CHAPTER 3. AFFECTED ENVIRONMENT

3.1. INTRODUCTION

This chapter presents the existing condition of the physical, biological, social, and economic resources of the human environment that may be affected by the implementation of the Proposed Action or its alternatives. It provides the baseline for the environmental impacts/consequences described in **Chapter 4**.

This chapter includes the following:

- Section 3.1 provides an introduction to the chapter, and the definitions for both project and study areas.
- Sections 3.2–3.16 discuss the key resource issues identified during the scoping process (**Section 1.8**): Paleontological Resources, Soils, Water Resources, Vegetation, Forest Products, Wildlife and Wildlife Habitat, Special Status Species, Range Resources, Land Use, Distinctive Land Areas, Recreation, Visual Resources, Cultural Resources, Socioeconomics, and Transportation.

All resource areas that were identified as potentially impacted by the Proposed Action and alternatives were analyzed in detail in resource-specific specialist reports contained in the project record. Affected environment discussions provided in the sections below are summarized from the specialist reports. More detailed descriptions that offer distinctions between the alternatives are provided for resources for which the impacts would be greater.

3.1.1. Project Area

The Project Area is in Garfield County, between the communities of Tropic and Hatch in southern Utah. The Project Area for most resource areas 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.

Some of these areas do not contain certain resources, and some resources require analysis beyond the above list (see **Section 3.1.2,** Study Area). In cases where there are differences between the Project Area and the Study Area, the differences are noted in the introduction to the resource.

3.1.2. Study Area

A Study Area is identified for the analysis of some resources. The Study Area provides context for resource effects that may occur within the Project Area in order to quantify the magnitude of effects. Where Study Areas are used they are defined in the introduction or the data and methods section for the resource.

3.2. PALEONTOLOGICAL RESOURCES

3.2.1. Data and Methods

Occurrences of paleontological resources are closely tied to the geologic units (i.e., formations, members, or beds) that contain them. The probability of finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Therefore, geologic mapping can be used to assess the potential for the occurrence of paleontological resources. For this analysis, published geologic mapping by Eppinger et al. (1990) was consulted to identify units occurring within the Project Area and numerous scientific publications were consulted to provide baseline geologic and paleontological data. The Utah Geological Survey performed a comprehensive database search of previously recorded paleontological localities to determine whether there are any known fossil localities within or near the Project Area. In addition, BLM paleontologist Dr. Alan Titus performed a field survey of the GSENM portion of the proposed alternative alignments.

3.2.2. Existing Conditions

3.2.2.1. Geologic Setting

The Project Area is located in the "High Plateaus" region of the Colorado Plateau within southern Utah (Eppinger et al. 1990). The eastern portion of the Project Area begins near GSENM within the Kaiparowits Basin and extends westward onto the Paunsaugunt Plateau through BRCA and into DNF. The remainder of the Project Area traverses DNF and terminates on BLM land, intermittently crossing state and private parcels. The eastern escarpment of the Paunsaugunt Plateau is the Pink Cliffs (of the Claron Formation) that constitute BRCA. Together the Kolob, Markagunt, Paunsaugunt, and Table Cliff Plateaus make up the Grand Staircase (Davis 1999). To the east of the Paunsaugunt Plateau is the Kaiparowits Basin, a large, fan-shaped structural basin located at the eastern end of a 250-kilometer-long belt of strata that were deposited near the western margin of the Cretaceous Western Interior Seaway (Titus et al. 2005).

According to published geologic mapping and paleontological locality data (Eppinger et al. 1990; UGS 2008; BLM 2008b), the Project Area traverses the following geologic units, which are listed in approximate ascending stratigraphic order. The paleontological resource potential of each is discussed in more detail below and depicted in **Figure 3.2-1**.

Tropic and Dakota Formations (Kdt)

The oldest geologic unit occurring in the Project Area is the Dakota Formation of early Late Cretaceous age (late Cenomanian). It is also the lowermost (oldest) Cretaceous unit that is located within south-central Utah (May and Traverse 1973). The Dakota Formation, also known locally as the Dakota Sandstone and Dakota Group, is composed of interbedded mudstone, claystone, coal, sandstone, and chert pebble conglomerate. This unit has been subdivided into three informal members in southern Utah: lower, middle, and upper (Titus et al. 2005). The depositional environment of the Dakota Formation has been interpreted as a mix of alluvial plain, coastal, and open marine sediments that were deposited on the western fringe of a broad shallow sea extending from the Gulf of Mexico to the Arctic Ocean (May and Traverse 1973). Relative to other (younger) sedimentary units in the Kaiparowits Basin, the Dakota

Figure 3.2-1. Geologic Formations in the Project Area

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Formation is relatively thin (less than 60 meters). Its thickness increases to more than 300 meters east of Cedar City (Titus et al. 2005; May and Traverse 1973).

The lower member of the Dakota Formation is composed of up to 15 meters of white, gray, and black chert pebble clast-supported conglomerate with minor amounts of lenticular mudstone, sandstone, and siltstone. Petrified wood reworked from older geologic units is common in the lower member, as well as recently discovered fossil turtle shell fragments (Titus et al. 2005). The middle member of the Dakota Formation is composed of sandstone, mudstone, claystone, and carbonaceous beds. This member yields locally abundant vertebrate fossils including fish scales and teeth, crocodile teeth and scutes, and turtle shell fragments, as well as fossil invertebrates and plants. The upper member of the Dakota Formation is lithologically similar to the middle member and is locally characterized by massive oyster shells and other bivalves within its uppermost bed.

The Tropic Shale [Formation] conformably overlies the Dakota Formation and is mapped by Eppinger and others (1990) as "undivided" together with the Dakota Formation. It is composed of mudstone, claystone, and sandstone with an overall thickness ranging from 183 to 274 meters (Titus et al. 2005). The Tropic Formation has yielded a diverse variety of locally abundant and well-preserved fossils including vertebrates such as sharks, bony fish, and marine turtles as well as plesiosaurs and a nearly complete dinosaur (Titus et al. 2005). Studies of fossil pollen by May and Traverse (1973) have identified 40 genera and 125 species of palynomorphs (microfossils).

Cretaceous Units, Undivided (Ku)

The following geologic units are mapped as "undivided" Cretaceous units by Eppinger et al. (1990). For the purpose of this analysis, each of the following rock units is discussed individually because they are all present within the Project Area (BLM 2008b) and are paleontologically important.

