garkane Energy Cooperative, Inc. (Garkane) proposes to construct a 138 kV circuit transmission line supported by wood pole H-frame structures between the communities of Tropic and Hatch in Garfield County, Utah. The proposed new transmission line would replace portions of an existing 69 kV transmission line between the Tropic and Hatch Substations that currently provides service west of Tropic.

1.1.1. Purpose of Specialist Report

The purpose of this Specialist Report is to characterize existing water resources within the Project Area and to analyze and disclose potential environmental effects on water resources that would occur under the Proposed Action and Alternatives as described below. These data and impact analyses will be used to develop an Environmental Impact Statement (EIS) for the Garkane 138 kV Transmission Line proposal.

1.1.2. Proposed Action and Alternatives

1.1.2.1. Alternative A: Proposed Action

Alternative A would be constructed within a right-of-way crossing public lands administered by the U.S. Forest Service (USFS) Dixie National Forest (DNF), Bureau of Land Management (BLM) Kanab Field Office (KFO), and the Grand Staircase-Escalante National Monument (GSENM); Utah State lands administered under the State Institutional Trust Lands Administration (SITLA); and private lands.

The Alternative A 100-foot-wide right-of-way would extend 30.41 miles. The route would begin at the proposed East Valley Substation located east of Tropic and extend northeast to adjoin the Rocky Mountain Power/PacifiCorp 230 kV transmission line right-of-way. The route would then parallel the west side of the Rocky Mountain Power/PacifiCorp transmission line route to the northwest across GSENM land and through Cedar Fork Canyon through a planning window for a utility right-of-way identified in the 1986 Land Resource Management Plan (LRMP). The route would diverge from the 230 kV line access route and extend west across John's Valley and skirt just to the north of the Bryce Canyon Airport. The route would continue west for approximately 4 miles and turn south, crossing State Route (SR) 12, and extend southwest across the Johnson Bench area, passing to the south of Wilson Peak. The route would continue west down Hillsdale Canyon through a planning window for a utility right-of-way identified in the 1986 LRMP and turn north for approximately 0.5 mile. The route would continue to the west, crossing private property (Sunset Cliffs), and extend west to cross U.S. 89 where it would turn to the southwest for approximately 2 miles to the Hatch Substation. The proposed route would cross 17.35 miles of DNF, 3.31 miles of KFO, 3.68 miles of GSENM, 4.23 miles of SITLA, and 1.84 miles of private lands.

In addition to construction of the proposed transmission line, the proposed project includes the development of a new substation (East Valley) east of Tropic and the expansion of the Hatch Substation. Garkane's existing 69 kV transmission line between the Bryce Canyon Substation and Hatch Mountain Switch Station would be unnecessary once the proposed 138 kV transmission line is operational and would be removed (approximately 16.23 miles) and the right-of-way rehabilitated.

The Proposed Action would involve the development of overland access routes in portions of the right-of-way where a suitable route is not available and where development of an access route is permitted by the authorizing agency. Access to the Rocky Mountain Power/PacifiCorp 230 kV transmission line in the

Cedar Fork Canyon area would need to be improved. In *limited access areas*, the alignment would be accessed via helicopter and/or foot, and there would be no centerline access.

Implementation of the Proposed Action would also require the amendment of the GSENM Management Plan (2000) by changing the designation of a 100-foot-wide 3.68-mile stretch (44.58 acres) of the Primitive Zone to Passage Zone, and within this area, changing the existing Visual Resource Management (VRM) Class designation from Class II to Class III.

1.1.2.2. Alternative B: Parallel Existing 69 kV Route

The Alternative B 100-foot-wide right-of-way would be constructed within a right-of-way crossing public lands administered by the DNF and KFO, National Park Service (NPS) Bryce Canyon National Park (BRCA), and SITLA and private lands. This route would have no surface impacts on the GSENM.

Alternative B would extend 29.11 miles. This alternative route would begin at the proposed East Valley Substation located east of Tropic and extend west through the Tropic Substation (the Tropic Substation would be decommissioned) and then cross SR 12 and continue across BRCA (deviating slightly from the existing right-of-way for approximately 1.5 miles) to a point near the current Bryce Canyon Substation near Bryce Canyon City. For this Alternative, the Bryce Canyon Substation would be decommissioned and a new replacement substation would be built at a new location approximately 1 mile to the west to allow for needed expansion. The route would extend approximately 0.5 mile to the north around Bryce Canyon City, west across SR 63 and then parallel Garkane's existing 69 kV line right-of-way predominately across private and SITLA lands. The alternative route would parallel the existing right-of-way just to the south across the plateau in a northwest direction to Red Canyon, where it would generally follow the existing right-of-way through Red Canyon into Long Valley where it would cross U.S. 89 and continue to the Hatch Mountain Substation. From there the route would follow the existing line south to the Hatch Substation. This route would cross 5.58 miles of DNF, 8.29 miles of KFO, 2.81 miles of BRCA, 3.63 miles of SITLA, and 8.80 miles of private lands.

The proposed project includes the development of a new substation (East Valley) east of Tropic and the expansion of the Hatch Substation. The Tropic Substation would be removed. One new substation would be required in Bryce Valley. The existing Bryce Canyon Substation would be decommissioned, and a new replacement substation to the west of Ruby's Inn would be built. It would be located in one of two new locations (Option 1 on DNF land or Option 2 on private land). Once the proposed 138 kV transmission line is operational, the entire existing 69 kV line from approximately 1 mile east of the existing Tropic Substation to the Hatch Mountain Substation would be removed (approximately 21.57 miles) and the right-of-way rehabilitated.

In addition, under Alternative B approximately 9 miles of distribution lines would need to be constructed primarily on private and SITLA lands in 50-foot rights-of-way in conjunction with the new substations.

A 22.75-mile long two-track access route along the centerline of the proposed right-of-way would provide construction access. Centerline access would not be developed within *limited access areas*, including BRCA and portions of Red Canyon.

Under this alternative the GSENM Management Plan would not be amended.

1.1.2.3. Alternative C: Cedar Fork Southern Route

Like Alternative A, Alternative C would be constructed within a right-of-way crossing public lands administered by the DNF, KFO, GSENM, SITLA, and private lands.

The Alternative C 100-foot-wide right-of-way would extend 29.78 miles. This alternative route would begin at the proposed East Valley Substation located east of Tropic and extend northeast to adjoin the Rocky Mountain Power/PacifiCorp 230 kV transmission line right-of-way. The route would then parallel the west side of the Rocky Mountain Power/PacifiCorp transmission line access to the northwest across

GSENM land and through Cedar Fork Canyon through a planning window for a utility right-of-way identified in the 1986 LRMP. The route would diverge from the 230 kV line access and extend west across John's Valley and follow the south side of SR 22 for just under 2 miles and then follow the western boundary of BRCA for approximately 1 mile. The route would then extend west to the north of Bryce Canyon City and across SR 63. The route would continue west across the southern portion of Johnson Bench and to the upper reaches of Right Fork Blue Fly Creek. The route would drop off the plateau at this point and traverse an unnamed canyon to Hillsdale Canyon and would extend south of private property and continue west, crossing U.S. 89, where it would turn to the southwest for approximately 2 miles to the Hatch Substation. This route would cross 13.58 miles of DNF, 3.43 miles of KFO, 3.68 miles of GSENM, 2.06 miles of SITLA, and 7.03 miles of private lands.

In addition to construction of the proposed transmission line, the proposed project includes the development of a new substation (East Valley) east of Tropic and the expansion of the Hatch Substation. Garkane's existing 69 kV transmission line between the Bryce Canyon Substation and Hatch Mountain Switch Station would be unnecessary once the proposed 138 kV transmission line is operational and would be removed (approximately 16.23 miles) and the right-of-way rehabilitated.

The Proposed Action would involve the development of overland access routes in portions of the right-of-way where a suitable route is not available and where development of an access route is permitted by the authorizing agency. Access to the Rocky Mountain Power/PacifiCorp 230 kV transmission line in the Cedar Fork Canyon area would need to be improved. In *limited access areas*, the alignment would be accessed via helicopter and/or foot, and there would be no centerline access.

Alternative C would also require the amendment of the GSENM Management Plan (2000) by changing the designation of a 300-foot-wide 3.68-mile stretch (133.81 acres) of the Primitive Zone to Passage Zone to accommodate both the proposed right-of-way and the existing 230 kV Rocky Mountain Power/PacifiCorp transmission line, as well as provide for future utility needs; and within this area, changing the existing VRM Management Class designation from Class II to Class III.

1.1.2.4. Interconnect Options

The purpose of the interconnect route options is to provide flexibility to decision makers to combine segments of the action alternatives to select the most appropriate route among the various alternatives to minimize impacts to resource values.

The North-South Interconnect option would extend 1.84 miles across DNF land west of Johnson Bench and could connect segments of Alternatives A and C together.

The East-West Interconnect option would extend 3.70 miles across DNF land south of Johnson Bench and could connect segments of Alternatives A and C together.

1.1.2.5. Alternative D: No Action

Though it does not meet the purpose and need statement, the No Action alternative is required under Council of Environmental Quality regulations for implementing the National Environmental Policy Act (NEPA) [40 CFR 1502.14(d)]. For this analysis, the No Action alternative is considered to be the continued operation of the existing 69 kV transmission line and future circumstances that would occur without federal approval of Garkane Energy's proposal to construct and operate a 138 kV transmission line from Tropic to Hatch. Specifically, it means that "no action" would be achieved by any one of the federal agencies declining to grant Garkane permission to build in the agency's respective jurisdiction. Thus, in the case of DNF, "no action" means denying the transmission line easement; for BLM, "no action" means denying approval of the proposed plan amendment and granting of a right-of-way permit for BLM lands; and, for BRCA, "no action" means denying a right-of-way permit. Each agency makes its decision independent of the others, so it is possible that one or more agencies could grant permission for

the proposal while another could deny permission. Thus, if any agency denied permission for the proposed transmission line, it would not be built.

The existing 69 kV transmission line has already passed its life expectancy. To maintain system stability and reliability, Garkane would need to overhaul the line within its existing right-of-way and permit conditions. Overhaul of the existing 69 kV transmission line would involve replacement of conductor and poles. Each pole would be inspected; Garkane estimates as much as 90 percent of the poles would need to be replaced. Overhaul would involve disturbance to the centerline access outside *limited access areas* using vehicles and equipment. Overhaul would require the use of temporary disturbance areas identified in conjunction with Alternative B, as the sites would be needed for pulling and splicing of wire and overall project staging. Total cost would range from 1.4 to 2.1 million dollars.

These activities would increase the amount of trucks, heavy equipment, and crews within the right-of-way far above average annual activity levels.

1.1.3. Impact Inducing Activities on Water Resources

The following activities could cause impacts to Project Area water resources and water quality:

- Transmission line construction may result in the direct surface disturbance of perennial, intermittent, and ephemeral stream systems, as well as wetlands, both within the right-of-way and at equipment staging areas and substation locations
- Construction and certain operations equipment may cause impacts to banks and beds causing erosion and sediment contributions to streams and stream systems
- Construction and certain operations equipment may leak or spill hazardous materials.

Operation of the proposed transmission line would require ongoing maintenance involving the passage of trucks and other equipment causing ongoing, but minor impacts to Project Area water quality.

1.1.3.1. Construction

Transmission line construction may result in the direct surface disturbance of perennial, intermittent, and ephemeral stream systems, as well as wetlands, both within the right-of-way and at equipment staging areas and substation locations. While poles would not be placed directly in any streams systems, wetlands, or floodplains (Transcon 2008a), crossings of these natural features may occur as a result of the placement of a two-track centerline access/maintenance route. Crossings would be in the form of engineered low water crossings (utilizing geotextile fabric and grid material to stabilize the stream bed) where surrounding topography and stream morphology proved feasible (low angle approach), or culvert placement for those drainages where low water crossings are not possible. Natural flow pattern alteration and channel instability may also occur during the construction phase. In areas with steep slopes (generally 12 to 15 percent grade or more [Transcon 2008a]) or other areas of limited access, installation of structures would be conducted via helicopter and no centerline access would be placed in these areas.

Indirect impacts to surface water resources could occur in the form of water quality degradation. Water quality may be affected by surface disturbance in highly-erodible soils in the vicinity of surface water systems, as well as in downstream receiving water bodies, as a result of increased sediment release. Soil compaction and removal of vegetation within the right-of-way and access routes (either existing or overland travel) could increase offsite sediment transport rates and quantities to area streams. However, overland construction travel and crushing of vegetation may conversely serve to limit this effect by intercepting precipitation and posing as a natural erosion control measure. A stormwater pollution prevention plan (SWPPP) would be developed for the selected alternative in order to mitigate potential erosion and sedimentation effects (Transcon 2008a).

Water for construction purposes would be limited to dust control. If construction water is drawn from local supply locations (as opposed to brought in via tanker truck), this may reduce productivity of those water supply features.

Surface water, and potentially groundwater, may be affected by leaking oil/gas/hydraulic fluid, etc. from construction equipment, particularly at equipment staging areas. If spills of polluting substances were to reach perennial, intermittent, or ephemeral stream systems, the level of significance of the spill event would depend on the polluting material, the amount of pollutant entering the stream, and the conditions of the stream.

Removal of the existing transmission line would result in similar impacts to water resources as those described for construction of the new line.

1.1.3.2. Operations and Maintenance

Operation of the proposed transmission line would require ongoing maintenance that may result in temporary surface disturbance similar to that described in **Section 1.1.3.1**, resulting from required access to the transmission line right-of-way. Effects to water resources would primarily be in the form of indirect water quality impacts.

The presence of maintenance vehicles also pose similar potential impacts due to oil/gas/hydraulic fluid that would be used for maintenance activities, although likely at a reduced rate due to the limited duration and amount of maintenance equipment as compared to construction equipment.

1.1.4. Water Resource Issue Statement

Transmission line construction activities could impact surface water, groundwater, and water rights resources throughout the project area.

Access to the proposed or alternative right-of-way for construction and maintenance may require temporary disturbance of surface water features, including perennial, intermittent, and ephemeral streams and wetlands, either by filling or placement of culverts. Surface disturbance may also lead to erosion and sedimentation. Groundwater and sensitive aquifers could be affected by releases of hazardous substances from construction and maintenance vehicles.

1.2. DESCRIPTION OF AFFECTED ENVIRONMENT

1.2.1. Project and Study Area

The Project Area is in Garfield County, between the communities of Tropic and Hatch in southern Utah. The Project Area includes the following:

- Proposed Action and alternative transmission line right-of-way.
- Temporary work areas.
- Proposed substation sites.
- Proposed access roads and routes, and access improvements.
- Existing 69 kV transmission line right-of-way.

The Study Area provides context for resource effects that may occur within the Project Area in order to quantify the magnitude of effects. The Study Area for water resources includes an area 0.5 mile wide on each side of the various alignment center lines (or other project elements) for a total Study Area width of 1 mile. This buffer distance was chosen based upon guidance provided in Taylor et al. (1999) and Flanagan et al. (1998) that suggests that effects from forest road stream crossings (which are the primary source of impact to water resources within the Project Area) may occur both upstream and downstream,

extending out to several hundred feet, from the disturbance point (depending on stream morphology, soil type, crossing type, and other environmental conditions at the crossing location and within the drainage basin). Effects are not expected to occur beyond the 0.5-mile buffer; therefore, this provides a context for the impact analysis and degrees of effect.

1.2.2. Data Sources

Baseline data sources utilized for this report included agency resource management plans and supplementary documentation, as well as existing spatial data for water rights (Utah Division of Water Rights), streams (U.S. Geological Survey [USGS]), floodplains (Federal Emergency Management Agency [FEMA]), and climatic data (Western Regional Climate Center [WRCC]). Field data collected by Transcon identified and categorized all drainages within the Study Area for type (perennial, intermittent, ephemeral), function, and potential federal jurisdiction, as well as delineated wetlands within the Study Area. Of particular interest was proximity of surface disturbance in highly erodible soils within 300 feet of a drainage; therefore, the NRCS *Soil Survey of Panguitch Area, Utah, Parts of Garfield, Iron, Kane, and Paiute Counties* (USDA 1990) and the NRCS *Soil Survey of the Grand Staircase-Escalante National Monument Area, Parts of Kane and Garfield Counties, Utah* (USDA 2007) were reviewed to identify soils which would meet the criteria of “highly erodible.”

1.2.3. Resource Management Direction

Relevant land management plans were reviewed for policies and procedures which may affect Action Alternatives in the context of water resources. Specific policies and management objectives are described, by agency, below.

1.2.3.1. U.S. Forest Service

Dixie National Forest

The 1986 Record of Decision for the DNF Final EIS and LRMP (USFS 1986), as amended, is the management plan in effect. According to the 1986 DNF LRMP, water quality is one of the primary management concerns for the DNF, focusing particularly on sedimentation as a result of erosional factors. Road construction, timber harvest, and grazing in riparian areas all tend to increase sediment loading in streams and lakes. Additional management considerations include consumptive use (most of which occurs off forest), non-consumptive use (e.g., maintaining in-stream flows to preserve fisheries and aquatic habitat), and riparian areas. Management activities within riparian areas are to comply with Executive Order 11990 on Protection of Wetlands and Executive Order 11988 on Floodplain Management. Specific management directives from the LRMP for riparian management areas and intensive riparian management areas include the following:

- Prevent or remove debris accumulations that reduce stream channel stability and capacity.

- Proposed new land-use facilities (roads, campgrounds, buildings) will not normally be located within floodplain boundaries for the 100-year flood. Protect present and all future facilities that cannot be located out of the 100-year floodplain by structural mitigation (deflection structures, riprap, etc.).

- Prevent stream channel instability, loss of channel cross-sectional areas, and loss of water quality resulting from activities that alter vegetative cover.

- Utilize appropriate sediment modeling techniques to determine sediment threshold limits for ground and vegetation disturbing management activities to meet the aquatic habitat condition objectives for these stream reaches.

Avoid channelization of natural streams. Where channelization is necessary for flood control or other purposes, use stream geometry relationships to re-establish meanders, width/depth ratios, etc., consistent with each major stream type.

Treat disturbed areas resulting from management activities to reduce sediment yields to the natural erosional rates in the shortest possible time.

Stabilize streambanks which are damaged beyond natural recovery in a reasonable time period with appropriate methods or procedures that emphasize control by vegetation.

Design and locate settling ponds to reduce downstream sediment yield and to prevent washout during high water. Locate settling ponds outside of the active channel. Restore any channel changes to hydraulic geometry standards for each stream type.

Include wildlife and fish habitat, aesthetic, or safety goals when planning projects that result in vegetation type conversion.

Require concurrent monitoring to ensure that mitigative measures are effective and in compliance with State water quality standards.

1.2.3.2. Bureau of Land Management

BLM, Grand Staircase-Escalante National Monument

From the BLM's GSENM Management Plan (BLM 2000), the BLM's objective with respect to water resources will be to ensure that appropriate quality and quantity of water resources are available for the proper care and management of the objects of the Monument.

In regards to water rights, the BLM will ensure that land management policies protect water resources, and that water flowing into the Monument is adequate to support Monument resources, and that other options for assuring water availability, if needed, are pursued.

In regards to water quality, the BLM will recognize the State of Utah, Division of Water Quality's (UDWQ) development of total maximum daily loads (TMDLs) for 303(d) waters in the Monument, develop a water quality monitoring program in conjunction with the UDWQ to ensure that State and Federal water quality standards are met, and monitor water quality when ground disturbance or other factors could adversely affect water quality.

Kanab Field Office

According to Section 2.2.1 of the KFO's Approved Resource Management Plan and Final EIS (BLM 2008), the following goals and objectives are detailed for water resources:

Maintain and/or restore natural hydrologic function of watersheds, including the capability to capture, store, and beneficially release water.

Reduce flood-related damage to infrastructure and downstream private lands.

Improve watershed conditions on eroding sites and on other sensitive watershed areas, such as riparian areas.

Maintain and improve water quality to meet state standards for water quality in order to protect established beneficial uses.

1.2.3.3. National Park Service

Bryce Canyon National Park

According to Section 4.6 of the 2006 *Management Policies* of the NPS, the following directives govern park activities relating to water resources (NPS 2006).

In regards to watershed and stream processes,

The Service will manage watersheds as complete hydrologic systems and minimize human-caused disturbance to the natural upland processes that deliver water, sediment, and wood debris to streams. The Service will protect watershed and stream features primarily by avoiding impacts on watershed and riparian vegetation and by allowing natural fluvial processes to proceed unimpeded. When conflicts between infrastructure (such as bridges and pipeline crossings) and stream processes are unavoidable, NPS managers will first consider relocating or redesigning facilities rather than manipulating streams. Where stream manipulation is unavoidable, managers will use techniques that are visually nonobtrusive and that protect natural processes to the greatest extent practicable.