Straight Cliffs Formation. The Late Cretaceous Straight Cliffs Formation is characterized by white to light gray, thick-bedded, massive, fine- to coarse-grained cross-bedded sandstone containing lenses of conglomerate and buff to tan and light brown, very fine- to fine-grained sandstone interbedded with mudstone, carbonaceous shale, and thin layers of coal (Foos 1999). This formation is divided into the following four members, in ascending stratigraphic order: (1) the Tibbet Canyon Member, (2) the Smoky Hollow Member, (3) the John Henry Member, and (4) the Drip Tank Member (Hettinger 1995). The Tibbet Canyon Member is the lowermost and oldest unit and is characterized as a yellowish-gray, moderate-brown, cross-bedded, and thin-to-thick-bedded cliff-forming sandstone with a thickness of approximately 70 to 185 feet (Doelling et al. 2000). The Smoky Hollow Member is characterized by interbeds of sandstone, bentonitic mudstone, and thin coal stringers with an overall thickness ranging from 25 to 230 feet. The overlying John Henry Member is composed of 590 to 1,100 feet of slope- and ledge-forming sandstone, mudstone, carbonaceous mudstone, and coal. Finally, the uppermost and prominent cliff-forming member of the Straight Cliffs Formation is the Drip Tank Member. It is characterized by yellow-brown to yellow-gray, fine- to medium-grained, poorly sorted and cross-bedded, lenticular, medium- to thick-bedded sandstone with a thickness ranging from 140 to 550 feet (Titus et al. 2005).

Although the Straight Cliffs Formation is richly fossiliferous, macrovertebrate fossils are relatively scarce (Titus et al. 2005). It is subdivided into four members, all of which commonly produce fossil plants, invertebrates, and microvertebrates. The oldest member, the Tibbet Canyon Member, is highly fossiliferous locally, containing ammonites, bivalves, pelecypods, shark teeth, and trace fossils (Doelling et al. 2000). The Smoky Hollow Member, the second oldest member, possesses a middle non-carbonaceous layer that exhibits an abundance of microvertebrates. Petrified wood and small bone fragments have also been noted in this member, but no major macrovertebrate discoveries have been reported (Titus et al. 2005). The third youngest member of the Straight Cliffs Formation, the

John Henry Member, has an abundance of both terrestrial and marine fossils. Shark, ray, turtle, and oyster remains are the most common fossils in this member, and ammonites found in the member have been used to constrain its time (Titus et al. 2005). Recent research utilizing new screen-washing techniques in the John Henry Member has yielded a single locality from which a wide variety of vertebrate fossils have been collected, including the remains of frogs and lizards (Eaton 2005). The first mammals of definite Santonian age to be described from North America came from this member and include marsupials, symmetrodonts, tribotheres, and multituberculates (Eaton 2006). The youngest member of the Straight Cliffs Formation, the Drip Tank Member, is the least fossiliferous, containing only the occasional fish scale, petrified wood fragment, or small bone fragment (Titus et al. 2005).

Wahweap Formation. The Late Cretaceous Wahweap Formation is characterized by light gray to white, fine- to coarse-grained, cross-bedded sandstone and conglomeratic sandstone overlying buff to light brown hard, fine-grained, lenticular sandstone interbedded with gray to tan mudstone, thin beds of light gray or white siltstone and very fine-grained sandstone (Foos 1999). In the Kaiparowits Basin, the Wahweap Formation has a thickness that ranges from 360 to 460 meters (Titus et al. 2005).

The Wahweap Formation has produced a diverse and significant fossil assemblage from a large number of localities. Plant fossils are common in the Wahweap, and many petrified logs have been recorded. Invertebrate fossils include freshwater mollusks and crabs (Kirkland 2005). Diagnostic dinosaur material is relatively rare, although some significant discoveries have been made very recently. Two dinosaur specimens recently found within the Wahweap are centrosaurines (horned ceratopsians), including one which is a new species that has helped to increase our understanding of early horned dinosaur evolution and another that is the oldest known centrosaurine dinosaur from south of Montana (Kirkland and DeBlieux 2007). Fossil mammals are fairly well known from this formation and include marsupials and marsupial-like mammals (Cifelli 1990a), as well as eutherians such as leptictids, lipotyphlans, and zhelestids (Cifelli 1990b).

Kaiparowits Formation. The Late Cretaceous Kaiparowits Formation is characterized by a drab-gray, olive-gray, or green-gray, very fine- to fine-grained, poorly sorted subarkosic sandstone with poorly defined to lenticular bedding (Doelling et al. 2000). The sediments comprising the Kaiparowits Formation indicate a variety of depositional environments in freshwater or brackish water lakes and subsiding low-relief inland alluvial plains (Doelling et al. 2000; Titus et al. 2005). This formation has a reported thickness of 855 meters and typically weathers into smooth-looking badlands (Titus et al. 2005).

The Kaiparowits Formation contains abundant fossils and has yielded many scientifically significant and exceptionally well-preserved specimens. The faunal remains are almost entirely terrestrial within surface collections; however, when sediments are sieved and washed small specimens of fishes, sharks, rays, and amphibians are present in relative abundance (Hutchinson et al. 1997). Additional non-vertebrate fossils recovered include plant material, freshwater mollusks, and trace fossils such as insect nests (Hutchison et al. 1997; Titus et al. 2005). The most abundant vertebrates include turtles and crocodilians from a number of different families and genera. The most scientifically notable of the fossil discoveries from the Kaiparowits are those of dinosaur and early mammal remains. The dinosaurs are diverse and include *Avisaurus*, an enantornithine bird that is the most complete known from Late Cretaceous terrestrial deposits in North American (Hutchison 1993); numerous specimens of large hadrosaurs (duck-billed dinosaurs) including *Parasaurolophus* (Weishampdl and Jensen 1979); two species of *Gryposaurus* (Titus et al. 2005); three new genera of ceratopsians (horned dinosaur); a small ornithomimid (ostrich-like dinosaur), *Ornithomimus velox* (DeCourten and Russell 1985); several fragmentary pachycephalosaur specimens (thick-headed dinosaurs); tyrannosaurs; and several ankylosaurs (armored dinosaurs). Dozens of well-preserved skin impressions of hadrosaurs

(duck-billed dinosaurs) have also been discovered in the Kaiparowits Formation in close association with articulated or partly articulated skeletons. This discovery of skin and bone together is a fascinating paleontological rarity (Titus et al. 2005). Mammals found within the Kaiparowits include marsupials (Cifelli 1990c), leptictids, lipotyphlans, and zhelestids (Cifelli 1990a). These mammals have contributed to our understanding of early mammalian evolution as a whole.

Claron Formation (Tc)

The Claron Formation of Paleocene and Eocene age (Bown et al. 1997) is divided into the White Limestone Member and the Pink Limestone Member. The Pink Limestone Member is the lowermost unit and is characterized by pale-pink, red, pale-orange, and tan, very fine-grained, thin-to-thick-bedded limestone, argillaceous limestone, and dolomitic limestone with sparse interbeds of gray or tan calcareous mudstone and a basal conglomerate (Foos 1999). The White Limestone Member is the uppermost unit and is characterized by white, light gray, or tan, fine-grained to microcrystalline, thick-bedded to massive limestone with local thin-bedded purplish gray mudstone interbeds. The Claron Formation was deposited at the southern end of a large lake (Titus et al. 2005) and may reach a maximum thickness of 1,400 feet (Doelling et al. 2000).

Very few fossils have been recovered from the Claron Formation, and these are limited to a few invertebrates and palynomorphs (Eaton et al. 1999). However, of the few fossils found there are some important discoveries. Several hymenopteran (bees, ants, wasps) trace fossils were recently discovered in paleosols within the formation, including the second ant nest ever to be described and a new species, *Eatonichus claronensis* (Bown et al. 1997).

Sevier River Formation (Ts)

The Sevier River Formation is Pliocene to possibly Miocene in age and is characterized by poorly consolidated coarse to fine-grained clastic fluvial deposits locally containing airfall tuffs and lacustrine rocks (Eppinger et al. 1990). This formation is believed to have at least in part been formed by alluvium washed in by the Sevier River and deposited as valley fill (Ives 1947). A comprehensive literature search did not reveal any paleontological discoveries within this formation. Although not much is locally known about the paleontology of this rock unit, its age and composition suggest that it does have the potential to contain significant Neogene age fossils (BLM 2008b).

Quaternary to Tertiary Basalt (QTb)

Widespread volcanic units composed variously of akali-basalt flows, cones, and domes are common throughout southwestern Utah. Locally, most of these volcanic units are less than 2 million years old but include basalt flows as old as Miocene age in the Modena area (Eppinger et al. 1990). Most volcanic rocks have low paleontological sensitivity because fossils are only very rarely preserved within these units, which are deposited at extremely high temperatures.

Quaternary Surficial Deposits, Undivided (Q)

Quaternary age unconsolidated surficial deposits consisting variously of alluvium (younger and older), colluvium, landslide deposits, dune deposits, and lacustrine sediments are mapped as "undivided" within the Project Area. Alluvium generally consists of gravel, sand, silt, clay, and other detrital sediments deposited by rivers, streams, and intermittent washes and on adjacent floodplains.

Although Holocene-aged sediments often contain the remains of modern organisms, they are too young to contain significant in situ paleontological resources. Landslide deposits are generally less likely to contain well-preserved fossils than intact deposits and are thus considered to have low paleontological sensitivity. There is moderate potential for Pleistocene vertebrates in older colluvium and soil horizons, particularly where such deposits are thick and laterally extensive. The remains of a

large proboscidian (cf. *Mammuthus colombi*) were collected on the Skutumpah Bench south of the Project Area in 2002–2003. It is possible that similar sites could be found in the Project Area.

3.2.2.2. Potential Fossil Yield Classification

Using the Potential Fossil Yield Classification (PFYC) System, originally developed by the USFS (1996) and recently significantly revised and adopted as policy by the BLM (BLM IM 2008–009 and BLM 2008b) to replace its previous resource management classification system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. This classification is applied to the geologic formation, member, or other distinguishable unit, preferably at the most detailed mappable level. It is not intended to be applied to specific paleontological localities or small areas within units. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; instead, the relative abundance of significant localities is intended to be the major determinant for the class assignment. A brief summary of Classes 1 – 5 follows. A more detailed explanation of the PFYC Classes is contained in the Paleontological Specialist Report in the Project Record.

- Class 1—Very Low: Includes geologic units that are not likely to contain recognizable fossil remains. The probability of impacting any fossils is negligible. Assessment or mitigation of paleontological resources is usually unnecessary. The occurrence of significant fossils is non-existent or extremely rare.
- Class 2—Low: Includes sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils. The probability of impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Assessment or mitigation of paleontological resources is not likely to be necessary. Localities containing important resources may exist but would be rare and would not influence the classification. These important localities would be managed on a case-by-case basis.
- Class 3—Moderate or Unknown: Includes fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence, or sedimentary units of unknown fossil potential. This classification includes a broad range of paleontological potential. It includes geologic units of unknown potential, as well as units of moderate or infrequent occurrence of significant fossils. Management considerations cover a broad range of options as well and could include pre-disturbance surveys, monitoring, or avoidance. These units may contain areas that would be appropriate to designate as hobby collection areas due to the higher occurrence of common fossils and a lower concern about affecting significant paleontological resources.
- Class 4—High: Includes geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented but may vary in occurrence and predictability. Surface-disturbing activities may adversely affect paleontological resources in many cases. The probability of impacting significant paleontological resources is moderate to high and is dependent on the Proposed Action. Mitigation considerations must include assessment of the disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. If impacts to significant fossils can be anticipated, on-the-ground surveys prior to authorizing the surface-disturbing action will usually be necessary. On-site monitoring or spot checking may be necessary during construction activities.

- Class 5—Very High: Includes highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils and that are at risk of human-caused adverse impacts or natural degradation. The probability of impacting significant fossils is high. Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. On-the-ground surveys prior to authorizing any surface-disturbing activities would usually be necessary. On-site monitoring may be necessary during construction activities.

3.2.2.3. Findings

Five of the nine geologic units that occur within the Project Area have the potential to contain fossils of varying abundance and significance. The paleontological sensitivity of each geologic unit to be impacted was evaluated using the PFYC System.

The PFYC designations for the affected geologic units analyzed here (**Table 3.2-1 and Figure 3.2-2**) were assigned by the authors of the Paleontological Resources Specialist Report (available in the project record) based on the results of the literature and records reviews. These classifications were corroborated by BLM (2008b).