In regards to water quality,

The Service will determine the quality of park surface and groundwater resources and avoid, whenever possible, the pollution of park waters by human activities occurring within and outside the parks.

The Service will work with appropriate governmental bodies to obtain the highest possible standards available under the Clean Water Act for the protection of park waters, will take all necessary actions to maintain or restore the quality of surface waters and groundwaters within the parks consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations, and will enter into agreements with other agencies and governing bodies, as appropriate, to secure their cooperation in maintaining or restoring the quality of park water resources.

In regards to wetlands,

The Service will (1) provide leadership and take action to prevent the destruction, loss, or degradation of wetlands; (2) preserve and enhance the natural and beneficial values of wetlands; and (3) avoid direct and indirect support of new construction in wetlands unless there are no practicable alternatives and the proposed action includes all practicable measures to minimize harm to wetlands.

In regards to floodplains,

The Service will protect, preserve, and restore the natural resources and functions of floodplains, avoid the long- and short-term environmental effects associated with the occupancy and modification of floodplains, and avoid direct and indirect support of floodplain development and actions that could adversely affect the natural resources and functions of floodplains or increase flood risks.

In regards to water rights,

Water for the preservation and management of the national park system will be obtained and used in accordance with legal authorities.

Additionally, the BRCA General Management Plan/Development Concept Plan (NPS 1987) cites the following as a specific park management objective:

To cooperate with outside agencies, organizations, and members of the public in (1) assuring, to the greatest extent possible, that nearby lands are developed and managed in ways that are compatible with preserving the park's air and water quality, geological resources, ecological communities, solitude, extreme quiet, and the scenery for which the park is famous...

Both the 2006 Management Guidelines and the BRCA General Management Plan direct the park to develop and manage their lands in a manner that preserves the park’s water resources, as well as to coordinate with surrounding land owners and other management agencies to insure that the same is done on their lands.

1.2.4. Climate and Geographic Setting

The Proposed Action and Action Alternatives are located within the Pass Creek, Upper East Fork Sevier River, and Upper Paria River watersheds in Garfield County, Utah (Seaber et al. 1987). Pass Creek drains east off the Markagunt Plateau into the Sevier River, while the Upper East Fork Sevier River drains north off the Paunsaugunt Plateau, then north and west along the eastern and northern sides of the Sevier Plateau and into the Sevier River near Kingston, Utah. The Sevier River drains north into Sevier Lake in the Great Basin, while the Paria River drains south to Lake Powell. Elevations within the study area range from 7,600 feet above mean sea level (AMSL) in Emery Valley, near the center of the study area, to over 9,000 feet AMSL near Wilson Peak, west of Johnson Bench and at the western terminus of the existing Bryce to Wilson distribution line.

Temperature and precipitation in the study area are typical of the arid high deserts of the west; and are generally characterized by a dry, arid climate with cold winters, hot summers and rapid, sometimes striking climatic changes. Although snowfall varies according to regional topography, average annual precipitation is known to vary from between 11.53 inches in Hatch to 15.73 inches at the BRCA headquarters (WRCC 2008) while average annual snowfall ranges from 33.7 inches in Tropic to 86.6 inches at the BRCA Headquarters. **Table 1.2-1** presents climate summaries for monitoring stations in the vicinity of the Project Area.

Table 1.2-1. Climate conditions for study area monitoring locations.

MONITORING STATION	ELEVATION (FT)	ANNUAL AVERAGE			
		TEMPERATURE (°F)		PRECIPITATION (IN.)	SNOWFALL (IN.)
		HIGH	LOW		
Hatch, Utah	6,932	N/A ¹	N/A ¹	11.53	44.7
Tropic, Utah	6,278	62.8	32.0	12.07	33.7
Bryce Canyon Airport	7,590	56.3	23.7	12.08	66.6
BRCA Headquarters	7,910	56.1	26.5	15.73	86.6

¹Insufficient data available.

Source: Western Regional Climate Center (2008)

1.2.5. Surface Water Resources

1.2.5.1. Streams

Transcon Environmental (2008b) performed pedestrian surveys of all project alternative alignments, in order to identify and classify all drainages. Drainages were classified by using the following characteristics: channel incision, cut banks, change in substrate, debris lines, scour lines, mineralization lines, vegetation growth, and/or change in vegetation type or structure. Additionally, USGS quadrangle maps were used to assist in classifying stream systems as perennial, intermittent, or ephemeral, and USFS data was evaluated for flow of perennial systems. Mapped streams are shown on **Figure 1.2-1**.

Figure 1.2-1 Surface Water Resources

Existing Conditions

Streams within the study area primarily occur as ephemeral systems, conveying water only during significant rainfall events. Few intermittent systems were identified, where water flows on a seasonal or regular-period basis, and fewer still perennial systems were identified, where water flows year-round. Stream systems ranged in size from small ephemeral washes, approximately 1 foot in width, to large perennial systems, such as the Sevier River, over 50 feet in width at the proposed crossing locations. A detailed description of individual drainages and their characteristics is provided in *Appendix A* of Transcon (2008b).

Table 1.2-2 provides a summary of drainages that were identified during field investigations.

Table 1.2-2. Summary of Drainages Identified within the Study Area during Field Investigations

ALTERNATIVE SEGMENT		NUMBER OF DRAINAGES ¹					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
A-1	Perennial	0	0	0	0	0	0
	Intermittent	0	1	0	2	6	0
	Ephemeral	5	8	0	65	66	0
A-2	Perennial	0	0	0	0	0	0
	Intermittent	0	0	0	0	0	0
	Ephemeral	0	0	0	0	6	0
A-3	Perennial	0	0	1	0	0	0
	Intermittent	0	0	0	0	2	0
	Ephemeral	5	6	17	0	30	0
B	Perennial	2	0	0	0	0	1
	Intermittent	1	1	0	0	0	0
	Ephemeral	30	12	34	0	0	33
C-1	Perennial	0	0	0	0	0	0
	Intermittent	1	0	0	2	6	0
	Ephemeral	13	3	0	65	59	0
C-2	Perennial	0	0	0	0	0	0
	Intermittent	0	0	0	0	0	0
	Ephemeral	0	0	0	0	6	0
C-3	Perennial	0	0	1	0	0	0
	Intermittent	0	0	0	0	1	0
	Ephemeral	2	5	19	0	48	0
East-West Interconnect	Perennial	0	0	0	0	0	0
	Intermittent	0	0	0	0	0	0
	Ephemeral	0	0	0	0	21	0

ALTERNATIVE SEGMENT		NUMBER OF DRAINAGES ¹					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
North-South Interconnect	Perennial	0	0	0	0	0	0
	Intermittent	0	0	0	0	0	0
	Ephemeral	0	0	0	0	5	0

Source: Transcon (2008b).

¹ Drainages that occurred in areas where segments are shared by multiple alternatives were included in counts of drainages on both alternatives (i.e., double counted).

The length of stream systems within the study area was calculated from GIS data provided by USGS. USGS stream categories consisted of “Stream/Braided Stream,” “Ditch or Canal,” and “Intermittent stream.” **Table 1.2-3** provides a summary of the linear mileage of streams, by class, within a 0.5-mile buffer of each alternative, while **Table 1.2-4** provides a summary of the linear mileage of streams, by class, within the proposed 100-foot-wide right-of-way.

Table 1.2-3. Summary of stream lengths within the study area.

ALTERNATIVE SEGMENT		STREAM CLASS LINEAR MILEAGE					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
A-1	Perennial ¹	0.00	0.00	0.00	0.00	2.91	0.00
	Ephemeral ²	17.41	19.62	0.00	22.67	25.84	0.00
A-2	Perennial ¹	0.00	0.00	0.00	0.00	4.34	0.00
	Ephemeral ²	0.00	0.00	0.00	0.00	0.00	0.00
A-3	Perennial ¹	2.68	0.00	5.58	0.00	12.62	0.00
	Ephemeral ²	15.20	4.98	16.33	0.00	0.00	0.00
B	Perennial ¹	3.53	0.00	4.56	0.00	10.07	2.00
	Ephemeral ²	29.46	10.05	19.40	0.03	1.54	7.08
C-1	Perennial ¹	0.17	0.00	0.00	0.00	0.14	0.00
	Ephemeral ²	37.89	6.72	2.08	22.67	15.71	2.05
C-2	Perennial ¹	0.00	0.00	0.00	0.00	5.44	0.00
	Ephemeral ²	1.68	0.62	0.00	0.00	5.16	0.00
C-3	Perennial ¹	1.70	0.00	4.77	0.00	11.73	0.00
	Ephemeral ²	15.20	4.98	16.33	0.00	0.00	0.00
East-West Interconnect	Perennial ¹	0.00	0.00	0.00	0.00	4.42	0.00
	Ephemeral ²	0.80	0.31	0.00	0.00	1.79	0.00
North-South Interconnect	Perennial ¹	0.00	0.00	0.00	0.00	4.55	0.00
	Ephemeral ²	0.00	0.00	0.00	0.00	0.00	0.00

Source: USGS 2007.

¹ Includes streams, braided streams, and ditches; ² Includes intermittent and ephemeral drainages.

Table 1.2-4. Summary of stream lengths within the proposed right-of-way.

ALTERNATIVE SEGMENT		STREAM CLASS LINEAR MILEAGE					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
A-1	Perennial ¹	0.00	0.00	0.00	0.00	0.01	0.00
	Ephemeral ²	0.16	0.41	0.00	0.30	0.62	0.00
A-2	Perennial ¹	0.00	0.00	0.00	0.00	0.00	0.00
	Ephemeral ²	0.00	0.00	0.00	0.00	0.00	0.00
A-3	Perennial ¹	0.03	0.00	0.04	0.00	0.45	0.00
	Ephemeral ²	0.02	0.04	0.41	0.00	0.00	0.00
B	Perennial ¹	0.02	0.00	0.17	0.00	0.18	0.00
	Ephemeral ²	0.41	0.15	0.17	0.00	0.00	0.14
C-1	Perennial ¹	0.00	0.00	0.00	0.00	0.00	0.00
	Ephemeral ²	0.36	0.07	0.00	0.30	0.31	0.00
C-2	Perennial ¹	0.00	0.00	0.00	0.00	0.08	0.00
	Ephemeral ²	0.00	0.00	0.00	0.00	0.27	0.00
C-3	Perennial ¹	0.00	0.00	0.00	0.00	0.44	0.00
	Ephemeral ²	0.02	0.04	0.41	0.00	0.00	0.00
East-West Interconnect	Perennial ¹	0.00	0.00	0.00	0.00	0.04	0.00
	Ephemeral ²	0.00	0.00	0.00	0.00	0.00	0.00
North-South Interconnect	Perennial ¹	0.00	0.00	0.00	0.00	0.07	0.00
	Ephemeral ²	0.00	0.00	0.00	0.00	0.00	0.00

Source: USGS.

¹ Includes streams, braided streams, and ditches.

² Includes intermittent and ephemeral drainages.

Measured Stream Flows

The primary perennial stream in the study area, the Sevier River, has a total drainage area of approximately 315 square miles. The river is gauged at Hatch, UT, near the western terminus of the study area. According to USGS, for the period from 1915 to 2007, annual averages ranged from a low of 42.6 cubic feet per second (cfs) in 1977, to a high of 338.8 in 2005, with a mean across all years of 111.1 cfs.

The East Fork Sevier River was gauged between 1962 and 1995 at a site near Bryce Canyon City, upstream of Johns Valley, where the drainage area is about 72 square miles. According to that data, peak flows typically occur in May or June and are associated with spring snowmelt (USGS 2007). Annual averages ranged from a low of 6 cfs in 1977, to a high of 45 cfs in 1980.

Highly Erodible Soils

Streams in this portion of the arid west are highly susceptible to changes in water quality as a result of erosional runoff.

Two area soil surveys¹ were reviewed to determine which Project Area soils may be “highly erodible”. Highly erodible soils are defined as any soil class whose hazard of water erosion was classified as “severe.” **Table 1.2-5** details those soils within the study area which were classified as highly erodible, while **Figure 1.2-2** depicts the locations of mapped soil units within the study area that meet these criteria.

Table 1.2-5. Highly erodible soil classes within the study area.

SOIL CODE	SOIL TYPE NAME
8	Badland-Cannonville-Rock outcrop complex, 2 to 20 percent slopes
9	Badland-Rock outcrop-Paunsaugunt complex, 2 to 20 percent slopes
11	Baldfield clay, 2 to 8 percent slopes, eroded
29	Connonville clay, 30 to 50 percent slopes
30	Connonville very stony clay, 30 to 50 percent slopes
34	Circleville-Rock outcrop complex, 25 to 60 percent slopes
39	Comodore-Rock outcrop complex, 15 to 40 percent slopes
110	Paunsaugunt gravelly loam, 2 to 15 percent slopes
115	Podo-Wiggler complex, 10 to 50 percent slopes
116	Podo-Rock outcrop complex, 10 to 40 percent slopes
123	Rock outcrop-Podo complex, 40 to 70 percent slopes
173	Zyme-Lazear-Rock outcrop complex, 8 to 60 percent slopes
5027	Badland (Tropic Formation Shale)-Cannonville-Rock outcrop (Dakota Formation) complex, 30 to 50 percent slopes
5090	Baldfield clay, saline, 2 to 8 percent slopes

Table 1.2-6 provides a summary of the acreage of highly erodible soils within a 0.5-mile buffer of all project elements.

¹ Soil Surveys of Panguitch Area, Utah, Parts of Garfield, Iron, Kane, and Paiute Counties (USDA 1990) and the Soil Survey of the Grand Staircase-Escalante National Monument Area, Parts of Kane and Garfield Counties, Utah (USDA 2007)

Figure 1.2-2. Highly Erodible Soils

Table 1.2-6. Summary of highly erodibly soil acreages within the study area.

SEGMENT	ACREAGE OF HIGHLY ERODIBLE SOIL ACRES					
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
A-1	1,580.57	2,317.90	0.00	2,084.41	6,795.43	39.23
A-2	0.00	0.00	0.00	0.00	1,642.53	0.00
A-3	1,052.12	494.92	1,946.39	0.00	2,772.42	0.00
B	927.84	66.23	477.33	0.11	2,110.91	1,394.48
C-1	4,400.47	970.65	112.10	2,084.41	3,672.25	0.00
C-2	76.14	94.58	0.00	0.00	1,913.47	0.00
C-3	979.79	494.92	1,868.80	0.00	3,489.78	0.00
East-West Interconnect	0.00	0.00	0.00	0.00	1,420.34	0.00
North-South Interconnect	0.00	0.00	0.00	0.00	826.03	0.00

Source: NRCS/USFS.

1.2.5.2. Wetlands and Waters of the United States

Waters of the United States are defined as all waters which are used in interstate or foreign commerce, including wetlands, as well as intrastate lakes, rivers, streams, wetlands, etc. whose degradation or destruction could affect interstate or foreign commerce (33 CFR 328.3). Wetlands, as defined in 40 CFR 230.3 and 33 CFR 328.3, may be jurisdictional “if they are adjacent to waters of the U.S.”. The term “adjacent” means bordering, contiguous, or neighboring. Wetlands separated from other waters of the U.S. by man-made dikes or barriers, natural river berms, beach dunes and the like are “adjacent wetlands.” In the absence of adjacent wetlands the limits of federal jurisdiction extend to the ordinary high water mark (OHWM). The United States Army Corps of Engineers (Corps) is tasked with regulating waters of the U.S., including wetlands.

Existing Conditions

Although formal coordination with the Corps was not conducted for this project, estimations of potential jurisdiction were made for all drainages surveyed in the field (a formal determination of jurisdiction will be conducted for the agency preferred alternative [Transcon 2008b]). These jurisdictional estimates were based on channel characteristics and potential surface water connectivity with waters of the U.S. Channel characteristics included the following: channel incision, cut banks, change in substrate, debris lines, scour lines, mineralization lines, vegetation growth, and/or change in vegetation type or structure. Drainages were considered jurisdictional if they had a width greater than 3 feet, displayed one or more of the characteristics described above, and had a connection or “nexus” to a navigable water of the U.S.

Table 1.2-7 provides a summary of potentially-jurisdictional waters identified during field surveys, and **Figure 1.2-1** depicts the location of potentially-jurisdictional drainages.

Table 1.2-7. Summary of potentially-jurisdictional waters identified during field investigations.

ALTERNATIVE SEGMENT		NUMBER OF POTENTIALLY JURISDICTIONAL DRAINAGES ¹					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
A-1	Perennial	0	0	0	0	0	0
	Intermittent	0	1	0	2	6	0
	Ephemeral	4	8	0	25	21	0
A-2	Perennial	0	0	0	0	0	0
	Intermittent	0	0	0	0	0	0
	Ephemeral	0	0	0	0	2	0
A-3	Perennial	0	0	1	0	0	0
	Intermittent	0	0	0	0	2	0
	Ephemeral	3	6	12	0	19	0
B	Perennial	2	0	0	0	0	1
	Intermittent	1	1	0	0	0	0
	Ephemeral	12	4	22	0	0	30
C-1	Perennial	0	0	0	0	0	0
	Intermittent	1	0	0	2	6	0
	Ephemeral	9	3	0	25	21	0
C-2	Perennial	0	0	0	0	0	0
	Intermittent	0	0	0	0	0	0
	Ephemeral	0	0	0	0	4	0
C-3	Perennial	0	0	1	0	0	0
	Intermittent	0	0	0	0	1	0
	Ephemeral	1	5	16	0	23	0
East-West Interconnect	Perennial	0	0	0	0	0	0
	Intermittent	0	0	0	0	0	0
	Ephemeral	0	0	0	0	15	0
North-South Interconnect	Perennial	0	0	0	0	0	0
	Intermittent	0	0	0	0	0	0
	Ephemeral	0	0	0	0	4	0

Source: Transcon (2008b).

¹ Drainages that occurred in areas where segments are shared by multiple alternatives were included in counts of drainages on both alternatives (i.e., double counted).

Perennial Waterways

Two perennial waterways occur in the Project Area. The Sevier River is located near the western edge of the study area, flowing south to north and discharging to Sevier Lake. It receives water from the majority of the drainages flowing off the west side of the Pansaugunt Plateau. Riparian vegetation associated with the river is limited to a narrow, sparse canopy of Fremont's cottonwood trees (*Populus fremontii*) and a

denser shrub layer of sagebrush (*Artemisia* spp.) and rabbitbrush (*Chrysothamnus* spp.). The river varies in width from 20 to 50 feet in different locations, and irrigated lands have encroached upon the river throughout the valley. The Sevier River would be crossed by all three alternatives.

The Tropic Ditch is a manmade ditch constructed in the early 1890s to convey water from the East Fork Sevier River to Tropic Valley for irrigation purposes. It receives water from releases out of the Tropic Reservoir into the East Fork Sevier River via a diversion structure. The ditch ranges from 20 to 50 feet wide and has deeply incised banks. Riparian vegetation consists of water birch (*Betula occidentalis*), Woods' rose (*Rosa woodsii*), willows (*Salix* spp.), and mountain alder (*Alnus incana*). The Tropic Ditch would be crossed only by Alternative B on private land within Tropic Valley east of Highway 12 and again within BRCA. Currently, irrigation water that once flowed in the ditch is piped and the ditch is abandoned at the proposed private land crossing. Water is diverted into the ditch from May through October only.

Intermittent Drainages

A total of four intermittent drainages were identified in the study area. The East Fork Sevier River flows during spring runoff, significant rain events, or when water is released from the Tropic Reservoir (Transcon 2008b). It is located on the Pansaugunt Plateau and adjacent vegetation is thick sagebrush and rabbitbrush. Some small willows and wild rose are also occasionally present, although no riparian canopy vegetation was observed. The East Fork Sevier River ranges in width from 10 to 25 feet, depending on the crossing location, and it has a well-defined bed and banks. The East Fork Sevier River would be crossed by all three alternatives.

Intermittent streams were also observed in both Hillsdale Canyon and Cedar Fork Canyon, with both assumed to be spring fed and receiving intermittent surface flows (Transcon 2008b). Both drainages range from 10 to 18 feet wide at the crossing locations and have surface flow through some sections of the lower reaches of the canyons, interspersed with sections of subsurface flow. Surface water was observed in the lower reaches of the canyons, likely where the water table intercepts the landform contours.

The intermittent stream reach in Hillsdale Canyon was characterized by a narrow band of mountain alder canopy trees, primarily found in the lower reaches of the canyon where surface water was observed. A water diversion structure is located in this drainage immediately up-canyon from a DNF road crossing, for purposes of irrigating nearby crop fields at the mouth of the canyon. This intermittent drainage would only be crossed by the Proposed Action, within DNF.