3.2.2.4. Field Survey

A field survey of the portions of the Project Area on the GSENM was conducted by Dr. Alan Titus on July 22, 2008. Dr. Titus performed a pedestrian survey of all accessible areas and examined exposures of the fossiliferous Tropic Formation and the Smoky Hollow and Tibbet Canyon Members of the Straight Cliffs Formation. No significant fossils were discovered; however, large petrified logs and a single ganoid fish scale (possibly lepisosteid) were discovered within colluvial debris of the Smoky Hollow Member. These fossil specimens were not assigned a locality number because they were not in situ and thus not deemed significant (BLM 2008b). Dr. Titus noted that these fossil occurrences are indicative of the presence of a rock facies that is conducive to the preservation of significant vertebrate fossil resources. Also noted were abundant sizable specimens of the oyster *Crassostrea soleniscus* observed in the Tibbet Canyon Member as well as occasional fragmented specimens of *Ostrea* (oysters) or *Mytiloides* (mussels) within the Tropic Formation (BLM 2008b). These fossil occurrences were also not assigned locality numbers as they occur in such large numbers and in a continuous layer; therefore, they are not deemed scientifically significant and in need of protection during surface-disturbing actions associated with the Proposed Action. Dr. Titus's full survey results are appended to the Paleontological Resources Specialist Report in the project record.

3.2.2.5. Paleontological Locality Searches

In support of this analysis, paleontological locality and specimen data were obtained from the Paleontological Locality Database maintained by the Utah Geological Survey (UGS). The results of the records searches are presented in detail in the Paleontological Resources Specialist Report. At least 19 previously recorded fossil localities occur within 1 mile of the Project Area, 3 of which occur directly within the proposed right-of-way. Of the 19 localities, 8 were discovered within the John Henry Member of the Straight Cliffs Formation and 1 was discovered within the Smoky Hollow Member of the same formation. Five localities were discovered within the Wahweap Formation, two within the Tropic Formation, and the remaining three in unknown or undetermined Late Cretaceous rock units. Staff at the GSENM also conducted a records search of the BLM's locality database, and both of the aforementioned localities from the Tropic Formation and Straight Cliff Formation were discovered in the vicinity of the Project Area.

Table 3.2-1. Summarized Paleontological Resources and PFYC Classifications within the Project Area

[1]Map Symbol	Geologic Unit	Age	Typical Fossils	PFYC Classification
Q	Quaternary Surficial Deposits, undivided	Holocene to Pleistocene	None in deposits of Holocene age. Scattered vertebrates, invertebrates, and plants occur in deposits of Pleistocene age	Class 2
QTb	Quaternary to Tertiary Basalt	Mostly Quaternary (less than 2 Ma)	None	Class 1
Ts	Sevier River Formation	Pliocene to possibly Miocene	Unknown	Class 3
Tc	Claron Formation	Paleocene to Eocene	Uncommon invertebrates and palynomorphs, trace fossils, local occurrences of vertebrates	Class 3
Ku	Kaiparowits Formation	Cretaceous	Terrestrial vertebrates including dinosaurs and early mammals, fishes, turtles, crocodiles, invertebrates, insect nests, trace fossils	Class 5
Ku	Wahweap Formation	Cretaceous	Petrified wood and other plant fossils, mollusks, mammals, some dinosaurs	Class 5
Ku	Straight Cliffs Formation			
	Drip Tank Member	Cretaceous	Microvertebrates (recently discovered), petrified wood	Class 5
	John Henry Member		Sharks, rays, turtle, frogs, lizards, mollusks	Class 5
	Smoky Hollow Member		Microvertebrates, petrified wood, invertebrates	Class 5
	Tibbet Canyon Member		Mollusks, shark teeth, trace fossils	Class 4
Kdt	Tropic Formation	Cretaceous	Invertebrates, sharks and bony fish, turtle, plesiosaurs, and at least one specimen of dinosaur	Class 5
Kdt	Dakota Formation	Cretaceous	Petrified wood and other plant fossils, turtle shell, fish scales and teeth, crocodile teeth, invertebrates	Class 5

[1]Map symbol taken from Eppinger et al. (1990).

Figure 3.2-2. Potential Fossil Yield Classification in the Project Area

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3.3. SOILS

3.3.1. Data and Methods

The Study Area for soils coincides with the Project Area. Available data from the Natural Resources Conservation Service (NRCS) and other scientific or governmental sources were utilized to obtain information for this section. The NRCS *Soil Survey of Panguitch Area, Utah, Parts of Garfield, Iron, Kane, and Piute Counties* (USDA 1990) and the *Soil Survey of Grand Staircase-Escalante National Monument Area, Parts of Kane and Garfield Counties, Utah* (USDA 2007a) were the main references for determining soil characteristics.

An additional reference includes the "Soil Survey Technical Report, Tropic to Hatch 138kV Transmission Line Project, Garfield County, Utah" (Transcon 2008a). Interpretations were adapted primarily from revised Internet versions of the *Soil Survey Manual* (USDA 1993) and the *National Soil Survey Handbook* (USDA 2007b), in addition to the *Forest Service Handbook, Intermountain Region* (USDA 2003a).

Soil map units and corresponding acreages were obtained from project maps overlaid with digital NRCS and DNF soil data. A detailed soils map is included in the Soils Specialist Report (JBR 2008).

3.3.2. Existing Conditions

During June 2008, Transcon Environmental conducted field surveys throughout the Project Area to verify the presence of soils identified in the published soil surveys. A total of 79 soil map units were analyzed. Field survey protocol included digging a 16-inch pit to determine soil structure, horizons, texture, percentage of rock fragments, and soil color. Other measurements evaluated effective ground cover and compaction, hydrophobicity (an indication of the soil's tendency to repel water), erosion, and soil displacement. The field data were consistent with the applicable soil surveys.

Additional information for existing soil condition was obtained from agency resource management plans and other governmental documents, where applicable.

3.3.2.1. Soil Health and Displacement

Field survey data indicate that existing soil health for all of the surveyed areas was satisfactory. Soil displacement was minimal or not evident, with no hummocks or displacement observed and no unusual or excessive soil deposition for all soil map units sampled (Transcon 2008a).

The Kanab BLM Final EIS and RMP states that during rangeland health evaluations conducted on BLM properties, more than 97 percent of the sites were classified as having none to slight, or slight to moderate, departures from the anticipated ecological condition. The RMP indicates that the landscape-level soil condition is largely considered to be functioning, although there may be site-specific issues of soil impacts or degradation (BLM 2008a).

Transcon observed no evidence of compaction in the survey area. Surface erosion rills or gullies were absent or contained blunted features. Plants and rocks were not pedestaled and roots were not exposed, with no unusual or excessive soil deposition, indicating a lack of surface sheet erosion for all soil map units sampled (Transcon 2008a).