The intermittent stream reach in Cedar Fork Canyon was characterized by willows, mountain alder, saltcedar (*Tamarix* spp.), Woods' rose, and buffaloberry (*Shepherdia canadensis*). The steepness of the canyon and limited water availability restrict riparian vegetation to an extremely narrow band, mainly a single row of trees and shrubs. The Cedar Fork Canyon intermittent stream would be crossed by the Proposed Action and Alternative C, within portions of DNF and GSENM.

North Creek, located in Tropic Valley, is an intermittent stream ranging from 10 to 20 feet wide, with deeply incised banks. Riparian vegetation is absent from the banks. North Creek is the main drainage for the east side of Tropic Valley, while the perennial Tropic Ditch is main drainage for the west side, with the two drainages converging south of the town of Tropic. North Creek would be crossed by all three action alternatives.

Ephemeral Drainages

The majority of the drainages located within the study area are ephemeral, conveying water only during significant precipitation events or during spring snow melt condition. Ephemeral drainages generally do not support riparian vegetation and provide limited aquatic habitat.

Wetlands

In addition to identifying stream systems, Transcon (2008b) also identified wetlands within the study area. Six wetland areas were identified during field surveys; three of which were located at high elevations on the Paunsaugunt Plateau and one of which was located east of the Sevier River, on the west side of the plateau. One wetland was associated with a seep while the other three were located within floodplains where water collects. Wetlands were generally identified by wetland grasses and sedges, most notable Baltic rush (*Juncus balticus*), and were each given a unique drainage number identifier.

Drainage Number 139 is an 11.42-acre wetland located north of Highway 12 and the Pine Hills, near Mud Spring. This wetland would be crossed by the Proposed Action, and it is located on private land.

Drainage Number 310 is a 12.09-acre mesic meadow located immediately east of Highway 63 and the existing Bryce substation, at the head of Shinglemill Swale. This wetland would be crossed by Alternative B only, and it is located on private land.

Drainage Number 324 is a 0.24-acre wetland located east of the Sevier River, approximately 0.75 miles southeast of the intersection of Highways 89 and 12. This wetland is crossed by the existing 69kv line from Bryce to Hatch Mountain (to be removed) and is approximately 200 feet south of the Alternative B center line. It is located on private land.

Drainage Number 381 is a 10.69-acre wetland located at the mouth of Daves Hollow, approximately 0.25 miles east of the Tropic Ditch and 0.5 miles east of East Fork Sevier River. Alternative C would cross the northern tip of this wetland, which is located on DNF land.

Drainage Number 385 is a 0.76-acre mesic area located immediately west of Drainage Number 381, between the Tropic Ditch and East Fork Sevier River. It would similarly be crossed by Alternative C, and it is located on private land.

Drainage Number 471 is an 8.25-acre wetland located on the east side of Highway 63, across the road from Ruby's Inn, approximately 0.5 miles west of Drainage Number 310. This wetland would be crossed by Alternative B only, and it is located on private land.

All wetlands were determined to be potentially jurisdictional. **Table 1.2-8** provides wetland acreages, by alternative, within the study area, and **Figure 1.2-3** depicts the location within the study area of these wetlands.

Table 1.2-8. Summary of wetland areas identified during field investigations.

ALTERNATIVE SEGMENT	WETLAND ACREAGE					
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
A-1	0.00	0.00	0.00	0.00	11.42	0.00
A-2	0.00	0.00	0.00	0.00	0.00	0.00
A-3	0.00	0.00	0.00	0.00	0.00	0.00
B	11.57	0.00	0.00	0.00	0.00	0.52
C-1	0.03	0.00	0.00	0.00	11.42	0.00
C-2	0.00	0.00	0.00	0.00	0.00	0.00
C-3	0.00	0.00	0.00	0.00	0.00	0.00
East-West Interconnect	0.00	0.00	0.00	0.00	0.00	0.00
North-South Interconnect	0.00	0.00	0.00	0.00	0.00	0.00
Removal of Existing 69 kV	8.25	0.00	0.24	0.00	0.00	0.00

Source: Transcon (2008b).

Figure 1.2-3. Wetlands

1.2.5.3. Floodplains

According to FEMA (2001), a floodplain is any land area susceptible to being inundated by water from any source, while special flood hazard areas are areas of land that would be inundated by a flood having a 1-percent chance of occurring in any given year (also referred to as the base flood or 100-year flood).

Although a number of drainages occur throughout the study area, a review of FEMA's digital flood insurance rate maps (DFIRMs) for Garfield County, Utah, most recently revised in 1995, show that there are no mapped special flood hazard areas located within the study area. Existing data for each land management agency in the study area (DNF, KFO, GSENM, BRCA) was reviewed for additional information regarding the presence and location of floodplains. No mapped floodplain areas were found.

In accordance with Executive Order 11988 on Floodplain Management, federal agencies should conduct an eight-step review process as part of their decision making on projects that have potential impacts to or within floodplains, including the following:

1. Determine if a proposed action is in the base floodplain (that area which has a one-percent or greater change of flooding in any given year).
2. Conduct early public review, including public notice.
3. Identify and evaluate practicable alternatives to locating in the base floodplain, including alternative sites outside of the floodplain.
4. Identify impacts of the proposed action.
5. If impacts cannot be avoided, develop measures to minimize the impacts and restore and preserve the floodplain, as appropriate.
6. Reevaluate alternatives.
7. Present the findings and a public explanation.
8. Implement the action.

Since data regarding base floodplain presence in the study area is not available, the proponent has committed to placing or rerouting structures not less than 100 feet outside of any floodplain, wetland, riparian area, or water course to avoid sensitive features where feasible (Transcon 2008b). Portions of Segments A-1 and C-1 are located within the Cedar Fork Canyon drainage floodplain, while a portion of Segment A-3 is located within the Hillsdale Canyon floodplain. The Sevier River floodplain is also crossed by Alternative B and Segments A-3 and C-3. It is not possible to locate structures outside of these floodplain areas, and impacts to these floodplains are analyzed in the impacts analysis section.

1.2.6. Groundwater Resources

Groundwater within the study area generally occurs as shallow or perched aquifers associated with springs, which typically represent discharge of small, locally recharged areas. More extensive regional aquifers are found at depths from several hundred to over a thousand feet below ground surface (USFS 1995). Typical of high elevation lands, much of the study area serves as recharge areas for shallow and regional aquifers, eventually supplying groundwater to lower elevation valleys.

Groundwater recharge and flow patterns in the region are determined primarily by geology. As described in USFS (1995), aquifers within the DNF are associated with Mesozoic sedimentary formations found at depths underlying the High Plateau area. The overlying Tertiary sediments and igneous intrusives are noted as formations with low primary, but high secondary, permeability (USFS 1995); these geologic units transmit infiltrated precipitation and runoff through fractures and solution channels to the underlying Mesozoic sandstones. Though topographically within the Sevier River Basin, the Paunsaugunt Plateau also provides groundwater to the Kanab Creek Basin via trans-basin outflow (Utah Division of Water

Resources 1993). Groundwater quality varies depending upon the aquifer's geologic properties and the water's proximity to the recharge area.

1.2.6.1. Springs

One spring was identified during field surveys, located at the top of Hillsdale Canyon within the western portion of the study area, immediately north of the shared Proposed Action and Alternative C alignments in DNF. It was characterized by water flowing out of a hillside into Hillsdale Canyon, with riparian vegetation continuing offsite into Hillsdale Canyon (described above).

1.2.7. Water Quality

The Utah Division of Water Quality assigns beneficial uses to all waters within the state, in order to protect them from controllable pollution (UDWQ 2000). Streams and lakes that the state considers impaired, and thus not able to meet their designated beneficial uses, are reported on the state's 303(d) list, which is updated every other year. Listed water bodies are then scheduled for total maximum daily load (TMDL) development. Utah's list of 303(d) waters are categorized as follows (UDWQ 2006a):

Category 4C—Impaired for one or more uses but does not require a total maximum daily load because impairment is not caused by a pollutant.

Category 5A – TMDL Required for River and Stream Segments, Lakes, and Reservoirs

Category 5B – Request for removal of waters from the 303(d) list. Water quality standards are now being met, new delineation of assessment unit, changes in beneficial use classification, change in listing methods, awaiting approval letter from EPA, or change in water quality standards.

Category 5C – Utah Pollutant Discharge Elimination System permit renewal TMDLs for most recent cycle.

Category 5D – Lakes not fully supporting beneficial uses that will not be listed as Category 5A until two consecutive assessment cycles demonstrate impairment.

Within the Sevier River watershed, a total maximum daily load study was completed in 2006 for the East Fork Sevier River assessment unit, including Otter Creek and Reservoir, Koosharem Reservoir, and Lower Box Creek Reservoir, north and downstream of the Study Area. The section of the East Fork Sevier River that contains the reach (and tributaries) from the confluence with the Sevier River upstream to Antimony Creek confluence, excluding Otter Creek and tributaries, was rated as Category 5A. Pollutants of concern for this reach include total phosphorus, according to Utah Division of Water Quality (UDWQ 2006b). According to UDWQ (2004a), excessive phosphorus loading has occurred as a result of livestock waste from grazing in and adjacent to the stream channel, flood irrigation of pasture land, and runoff from animal feeding operations. One point source of pollution, the Mammoth Creek Fish Hatchery, was also identified as a phosphorus source although the operation is currently out of production (as of July 2002) due to contamination by whirling disease. Habitat alteration along the Sevier River, in the form of eroding banks, sedimentation, and a lack of woody vegetation, has primarily occurred as a result of grazing and agricultural activities.

The East Fork Sevier River upstream of this reach and located in the project study area was considered as supporting the listed beneficial use classes (UDWQ 2006b).

The Upper Sevier River and tributaries from Long Canal to Mammoth Creek confluence have been rated as Category 5A, while the reach downstream to Circleville Irrigation Diversion has been listed as 4C and 5A, where some TMDLs are required and some not required (depending on pollutant – a pollution parameter listed as Category 4C does not require a TMDL analysis). Pollutants of concern for these listed reaches include total phosphorus and habitat alteration (UDWQ 2004a).

Within the Colorado River West watershed, the Paria River reaches (and tributaries) from the start of the Paria River Gorge to the headwaters and from the Arizona-Utah state line to the Cottonwood Creek confluence are also rated as Category 5A. Pollutants of concern for these reaches include total dissolved solids (TDS). A total of 26.00 miles of stream is included in this category.

No other 303(d)-listed waters occur in the study area.

1.2.8. Water Rights

The Utah Department of Natural Resources, Division of Water Rights (DWR), administers the appropriation and distribution of the state’s water resources. All waters in Utah are public property, and a water right is the right to divert (i.e., remove from its natural source) and beneficially use water. The DWR maintains a database of all water rights claims adjudicated in the state of Utah.

A 1-mile buffer surrounding the Proposed Action and Action Alternatives was used to evaluate the presence of water rights. **Table 1.2-9** presents the number of water rights, by Alternative, present in the study area, while **Figure 1.2-4** depicts the locations and type of each water right. Access to water rights would not be restricted by any of the alternatives.

Table 1.2-9. Number of Water Rights within the Study Area

SEGMENT	WATER RIGHT TYPE ¹							
	ABANDONED WELL	DRAIN	POINT-TO-POINT	REDIVERSION	RETURN	SPRING	SURFACE	UNDER-GROUND
A-1	0	0	10	0	0	0	1	18
A-2	0	0	0	0	0	0	0	0
A-3	2	0	0	0	0	0	68	5
B	2	0	80	0	0	0	53	83
C-1	0	0	10	0	0	0	9	38
C-2	0	0	0	0	0	0	1	3
C-3	2	0	0	0	0	0	70	5
East-West Interconnect	0	0	0	0	0	0	0	3
North-South Interconnect	0	0	0	0	0	0	0	0

Source: Utah Department of Natural Resources, Division of Water Rights (2008).

Figure 1.2-4 Water Rights

1.3. IMPACT ANALYSIS

1.3.1. Direct and Indirect Effects

The Proposed Action and Alternatives outlined in previous sections may cause, directly or indirectly, changes in the physical environment. This report assesses and analyzes these potential changes for inclusion in the EIS prepared for this proposal.

The terms “effect” and “impact” are synonymous under NEPA. Effects may refer to adverse or beneficial ecological, aesthetic, historical, cultural, economic, social, or health-related phenomena that may be caused by the Proposed Action or Action Alternatives (40 CFR 1508.8). Effects may be direct, indirect, or cumulative in nature. A direct effect occurs at the same time and place as the action (40 CFR 1508.8(a)). Indirect effects are reasonably foreseeable effects that occur later in time or are removed in distance from the action (40 CFR 1508(b)). In this report, direct and indirect effects are discussed in combination.

1.3.1.1. Indicators and Methods of Analysis

In order to evaluate impacts to water resources, the following indicators were established for analysis:

- Number and types of drainage crossings within the Project Area.
- Acreage of surface disturbance in highly erodible soils within 300 feet of a drainage, which may contribute to erosion and degradation of water quality.
- Acreage of surface disturbance to federally jurisdictional waters of the U.S., including wetlands.
- Compliance with applicable state and federal water quality discharge regulations.
- Compliance with existing water right allocations in the vicinity of the project, should these water rights be used for construction water supply.

Table 1.3-1 describes the relative degree and temporal duration by which impacts were assessed.

Table 1.3-1. Description of impact degrees employed for water resources.

ATTRIBUTE OF EFFECT		DESCRIPTION RELATIVE TO WATER RESOURCES
Magnitude	Negligible	A change in current conditions that is too small to be physically measured using normal methods or perceptible to a trained human observer. There is no noticeable effect on the natural or baseline setting. There are no required changes in management or utilization of the resource.
	Minor	A change in current conditions that is just measurable with normal methods or barely perceptible to a trained human observer. The change may affect a small (<10 %) portion of a resource but does not result in a modification of the overall value or productivity of the resource.
	Moderate	An easily measurable change in current condition that is readily noticeable to a trained human observer. The change affects between 25 and 75 % of the resource, which may lead to modification or loss in viability or productivity of the resource. There are some required changes in management or utilization of the resource.
	Major	A large measurable change in current conditions that is easily recognized by all human observers. The change affects more than 75 % of the resource, which leads to significant modification in the value or productivity of the resource. There are profound or complete changes in management or utilization of the resource.

ATTRIBUTE OF EFFECT		DESCRIPTION RELATIVE TO WATER RESOURCES
Duration	Short-term	10 years or less
	Long-term	More than 10 years

Impacts to water resources were evaluated in a number of manners. For those indicators where linear footage or acreage of disturbance was used as the metric of analysis, linear footages and acreages were generated by utilizing the temporary and long-term disturbance GIS layers superimposed onto the resource of interest. Compliance with state and federal water quality regulations was conducted by evaluating potential direct or indirect effects on state-listed 303(d) imperiled waters or those waters where TMDLs have been established. In order to evaluate compliance with existing water rights, the number of water rights within 1 mile of the alternative alignments was reviewed in accordance with water supply activities.

1.3.1.2. Direct and Indirect Effects by Alternative

Appendix A contains general acreage tables for the project and all Action Alternatives.

Impacts Common to All Action Alternatives

Drainages, wetlands, and highly erodible soils in *limited access areas* were not included in inventories under alternative discussions below because there would be no centerline access created in the *limited access areas*, and therefore no impacts would be expected within the *limited access areas*.

Construction

Surface Water Resources.

- **Drainages.** Short-term construction impacts to drainage systems as a result of the Action Alternatives were considered as the linear footage of drainage impacts, and the number and types of drainage crossings that would occur as a result of the project. These impacts could result from the construction and/or improvement of access routes and existing roads, the installation of transmission line pole structures, or the construction of substations. Short-term impacts include areas such as temporary work spaces and construction zones required for ancillary facilities (i.e., substations), the removal of facilities, and temporary construction drainage crossings by the centerline/maintenance access. Impacts to drainage systems affected by any permanent crossings along the centerline/maintenance access are included in long-term impacts, as these features would remain after the construction phase is complete. The majority of crossings are temporary in nature.

For the purposes of this analysis, long-term low water crossings and culverted crossings were assumed to be 10 feet in width, which is the minimum width necessary for maintenance vehicle access along the right-of-way.

Direct project effects to drainage systems would occur in the form of road crossings by the centerline access/maintenance two-track road or other access routes to ancillary facilities or construction areas (transmission line pole structures and ancillary facilities would not be placed in any drainage system, and existing roads would be used to access the right-of-way). Crossing types are as follows:

1. **Unimproved Drainage Crossing:** The majority of drainage crossings would occur via this method. This type of crossing would be used at all dry crossings and intermittent drainages with infrequent flows, unless the physical capabilities of construction equipment and/or local topography of the drainage make it unsafe to cross without earth grading (or federal regulations and/or specific EIS mitigation measures require additional

work). In general, this type of crossing would be possible at drainages with defined bank slopes less than 25 percent or incised banks 18 inches or less in depth, with crossing of wide drainages (>50 feet) with steeper banks with a height less than 4 feet also possible. Impacts associated with unimproved drainage crossings would primarily be in the form of surface soil disturbance within and adjacent to the drainage system, resulting in increased erosion potential. Some minor bank grading may also occur in drainages with incised banks, and temporary bed rutting may occur (which is expected to stabilize following the next runoff event). Vegetation removal and/or blading in drainages is not anticipated with this crossing type.

2. **Temporary Log Crossing:** This type of crossing would be used at drainages with narrow (less than 10 feet wide), moderately deep (6+ feet deep) incised banks during the construction phase, at locations where maintenance activities can easily be performed by accessing the right-of-way without crossing the drainage following construction. Log crossings would be installed during the right-of-way clearing phase of construction and removed at the completion of construction. Drainage impacts associated with temporary log crossings would be in the form of some minor bank alterations and/or vegetation clearing due to temporary log placement; no bed alterations would occur. Erosion and hydrologic alteration potential with this crossing type would be negligible. Upon removal of the temporary log crossing, it is anticipated that bank structure and bank vegetation would reestablish within 1-2 years.
3. **Low Water Crossing – Consolidated Bed:** This is the preferred method of crossing where bank grading would be required but no alterations to bed surface are anticipated (i.e., an Unimproved Drainage Crossing is not feasible). This crossing method would be used at locations where grading of drainage banks would be required to cross but where the existing drainage bed substrate consists of material sufficient to support construction equipment without any improvements. The appropriate agency contact would be consulted to determine the specific requirements for each crossing requiring bank grading. In general, drainages with defined bank slopes greater than 25 percent or incised banks deeper than 18 inches and bank to bank width of more than 8 feet with drainage beds of gravel, cobble, or other solid material (or bank slopes less than 25 percent or incised banks less than 18 inches and a width of less than 8 feet with this bed material) would require this type of crossing. Impacts associated with this crossing type would include bank alteration to reduce approach angles, which may also result in some vegetation clearing from drainage banks. Increased erosion potential is likely, as is some bank erosion over time. BMPs (as described below) would be implemented to prevent sediment transport or hydrologic alteration. This crossing type would be permanent and would remain for long-term maintenance activities.
4. **Low Water Crossing – Unconsolidated Bed:** This is the preferred method of crossing where bank grading *and* bed improvements would be required (i.e., an Unimproved Drainage Crossing is not feasible). This crossing method would be used at locations where grading of drainage banks would be required to cross and where the drainage bed substrate requires the placement of gravel, grid material, and/or geotextile fabric (or similar stabilization method). The appropriate agency contact would be consulted to determine the specific requirements for each crossing requiring grading and bed alterations. In general, drainages with defined bank slopes greater than 25 percent or incised banks deeper than 18 inches and bank to bank width of more than 8 feet and drainage beds with sandy, unconsolidated material (or bank slopes less than 25 percent or incised banks less than 18 inches and a width of less than 8 feet with this bed material) would require this type of crossing. Impacts associated with this crossing type include

bank alterations, bed alterations (placement of fill material), and possible vegetation clearing. Increased erosion potential is likely, and some slight modification in hydrology is possible, depending on the bed stabilization method. This crossing type would be permanent and would remain for long-term maintenance activities.

5. **Culvert Crossing:** Unimproved Drainage Crossings or Low Water Crossings would be used at all possible locations, and Culvert Crossings would only be installed if absolutely necessary based on drainage/bank depth and bank integrity. Culvert placement may be temporary at locations where maintenance activities can easily be performed by accessing the right-of-way without crossing the drainage. Culverts would be installed during the right-of-way clearing phase of construction and removed at the completion of construction. If channel grading is required, the appropriate agency contact would be consulted to determine the specific requirements for each crossing requiring grading. Culvert placement would require fill material, and possibly headwall construction, in the drainage system. Culverts would be limited to the minimum width required for construction equipment to cross the drainage system, and they would be designed, sized, and placed to maintain the existing hydrology and flow rates of the drainage system and to prevent headcutting, scouring, or other erosional activities. In general, drainages with defined bank slopes greater than 25 percent or incised banks deeper 18 inches and a width of less than 8 feet would be crossed via culvert, although only in cases where a Low Water Crossing is not feasible. Impacts associated with culvert placement include possible hydrologic alteration, channel fill, and increased erosion potential due to channel manipulation.

Typical section drawings of each crossing type can be found in the project record. The number of crossings by alternative are discussed under each alternative analysis below. Crossing types are anticipated based on recent site conditions and evaluations by Transcon (2008b); however, it is possible that slight modifications to the proposed crossing methods at individual locations may occur during construction as site conditions dictate. These modifications are not expected to change the length or degree of impact for any alternative.

Presently, there are no Culvert Crossings anticipated for the Proposed Action or alternatives/interconnect options. This crossing method would only be used in unique circumstances where drainage channel conditions and/or bank morphology at the time of construction preclude the use of one of the other crossing methods. The Culvert Crossing description is provided for reference only, as a disclosure of potential impact types that could occur should individual site conditions dictate during construction. Any culvert placement would be in compliance with the stated BMPs and environmental protection measures, as well as all state and federal regulations.

In order to minimize runoff and sedimentation, a Storm Water Pollution Prevention Plan (SWPPP) would be completed and implemented for the chosen alternative, and a Stream Alteration Permit would be obtained from the Utah Division of Water Rights. Crossings would be designed in accordance with Forest Service Handbook 7709, Transportation Engineering Handbook guidelines.

The State of Utah and the National Forests in Utah have agreed, through a 1993 Memorandum of Understanding (MOU), to use Forest Plan Standards & Guidelines and the Forest Service Handbook No. 2509.22, Soil & Water Conservation Practices (SWCP [USFS 1988]) to meet the water quality protection elements of the Utah Nonpoint Source Management Plan. BMPs outlined in the SWCP would be followed to mitigate potential erosion and sedimentation impacts. Structures would be designed to avoid obstruction of the drainage course, including the floodplain, and fill would be stabilized and kept to a minimum.

Specifically, the following BMPs would be employed in the placement and design of culverts and low water crossings:

- Deposit erodible materials well away from the drainage channel.
 - Remove any material stockpiled on floodplains in order that rising waters would not reach them.
 - Construction activities in or adjacent to drainages would be limited to specific times to protect beneficial water uses, and construction periods shall be as short as practicable.
 - Install culverts or pipe arches across small drainages to conform to the natural drainage bed and slope on streams that support fish or seasonal fish passage.
 - Place culverts slightly below normal drainage grade to avoid culvert outfall barriers, and do not alter drainage channels upstream from culverts unless necessary to protect fill or to prevent culvert blockage.
 - Install culverts to prevent erosion of fill. Compact the fill material to prevent seepage or failure, and armor the inlet and/or outlet with rock or other suitable material where needed.
 - Align any structures or low water crossings perpendicular to stream flow.
- **Wetlands and Waters of the U.S.** In order to assess construction impacts to wetlands and waters of the U.S. (as regulated by Section 404 of the Clean Water Act), the acreage of short-term and long-term disturbance to potentially jurisdictional drainages was calculated by multiplying the approximate width of the drainage crossing by 10 feet, which is the maximum width of the centerline access where crossing types 4 and 5 above would result in permanent fill (no other wetlands or waters of the U.S. would be impacted, since existing access routes would be utilized and Unimproved Drainage Crossings and Low Water Crossings – Consolidated Bed would not violate Section 404).

Wetland and riparian areas would be avoided by design (through reroute, placing in a different location, or spanning) where possible (Transcon 2008b). Pole structures would be located not less than 100 feet from any wetland or riparian area (the sensitive area would be spanned), and access/maintenance roads would be routed around any wetland areas where possible. Impacts to jurisdictional drainage systems would be the same type as those described in the **Drainages** section above, primarily due to access/maintenance road crossings of ephemeral channels. Short-term impacts to wetlands, if unavoidable, would be in the form of wetland vegetation and soil disturbance, potentially including rutting. This may reduce the capability of that wetland to provide habitat function for a short period of time during construction, although these temporarily affected areas would be restored to their pre-existing condition after construction was completed. Wetland habitat function may be reduced while vegetation re-establishes. Smaller wetlands (such as Drainage Numbers 324 and 385; see **Figure 1.2-3**) would be avoided and would have no effect or short-term loss of function, while larger wetlands (such as Drainage Numbers 139, 310, 381, and 471; see **Figure 1.2-3**) may experience some rutting and crushing of vegetation when conductor is strung across them. However, by virtue of the fact that these wetlands are larger in size, their functional habitat capacity would be only minimally affected, as other parts of the wetland could be used for refuge during construction.

Permitting of impacts would likely fall under the Corps' Nationwide Permitting program, for those jurisdictional drainage and/or wetland systems that were deemed unavoidable. All activities under any of the Action Alternatives would be allowable under Nationwide Permit No. 12 – Utility Line Activities, which considers activities required for the construction, maintenance, and repair of utility lines and associated facilities in waters of the U.S. (including wetlands), up to a limit of 0.5 acre. If long-term impacts were to exceed 0.5 acre, an Individual Permit from the

Corps would be required. Any temporarily disturbed areas would be restored to the pre-existing conditions. Construction impacts would be short-term and minor, and long-term impacts would also be minor. If long-term impacts exceeded the 0.5-acre limit, and therefore required an Individual Permit, then these impacts would be considered moderate.

- **Floodplains.** In order to mitigate adverse effects to floodplains, the proponent has committed to placing or rerouting structures not less than 100 feet outside of any floodplain, where feasible (Transcon 2008b). Since base floodplain data are not available for the Project Area, a qualified environmental inspector would identify potential floodplain areas during the construction phase for avoidance.
- **Highly Erodible Soils.** To assess potential construction impacts from the Proposed Action to drainage systems that are particularly sensitive to erosion, the acreage of short-term disturbance to highly erodible soils in the vicinity of drainage systems was evaluated. These impacts could result from the construction of access and maintenance routes, the installation of transmission line pole structures, or the construction of substations.

During the construction phase, disturbances in highly erodible soils would occur in the form of vegetation clearing and blading for structures and access roads, exposing highly erodible soils to precipitation and increased runoff rates, as well as travel across these soils by construction equipment causing an increase in dust and further destabilizing native soil material. This exposure and destabilization could lead to increased, unnatural sediment loading in nearby drainages, although the implementation of a SWPPP, BMPs, and disturbed-area rehabilitation efforts (as described above and in Transcon [2008b]) are likely to mitigate these impacts, resulting in their being short-term and minor. Long-term impacts would be negligible to minor, since the proponent intends to actively reclaim surface disturbance areas (such as pole sites, stringing locations, and construction areas surrounding ancillary facilities) after the construction period, and the centerline access would not be bladed and would remain as a two-track overland travel route. Erosion control devices established during the construction phase would remain in place until disturbed areas in the vicinity of drainages systems were stabilized.

Groundwater Resources. Construction impacts to groundwater resources as a result of the Action Alternatives could include releases of oil, gas, and/or hydraulic fluid from construction equipment, particularly in temporary work spaces, where hazardous material has the potential to leach through permeable soils into groundwater aquifer systems. The release of these materials could contaminate groundwater aquifers if spills were not identified, contained, and the polluted soil removed in an expedient manner.

A Spill Prevention Plan (SPP) would be developed for all construction areas where hazardous materials would be stored or utilized, and all construction personnel operating equipment would be trained in identifying spills and in the proper notification/cleanup procedures. The SPP would include guidance on storage, refueling, and lubrication procedures and locations, as well as BMPs regarding spill prevention and cleanup procedures. BMPs should include the following, at a minimum:

- Refueling and storing potentially hazardous materials should not occur within a 200-foot radius of any private water well and a 400-foot radius of any municipal or community water supply well.
- Storing of fuel, lubricant, or hazardous materials within 100 feet of waterbody or wetland boundary or within a designated municipal watershed shall be prohibited, unless the location is designated for such use by an appropriate governmental authority (this applies to storage of these materials and does not apply to normal operational equipment use).

- No potentially hazardous materials, other than essential equipment fuels or standard lubricants, shall be transported onto the right-of-way or construction area without coordination and approval by the project environmental inspector.
- Heavy equipment used in the Project Area would be inspected daily for leaks. No leaking equipment may be used within 100 feet of any surface water feature, including wetlands.

Potential impacts to groundwater as described above are the worst case scenario and are unlikely assuming the SPP and BMPs are implemented. Impacts are anticipated to be negligible as surface soils in the area tend to have low permeability and aquifers are deep, ranging in depth from several hundred to over a thousand feet.

Temporary work spaces and BMPs for the construction phase would be considered accordingly to minimize the potential for groundwater contamination. In addition to the above BMPs, no permanent storage, refueling, or application of petrochemicals, including fuel, oil, hydraulic fluid, lubricants, or other petrochemicals would occur within 0.25 mile of springs. Any temporary usage of these materials should have a secondary containment system to prevent spills and exposure of shallow groundwater to these materials. Impacts to groundwater would be negligible with implementation of the SPP and BMPs.

Water Quality. Construction impacts to water quality could occur locally on a small scale, where increased erosion and sedimentation as a result of surface disturbance could contribute to turbidity levels in surface drainages outside of state regulations, or they could occur regionally, where contributions from several surface water systems affect drainages listed on the state's 303(d) list (Water Quality). Surface disturbance associated with placement of pole structures, use of herbicides, and construction of ancillary facilities, as well as for the centerline access/maintenance road, would occur in the form of vegetation clearing. This could expose soils to splash erosion and increased runoff and increase sedimentation rates to nearby drainages. Erosion control measures and BMPs, as discussed in **Drainages** above, would serve to mitigate these potential impacts.

- **Sevier River.** The Action Alternatives would cross the Sevier River within the reach designated as Category 5A, where the pollutants of concern are total phosphorus and habitat alteration. As discussed in the **Drainages** section above, the Sevier River would be spanned by the transmission line conductors, and the proponent would locate any structures or disturbance areas not less than 100 feet from riparian areas if feasible to avoid impact. Similarly, no crossing structures would be utilized for the Sevier River; rather, it would be approached from either side to prevent disturbance.

Water Rights. In regards to potential reduced capacity or rate of water for potentially affected water rights during the construction phase, the Proponent anticipates using water tankers for construction water needs, thereby resulting in no effect on water rights for water supply purposes. If any water rights in the area are to be used for construction water, the Proponent would negotiate legal authority for access and consumption of any water rights with the owner prior to usage. Impacts to surface and groundwater are discussed in the sections above. The number of water rights in proximity to the Proposed Action and Action Alternatives provides the relative amount of potential exposure to the impacts described above. If BMPs are properly utilized, there should be no effect on water rights.

Operations and Maintenance

Surface Water.

- **Drainages.** Operations and maintenance impacts to drainage systems as a result of the Proposed Action and Action Alternatives could result from the maintenance of pole structures, transmission lines, substation facilities, and access/maintenance roads. Since culverts and/or low water crossings would be placed during the construction phase, additional impacts to drainage systems beyond those discussed above would be unlikely. In the event that culvert repair or repair of engineered low water crossings is necessary, short-term and negligible disturbances to the

drainage system may occur in the form of bank grading and replacement of fill material surrounding the culvert or gravel in the low water crossing. However, additional indirect effects beyond the immediate surface disturbance area would be minimized by BMPs, as discussed in the **Water Quality** section below.

- **Wetlands and Waters of the U.S.** As with the drainage systems discussed above, operation and maintenance impacts to wetlands and waters of the U.S. as a result of the Proposed Action and Action Alternatives are anticipated to be short-term and negligible, since all long-term impacts would occur during the construction phase. Impacts to jurisdictional wetlands and waters of the U.S. as a result of maintenance activities could be permitted under Nationwide Permit No. 03 – Maintenance, which allows for activities related to the repair, rehabilitation, or replacement of any previously authorized structure; discharges of dredged or fill material, including excavation, to remove accumulated sediments in the vicinity of existing structures or the placement of riprap to protect the structure; and/or discharges of dredged or fill material, including excavation, associated with the restoration of upland areas damaged by storm, flood, or other event, including the construction, placement, or installation of upland protection structures.
- **Floodplains.** No impacts to floodplains would be anticipated to result from operations and maintenance of the proposed 138 kV transmission line under any of the Action Alternatives.
- **Highly Erodible Soils.** Operations and maintenance impacts to highly erodible soils within 300 feet of surface water systems would be short-term and negligible as a result of surface disturbance associated with pole structure maintenance or maintenance of transmission and substation facilities, as well as access road maintenance. The majority of impacts to highly erodible soils would occur during the construction phase, and any additional disturbance would be easily managed with BMPs during operation and maintenance.

Ground Water. Operations and maintenance impacts to ground water would be unlikely in regards to potential hazardous materials spills with implementation of the SPP and BMPs.

Water Quality. Operations and maintenance impacts to water quality would be the result of drainage crossings, primarily in the form of short-term increases in erosion and sedimentation. Those drainages that were crossed via culvert or low water crossing during the construction phase would not see additional impacts, as these are permanent structures. Those drainages crossed via unimproved crossings would experience the same types of impacts to water quality as during the construction but at reduced frequency. All water quality impacts are expected to be minimized by implementation of the BMPs as described above.

Water Rights. Potential operation and maintenance impacts to water rights as a result of the Action Alternatives would be the same as for the construction phase. However, impacts to water rights are not anticipated.

Removal of 69kV Transmission Line

Surface Water.

- **Drainages.** The centerline access associated with the existing 69 kV transmission line crosses and has impacted ephemeral drainages as well. Currently the access is only used occasionally for maintenance and operations. Utilization of the centerline access for removal of the 69 kV line would likely result in negligible adverse impacts to ephemeral drainages along the centerline access route in the short term, as the route does not currently see much use. Upon completion of removal of the 69 kV transmission line the centerline access would be rehabilitated and would not be authorized for use, which would result in long-term negligible to minor beneficial impacts to water resources.

- **Wetlands and Waters of the U.S.** The centerline access associated with the existing 69 kV transmission line currently impacts approximately 0.22 acre of potentially jurisdictional drainages. Removal of the 69 kV transmission line upon completion of construction of the proposed 138 kV line would likely result in negligible adverse impacts to potentially jurisdictional drainages as the centerline access would see increased activity and heavy equipment movement. The centerline access would be rehabilitated upon project completion, which should result in long-term negligible to minor beneficial impacts to potentially jurisdictional drainages.
- **Floodplains.** No impacts to floodplains would be anticipated to result from removal of the existing 69 kV transmission line under any of the Action Alternatives.
- **Highly Erodible Soils.** Existing access routes would be utilized for the removal of the existing 69 kV line; therefore no new surface disturbance to areas of highly erodible soils within 300 feet of a drainage are anticipated. Some improvements to the access routes could be necessary, resulting in short-term and negligible increase in erosion potential; however, these access routes would be allowed to revegetate and stabilize long-term, resulting in minor beneficial impacts. There is only a small amount of highly erodible soils within 300 feet of a drainage in the vicinity of the existing 69 kV line, near the southeastern terminus, as shown on **Figure 1.2-2**.

Ground Water. Any impacts to ground water associated with the removal of the 69 kV line as a result of any hazardous material spills from removal equipment would be unlikely after implementation of the SPP and BMPs.

Water Quality. Impacts to water quality as a result of the removal of 69 kV line would be short-term, minor increases to erosion and sedimentation during surface disturbance activities; however, the implementation of environmental protection measures and BMPs is anticipated to mitigate erosion and sedimentation during surface disturbance. Long-term minor beneficial effects are anticipated as the right-of-way is allowed to revegetate and stabilize, preventing future sedimentation.

Water Rights. No impacts to water rights as a result of the 69 kV line removal are anticipated, beyond those discussed above under construction, operations, and maintenance common to all Action Alternatives.

Alternative A: Proposed Action

Construction

Surface Water Resources

- **Drainages.** Table 1.3-2 provides stream crossings that would occur under the Proposed Action.

Table 1.3-2. Summary of stream crossings by the Proposed Action.

SEGMENT		NUMBER OF STREAM CROSSINGS					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
A-1	Unimproved	4	8	0	57	37	0
	Temporary Log	0	0	0	0	0	0
	LWC - Unconsolidated	1	0	0	9	1	0
	LWC - Consolidated	0	1	0	2	6	0
	Culvert	0	0	0	0	0	0
A-2	Unimproved	0	0	0	0	6	0
	Temporary Log	0	0	0	0	0	0
	LWC - Unconsolidated	0	0	0	0	0	0
	LWC - Consolidated	0	0	0	0	0	0
	Culvert	0	0	0	0	0	0

SEGMENT		NUMBER OF STREAM CROSSINGS					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
A-3	Unimproved	5	0	15	0	26	0
	Temporary Log	0	0	0	0	0	0
	LWC - Unconsolidated	0	0	0	0	1	0
	LWC - Consolidated	0	0	2	0	2	0
	Culvert	0	0	0	0	0	0

Alternative A would cross a total of 183 drainages. Unimproved drainage crossings would be used for 52 drainages; 12 drainages would be crossed via Low Water Crossing – Unconsolidated Bed; and 13 would be crossed using Low Water Crossing – Consolidated Bed. No temporary log crossings or culverts would be utilized for drainage crossings.

Utilizing crossing lengths provided in Transcon (2008b), as a result of construction of Alternative A a total of up to 1,303 LF of ephemeral drainage would be crossed. Of this, 98 LF would be via Low Water Crossing – Unconsolidated Bed, 219 LF would be via Low Water Crossing – Consolidated Bed, and the remainder would be via Unimproved Drainage Crossing. For the perennial and intermittent drainages of the Sevier River, Tropic Ditch, and portions of Hillsdale and Cedar Fork Canyons, and North Creek, crossing impacts would not occur; the transmission line right-of-way would be accessed from either side of the drainage, the riparian area would be spanned by the conductors, and the drainage would not be disturbed. For the intermittent drainages of North Creek, East Fork Sevier River, and Cedar Fork Canyon, the Low Water Crossing – Consolidated Bed method would be used. Several drainages are also located in *limited access areas* within Segments A-1 (near Cedar Fork Canyon) and A-3 (east of Hillsdale Canyon) and would not be disturbed. For many of the proposed crossings in Segment A-1, the existing 230 kV line access route would be used where possible and, depending on pole locations, fewer new crossings would be required. This represents the maximum potential disturbance.

As a result of Alternative A, a total of 317 LF of ephemeral drainage would be impacted long-term via permanent crossing types.

With nearly 70 total miles of ephemeral drainages located within 0.5 mile of the center line of the Proposed Action, direct construction impacts to drainage systems would be short-term and negligible to minor, relative to the overall amount of drainage systems present in the area, with implementation of BMPs, and Resource Protection Measures contained in **Appendix B**. Indirect effects of these direct drainage impacts are discussed in **Water Quality** below.

- **Wetlands and Waters of the U.S. Table 1.3-3** provides a summary of the acreage of impacts to potentially jurisdictional drainages as a result of the Proposed Action.

Table 1.3-3. Summary of potentially jurisdictional drainages impacted by the Proposed Action.

SEGMENT	POTENTIALLY JURISDICTIONAL DRAINAGE IMPACTS (AC.)					
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
A-1	0.002	0	0	0.016	0.002	0
A-2	0	0	0	0	0	0

SEGMENT	POTENTIALLY JURISDICTIONAL DRAINAGE IMPACTS (AC.)					
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
A-3	0	0	0	0	0.002	0

Short-term and long-term disturbance values for potentially jurisdictional drainages were calculated at the drainage crossing width (from Transcon [2008b]) times 10 feet, which is the maximum disturbance width necessary for construction equipment; however, only those systems that are potentially jurisdictional and would be crossed via either Low Water Crossing – Unconsolidated Bed or Culvert Crossing methods were used, as these are the locations where permanent fill material would be placed.

As a result of Alternative A, up to 0.022 acre of waters of the U.S., including wetlands, could be impacted. These impacts would be in the form of long-term placement of fill within the jurisdictional channels, although they would be negligible due to the overall amount of jurisdictional waters within the Study Area. These impacts would qualify for permitting under Nationwide Permit No. 12 – Utilities.

- **Floodplains.** Garkane anticipates placement of one or two structures in a potential floodplain area due to the proximity of the Sevier River to U.S. 89, as well as several structures in a potential floodplain within Cedar Fork and Hillsdale Canyons. With mitigation, the impacts to floodplains would be negligible, as the permanent placement of pole structures is not anticipated to alter floodplain capacity or function.
- **Highly Erodible Soils.** Table 1.3-4 provides a summary of the acreage of highly erodible soils within 300 feet of stream systems identified by Transcon (2008b) that would be disturbed by the Proposed Action.

Table 1.3-4. Summary of highly erodible soils within 300 feet of a stream system disturbed by the Proposed Action.