There are a total of 6.22 miles of existing access routes in conjunction with the Rocky Mountain Power/PacifiCorp 230 kV transmission line. The existing 69kV transmission line alignment consists of approximately 124.67 acres of previous disturbance.

3.3.2.2. Ground Cover and Woody Debris

Vegetation cover types, extent and health of vegetation, and recovery predictions are thoroughly described in **Section 3.5**, Vegetation. Ground cover is used as a guideline because it protects soil from accelerated erosion. Effective ground cover is expressed as the percentage of material covering bare ground and consists of living and dead vegetation, litter, cobbles, gravel, stones, bedrock, and other rock fragments larger than 0.75 inch in diameter. Coarse woody debris includes organic materials such as plant stems, branches, and logs with a diameter greater than 3 inches. Woody debris may contain both natural materials and management-induced post-harvest slash (USDA 2003a).

Effective cover percentage for the 79 sampled soil types ranged from 15 to 100 percent. Of the sampled sites, 51 soil types exhibited greater than 90 percent cover; 21 soils were in the 80 to 90 percent range; 13 sites had 70 to 79 percent cover; and 7 sites demonstrated only 60 to 69 percent effective cover. Eight soil sample sites exhibited less than 60 percent effective cover (Transcon 2008a).

Of the soil types identified by Transcon within the Study Area, seven occur in forested conditions. Average coarse woody debris was calculated for these seven sites, with a range of 1.7 to 19.65 average tons per acre (T/acre) and an overall mean of 7.39 T/acre. The optimum amount of coarse woody debris in forested habitat types has been identified as within a range of 4.5 to 8.9 tons per acre (USDA 1994). Transcon field evaluation results (2008a) indicate that the existing cover material meets or exceeds local guidelines to protect soil resources.

3.3.2.3. Sensitive Soils

The Kanab BLM Final RMP and EIS (BLM 2008a) identifies sensitive soils as those with steep slopes, high salt or gypsum content, low available water-holding capacity, clayey textures, or high water tables. A subset of sensitive soils is classified as fragile soils (i.e., highly erosive soils). These soils have high salinity, very fine textures, shallow depths, and steep slopes (greater than 30 percent). Fragile soils may be easily eroded by wind or water due to their normally sparse vegetative cover. Fine-textured soils such as clays, or silty clays, have slow infiltration rates and high runoff rates. Slope steepness increases the rate of overland water flow, increasing the tendency to transport soil particles downslope. Maps of sensitive soils resources locations are in the Soils Specialist Report in the project record.

Highly Erodible Soils

Highly erodible soils are defined as any soil class whose hazard of water erosion was classified as "severe." Two area soil surveys (USDA 1990 and 2007a) and data from the Escalante Ranger District of the DNF were reviewed to determine which Project Area soils may be highly erodible. **Figure 3.3-1** depicts the locations of mapped soil units within the Study Area that are classified as highly erodible.

Table 3.3-1 provides a summary of the acreage of highly erodible soils within a 0.5-mile buffer of all project elements.

Table 3.3-1. Summary of Highly Erodible Soil Acreages

SEGMENT	ACREAGE OF HIGHLY ERODIBLE SOIL ACRES					
	PRIVATE	STATE	BLM	GSENM	USFS	NPS
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.

Soil Biological Crusts

Living organisms and their byproducts form biological crusts at the surface of the soil by binding soil particles together with organic materials. These crusts serve as living mulch, retaining soil moisture and discouraging the growth of some types of annual weeds. The ecological function of these crusts is to stabilize the soil, reduce runoff, increase water infiltration, and enhance plant establishment. Total crust cover is usually inversely related to plant cover and is greatest at lower elevation inland sites (BLM 2008a).

On lands administered by the KFO, most biological soil crusts consist of cyanobacteria and nitrogen-fixing lichens. These types of crust are limited and sparse on BLM lands due to the relatively high elevations (4,500 to 9,000 feet) and the relatively dense vascular plant cover. There has not been a systematic inventory of soil crusts on lands administered by KFO (BLM 2008a). Maps of biotic soils encountered along the proposed alignments during Transcon's field surveys are in the Soils Specialist Report (Transcon 2008a) in the project record.

Biological soil crusts play an important ecological role in the functioning of soil stability and erosion; these crusts are widespread, but not pervasive, on GSENM lands. Management objectives on the Monument include prevention of damage, increased public education, and research to improve preservation and restoration of soils (BLM 2000).

Figure 3.5-1 details points along the alternative routes where soil biological crusts were observed.

3.3.2.4. Erosion

The overall hazard of erosion for soils has previously been determined by soil surveys conducted within the Project Area. In general, upland areas are more susceptible to erosion than lowland sites, and areas with higher coarse fragment content and lower slope angle have lower potential for water erosion hazard.

Areas where herbaceous vegetation is sparse or absent, including sensitive soils such as the Tertiary Claron Limestone Formation located in Cedar Fork Canyon, Bryce Canyon, Red Canyon, and Hillsdale/Blue Fly Canyon, are most susceptible to wind and water erosion and to drying and crusting

(USDA 1990, 2007). Tropic Valley is characterized by rolling hills and flats dominated by alkaline soils and sparse amounts of salt-tolerant vegetation species. A greasewood–salt scrub vegetation community is located at the east end of Tropic Valley.

Saline geologic formations and slightly to highly saline soils are present in the Project Area on lands administered by the KFO. Erosion on public lands is one source of sediment and associated salts in the area. The RMP indicates that some of this erosion is natural or results from relatively stable conditions in a semi-arid climate regime with periodic, high-intensity storms (BLM 2008a).

Several areas of extremely high soil erosion rates exist in four canyons within the proposed Project Area. Steep slopes and red rock cliff faces of the Tertiary Claron Formation characterize the topography of Cedar Fork Canyon, Red Canyon, and Bryce Canyon. Hillsdale/Blue Fly Canyon is also characterized as having steep slopes, cliff faces, and rock formations of the Claron Formation. Erosion rates from these unvegetated escarpments are difficult or impossible to significantly reduce (USFS 1986).

Soil permeability is the quality of the soil that enables water or air to move through it. Soils with moderate or moderately rapid permeability tend to reduce surface water erosion potential. Hydrophobicity is the tendency of the soil to repel water and can be an indicator of soil permeability, with rapid infiltration of a bead of water indicating a relative lack of compaction at the surface. Field data sheets indicate hydrophobicity to be none or slight, with a bead of water infiltrating in less than 10 seconds for all sampled soils in the survey area. The hydrophobicity measurements of none to slight within the Study Area are correlated with favorable permeability. Higher values would indicate reduced permeability. Soil structure was moderate to strong granular or single grained (Transcon 2008a).