SEGMENT		ACREAGE OF HIGHLY ERODIBLE SOILS					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
A-1	Temporary	0	0	0	2.33	2.16	0
	Long-Term	0	0	0	2.17	0.83	0
	Right-of-way	0	0	0	17.97	8.12	0
A-2	Temporary	0	0	0	0	0	0
	Long-Term	0	0	0	0	0	0
	Right-of-way	0	0	0	0	0	0
A-3	Temporary	0	0	0	0	0.02	0
	Long-Term	0	0	0	0	0.03	0
	Right-of-way	0	0	0	0	8.8	0

The acreage of highly erodible soils within 300 feet of drainage systems that would be disturbed by Alternative A was identified by Transcon (2008b). Short- and long-term disturbance values for highly erodible soils were calculated in the same fashion as with drainage systems, discussed above.

Within the Project Area for Alternative A, 34.89 acres of highly erodible soils are within 300 feet of a drainage system. As a result of Alternative A, approximately 4.51 acres (12 percent) of the

highly erodible soils within 300 feet of a drainage system would be temporarily disturbed, while 3.03 acres (10 percent) would be disturbed long-term.

Groundwater Resources. One spring was identified near Hillsdale Canyon, approximately 250 feet northeast of the center line of Alternative A (outside of the right-of-way); therefore, it is likely a shallow aquifer exists in this particular area, making sensitivity to hazardous releases higher in this general vicinity. Impacts to groundwater would be unlikely with implementation of the SPP and BMPs.

Water Quality. Alternative A traverses the Sevier River, the East Fork Sevier River, and the Upper Paria River watersheds in which 303(d)-listed waters occur.

- **Sevier River.** Given the mitigation measures proposed, including those outlined in the **Drainages** section, it is unlikely that Alternative A would contribute to either increasing total phosphorus or further altering habitat to this reach of the 303(d)-listed Sevier River. The implementation strategy for this TMDL includes grazing management, streambank restoration, and irrigation efficiency and buffers, none of which Alternative A would interfere with. Overall short- and long-term adverse impacts to the Sevier River would be negligible.
- **East Fork Sevier River.** The East Fork Sevier River is listed as Category 5A, or TMDL required, although the listed reach occurs approximately 30 miles downstream of the Study Area. It is unlikely that construction activities associated with Alternative A would contribute to increased levels of phosphorus, as erosion control measures (described in **Drainages** above) would prevent increased sediment loading to the East Fork Sevier River reach crossed by Alternative A. The transmission line would span the East Fork Sevier River, and no new crossings of the river would be created, during either construction or maintenance. Overall short- and long-term adverse impacts to the East Fork Sevier River would be negligible.
- **Paria River.** Two reaches of the Paria River are listed as Category 5A also; however, the pollutant of concern for this water body includes TDS. According to UDWQ (2004b), the Paria River reach occurring in the Study Area (from the confluence with Rock Springs Creek to the headwaters) exceeds TDS criteria primarily due to natural sources, with no specific excess TDS loading associated with irrigation and agricultural practices (which are common in the area). Other contaminant sources included off-road recreational vehicle use, particularly in areas not designated for recreational use or where existing roads are not present.

Alternative A would span North Creek, an intermittent tributary to the Paria River, in the middle of East Valley, near the eastern extent of the Study Area. North Creek discharges to the Paria River approximately 4 miles downstream of this crossing location. In addition to the North Creek crossing location, Alternative A would cross approximately 100 additional small, ephemeral drainages within the upper Paria River watershed. While North Creek would not be disturbed and no permanent crossing structures would be placed, it is possible that construction activities, particularly those involving disturbance to surface water systems and to highly erodible soils in the vicinity of surface water systems (as described in **Drainages** above), could contribute to increased levels of TDS within the 303(d)-listed Paria River reach. In addition to drainage crossings, the centerline access within the watershed could be illegally traveled by recreational off-road users, contributing to increased runoff and sedimentation, thereby negatively affecting TDS conditions. If erosion control measures and BMPs (as discussed above) are implemented, potential TDS impacts could be minimized; however, Alternative A is likely to negatively affect the 303(d)-listed Paria River area. Overall short- and long-term adverse impacts to the Paria River would be minor.

Water Rights. There are 104 active water rights within a 1-mile buffer of the Proposed Action. It is unlikely that these water rights would be affected by any activities associated with Alternative A (beyond impacts to surface and ground water, as discussed above).

Operations and Maintenance

Surface Water.

- **Drainages.** Operations and maintenance impacts to drainages as a result of Alternative A would come as a result of re-crossing some drainages via the Unimproved Drainage Crossing method. Permanent crossings established during construction would not experience any additional impacts. Any disturbance would be short-term and negligible.
- **Wetlands and Waters of the U.S.** Operations and maintenance impacts to wetlands and waters of the U.S. would be short-term and negligible, since these areas would already have been permanently impacted during construction. Any alterations would be covered under Nationwide Permit No. 3 – Maintenance.
- **Highly Erodible Soils.** The types of impacts to highly erodible soils resulting from operations and maintenance activities under Alternative A would be the same as for the construction phase, although at a reduced scale. The disturbance would only occur along the centerline access route, and the implementation of environmental protection measures and BMPs would make these impacts short-term and negligible.

Ground Water. Potential operation and maintenance impacts to groundwater resources as a result of Alternative A would be similar in type to the construction impacts, although at a much-reduced scale. Maintenance equipment would be minimal and would be unlikely to be stationed at any one location long enough to release amounts of oil, gas, and/or hydraulic fluid that would impact ground water. If releases were to occur, they would be small and could be easily cleaned up. Impacts to groundwater resources as a result of operation and maintenance would be short-term and negligible with the implementation of the SPP and BMPs.

Water Quality. Operations and maintenance impacts to water quality would occur in the form of temporary disturbance to unimproved drainage crossings, resulting in short-term and negligible increases in erosion and sedimentation.

Water Rights. No impacts to water rights from operation and maintenance are anticipated, beyond those discussed above.

Removal of 69 kV Transmission Line

Surface Water.

- **Drainages.** There are several existing drainage crossings along the existing 69 kV line and associated access route. The removal of this line would cause short-term, minor surface disturbance and potential increase in erosion and sedimentation to these drainages at the crossing location. However, upon removal of the line and rehabilitation of the access route, negligible to minor beneficial effects would occur, as no more maintenance crossing of these drainages would occur.
- **Wetlands and Waters of the U.S.** There are a few jurisdictional drainages located along the existing 69 kV line, although no permanent fill is present in any of them. There could be short-term, negligible disturbance to one wetland that is spanned by the existing line, although long-term effects to the area are expected to be beneficial as with **Drainages** above. There would be no change to the majority of wetlands and waters of the U.S. following removal of the existing line.
- **Floodplains.** No impacts to floodplains would be anticipated from removal of the existing 69 kV transmission line.

- **Highly Erodible Soils.** Existing access routes would be used for the removal of the existing 69 kV transmission line. Although some new ground disturbance may occur, and there are large areas of highly erodible soils along the line, there are only two drainages within 300 feet of a highly erodible soil along the existing line; therefore, erosion potential is negligible. The implementation of environmental protection measures and BMPs would make any impacts short-term and negligible.

Ground Water. Impacts to ground water as a result of the removal of the existing 69 kV transmission line would be similar to those described for construction impacts in **Section 1.3.1.2, Impacts Common to All Action Alternatives.**

Water Quality. Impacts to water quality as a result of the removal of the existing 69 kV transmission line would be short-term and negligible to minor with the implementation of BMPs. These would primarily occur in the form of unimproved drainage crossings, as described above.

Water Rights. There are 131 active water rights within a 1-mile buffer of the existing 69 kV transmission line. There would be no impacts to water rights from removal of the existing transmission line, beyond those discussed above.

Alternative B: Parallel Existing 69 kV Route

Construction

Surface Water Resources.

- **Drainages.** Table 1.3-5 provides the stream crossings that would occur under the Alternative B.

Table 1.3-5. Summary of stream crossings by Alternative B.

SEGMENT		NUMBER OF STREAM CROSSINGS					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
B ¹	Unimproved	11	12	37	0	0	0
	Temporary Log	0	0	0	0	0	0
	LWC - Unconsolidated	0	0	2	0	0	0
	LWC - Consolidated	0	0	1	0	0	0
	Culvert	0	0	0	0	0	0
B ²	Unimproved	11	12	37	0	0	0
	Temporary Log	0	0	0	0	0	0
	LWC - Unconsolidated	0	0	2	0	0	0
	LWC - Consolidated	0	0	1	0	2	0
	Culvert	0	0	0	0	0	0

Alternative B would cross 63 or 65 drainages, depending on which substation option were selected. Under either substation option, unimproved drainage crossings would be used for 60 drainages and 2 drainages would be crossed via Low Water Crossing – Unconsolidated Bed. With substation option B1, 1 drainage would be crossed using Low Water Crossing – Consolidated Bed; with substation option B2, 3 drainages would be crossed using this method. No temporary log crossings or culverts would be utilized for drainage crossings.

Utilizing crossing lengths provided in Transcon (2008b), Alternative B would impact 417 LF of intermittent/ephemeral drainages. Of this, 39 LF would be via Low Water Crossing – Unconsolidated Bed, 23 LF would be via Low Water Crossing – Consolidated Bed, and the remainder would be via Unimproved Drainage Crossing. There are existing access and *limited access areas* throughout the majority of BRCA; therefore no drainage crossings are proposed

there. There are also no new access routes proposed on the private land located near the southeastern terminus of Alternative B, and therefore no new crossings would occur in this location either.

As a result of Alternative A, a total of 62 LF of ephemeral drainage would be impacted long-term via permanent crossing types (as described above).

As with Alternative A, direct construction impacts to drainage systems would be short-term and negligible to minor due to the large amount of drainage linear footage within the Study Area, with implementation of BMPs and Resource Protection Measures (**Appendix B**). Indirect effects of these direct drainage impacts are discussed in **Water Quality** below.

- **Wetlands and Waters of the U.S.** **Table 1.3-6** provides a summary of the acreage of impacts to potentially jurisdictional drainages as a result of Alternative B. Disturbance values were calculated in the same fashion as with the Proposed Action, discussed above.

Table 1.3-6. Summary of potentially jurisdictional drainages impacted by Alternative B.

SEGMENT	POTENTIALLY JURISDICTIONAL DRAINAGE IMPACTS (AC.)					
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
B ¹	0	0	0.007	0	0.002	0
B ²	0	0	0.007	0	0.002	0

Disturbance values for potentially jurisdictional drainages were calculated in the same fashion as with Alternative A, discussed above. Under either substation option, Alternative B could impact 0.009 acre of potentially jurisdictional waters of the U.S. These impacts would be in the form of long-term placement of fill within the jurisdictional channels, although they would be negligible due to the overall amount of jurisdictional waters within the Study Area. These impacts would qualify for permitting under Nationwide Permit No. 12 – Utilities.

- **Floodplains.** There would be no impacts to floodplains from construction anticipated under Alternative B.
- **Highly Erodible Soils.** **Table 1.3-7** provides a summary of the acreage of highly erodible soils within 300 feet of stream systems identified by Transcon (2008b) that would be disturbed by Alternative B. Temporary and long-term disturbance values were calculated in the same fashion as with stream systems, discussed above.

Table 1.3-7. Summary of highly erodible soils within 300 feet of a stream system disturbed by Alternative B.

SEGMENT		ACREAGE OF HIGHLY ERODIBLE SOILS					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
B ¹	Temporary	0.92	0	0	0	0	0
	Long-Term	0.54	0	0.41	0	0.14	0
	right-of-way	4.61	0	4.03	0	9.43	6.83
B ²	Temporary	0.92	0	0	0	0	0
	Long-Term	1.35	0	0.41	0	0.14	0
	right-of-way	4.61	0	4.03	0	9.43	6.83

¹ Substation located on USFS land

² Substation located on private land

The acreage of highly erodible soils within 300 feet of drainage systems under Alternative B was identified by Transcon (2008b). Short-term and long-term disturbance values were calculated in the same fashion as with drainage systems, discussed above.

Alternative B would temporarily impact 0.92 acre of highly erodible soils within 300 feet of a drainage. Overall, the terrain for Alternative B is steeper and has more erodible soil than the Proposed Action, although much of this area is not within 300 feet of a drainage or is proposed for limited access construction methods. Alternative B would have long-term impacts to either 1.09 acres or 1.90 acres of highly erodible soils within 300 feet of a drainage, depending on the location of the substation. Construction-related impacts would be short-term and negligible to minor, and long-term impacts would also be negligible to minor.

Groundwater Resources. There are no known springs located in the vicinity of Alternative B. Contamination of groundwater from hazardous materials releases would be unlikely with implementation of the SPP and BMPs; any impacts would be negligible.

Water Quality. Similar to the Proposed Action, Alternative B would have transmission line crossings of the Sevier, East Fork Sevier, and Paria Rivers where TMDLs are proposed. The Alternative B crossing of the Sevier River would also be within the 303(d)-listed reach, and the types of impacts would be the same as for the Proposed Action (the Sevier River would be spanned by the conductors and no crossings would be placed). The East Fork Sevier River crossing would occur further upstream from the 303(d)-listed reach than the Proposed Action, and no impacts to this listed reach are anticipated. The Paria River tributary of North Creek would be crossed 2 miles upstream of the confluence with the Paria River. In addition to the North Creek crossing, approximately 14 small, ephemeral drainage crossings within the upper Paria River watershed would occur with Alternative B. Overall short- and long-term impacts to the Sevier and East Fork Sevier Rivers would be the same as for Alternative A. Short- and long-term impacts to the Paria River would be negligible due to the small number (14) of ephemeral drainage crossings within the watershed.

Water Rights. Alternative B has 218 active water rights within a 1-mile buffer of the Alternative B alignment, although none are proposed for construction usage. Should impacts as discussed above occur, they would likely be long-term and minor to major.

Substation Distribution Lines

Construction of distribution lines in conjunction with removal of the existing Tropic Substation could potentially involve crossing of two streams/rivers and three intermittent drainages and highly erodible soils, and it could potentially impact one surface point of diversion. Construction of distribution lines in conjunction with either of the new Bryce Substation options may potentially cross two intermittent drainages and highly erodible soils, and it could potentially impact Drainage #471. Three underground

and two surface points of diversion are located near the existing Bryce Substation. Resource protection measures (**Appendix B**) would be employed to minimize any impacts to water resources and erodible soils that might impact water resources. Streams and wetland areas would likely be spanned by the proposed distribution lines to minimize effects, and no permanent structures would be placed in any stream or wetland.

Operations and Maintenance

Surface Water.

- **Drainages.** Impacts to drainages as a result of operation and maintenance of Alternative B would be of the same type and degree as for the Proposed Action, relative to the number of drainage crossings necessary within Alternative B. No additional operation and maintenance impacts are anticipated. Any impacts would be short-term and negligible.
- **Wetlands and Waters of the U.S.** Impacts to waters of the U.S., including wetlands, as a result of operation and maintenance of Alternative B would be of the same type and degree as for the Proposed Action, relative to the number of new crossings of jurisdictional systems necessary, although all crossing impacts are expected to occur during the construction phase. Any impacts would be permitable under Nationwide Permit No. 3 – Maintenance. Any impacts would be short-term and negligible.
- **Highly Erodible Soils.** Impacts to highly erodible soils within 300 feet of a drainage as a result of operation and maintenance of Alternative B would be of the same type and degree as for the Proposed Action, relative to the surface disturbance area within these areas. Any impacts would be short-term and negligible. The construction of Alternative B and the removal of the existing 69 kV line would occur simultaneously, and much of the route is shared, although the locations of highly erodible soils within 300 feet of a drainage along the Alternative B route are in areas where the existing line is not present.

Ground Water. Impacts to ground water as a result of operation and maintenance of Alternative B would be of the same type and degree as for the Proposed Action.

Water Quality. Impacts to water quality as a result of operation and maintenance of Alternative B would be of the same type and degree as for the Proposed Action.

Water Rights. Impacts to water rights as a result of operation and maintenance of Alternative B would be of the same type and degree as for the Proposed Action.

Removal of 69 kV Transmission Line

The water rights impacted by removal of the existing 69 kV transmission line are included in construction impacts above. Impacts resulting from removal of the existing 69 kV transmission line under Alternative B would be the same as those described under Construction above.

Alternative C: Cedar Fork Southern Route

Construction

Surface Water Resources.

- **Streams.** **Table 1.3-8** provides acreages of impacts to ephemeral streams that would occur under the Alternative C.

Table 1.3-8. Summary of stream crossings by Alternative C.

SEGMENT		NUMBER OF STREAM CROSSINGS					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
C-1	Unimproved	13	0	0	57	27	0
	Temporary Log	2	0	0	0	0	0
	LWC - Unconsolidated	1	0	0	9	3	0
	LWC - Consolidated	0	0	0	2	6	0
	Culvert	0	0	0	0	0	0
C-2	Unimproved	0	0	0	0	3	0
	Temporary Log	0	0	0	0	0	0
	LWC - Unconsolidated	0	0	0	0	2	0
	LWC - Consolidated	0	0	0	0	0	0
	Culvert	0	0	0	0	0	0
C-3	Unimproved	5	0	17	0	45	0
	Temporary Log	0	0	0	0	1	0
	LWC - Unconsolidated	0	0	0	0	0	0
	LWC - Consolidated	2	0	2	0	3	0
	Culvert	0	0	0	0	0	0

Alternative C would cross a total of 200 drainages. Unimproved drainage crossings would be used for 70 drainages; 15 drainages each would be crossed via Low Water Crossing – Unconsolidated Bed and Low Water Crossing – Consolidated Bed; and 3 drainages would be crossed via temporary log crossings. No culverts would be utilized for drainage crossings.

Utilizing crossing lengths provided in Transcon (2008b), Alternative C would impact 1,208 LF of intermittent/ephemeral drainages. Of this, 24 LF would be via temporary log crossing, 107 LF would be via Low Water Crossing – Unconsolidated Bed, 179 LF would be via Low Water Crossing – Consolidated Bed, and the remainder would be via Unimproved Drainage Crossing. As with Alternative A, for the intermittent drainages of North Creek, East Fork Sevier River, and Cedar Fork Canyon, the Low Water Crossing – Consolidated Bed method would be used. For the perennial drainages of the Sevier River and Tropic Ditch, crossing impacts would not occur; the transmission line right-of-way would be accessed from either side of the drainage, the riparian area would be spanned by the conductors, and the drainage would not be disturbed.

Several drainages are also located in *limited access areas* within Segment C-1 (near Cedar Fork Canyon) and would not be disturbed. For many of the proposed crossings in Segment C-1, the existing 230 kV line access route would be used where possible and, depending on pole locations, fewer new crossings would be required. This represents the maximum potential disturbance.

As a result of Alternative A, a total of 286 LF of ephemeral drainage would be impacted long-term via permanent crossing types (as described above).

As with Alternative A, direct construction impacts to drainage systems would be short-term and negligible to minor due to the large amount of drainage linear footage within the Study Area, with implementation of BMPs and Resource Protection Measures (**Appendix B**). Indirect effects of these direct drainage impacts are discussed in **Water Quality** below.

- **Wetlands and Waters of the U.S. Table 1.3-9** provides a summary of the acreage of impacts to potentially jurisdictional drainages as a result of Alternative C. Temporary and long-term

disturbance values were calculated in the same fashion as with the Proposed Action, discussed above.

Table 1.3-9. Summary of potentially jurisdictional drainages impacted by Alternative C.

SEGMENT	POTENTIALLY JURISDICTIONAL DRAINAGE IMPACTS (AC.)					
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
C-1	0	0	0	0.016	0.005	0
C-2	0	0	0	0	0.004	0
C-3	0	0	0	0	0	0

Short- and long-term disturbance values for potentially jurisdictional drainages were calculated in the same fashion as with Alternative A, discussed above.

As a result of Alternative C, up to 0.025 acre of waters of the U.S., including wetlands, could be impacted. These impacts would be in the form of long-term placement of fill within the jurisdictional channels, although they would be negligible due to the overall amount of jurisdictional waters within the Study Area. These impacts would qualify for permitting under Nationwide Permit No. 12 – Utilities.

- **Floodplains.** Impacts to floodplains would be the same as for Alternative A, except no structures would be placed within Hillsdale Canyon.
- **Highly Erodible Soils.** Table 1.3-10 provides a summary of the acreage of highly erodible soils within 300 feet of stream systems identified by Transcon (2008b) that would be disturbed by Alternative C. Temporary and long-term disturbance values were calculated in the same fashion as with stream systems, discussed above.

Table 1.3-10. Summary of highly erodible soils within 300 feet of a stream system disturbed by Alternative C.