Figure 3.3-1. Highly Erodible Soils

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3.4. WATER RESOURCES

3.4.1. Data and Methods

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 provided in **Section 4.4**.

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 NRCA *Soil Survey of the Grand Staircase-Escalante National Monument Area, Parts of Kane and Garfield Counties, Utah* (USDA 2007a) were reviewed to identify soils which would meet the criteria of "highly erodible."

3.4.2. Existing Conditions

3.4.2.1. 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 and 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 in Emery Valley, near the center of the Study Area, to over 9,000 feet above mean sea level 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 3.4-1** presents climate summaries for monitoring stations in the vicinity of the Study Area.

Table 3.4-1. Climate Conditions for Study Area Monitoring Locations

Monitoring Station	Elevation (feet)	Annual Average Temperature (°F)		Precipitation (inches)	Snowfall (inches)
		High	Low		
Hatch, Utah	6,932	N/A[1]	N/A[1]	11.5	44.7
Tropic, Utah	6,278	62.8	32.0	12.1	33.7
Bryce Canyon Airport	7,590	56.3	23.7	12.1	66.6
Bryce Canyon National Park Headquarters	7,910	56.1	26.5	15.7	86.6

Source: Western Regional Climate Center (2008).

[1] Insufficient data available.

3.4.2.2. Surface Water Resources

Streams

Transcon Environmental (2008b) performed pedestrian surveys of all project alternative alignments to identify and classify all drainages. Drainages were classified as perennial, intermittent, or ephemeral 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, and USFS data were evaluated for flow of perennial systems. Mapped stream crossings are shown on **Figure 3.4-1**.

Streams within the Study Area primarily occur as ephemeral systems, conveying water only during significant rainfall events. Few intermittent systems, where water flows on a seasonal or regular-period basis, were identified, and even fewer perennial systems, where water flows year-round, were identified. Stream systems ranged in size from small ephemeral washes, approximately 1 foot wide, to large perennial systems, such as the Sevier River, over 50 feet wide at the proposed crossing locations.

A detailed description of individual drainages and their characteristics is provided in the Water Resources Specialist Report in the project record. **Table 3.4-2** provides a summary of drainages that were identified within the Study Area during field investigations.

Table 3.4-2. Summary of Drainages Identified within the Study Area during Field Investigations

Alternative Segment		Number of Drainages[1]					
		Private	State	BLM	GSENM	USFS	NPS
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

Alternative Segment		Number of Drainages[1]					
		Private	State	BLM	GSENM	USFS	NPS
	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
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 lengths of stream systems within the Study Area were calculated from GIS data provided by USGS. USGS stream categories consisted of "Stream/Braided Stream," "Ditch or Canal," and "Intermittent stream." For **Tables 3.4-3** and **3.4-4**, streams, braided streams, ditches, and canals were classified as perennial while intermittent streams were classified as ephemeral. **Table 3.4-3** provides a summary of the linear mileage of streams, by class, within a 0.5-mile buffer of each alternative, and **Table 3.4-4** provides a summary of the linear mileage of streams, by class, within the proposed 100-foot-wide right-of-way.

Table 3.4-3. Summary of Stream Lengths within the Study Area

Alternative Segment		Stream Class Linear Mileage					
		Private	State	BLM	GSENM	USFS	NPS
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

Alternative Segment		Stream Class Linear Mileage					
		Private	State	BLM	GSENM	USFS	NPS
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 2007a.

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

Table 3.4-4. Summary of Stream Lengths within the Proposed Right-of-Way

Alternative Segment		Stream Class Linear Mileage					
		Private	State	BLM	GSENM	USFS	NPS
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	Perennial[1]	0.00	0.00	0.00	0.00	0.07	0.00

Alternative Segment		Stream Class Linear Mileage					
		Private	State	BLM	GSENM	USFS	NPS
Interconnect	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, Utah, 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 2007a). Annual averages ranged from a low of 6 cfs in 1977 to a high of 45 cfs in 1980.

Highly Erodible Soils. Highly erodible soils found within the Study Area are detailed in **Table 3.3-1** and **Figure 3.3-1**. Streams in this portion of the arid west are highly susceptible to changes in water quality as a result of erosional runoff.

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, and so on 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. The U. S. Army Corps of Engineers (Corps) is tasked with regulating waters of the U.S., including wetlands.

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 would 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 3.4-5 provides a summary of potentially jurisdictional waters identified during field surveys, and **Figure 3.4-1** depicts the location of potentially jurisdictional drainages.

Table 3.4-5. Summary of Potentially Jurisdictional Waters Identified within the Study Area during Field Investigations

Alternative Segment		Number of Potentially Jurisdictional Drainages[1]					
		Private	State	BLM	GSENM	USFS	NPS
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).

Figure 3.4-1. Surface Water Resources

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The centerline access associated with the existing 69 kV transmission line currently crosses approximately 0.22-acre of potentially jurisdictional drainages and two wetlands (described below).

Perennial Waterways. Two perennial waterways occur in the Study 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 Paunsaugunt 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. 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 Utah Highway (SR) 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, during significant rain events, or when water is released from the Tropic Reservoir (Transcon 2008b). It is located on the Paunsaugunt 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 in this drainage immediately up-canyon from a forest road crossing is there for irrigating nearby crop fields at the mouth of the canyon. This intermittent drainage would be crossed only by the Proposed Action, within DNF.

The intermittent stream reach in Cedar Fork Canyon was characterized by willows, narrowleaf cottonwood (*Populus angustifolia*), 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 that do not have riparian vegetation. North Creek is the main drainage for the

east side of Tropic Valley, while the perennial Tropic Ditch is the 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 spring snow melt conditions. 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 notably Baltic rush (*Juncus balticus*), and each was given a unique drainage number identifier. **Figure 3.4-2** depicts the location within the Study Area of these wetlands.

Drainage 139 is an 11.42-acre wetland north of SR 12 and the Pine Hills, near Mud Spring. This wetland would be crossed by Segment A-1, and it is located on private land.

Drainage 310 is a 12.09-acre mesic meadow immediately east of SR 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 324 is a 0.24-acre wetland east of the Sevier River, approximately 0.75 mile southeast of the intersection of U.S. 89 and SR 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 381 is a 10.69-acre wetland at the mouth of Daves Hollow, approximately 0.25 mile east of the Tropic Ditch and 0.5 mile east of East Fork Sevier River. Segment C-1 would cross the northern tip of this wetland, which is located on USFS land.

Drainage 385 is a 0.76-acre mesic area immediately west of Drainage 381, between the Tropic Ditch and East Fork Sevier River. It would similarly be crossed by Segment C-1, and it is located on private land.

Figure 3.4-2. Wetlands

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Drainage 471 is an 8.25-acre wetland on the east side of SR 63, across the road from Ruby's Inn, approximately 0.5 mile west of Drainage 310. This wetland is crossed only by the existing 69kv line between the Bryce and Hatch Mountain Substations, and it is located on private land.

All wetlands were determined to be potentially jurisdictional. **Table 3.4-6** provides wetland acreages, by alternative, within the Study Area.

Table 3.4-6. Summary of Wetland Areas Identified within the Study Area during Field Investigations

Alternative Segment	Wetland Acreage					
	Private	State	BLM	GSENM	USFS	NPS
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).

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 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 (USFS, BLM, NPS) were 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 1 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 are 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 Chapter 4.

3.4.2.3. 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 1995a). 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 (1995a), 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 1995a); 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.

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 off-site into Hillsdale Canyon (described above).

3.4.2.4. 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 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—Total maximum daily load 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 total maximum daily loads 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 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. The reach downstream to Circleville Irrigation Diversion has been listed as 4C and 5A, where some total maximum daily loads are required and some not required (depending on pollutant—a pollution parameter listed as Category 4C does not require a total maximum daily load 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. A total of 26 miles of stream is included in this category.

No other 303(d)-listed waters occur in the Study Area.

3.4.2.5. Water Rights

The Utah Department of Natural Resources, Division of Water Rights 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 Division of Water Rights 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 3.4-7** presents the number of water rights, by alternative, present in the Study Area, while **Figure 3.4-3** depicts the locations and type of each water right. Access to water rights would not be restricted by any of the alternatives.

Table 3.4-7. 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 3.4-3. Water Rights

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3.5. VEGETATION

3.5.1. Data and Methods

The DNF, BLM, and Utah Division of Wildlife Resources (UDWR) were consulted to identify biological resources issues and concerns. In addition, the USFWS Mountain Prairie Region website was accessed to assemble a list of species protected under the Endangered Species Act for Garfield County. The UDWR list of sensitive species was used to identify any sensitive species in the Project Area. Habitat requirements of these species and their known range were compiled. Special status species are discussed in **Section 3.8.**

Transcon performed pedestrian surveys of the Project Area between April and June, 2008, to document vegetation, snags, and invasive species occurring in the action area (Transcon 2008c). Baseline GIS data were generated from existing BLM, GSENM, USFS, NPS, NRCS, USGS, and State of Utah vegetation data (including noxious or invasive species). Southwest Regional GAP Analysis Project GIS data were used to characterize vegetation types within the Project Area (USGS 2007b).

3.5.2. Existing Conditions

3.5.2.1. Vegetative Cover Types in Project Area

Table 3.5-1 lists the vegetation cover types within the Project Area. Vegetative landcover types present in the right-of-way were derived from NatureServe's Ecological System concept. The 41 landcover classes were consolidated into 11 types (**Table 3.5-1**) based on a variety of shared characteristics. The original 41 cover types that were identified and a detailed summary for each cover type are located in the Vegetation Specialist Report, in the project record.

Table 3.5-1. Vegetative Cover Types Present within the Project Area

TYPE	DESCRIPTION
Grass	Grassland or meadow
Mixed conifer	Mixed conifer, includes aspen/conifer forest
Other	Developed areas, agricultural, recently burned or logged
Pinyon-juniper	Pinyon, juniper, includes recently chained areas
Ponderosa pine	Ponderosa pine
Rock/dune	Cliff, canyon, volcanic, badland, dune, etc.
Sagebrush	Sagebrush
Shrub/scrub	Any other shrub or scrub category, including mountain mahogany and oak
Spruce/fir	Spruce, fir
Wetland/riparian	Wetland, wet meadow, or riparian

3.5.2.2. Field Survey Results

The following descriptions of vegetative communities within the Project Area were taken from Transcon's Biological Field Review Technical Report (Transcon 2008c). The technical report in the project record contains more detailed descriptions of the vegetative cover types mentioned below.

Tropic Valley

All alternatives originate in the Tropic Valley, which consists of greasewood–salt scrub vegetation on the east end of the valley and transitions into sagebrush–perennial grassland habitat on the west side of the valley. The vegetation transitions into pinyon-juniper on the very western edge of the valley. The majority of the valley is rolling hills and flats dominated by alkaline soils and salt-tolerant species. The elevation in the valley ranges from approximately 6,000 to 6,500 feet above mean sea level.

Cedar Fork Canyon and Bryce Canyon

The alignments for Alternatives A and C would exit Tropic Valley and travel through Cedar Fork Canyon, which includes both pinyon–ponderosa pine and mixed conifer vegetation communities. The Alternative B alignment exits Tropic Valley and travels through the north side of BRCA, which consists of mixed conifer vegetation communities and sparsely vegetated endemic plant communities. The topography of both of these canyons is characterized by steep slopes and red rock cliff faces of the Tertiary Claron Formation. The elevation ranges from 6,500 to 7,500 feet in both of these canyons.

Paunsaugunt Plateau

All alternatives cross the Paunsaugunt Plateau from east to west after exiting the canyons. The majority of the plateau consists of sagebrush–perennial grassland habitat. However, across the plateau the alternatives travel through large and small stands of ponderosa pine communities. On the west side of the plateau all alternatives travel from sagebrush into ponderosa pine communities. The topography of the plateau is flat with rolling hills. Elevations on the plateau range from 7,500 to 8,000 feet.

Hillsdale/Blue Fly Canyon and Red Canyon

Alternatives A and C would both travel down Hillsdale/Blue Fly Canyon on the west side of the plateau. These canyons consist of mixed conifer and ponderosa pine vegetation communities. The topography is characterized by steep slopes, cliff faces, and rock formations of the Claron Formation with patches of sparsely vegetated endemic plant communities. Alternative B passes into ponderosa pine vegetation as it approaches Red Canyon. It then enters mixed conifer forest and sparsely vegetated endemic plant communities as it travels through Red Canyon. Red Canyon also has steep-sloped topography and rock formations of the Claron Formation. The elevation ranges from 7,500 to 6,500 feet as the alternatives descend the canyons into the Hatch Valley.