SEGMENT		ACREAGE OF HIGHLY ERODIBLE SOILS					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
C-1	Temporary	0	0	0	0	4.50	0
	Long-Term	0.09	0	0	2.17	0.55	0
	right-of-way	0.89	0	0	0	5.31	0
C-2	Temporary	0	0	0	0	0	0
	Long-Term	0	0	0	0	0	0
	right-of-way	0	0	0	0	0.03	0
C-3	Temporary	0	0	0	0	2.35	0
	Long-Term	0	0	0	0	0	0
	right-of-way	0	0	0	0	4.28	0

The acreage of highly erodible soils within 300 feet of drainage systems under Alternative C was identified by Transcon (2008b). Short-term and long-term disturbance values were calculated in the same fashion as with drainage systems, discussed above.

The types of impacts to surface waters in the vicinity of highly erodible soils as a result of Alternative C would be the same as for the Proposed Action, and the mitigation measures would be the same also. Alternative C would temporarily impact 6.85 acres and 2.81 acres in the long term. Construction-related impacts would be short-term and negligible to minor, while long-term impacts would be negligible to minor.

Groundwater Resources. Impacts to groundwater resources as a result of Alternative C would be the same as those associated with the Proposed Action.

Water Quality. Similar to Alternatives A and B, Alternative C would have transmission line crossings of the Sevier, East Fork Sevier, and Paria Rivers, where TMDLs are proposed. The Alternative C crossings of the Sevier River and North Creek (as well as the ephemeral drainage crossings in the upper Paria River watershed) would be identical to Alternative A. The East Fork Sevier River crossing would occur further upstream from the 303(d)-listed reach than Alternatives A or B, and no impacts to this listed reach are anticipated.

Water Rights. Alternative C has 138 active water rights within a 1-mile buffer of the Alternative C alignment. Should impacts occur, as discussed above, they would likely be long-term and minor to major.

Operations and Maintenance

Impacts to water resources under Alternative C from operations and maintenance activities would be the same as those described for the Proposed Action above.

Removal of 69 kV Transmission Line

Impacts to water resources under Alternative C from removal of the existing 69 kV transmission line would be the same as those described for removal of the transmission line under the Proposed Action above.

1.3.1.3. Interconnect Options

Construction

Surface Water Resources.

- **Drainages.** The North-South and East-West Interconnect Options would have several stream crossings, as shown in **Table 1.3-11**.

Table 1.3-11. Summary of stream crossings by the Interconnect Options.

SEGMENT		NUMBER OF STREAM CROSSINGS					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
E-W	Unimproved	0	0	0	0	17	0
	Temporary Log	0	0	0	0	0	0
	LWC - Unconsolidated	0	0	0	0	2	0
	LWC - Consolidated	0	0	0	0	6	0
	Culvert	0	0	0	0	0	0
N-S	Unimproved	0	0	0	0	5	0
	Temporary Log	0	0	0	0	0	0
	LWC - Unconsolidated	0	0	0	0	0	0
	LWC - Consolidated	0	0	0	0	0	0
	Culvert	0	0	0	0	0	0

The East-West Interconnect Option would cross a total of 25 drainages. Unimproved drainage crossings would be used for 17 drainages; 2 drainages would be crossed via Low Water Crossing

– Unconsolidated Bed; and 6 would be crossed using Low Water Crossing – Consolidated Bed. No temporary log crossings or culverts would be utilized for drainage crossings. The North-South Interconnect Option would cross a total of 5 drainages, all of which would be crossed via unimproved drainage crossings.

Utilizing crossing lengths provided in Transcon (2008b), the East-West Interconnect would impact 101 LF of intermittent/ephemeral drainages. Of this, 15 LF would be via Low Water Crossing – Unconsolidated Bed and the remainder would be via Unimproved Drainage Crossing. The North-South Interconnect would impact 20 LF of ephemeral drainages, all via Unimproved Drainage Crossing.

As with Alternative A, direct construction impacts to drainage systems would be short-term and negligible to minor due to the large amount of drainage linear footage within the Study Area, with implementation of BMPs and Resource Protection Measures (**Appendix B**). Indirect effects of these direct drainage impacts are discussed in **Water Quality** below.

- **Wetlands and Waters of the U.S.** Only two potentially jurisdictional drainages that would be crossed by Low Water Crossing – Unconsolidated Bed methods are present, both within the East-West Interconnect. A total of 0.003 acre of jurisdictional impact would occur within the East-West Interconnect, and none would occur within the North-South Interconnect. These impacts would be negligible.
- **Floodplains.** No impacts to floodplains would be anticipated under either of the interconnect options.
- **Highly Erodible Soils.** Table 1.3-12 provides a summary of the acreage of highly erodible soils within 300 feet of stream systems identified by Transcon (2008b) that would be disturbed by the interconnect options. Temporary and long-term disturbance values were calculated in the same fashion as with stream systems, discussed above.

Table 1.3-12. Summary of highly erodible soils within 300 feet of a stream system disturbed by the interconnect options.

SEGMENT		ACREAGE OF HIGHLY ERODIBLE SOILS					
		PRIVATE	SITLA	KFO	GSENM	DNF	BRCA
E-W Interconnect	Temporary	0	0	0	0	0.96	0
	Long-Term	0	0	0	0	0.13	0
	right-of-way	0	0	0	0	2.85	0
N-S Interconnect	Temporary	0	0	0	0	0.46	0
	Long-Term	0	0	0	0	0.16	0
	right-of-way	0	0	0	0	1.56	0

The acreage of highly erodible soils within 300 feet of drainage systems under the Interconnect Options was identified by Transcon (2008b). Short- and long-term disturbance values were calculated in the same fashion as with drainage systems, discussed above.

The East-West Interconnect has the potential to temporarily affect 0.96 acre and have long-term effects to 0.13 acre of highly erodible soils within 300 feet of a drainage system, while the North-South Interconnect would have short-term effects to 0.46 acre and 0.16 acre of long-term effects to highly erodible soils within 300 feet of a drainage system.

Groundwater Resources. There are no springs in the vicinity of either interconnect option, and ground water impacts would be the same types and degrees as with Alternative A.

Water Quality. Both interconnect options would span an unnamed intermittent tributary of the East Fork Sevier River, although neither option crosses a reach that is listed for TMDL. The East Fork Sevier River is on the state 303(d) list for total phosphorus, although the listed reach is located approximately 30 miles downstream from the Project Area; therefore, neither interconnect option is anticipated to negatively affect water quality.

Water Rights. The types of impacts to water rights as a result of the interconnect options would be the same as those associated with Alternative A, and the mitigation measures would be the same also. There are two underground water rights and one surface water right within a mile of the East-West option, and no water rights within a mile of the North-South option.

Operations and Maintenance

Surface Water

- **Drainages, Wetlands, and Waters of the U.S.** Operations and maintenance impacts to drainages, wetlands, and Waters of the U.S. would be the same types and degrees of impacts as described for Alternative A with relative differences of scale.
- **Highly Erodible Soil.** Operations and maintenance impacts to highly erodible soils would be the same as those described for Alternative A above.

Ground Water, Water Quality, and Water Rights. Operations and maintenance impacts to ground water, water quality and water rights would be the same as those described for Alternative A above.

Alternative D: No Action Alternative

Under the No Action Alternative, the proposed 138 kV transmission line and associated new infrastructure would not be constructed, and the existing 69 kV transmission line would remain in operation in its current location. The existing transmission line would be overhauled including the possible replacement of conductor wire and the majority of the poles. Ground disturbance and resulting impacts to water resources from overhaul would be similar to, but somewhat less than, that described above for construction under Alternative B. Future maintenance and line operations would be similar to current levels. Surface water, groundwater, water quality, and water rights would experience effects similar to the current level.

1.3.1.4. Summary

Potential effects on water resources vary between the Proposed Action and Action Alternatives, especially in regards to surface water resources and available water rights. Although conditions vary somewhat between the alternatives in regards to groundwater and water quality, these variations are negligible and are therefore not considered here. **Table 1.3-13** provides a comparative summary of short-term and long-term surface water impacts and potentially affected water rights among the three alternatives.

Table 1.3-13. Summary of Short-Term and Long-Term Surface Water Impacts and Potentially Affected Water Rights

WATER RESOURCE	ALTERNATIVES						
	ALT. A	ALT. B (INCL. 69 kV REMOVAL)		ALT. C	INTERCONNECT OPTIONS		69 kV TRANSMISSION LINE REMOVAL (ALTS. A & C)
		B1	B2		NORTH-SOUTH	EAST-WEST	
Drainages							
Linear Feet	1,303	417		1,208	20	101	Minor, ST Neg to Min, LT, beneficial
Number of Crossings	183	63	65	200	5	25	

WATER RESOURCE	ALTERNATIVES						
	ALT. A	ALT. B (INCL. 69 kV REMOVAL)		ALT. C	INTERCONNECT OPTIONS		69 kV TRANSMISSION LINE REMOVAL (ALTS. A & C)
		B1	B2		NORTH-SOUTH	EAST-WEST	
Wetlands & Waters of the U.S. (acres)							
Short-term	None*						
Long-term	0.022	0.009	0.009	0.025	0	0.003	Neg to Min, beneficial
Floodplains							
Short-term	None**						
Long-term	Neg	None		Neg	None		None
Highly Erodible Soils (acres)							
Short-term	4.51	0.92		6.85	0.046	0.96	Neg
Long-term	3.03	1.09	1.90	2.81	0.16	0.13	Minor beneficial
Ground Water							
Number of springs in proximity to Project Area	1	0		1	0		Same as Alt. B Construction
Water Quality							
Short-term	Neg	Neg	Neg	Neg	None		Minor, adverse
Long-term	Neg	Neg	Neg	Neg			Minor, beneficial
Water Rights							
Number of Water Rights within 1 mile of right-of-way	104	218		138	0	3	131

*All construction of crossings or placement of fill would be maintained for the long term to allow for stream channel crossing for operations and maintenance.

**All construction in floodplains would include long-term placement of poles; there would be no short-term impacts that would affect floodplain capacity or function.

1.3.2. Cumulative Effects

This section addresses potential cumulative effects that would result from the effects of the Proposed Action or Action Alternatives when combined with the effects of other past, present, and reasonably foreseeable future projects. Cumulative effects are incremental in nature. They can result from individually minor, but collectively significant, actions taken over a period of time.

1.3.2.1. Cumulative Effects Area

The general cumulative effects area (**Figure 1.3-1**) for the project for all resources except wildlife, special status species, and socioeconomics includes all HUC 12 (6th level) watersheds that come within 0.5 mile of the project components. The cumulative effects area encompasses 237,010 acres (**Table 1.3-14**). Land management agencies responsible for managing a range of uses on 204,559 acres of public land are the DNF Powell and Escalante Ranger Districts, the KFO and GSENM, BRCA, and SITLA. Private land ownership accounts for 13.7 percent (32,451 acres) of land within the cumulative effects area.

Figure 1.3-1. General Cumulative Effects Area

Table 1.3-14. Cumulative Effects Area – Acreage by Land Ownership/Management

LAND OWNERSHIP/MANAGEMENT	ACRES
U. S. Forest Service - DNF	121,852.4
Bureau of Land Management – KFO	35,133.9
Bureau of Land Management – GSENM	11,981.5
National Park Service – BRCA	17,067.3
SITLA	18,524.1
Private	32,450.9
Total	237,010.1

1.3.2.2. Past, Present, and Reasonably Foreseeable Actions

National Forest lands and BLM lands administered by KFO are managed for multiple resource values and uses. In the cumulative effects area, past and present uses include timber and woodland product harvest; livestock grazing; and recreation uses including hunting, fishing, camping, picnicking, hiking, back country driving, and mountain biking. Lands are also available for mining, oil and gas development, and production of mineral materials (building stone and sand and gravel). Roads, transmission lines, pipelines, and communication sites are located on National Forest and other public lands. While these types of uses have resulted in an unknown amount of surface or subsurface disturbance and placement of human-made structures on the landscape, the National Forest and public lands still retain a largely undeveloped appearance. These lands are not characterized by urban or commercial development that is typical of cities and towns.

The GSENM is managed for a variety of resource values and uses, with a mandate from the Presidential Proclamation that established the Monument to protect myriad historic and scientific resources. To meet this objective, BLM manages the Monument to protect its primitive frontier state and safeguard its remote and undeveloped character. Further, BLM manages the Monument to provide opportunities for study of scientific and historic resources. Within this management focus, past and present uses of public lands in the Monument include livestock grazing, recreation, and realty actions. While the Monument is closed to mining and oil and gas development, roads, transmission lines, pipelines, and communication sites are located on these public lands. These uses have resulted in an undetermined amount of surface and subsurface disturbance and placement of human-made structures on the landscape, but public lands in the Monument still retain a largely undeveloped appearance.

BRCA, on the other hand, is managed with an emphasis on protection and enhancement of its unusual scenic beauty and its value for science and education, and for the benefit and enjoyment of the public. Even with this focus on protection and preservation, some past and present development has occurred in the Park for management of visitor use and the protection of Park resources. A paved access road runs the length of the Park, providing access to many sites and facilities, including administrative offices and buildings, Bryce Canyon Lodge, campgrounds, trails, interpretive sites, and others. Other infrastructure, including transmission lines, is also present. Garkane’s existing 69 kV transmission line crosses the northern end of the park, as does SR 12. However, even with this development, the vast majority of the Park in the cumulative effects area is undeveloped, and presents a natural landscape.

State lands in the cumulative effects area are managed by SITLA to produce revenue for the State school system. State lands are managed for a variety of uses that produce revenue, and past and present uses include livestock grazing, recreation uses, roads, highways, utility lines, and other commercial uses. Lands are occasionally sold for private development. As with federal lands, these uses result in surface

disturbances, but generally, State lands retain an undeveloped appearance. The current amount of surface and subsurface disturbance is unknown.

Private lands in the cumulative effects area are used and developed for a variety of purposes, including residential, commercial, and industrial development in and adjacent to cities and towns. Many acres of private land are in farmland production, including irrigated pastures, range pastures, and hay, grain, and alfalfa.

Reasonably foreseeable future actions within the cumulative effects area that are currently planned or under review include activities that fall into several broad categories:

- Energy and communications
- Transportation
- Vegetation and fire fuels management
- Habitat improvement
- Land use and management
- Recreation
- Mining
- Miscellaneous

Table 1.3-15 shows activities currently planned, under review, or in permitting in Garfield County that may be pertinent to cumulative effects for one or more resource areas. Projects within Garfield County but outside the cumulative effects area for all resources (except socioeconomics) are labeled “socio only.” The table is organized generally by project type (energy, transportation, forest fuels management, etc.), but many of the entries could easily fit into more than one classification.

Table 1.3-15. Reasonably Foreseeable Future Actions in the Cumulative Effects Areas

PROJECT (LEAD AGENCY)	LOCATION	DESCRIPTION	ESTIMATED DISTURBANCE (IF AVAILABLE)
Energy & Communications			
Designation of Energy Corridors (USFS)	Forest-wide	Would designate energy corridors on the DNF and other federal land in 11 western states. Corridor 116-206 would be west of U.S. 89 in the cumulative effects area.	
Geothermal Leasing Programmatic EIS (USFS)	Forest-wide	USFS and BLM are preparing a joint programmatic EIS to analyze leasing of federal lands with moderate to high potential for geothermal resources in 11 western states	
Oil and Gas Leasing Analysis (USFS)	Forest-wide	EIS to evaluate all BLM and USFS administered lands for oil and gas leasing	

PROJECT (LEAD AGENCY)	LOCATION	DESCRIPTION	ESTIMATED DISTURBANCE (IF AVAILABLE)
Panguitch Lake Power Line Realignment (DNF)	Cedar City RD (Socio only)	Authorization to PacifiCorp for the relocation of 1.2 miles of 12.5 kV power line. Work would involve construction of a new overhead power line and removal of the old line. Area is approximately 17 miles southwest of Panguitch.	
South Central Utah Telephone Association (SCSRA) I-15 to U.S. 89 Fiber Optic Line (BLM)	(Socio only)	Fiber optic line from I-15 in Iron County to U.S. 89 in Garfield County 7.5 miles north of Panguitch requiring BLM right-of-way	
Oil and Gas Lease Sales (BLM)	BLM	Ongoing BLM program to lease lands suitable for oil and gas development, including lands in Garfield County classified as having high potential for oil & gas development	
Transportation			
DNF Motorized Travel Plan (DNF)	Forest-wide	To identify changes to the motorized travel system (roads) to meet administrative, fire, recreational, and resource needs; will generally prohibit cross-country (off-road) motorized travel on the Forest, but would remain open to hiking, horseback riding, cross-country skiing, and snowmobile use.	
Mammoth Highway Easement (DNF)	Cedar City RD (Socio only)	Issuance of a right-of-way easement to Garfield and Kane Counties for Mammoth Highway (Forest Road 068), northeast of Duck Creek Village, between State Highways 14 and 143.	
Tropic Canyon Highway Stabilization Project (BRCA)	BRCA	Repair and stabilize SR 12 and introduce water diversion into Tropic Wash, west of Tropic	210 linear feet of road shoulder; 5 stream barbs in Tropic Wash
SR-12 Environmental Study (UDOT, FHWA, GSENM)	Escalante to Boulder (Socio only)	EA for project to obtain over 14 miles of right-of-way from BLM and generally upgrade SR 12	
SR-12 Scenic Byway Improvements (UDOT, GSENM)	SR 12 throughout Garfield County	Improve overlooks, interpretive sites, and gateway features	

PROJECT (LEAD AGENCY)	LOCATION	DESCRIPTION	ESTIMATED DISTURBANCE (IF AVAILABLE)
SR-12 Corridor Management Plan Implementation (UDOT, GSENM)	SR 12 throughout Garfield County	Corridor Management Plan Implementation	
US-89 from SR-14 to Hatch (UDOT)	SR-14 to Hatch	Bituminous pavement, reconstruction, widen shoulders	
Notom Road (UDOT)	(Socio only)	Engineering and environmental study, preparatory to road improvements	
Vegetation and Fire Fuels Management			
Aerial application of fire retardant (DNF, KFO, GSENM)	Forest-wide	The USFS proposes to continue the aerial application of fire retardant to fight fires on National Forest System lands, including the DNF.	
Right-of-way Lakes Timber Management (DNF)	Freemont River RD (Socio only)	Fuels Management Reduction on approximately 600 acres of forested land to reduce the impacts of insects and disease	600 acres
Stump Springs Fire Treatments (DNF)	Escalante RD (Socio only)	Project uses prescribed fire treatments to disturb vegetation, slowly moving heterogeneous patches towards a fine-grained landscape that is more resistant and resilient to fire and other disturbance.	Approximately 5,400 acres over 9 years
Clayton Salvage (DNF)	Escalante RD (Socio only)	Timber salvage of 248 acres of dead and dying spruce on the Griffin Top Plateau.	248 acres (2008)
Pockets Vegetation Management (DNF)	Escalante RD (Socio only)	The Project is designed to reduce bark beetle risk and improve habitat for northern goshawk. It would include commercial timber harvest, pre-commercial stand treatment, fencing, and travel management. The Project covers an area of 8,564 acres and would include commercial timber harvest on 4,721 acres of conifers and 2,647 acres of aspen, including 82 acres along the Antimony Creek drainage. Smaller areas would receive additional treatments. In addition, 9 miles of new roads would be required, 7.0 miles of unauthorized roads would be designated NFS roads, and 13.4 miles of existing NFS roads would be improved.	8,564 acres 9 miles of new roads 7.0 miles added to system roads

PROJECT (LEAD AGENCY)	LOCATION	DESCRIPTION	ESTIMATED DISTURBANCE (IF AVAILABLE)
Toad Salvage (DNF)	Escalante RD (Socio only)	Salvage of dead and dying ponderosa pine within the perimeter of a Wildland Fire Use burn area. September 2007, 1400 acres burned.	230 acres
Boulder Town Fire Protection (DNF)	Escalante RD (Socio only)	Boulder was identified as a community at risk and a Community Wildland Fire Protection Plan was developed. 65 acres of prescribed burns and 186 acres of vegetative treatments are planned to provide community protection.	251 acres
Bug Lake Salvage Project (DNF)	Escalante RD (Socio only)	Timber Salvage of dead and dying spruce on the Aquarius plateau will use existing Forest roads with approximately 1 mile of road reconstruction.	228 acres (2007)
Dugout/Tarantula Mesa Veg. Project (BLM)	Richfield FO (Socio only)	Utilize mechanical (chainsaw, handsaws, etc.) to cut, lop, and scatter the pinyon and juniper trees that have encroached into the existing chainings that were established in the 1960s	
North Wash Tamarisk Control Project (BLM)	Richfield FO (Socio only)	Removal and chemical control of 20 acres of tamarisk (salt cedar) approximately 30 miles southeast of Hanksville in the Fiddler Butte Wilderness Study Area	
Bear Creek Fire Salvage and Reforestation, DNF, CE	Garfield County (Socio cumulative effects area only)	Salvage fire killed and damaged trees within the 1400-acre Bear Creek burn area	
Corn Creek Salvage and Reforestation, DNF, EA	Garfield County (Socio cumulative effects area only)	Salvage dead and dying timber and reforest areas within burn with inadequate stocking in a 2270-acre burn	
Paunsaugunt Aspen Vegetation Management, DNF, EA	Powell Ranger District	Manage aspen stands to increase aspen regeneration, reduce conifer encroachment, and develop multi-aged aspen stands	
GSENM Plan Amendment & Rangeland Health EIS	GSENM	The Grand Staircase-Escalante National Monument Management Plan Amendment and Rangeland Health EIS describes and analyzes alternatives for management of livestock grazing on public lands administered by the BLM.	2,168,726 acres (GSENM, Glen Canyon NRA, & KFO)
Habitat Improvement			
Cooperative Fisheries Enhancement Projects (DNF)	Powell RD	In cooperation with UDWR, re-establish native trout populations in 2 streams on the DNF (also 8 streams on the Fishlake National Forest)	

PROJECT (LEAD AGENCY)	LOCATION	DESCRIPTION	ESTIMATED DISTURBANCE (IF AVAILABLE)
Marshall Canyon Pinyon-Juniper Removal (DNF)	Powell RD (Socio only)	The Proposed Action is to treat up to 900 acres within an existing chained area to improve wildlife habitat on the western portion of the Sevier Plateau (Mt. Dutton). The Proposed Action consists of the following actions: Remove pinyon pine and juniper mechanically on approximately 900 acres using a skid steer (bobcat) or other tractor type device, or through hand thinning with chainsaws. Broadcast seed into seedbed using forbs and grass mixture. Where needed, native seed will be part of this mixture.	900 acres
Antelope Springs Draw Sagebrush Steppe Habitat Enhancement (DNF)	Escalante RD ¹ (Socio only)	Mow or brushbeat 500 acres of dense even-aged sagebrush and interseed a native grass and forb mixture.	500 acres
Dipping Vat Habitat Improvement Project (DNF)	Escalante RD	Project would include the thinning of pine forests and the mechanical treatment of sagebrush for habitat improvement and fuels reduction in Johns Valley, approximately 7 miles north of Tropic. The Project would affect approximately 1,132 acres.	1,132 acres (2010)
Boulder Creek Wildlife Habitat Improvement (DNF)	Escalante RD (Socio only)	Removing encroaching conifers to restore Aspen Grove wildlife habitat	
Aquatic Monitoring Amendment, DNF	Forest-wide	Proposal to amend the Aquatic Management Indicator Species (MIS) in the DNF LRMP	
East Fork Boulder Creek Fish Passage Improvement DNF, CE	Garfield County (Socio cumulative effects area only)	Replace a culvert that is inhibiting fish passage on Road 166 with a new span designed for high and low flow maintenance of all aquatic species	
Land Use and Management			
Resources Management Plan (BLM)	Richfield Field Office BLM (Socio only)	Comprehensive Resource Management Plan for public lands and resources managed by the BLM Richfield Field Office	
Resources Management Plan (KFO)	KFO BLM	FEIS and Resource Management Plan for public lands and resources managed by the KFO	

PROJECT (LEAD AGENCY)	LOCATION	DESCRIPTION	ESTIMATED DISTURBANCE (IF AVAILABLE)
First Annual Centennial Strategy for Bryce Canyon National Park (BRCA)	BRCA	Reduce private vehicle use by providing public transportation for park visitors; planning addition of a bicycle transportation system in park; restore historic buildings; treat 193 acres of exotic weed infestation; inventory and assess condition of 224 identified archaeological sites	
Panguitch Lake Resort	Panguitch Lake (Socio only)	RV timeshare resort around Panguitch Lake that is under development	
Incorporation of Ruby's Inn	Ruby's Inn	Ruby's Inn was incorporated as Bryce Canyon City. Ruby's Inn has a single land owner. The intention of incorporating is to prepare for subdivision and growth.	
Recreation			
Red Canyon bike trail extension (DNF)	Powell RD	Extend existing bike trail along SR 12 3.1 miles east to the East Fork of the Sevier River Road.	
Canaan Mountain Reroute (DNF)	Escalante RD (Socio only)	The Canaan Mountain Loop Trail approximately 14.5 miles southwest of Escalante would be rerouted to move it off a waterline, reduce its grade, and provide for improved maintenance.	
Mossy Cave Trail Rehabilitation and Resource Protection (BRCA)	BRCA	Large boulders from Water Canyon adjacent to the trail will be moved to stabilize areas where the trail has eroded and footbridge abutments	
Grandview Trail Re-route (DNF)	Powell Ranger District	Construct several sections of non-motorized trail to eliminate dual use by motorized and non-motorized recreationists	
King Creek Campground Non-commercial Thinning DNF, CE	Powell Ranger District	Thin heavily stocked ponderosa pine to improve vigor and forest health in a developed recreation area	
Mining			
Boulder Gravel Pit (DNF)	Escalante RD (Socio only)	A gravel pit will be developed and managed to provide gravel for county and Forest needs.	< 5 acres
Troy M Mine Phase Two (BLM)	Richfield FO, near Ticaboo (Socio only)	Extend existing underground workings; construct mine shaft and waste rock storage area; construct ventilation shafts and expand existing evaporation pond for mine dewatering	

PROJECT (LEAD AGENCY)	LOCATION	DESCRIPTION	ESTIMATED DISTURBANCE (IF AVAILABLE)
Phase II, Abandoned Mine Reclamation, (GSENM)	GSENM	EA to address potential environmental impacts associated with the Phase II Abandoned Mine Reclamation Project, which includes the Henrieville Prospect Site east of Tropic	
Reopening of Ticaboo uranium mill and mine	Ticaboo/Bullfrog (Socio only)	Garkane has been contacted regarding service to the Ticaboo/Bullfrog area for planned re-opening of the uranium mill; the mine has been re-opened and is supplying its own power with diesel generators	
Miscellaneous			
Wild and Scenic River Suitability Study – Utah (USFS)	Pine Valley, Cedar City, and Escalante RDs	A draft EIS has been prepared analyzing the suitability of 86 Utah river segments, including 8 on the DNF in Garfield County, for inclusion in the National Wild and Scenic River System	
West Dixie Water Improvement (DNF)	Powell RD	No Information	3,000 acres (2007) 2,000 acres (2008) 2,000 acres (2009) 2,000 acres (2010)
West Deer Creek Grazing Allotment (DNF)	Escalante RD (Socio only)	Proposal to re-authorize livestock grazing on the West Deer Creek Allotment north of Boulder, Utah east of SR 12	
Ohio University Dinosaur Collection (GSENM)	GSENM	Proposal to excavate and remove remains of a horned dinosaur from Grand Staircase National Monument	
McGath Lake Dam (DNF)	Escalante RD (Socio only)	The McGath Lake Dam is deteriorating and in need of repair. Without action the dam is likely to fail and destroy an important fishery. McGath Lake is located approximately 16 miles north of Escalante.	
Dinosaur Documentary Film (BLM)	GSENM & BLM	Various locations within the GSENM, Wolverine Petrified Forest, The Blues Area, Red Canyon, Cocks Comb Road, etc,	

1.3.2.3. Cumulative Effects

Cumulative effects on surface water resources as a result of any of the Action Alternatives are likely to be similar in type to the direct and indirect effects, particularly in regards to disturbance of intermittent and

ephemeral stream systems. While there are no specific past, present, or reasonably foreseeable future actions that have a particular likelihood to cumulatively affect surface water resources in conjunction with any of the Action Alternatives, any actions that have required or will require ground disturbance in the vicinity of a surface water feature, especially those in highly erodible soil types, could serve to cumulatively affect streams in the same watersheds as the Action Alternatives. If proper BMPs and erosion control measures are implemented for these projects, it is unlikely that there would be adverse cumulative effects to intermittent and ephemeral streams as a result of any of the Action Alternatives.

All of the alternatives would avoid wetland impacts by design wherever possible and any other projects within the cumulative effects area would require similar avoidance and minimization measures as outlined in Section 404, so cumulative effects to wetlands in the cumulative effects area are unlikely. Similarly, all Action Alternatives would avoid permanent impacts to floodplains, and therefore no contribution to cumulative impacts to floodplains are anticipated.

Throughout both the Project Area and the cumulative effects area, groundwater aquifers are generally deep, often more than 1,000 feet below ground surface. Potential direct and indirect effects on groundwater resources are limited to spills of hazardous materials associated with construction equipment (e.g., fuel, oil, hydraulic fluid, etc.), and cumulative effects would include these direct/indirect effects in addition to other potential spills associated with other construction projects occurring in the cumulative effects area.

The Action Alternatives would cross three waterways identified on Utah's 303(d) list of impaired waters - the Sevier, East Fork Sevier, and Paria Rivers - as well as a number of tributaries of those rivers, although the listed reach of the East Fork Sevier River occurs well downstream of both the Project Study Area and the cumulative effects area. The Sevier River is listed for total phosphorus and habitat alteration, while the Paria River is listed for total dissolved solids. While past, present, and reasonably foreseeable future actions that have occurred or will occur in the cumulative effects area may contribute to phosphorus loading and/or habitat alteration of the Sevier River, no activity that would occur as a result of the Action Alternatives would affect the Sevier River, and therefore no cumulative effects to the Sevier River are anticipated.

The listed reach of the Paria River (and tributaries) occurs near the southeastern extent of the cumulative effects area within portions of BRCA, GSENM, BLM, and private land. Since the Paria River is listed for total dissolved solids, and surface disturbance associated with the Action Alternatives and other present and reasonably foreseeable future actions in this area could contribute total dissolved solids to the listed reaches, adverse cumulative effects to water quality in this area are anticipated. Projects such as BLM's oil and gas lease sales, improvements to SR 12 and the Tropic Canyon highway, livestock grazing within GSENM, and other recreational and land-management activities within these areas, in conjunction with surface disturbance activities associated with the Action Alternatives, could exacerbate the total dissolved solids condition of the Paria River.

The majority of water rights within the Project Area and the cumulative effects area are surface and groundwater rights; therefore, the potential types of effects to these water rights would be similar to those described for surface and groundwater features. Since effects to water rights as a result of the Action Alternatives would be mitigated by the utilization of BMPs, no cumulative adverse effects on water rights are anticipated.

Since there are no surface water, groundwater, water quality, or water rights impacts associated with either interconnect option, there are similarly no cumulative effects anticipated for either interconnect option.

Under the No Action Alternative, overhaul of the existing 69 kV transmission line would contribute to cumulative impacts to water resources similar to those described for Alternative B, but the overall

contribution would be less as the scope of the overhaul effort would be less than replacement of the entire line.

1.4. PLAN CONSISTENCY

Assuming activities for both the construction and operation/maintenance phases, as described in Transcon (2008a), are followed (including development and implementation of mitigation measures discussed here), the Proposed Action and Action Alternatives are consistent with the management plan initiatives as outlined in **Section 1.2.2**. Erosion and sedimentation (and subsequent degradation of water quality) as a result of stream impacts are a common theme across all management directives, such that substantial efforts should be made to avoid and minimize these types of impacts to the extent possible. Permitting through the U.S. Army Corps of Engineers for impacts to federally jurisdictional wetlands and waters of U.S. must be completed in order to meet multiple management plan directives, as should compliance with water quality and TMDL designations. The Proposed Action and Action Alternatives are unlikely to significantly degrade any watersheds within the management plan areas.

1.5. COMPLIANCE WITH OTHER LAWS AND REGULATIONS

There are no activities included in the Proposed Action or Action Alternatives that would fail to be compliant with federal, state, and/or local government laws and regulations. The Proposed Action and Alternatives would comply with Executive Orders 11988 and 11990 and the Clean Water Act if mitigation measures are followed.

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Appendix A – General Project Acreage Tables

Project Area Calculations (Acres)

Alt Segment	Acres						
	Private	State	BLM	GSENM	USFS	NPS	TOTAL
A-1	21.19	41.48		50.58	153.14		266.39
A-2					26.65		26.65
A-3	13.93	14.4	51.45		61		140.78
A TOTAL	35.12	55.88	51.45	50.58	240.79	0	433.82
B Removal	27.44	3.94	8.37		9.89		49.64
A TOTAL + B Removal	62.56	59.82	59.82	50.58	250.68	0	483.46
B	146.04	45.84	115.61	0	76.33	34.44	418.26
C-1	118.44	14.63		50.58	92.86		276.51
C-2					38.71		38.71
C-3	4.97	14.4	53.71		78.5		151.58
C TOTAL	123.41	29.03	53.71	50.58	210.07	0	466.80
B Removal	6.35	3.94	8.37		9.89		28.55
C TOTAL + B Removal	129.76	32.97	62.08	50.58	219.96	0	495.35
E-W					48.65		48.65
N-S					27.24		27.24

Total Long-Term Disturbance* Area (Acres)

Alternative	Long-Term Disturbance (Acres)						
	Private	State	BLM	GSENM	USFS	NPS	Total
A-1	5.31	5.01	0.00	6.74	17.72	0.00	34.78
A-2	0.00	0.00	0.00	0.00	2.87	0.00	2.87
A-3	2.67	1.68	5.23	0.00	5.88	0.00	15.47
A Total	7.97	6.70	5.23	6.74	26.47	0.00	53.12
B (Bryce 1 Substation on USFS land)	19.36	5.74	13.12	0.00	6.59	1.04	45.85
B (Bryce 2 Substation on Private land)	21.30	(same)	(same)	(same)	4.52	(same)	45.62
C-1	13.97	1.58	0.00	6.74	9.12	0.00	31.41
C-2	0.00	0.00	0.00	0.00	3.92	0.00	3.92
C-3	2.22	1.68	5.42	0.00	7.00	0.00	16.33
C Total	16.19	3.26	5.42	6.74	20.04	0.00	51.66
North-South Interconnect	0.00	0.00	0.00	0.00	2.91	0.00	2.91
East-West Interconnect	0.00	0.00	0.00	0.00	5.85	0.00	5.85

Alternative	Long-Term Disturbance (Acres)						
	Private	State	BLM	GSENM	USFS	NPS	Total
Interconnect Total	0.00	0.00	0.00	0.00	8.76	0.00	8.76

*Includes permanent disturbance associated with power poles (estimated), substations, substation access roads, existing access road upgrades, and 10-foot wide centerline access roads.

Total Short-Term Disturbance Area by Alternative Segments and Land Ownership*

Alternative	Short-Term Disturbance (Acres)						
	Private	State	BLM	GSENM	USFS	NPS	Total
A-1	8.76	18.14	0.00	23.27	70.55	0.00	120.72
A-2	0.00	0.00	0.00	0.00	14.21	0.00	14.21
A-3	9.19	6.96	28.14	0.00	23.08	0.00	67.37
A Total	17.94	25.10	28.14	23.27	107.84	0.00	202.29
B	75.38	20.19	54.08	0.00	18.48	0.78	168.91
C-1	68.72	7.23	0.00	23.27	48.30	0.00	147.52
C-2	0.00	0.00	0.00	0.00	21.69	0.00	21.69
C-3	1.74	6.95	29.34	0.00	36.19	0.00	74.22
C Total	70.47	14.18	29.34	23.27	106.18	0.00	243.44
North-South Interconnect	0.00	0.00	0.00	0.00	13.78	0.00	13.78
East-West Interconnect	0.00	0.00	0.00	0.00	24.97	0.00	24.97
Interconnect Total	0.00	0.00	0.00	0.00	38.75	0.00	38.75

*Includes temporary disturbance associated with pulling sites, laydown areas, and power pole (H-structure) installation. Some overlap between disturbance areas exists because a single area could be used for multiple alternatives. "Limited Access" areas not analyzed for temporary disturbance associated with pole installation.

Appendix B – Resource Protection Measures

Resource Protection Measures

The following resource protection measures are considered part of the Proposed Action and other Action Alternatives and would be carried out in the course of construction, operation, and maintenance activities as specified below.

Soils

- Ingress and egress to pole locations would be on the same path to minimize disturbance to soil and biological soil crusts, especially in sparsely vegetated areas.
- Soil from pole and guy wire hole excavations would be used to refill the hole and any remainder evenly distributed over the disturbance area around the hole. In sensitive visual areas where different soil colors could distract from the view, excess soils would be removed from the site.
- Herbicide use would be applied in accordance with label requirements and comply with the BLM Vegetation Treatments Using Herbicides Final Programmatic EIS (BLM 2007) and the DNF Environmental Assessment for Noxious Weed Management (2000).
- Where temporary minor changes in contours occur during construction along the route, the area would be returned to near pre-construction contours through reshaping, as required by the authorizing agency. On BRCA lands, the soil would be re-contoured using hand tools to minimize erosion.
- If any areas outside the *limited access areas* have slopes greater than 35 percent, tractor/equipment operation would not be permitted. This measure limits surface disturbance and keeps surface runoff water from concentrating. This practice restricts tractor operation to slopes where corrective measures for proper drainage such as water bars are easily installed and effective. Criteria that may be used to determine slope restrictions are soil stability, mass stability, infiltration rate, and soil water holding capacity. These data may be interpreted from soil and land type inventories, geologic maps, and climatic and hydrologic information. Subsequent field verification may be necessary.
- Tractor/equipment operation would be limited during times of high soil moisture levels to minimize soil compaction, puddling, rutting, and gulying with resultant sediment production and loss of soil productivity. This measure minimizes surface disturbance during high soil moisture conditions which would result in compaction, puddling, rutting, and gulying problems. This practice reduces the need to correct these soil and water resource problems later. High soil moisture conditions will be defined and evaluated during construction by USFS Contract Inspectors in concert with representatives from affected cooperating agencies.

Weeds

- A pre-construction weed inventory would be required, and early treatment of weeds would occur prior to construction vehicles entering infested areas.
- To minimize the potential for the spread of noxious weeds, all equipment used during construction would be power washed off-site to remove all soil and plant material prior to entering the Project Area.
- Ongoing monitoring and treatment of noxious and invasive species would be incorporated into the Operation and Maintenance Plan. Garkane would bi-annually (during the growing season) survey and treat, if necessary, the right-of-way for noxious weeds for the first 10 years following end of construction, and submit bi-annual reports to lead and cooperating agencies as requested.
- Control and follow-up treatment of invasive species specific to this project within the right-of-way would be the responsibility of Garkane.

- If chemical weed control is used, only agency-approved chemicals would be used by certified applicators.

Revegetation

- Where re-contouring is not required, vegetation would be left in place wherever possible to avoid excessive root damage and allow for re-sprouting.
- Re-vegetation of the Project Area, where necessary, would be Garkane's responsibility and would be coordinated with the appropriate affected agency's resource division.
- Areas identified by the agency or landowner would be seeded following construction activities using an agency-approved seed mixture and adhering to standards recommended by the specific agency for that portion of the right-of-way. Seed mixes used for rehabilitation purposes would be certified noxious weed free. Revegetation of the Project Area would be subject to agency monitoring and inspection (at agency discretion) to ensure adequate revegetation establishment. Based on these findings, the affected agency may require additional revegetation from Garkane if agency revegetation objectives are not adequately met. Agencies would provide revegetation objectives to Garkane prior to project initiation.
- Reseeded areas within grazing allotments may require additional measures to assure effective revegetation. Reseeded areas around structures and other disturbances within grazing allotments may attract cattle to graze on new growth. Herding, salting, and placement of water sources may be used to attract cattle away from revegetated areas to allow vegetation to mature and become established. Larger reseeded areas (such as lay-down yards or pulling sites) may require temporarily fencing cattle out to allow for effective revegetation.

Fire

- Blasting along with use of mechanical equipment may be limited/restricted during drought conditions if fire restrictions are implemented. A waiver may be granted if Garkane can provide required mitigation measures such as hours of work, available water, and fire lookouts.

Wildlife

- If a federally listed species is located within the Project Area, work would be immediately halted to allow the appropriate federal agency to respond. Consultation with the USFWS would be initiated immediately upon species discovery and additional mitigation measures may be applied where necessary.
- Construction, demolition, and maintenance activities would be subject to species-specific temporal restrictions to address wildlife concerns. These restrictions would be set based on consultation and coordination with the USFWS and Utah Division of Wildlife Resources.
- Pre-construction/demolition raptor/nesting bird surveys may be required if project implementation occurs more than 2 years from the decision in accordance with USFS and other agency guidelines.
- With the exception of emergency repair situations, right-of-way construction, demolition, restoration, maintenance, and termination activities in designated areas would be modified or discontinued during sensitive periods (e.g., nesting and breeding periods) for candidate, proposed, threatened, endangered, or other sensitive animal species. The list of sensitive periods would be approved in advance by the authorized officer of the appropriate land management agency.
- Timing limitations for timber clearing and right-of-way vegetation maintenance would be in agreement with Migratory Bird Treaty Act (MBTA) protocol.

- Construction and demolition activities within active raptor nesting areas would be allowed in compliance with the appropriate temporal and spatial buffers as set forth by the management agency.
- Structures would be designed in accordance with the Avian Protection Plan Guidelines developed by the USFWS' Avian Power Line Interaction Committee (2006) to minimize avian conflicts.
- Raptor perch deterrents/discouragers would be used on poles to minimize perching in areas inhabited by Utah prairie dogs, greater sage grouse, and pygmy rabbits as required by each land management regulating agency.

Additional wildlife mitigation measures may be required if areas where habitat improvement projects have been conducted would be disturbed.

Cultural Resources

- Should any of the following be discovered during construction, such activities would cease in the immediate area of discovery and the appropriate agency representative would be notified immediately: (1) previously unidentified surface or subsurface cultural resources and/or (2) human remains and/or objects or materials subject to the Native American Graves Repatriation and Protection Act, as amended. An evaluation of the discovery would be made by the lead USFS authorized officer or relevant cooperating agency representative to determine appropriate actions and avoidance measures that would prevent the loss of any significant cultural or scientific values. The authorized officer would make any decisions pertaining to mitigation measures after consulting with appropriate agencies. No operations would resume in the immediate area of the discovery until written authorization to proceed is issued by the USFS or appropriate agency.
- Cultural resources would be protected by limiting access to known archaeological sites, educating employees about the importance of cultural resources, and implementing a strict management policy restricting collection of artifacts.

Paleontology

- Construction- or maintenance-related activities that require significant ground disturbance (greater than 12 inches deep) should be surveyed and monitored when conducted in areas of bedrock outcrop for the following geologic units: Tropic Shale, Dakota Formation; the Tippet Canyon, Smoky Hollow and John Henry members of the Straight Cliffs Formation; and the Wahweap and Kaiparowits formations.
- Should any paleontological resources be found during construction, work would be halted and the appropriate agency representative would be notified immediately. The authorized officer would make any decisions pertaining to mitigation measures after consulting with appropriate agencies. No operations would resume in the immediate area of the discovery until written authorization to proceed is issued by the USFS or appropriate agency.

Visual

- To the extent possible, placement of access routes and points of ingress and egress would be situated to minimize visual intrusion and to obscure views from local highways and county roads.
- No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate limits of survey or construction activity.
- Non-reflective wire would be used within USFS High SIO areas, BLM VRM Class II areas, and in the GSENM as required by the Management Plan.
- When use of wood pole structures is not practicable, and the use of fiberglass or steel structures is approved, dark colored, non-reflective surfaces would be used.

- To the extent practicable, siting of individual structures would take advantage of both topography and vegetation as screening devices to restrict views of structures from visually sensitive areas.
- Where practicable, the siting of structures would avoid ridgelines, summits, or other prominent locations and use topography as a backdrop to avoid skylining.
- The transmission line alignment would cross linear features (e.g., trails, roads, rivers) at right angles whenever possible to minimize viewing area and duration.
- Vegetation openings for facilities, structures, routes, etc., would mimic the size, shape, and characteristics of naturally occurring openings to the extent practicable.
- Vegetation clearing design in highly visible forested areas could include feathering of right-of-way edges, i.e., progressive, selective thinning of trees from the edge of the right-of-way inward, mixing tree heights from the edge of the right-of-way, and creation of an irregular vegetation outline.
- Lighting for facilities would not exceed the minimum required for safety and security while not affecting wildlife behavior, and designs would be selected that minimize upward light scattering (light pollution).
- Visual impact mitigation objectives and activities would be discussed with equipment operators prior to commencement of construction activities.
- Methods for disposal of slash from vegetation removal would be site dependent. Slash may be mulched and spread to cover fresh soil disturbances (preferred), hauled off site for disposal, or buried.
- Restoration activities specified here or in project-related documents would be undertaken by Garkane immediately after disturbances.
- Disturbed areas would be covered with stockpiled topsoil or mulch and revegetated using a mix of native species selected for visual compatibility with existing vegetation.
- Edges of revegetated areas would be feathered (strategically removing vegetation along the margins of the right-of-way at agency direction) to reduce form and line contrast with existing landscape.
- Excess fill material would not be wasted down slope to avoid color contrast with existing vegetation/soils.

Water

- Water needed during construction would be limited to that needed for dust control. The conditions of the Storm Water Pollution Prevention Plan would be imposed on all construction activities to avoid or limit sedimentation to surface waters.
- Equipment operation would be excluded from wetlands, floodplains, stream channels, and wet meadows to limit soil damage, turbidity, and sediment production resulting from compaction, rutting, runoff concentration, and subsequent erosion. This practice is designed to prevent soil puddling, compaction, and displacement, and the concentration of surface water and soil erosion, which may lead to rill or gully erosion and subsequent water quality degradation. This measure is intended to prevent or reduce the need for corrective measures to solve water concentration problems due to equipment use.
- When applying pesticides, an untreated 300-foot buffer strip from each side of surface water, wetlands, or riparian areas will be left to minimize the risk of a pesticide entering surface or subsurface waters or affecting riparian areas, wetlands, and other non-target areas.

Land Use

- Range improvements (e.g., fences, water developments, corrals, cattle guards) would be identified and protected from any damage associated with project activities.
- Proper signage would be posted in affected areas prior to and during construction if temporary road closures or restricted access were anticipated.
- In the event of property damage caused by construction and operations activities, Garkane and/or the agency would quickly investigate and reasonably attempt to settle with the party who incurred property damages.

Additional Construction and Operations Standards (as required by BRCA)

The following construction and operations standards would be in addition to those listed above and would be implemented during construction, operation, and maintenance activities in BRCA for Alternative B.

General

- If a reclamation bond is posted, holes within BRCA would be dug primarily by a mini-excavator that would be flown to within 50 feet of the hole location. Hand tools (e.g., hand auger, shovels, picks) may also be used. As noted below, all equipment would be transported in by helicopter or foot. Use of generators and gasoline-powered hand augers would be allowed. Precautions to prevent gasoline spills, such as a tray to hold equipment, must be implemented.
- In BRCA, wheelbarrow use is only allowed at pole locations to transport soil within a 100-foot radius. Any visible tracks must be raked out.
- The Park Superintendent must approve the use of explosives to excavate holes within BRCA. The Superintendent must be notified at least three days before explosives use is planned.
- Collection of plants, rocks, fossils, wildlife, artifacts, or any items or materials from BRCA is prohibited.
- If the 69 kV transmission line is de-energized and removed from BRCA, the guy wires would be removed, the poles would be “flush cut” at or slightly below ground level, the portion of the pole remaining in the ground would be covered with soil, and the area where the pole was removed would be re-vegetated. Poles would be removed by helicopter.
- Garkane would provide BRCA with informational material (project overview and activities) for distribution to the public during periods of project construction.

Access

- *Limited access areas* would also include all of BRCA.
- No road building would occur within BRCA.
- Construction access would be allowed for the rim pole on the west boundary of BRCA.

Helicopter Use

- All equipment used in BRCA would be transported by helicopter or foot.
- Helicopter use within BRCA must follow the terms and conditions stipulated in the existing Right-of-Way Permit (RW 1330-05-001) for the approved transmission lines.
- When work is conducted within BRCA, Garkane would notify the Chief Ranger at the beginning of each week regarding the work plan for the week and approximate number of overflights expected.

- Helicopter flights over trails and heavily used areas within BRCA would be limited to the right-of-way. Flights over the Mossy Cave Trail would be limited to the extent practicable. Garkane would provide public notice of proposed times and places in local newspapers or other media outlets.
- A “Letter of Authorization to Use Bryce Canyon Radio Frequencies” would be required prior to helicopter use in BRCA.

**Addendum to
Water Resources Specialist Report
dated December 2009**

Prepared For:

US Forest Service – Dixie National Forest
National Park Service – Bryce Canyon National Park
Bureau of Land Management – Kanab Field Office
Bureau of Land Management – Grand Staircase-Escalante National Monument

Prepared By:



8160 South Highland Drive
Sandy, Utah 84093

This addendum updates the Water Resources Specialist Report dated December 2009 by expanding the report to include the Agency Preferred Alternative and providing errata to expand on or correct data previously presented.

Agency Preferred Alternative

The Agency Preferred Alternative was developed through a joint effort of all agencies (USFS, BLM, and NPS) taking into consideration the impacts of all of the resources along the Action Alternatives. Alternative E is the Agency Preferred Alternative because it attains the project's purpose and need while still being sensitive to other resource concerns within the Project Area, and the missions and management objectives of the various land management agencies responsible for the public lands that would be crossed by the Agency Preferred Alternative.

The 100-foot-wide right-of-way for Alternative E, the Agency Preferred Alternative route (**Figure 1**) would begin with Segment C1 (17.36 miles), the East-West Interconnect option (3.70 miles), and a combination of portions of Segments A-3 and C-3 (referred to as E-3). Alternative E contains the segment combining portions of Alternatives A and C called E-3. Segment E-3 begins where the East-West Interconnect joins the Alternative A route and terminates at the Hatch Substation. Segment E-3 would follow Segment A-3 for 1.6 miles to the point where it intersects Segment C-3 and would follow the remainder of Segment C-3, terminating at the Hatch Substation for 6.76 miles. The total length of the preferred route would be 29.41 miles.

Approximately 16.23 miles of the existing 69 kV transmission line infrastructure from the Bryce Canyon Substation to the Hatch Mountain Substation would be removed.

Alternative E, the Agency Preferred Alternative, would also require the amendment of the GSENM MP (BLM 2000) by changing the designation of a 300-foot-wide 3.68-mile stretch (133.74 acres) of the Primitive Zone to Passage Zone, and within this area, changing the existing VRM Management Class designation from Class II to Class III.

Figure 1. Alternative E, Agency Preferred Alternative Route

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Resource Impacts

Alternative E, the Agency Preferred Alternative route, is comprised of segments or portions of segments analyzed under Alternatives A and C, which are fully analyzed in the original Specialist Report dated December 2009. Resource specific disturbance acreages and other data specific to Alternative E, the Agency Preferred Alternative, are provided in the table below.

WATER RESOURCES	ALTERNATIVE E: PREFERRED ALTERNATIVE		69 KV LINE REMOVAL, ALTERNATIVE E	
	Short-term	Long-term	Short-term	Long-term
Linear Feet of Streams	1,196		Minor, adverse	Negligible to minor, beneficial
Number of Stream Crossings	193			
Wetlands and Waters of the U.S. Disturbed (Acres)	0.00	0.025	Negligible to minor, beneficial	
Floodplains Disturbances	Negligible		None	
Highly Erodible Soils Disturbed (Acres)	8.22	3.60	Short-term, negligible	Long-term, minor beneficial
Number of Springs in Proximity to Right-of-Way	1		0	
Water Quality Impacts	Negligible	Negligible	Short-term, minor adverse	Long-term, minor beneficial
Number of Water Rights within a 1-mile of right-of-way	131		131	
General	Potential impacts to water resources would be minor adverse level, short-term or long-term.			

Errata

Some changes, clarification and updates to resource-specific data and analysis were made as a result of the comments received on the Draft Environmental Impact Statement. The errata below update the original Specialist Report dated December 2009.

Page 3

The second paragraph under the heading **1.1.2.2 Alternative B: Parallel Existing 69 kV Route** should read:

The Alternative B Route would generally parallel the existing 69 kV line right-of-way, but must be separated from the existing 69 kV line right-of-way for constructability and safety reason, in order to safely build and energize the line prior to removal of the existing line. Alternative B would extend 29.11 miles. This alternative route would begin at the proposed East Valley Substation located east of Tropic and extend west through the Tropic Substation (the Tropic Substation would be decommissioned) and then cross SR 12 and continue across BRCA (deviating slightly from the existing right-of-way for approximately 1.5 miles) to a point near the current Bryce Canyon Substation near Bryce Canyon City. For this Alternative, the Bryce Canyon Substation would be decommissioned and a new replacement substation would be built at a new location approximately 1 mile to the west to allow for needed expansion. The route would extend approximately 0.5 mile to the north around Bryce Canyon City, west across SR 63 and then parallel Garkane's existing 69 kV line right-of-way predominately across private and SITLA lands. The alternative route would parallel the existing right-of-way just to the south across the plateau in a northwest direction to Red Canyon, where it would generally follow the existing right-of-way through Red Canyon into Long Valley where it would cross U.S. 89 and continue to the Hatch Mountain Substation. From there the route would follow the existing line south to the Hatch Substation. This route would cross 5.58 miles of DNF, 8.29 miles of KFO, 2.81 miles of BRCA, 3.63 miles of SITLA, and 8.80 miles of private lands.

Page 23:

Insert text after Table 1.2-9 under heading **Water Rights:**

There are two municipal public water systems (PWSs) in the project area that are protected under Utah R309-600, Source Protection: Drinking Water Source Protection For Ground-Water Sources. The protected systems are the Hatch and Tropic municipal water systems. None of the Action Alternatives would cross either of the protection zones.

In addition to the municipal PWSs there are several transient (non-community) PWSs in the project area. Transient PWSs are those which serve parks, campgrounds, restaurants, resorts or similar facilities. The Bryce Canyon Pines, Pines Highway Rest Area, and Bristlecone systems are along Route 12 and would be crossed by Segment A-1 (Personal Communication, Kate Johnson, Utah Department of Environmental Quality, Division of Drinking Water).

Page 36:

Insert text under the heading and after the existing paragraph.

Water Rights.

Segment A-1 would cross drinking water source protection zones for three transient (non-community) public water systems serving Bryce Canyon Pines, Pines Highway Rest Area, and Bristlecone (Personal Communication, Kate Johnson, Utah Department of Environmental Quality, Division of Drinking Water June 16, 2010). The most likely sources of contamination to the wells protected under this program would be through use of chemicals on the surface or if holes dug for poles were to breach the drinking water aquifer. Use of the SPP and BMPs described in Section 4.4.2.1 above would reduce the risk of contamination through chemical use to a negligible level. A sampling of five well logs in the area showed static water levels between 18 and 32 feet, with all wells having at least six feet of clay (low permeability) above the static water level, which would effectively filter any sediment mobilized during construction. Therefore, any impact to protected drinking water sources from construction would be short-term and negligible along this segment.

Appendix A:

The tables below detail the land management, and long- and short-term disturbance associated with Alternative E, the Agency Preferred Alternative, and should be added to the tables presented in Appendix A of the Specialist Report of December 2009.

Agency Preferred Alternative Project Area

ALTERNATIVE E SEGMENTS	PROJECT AREA* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Segment C-1	118.44	14.63	0.00	50.58	92.86	0.00	276.51
East-West Interconnect	0.00	0.00	0.00	0.00	48.65	0.00	48.65
Segment E-3	6.30	14.85	54.24	0.00	52.40	0.00	127.79
69 kV Line Removal – Alternative E	6.35	3.94	8.37	0.00	9.89	0.00	28.55
Alternative E Total	131.09	33.42	62.61	50.58	203.80	0.00	481.50

*The Project Area contains the 100-foot right-of-way, substation sites and their associated access roads; all temporary work spaces outside the right-of-way; and the disturbance area associated with the existing 69 kV transmission line removal.

Agency Preferred Alternative 100-foot Right-of-Way Encumbrances*

ALTERNATIVE E SEGMENTS	RIGHT-OF-WAY (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Segment C-1	83.11	12.59	0.00	44.58	70.42	0.00	210.70
East-West Interconnect	0.00	0.00	0.00	0.00	44.99	0.00	44.99
Segment E-3	2.56	12.86	40.71	0.00	44.87	0.00	101.00
Alternative E Total	85.67	25.45	40.71	44.58	160.28	0.00	356.69

*Buffer of 50 feet on each side of transmission line. Not all acres would be disturbed within the right-of-way, but the right-of-way is considered to be long-term encumbrance for the duration of the permit.

Agency Preferred Alternative Total Long-Term Surface Disturbance and Land Ownership/Management

ALTERNATIVE E SEGMENTS	LONG-TERM DISTURBANCE* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Segment C-1	13.97	1.58	0.00	6.74	9.12	0.00	31.41
East-West Interconnect	0.00	0.00	0.00	0.00	5.85	0.00	5.85
Segment E-3	2.24	1.68	5.42	0.00	4.19	0.00	13.54
Alternative E Total	16.21	3.26	5.42	6.74	19.16	0.00	50.80

*Includes long-term disturbance associated with power poles, substations, substation access roads, existing access road upgrades, and a 10-foot-wide centerline access route.

Agency Preferred Alternative Total Short-Term Surface Disturbance and Land Ownership/Management

ALTERNATIVE E SEGMENTS	SHORT-TERM DISTURBANCE* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Segment C-1	68.72	7.23	0.00	23.27	48.30	0.00	147.52
East-West Interconnect	0.00	0.00	0.00	0.00	24.97	0.00	24.97
Segment E-3	1.74	6.95	30.32	0.00	22.54	0.00	61.55
Alternative E Total	70.46	14.18	30.32	23.27	95.81	0.00	234.04

*Includes short-term disturbance associated with pulling and splicing sites, lay-down areas, and power pole (H-structure) installation. Some overlap between disturbance areas exists because a single area could be used for multiple alternatives. *Limited access areas* were not analyzed for short-term disturbance associated with pole installation. Alternative B also includes short-term disturbance associated with removal of the existing 69 kV transmission line.

Short-Term Disturbance Associated with Removal of Existing 69 kV Line (Parallel to Alternative B)

SHORT-TERM DISTURBANCE* (ACRES)						
PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
27.44	3.94	8.36	0.00	9.89	0.00	49.63

*This short-term disturbance area includes lay-down yards and pulling and splicing sites needed for the existing 69 kV line removal. For analysis, short-term surface disturbance for line removal is assumed to include all of the short-term disturbance areas (i.e., lay-down areas, pulling/splicing sites) that are included under Alternative B. This effectively reduces the amount of disturbance shown for Alternative B as these areas are the same as those counted for the installation of the 138 kV line. In reality these areas needed for removal would be very similar to, but slightly offset from, the installation sites.

Appendix B:

The first bullet after the heading **Water** should read:

Water needed during construction would be limited to that needed for dust control (See Appendix C, Dust Management Plan).

Appendix C, Dust Management Plan should be inserted after Appendix B, Resource Protection Measures.

Appendix C: Fugitive Dust Management Plan

A control strategy or strategies for fugitive dust are listed for each activity proposed under the Action Alternatives described in the Environmental Impact Statement. The strategies are listed in a staged approach, meaning that if the first approach of control, Stage 1, is not satisfactory, then the next approach of control, Stage 2 will be attempted.

ACTIVITY	ACTIVITY DETAILS	CONTROL STRATEGIES	
Material Storage	Storage of materials required for road widening.	Stage 1:	Inherent moisture with water sprays only on an as-needed basis.
		Stage 2:	Increase use of water sprays until fugitive dust is controlled.
Material Handling, Transfer, Hauling, Loading or Dumping	Placing fill material along roadside for widening.	Stage 1:	Inherent moisture with water sprays only on an as-needed basis.
		Stage 2:	Increase use of water sprays until fugitive dust is controlled.
Haul Roads, Roadways, or Yard Areas	Existing FS roads, centerline access; pulling, splicing and laydown yards	Stage 1:	Water sprays only on as-needed basis.
		Stage 2:	Increase use of water sprays until fugitive dust is controlled.
Clearing, Leveling	Pulling, splicing, laydown yards; area at pole locations	Stage 1:	Inherent moisture with water sprays only on an as-needed basis.
		Stage 2:	Increase use of water sprays until fugitive dust is controlled.
Earth Moving, Excavation	Foundation construction in certain locations	Stage 1:	Inherent moisture with water sprays only on an as-needed basis.
		Stage 2:	Increase use of water sprays until fugitive dust is controlled.
Construction, Demolition	Constructing and erecting new pole structures; removal of existing pole structures	Stage 1:	Water sprays only on an as-needed basis.
		Stage 2:	Increase use of water sprays until fugitive dust is controlled.

Consideration of Best Available Science

The techniques and methodologies used in this analysis consider the best available science. The analysis includes a summary of the credible scientific evidence that is relevant to evaluating reasonably foreseeable impacts. In addition, the analysis also identifies the methods used and references the scientific sources relied on. When appropriate, the conclusions are based on a scientific analysis that shows a thorough review of relevant scientific information, a consideration of responsible opposing views, and the acknowledgment of incomplete or unavailable information, scientific uncertainty, and risk.

William Goodman

Name (Printed)



Signature

Jan 6, 2011

Date