Hatch Valley

The habitat transitions into pinyon-juniper habitat at the bottom of Red Canyon and then turns to sagebrush–perennial grassland as Alternative B enters Hatch Valley. Alternative B is in sagebrush habitat until it crosses U.S. 89, and then it passes through sections of sagebrush and pinyon-juniper habitat until it reaches the Hatch Substation. Both Alternatives A and C pass through ponderosa pine communities as they exit Hillsdale/Blue Fly Canyon and transition into pinyon-juniper habitat. At the DNF boundary the habitat transitions into sagebrush–perennial grassland. The alternatives are in sagebrush–perennial grass habitat to the Hatch Substation. The topography of the Hatch Valley consists mainly of rolling hills characterized by sagebrush and pinyon-juniper vegetation communities. Elevations in Hatch Valley range from 6,000 to 6,500 feet.

3.5.2.3. Existing Weed Infestations

The weeds listed on **Table 3.5-2** are officially designated and published as noxious for the State of Utah, as per the authority vested in the Commissioner of Agriculture under Section 4-17-3, Utah Noxious Weed Act. The noxious weeds that occur on this list were given special attention during the

field review. **Figure 3.5-1** illustrates noxious weed infestations that were observed within the Project Area during baseline surveys. Salt cedar (*Tamarix* spp.*)* was observed in the riparian areas in Cedar Fork Canyon. No GPS points were taken because salt cedar occurred intermittently throughout Cedar Fork Canyon in riparian areas. Scotch thistle (*Onopordum acanthium*) and Canada thistle (*Cirsium arvense*) were observed during surveys in several locations within the Project Area. Thistle was observed intermittently throughout Cedar Fork Canyon and Blue Fly Canyon and along the Sevier River. No GPS points were taken for these areas, because thistle occurred intermittently throughout these areas. One thistle location on the Paunsaugunt Plateau and one near the Tropic Substation are indicated on the Biologically Sensitive Areas map in Appendix B of Transcon's Biological Field Review Technical Report. Hoary cress (*Lepidium draba*, also commonly known as white top) was observed by surveyors intermittently along the length of the alternative through the GSENM area during field reviews; no GPS points were taken. **Table 3.5-3** summarizes the presence or absence of noxious weed species by alternative. UTM coordinates for the noxious weed locations, where there are distinct populations, are found in the biological field survey data set on the GIS Field Data CD prepared for the project (Transcon 2008c).

In addition to the listed noxious weeds, there are plant species in the planning area that are considered undesirable. A plant is usually labeled undesirable when it presents a poisoning threat to livestock or when it is invasive. Some undesirable plants occur as part of the natural vegetative community. Others invade or increase as a result of poor rangeland conditions. It is not feasible to attempt control of most undesirable species because they are common and widespread (BLM 2008a). One undesirable species, cheatgrass (*Bromus tectorum*), was observed intermittently throughout the entire Project Area along all alternatives; a few areas dominated by cheatgrass on the Paunsaugunt Plateau are indicated on the Biologically Sensitive Areas map in Appendix B of the Biological Field Review Technical Report (Transcon 2008c) in the project record.

Table 3.5-2. State of Utah Noxious Weeds List

COMMON NAME	SCIENTIFIC NAME
Bermudagrass	*Cynodon dactylon*
Black henbane	*Hyoscyamus niger*
Canada thistle	*Cirsium arvense*
Dalmatian toadflax	*Linaria dalmatica*
Diffuse knapweed	*Centaurea diffusa*
Dyers woad	*Isatis tinctoria*
Field bindweed (wild morning glory)	*Convolvulus arvensis*
Hoary cress (white top)	*Lepidium* spp.
Houndstongue	*Cynoglossum officinale*
Johnsongrass	*Sorghum halepense*
Leafy spurge	*Euphorbia esula*
Medusahead	*Taeniatherum caput-medusae*
Musk thistle	*Carduus nutans*
Ox-eye daisy	*Chrysanthemum leucanthemum*
Perennial pepperweed	*Lepidium latifolium*
Perennial sorghum	*Sorghum halepense* and *Sorghum almum*
Poison hemlock	*Conium maculatum*

COMMON NAME	SCIENTIFIC NAME
Purple loosestrife	*Lythrum salicaria*
Quackgrass	*Agropyron repens*
Russian knapweed	*Centaurea repens*
Salt cedar	*Tamarix ramosissima*
Scotch thistle	*Onopordum acanthium*
Spotted knapweed	*Centaurea maculosa*
Squarrose knapweed	*Centaurea squarrosa*
St. John's wort	*Hypericum perforatum*
Sulfur cinquefoil	*Potentilla recta*
Yellow starthistle	*Centaurea solstitialis*
Yellow toadflax	*Linaria vulgaris*

Source: Utah Department of Agriculture and Food, October 2008, http://ag.utah.gov/divisions/plant/noxious/documents/noxUtah.pdf.

Table 3.5-3. Noxious and Undesirable Weeds Observed in the Alternative Rights-of-Way

ALTERNATIVE	THISTLE	HOARY CRESS	SALT CEDAR	CHEATGRASS
Alternative A	YES	YES	YES	YES
Alternative B	YES	NO	NO	YES
Alternative C	YES	YES	YES	YES
North-South Interconnect	NO	NO	NO	YES
East-West Interconnect	NO	NO	NO	YES

Source: Transcon 2008c.

Figure 3.5-1. Areas Containing Biotic Soils or Weed Infestations

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Vegetation Resources by Alternative

The total acreage of vegetative cover type within the Project Area for each alternative is listed in **Tables 3.5-4** to **3.5-7**. It is important to note that these acres represent only existing vegetative conditions and do not represent any level of disturbance.

Table 3.5-4. Acres of Existing Vegetation within the Alternative A Project Area

DESCRIPTION	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Grass	0.00	0.00	0.00	0.24	1.02	0.00	**1.26**
Mixed conifer	0.00	0.00	0.00	0.00	0.00	0.00	**0**
Other	2.85	0.00	2.95	0.00	0.05	0.00	**5.85**
Pinyon-juniper	1.37	0.38	9.64	1.71	49.60	0.00	**62.70**
Ponderosa pine	10.17	1.14	0.00	0.00	91.34	0.00	**102.65**
Rock/dune	0.68	5.61	0.00	0.16	14.28	0.00	**20.73**
Sagebrush	47.43	41.13	47.20	34.27	88.61	0.00	**258.64**
Shrub/scrub	0.00	11.54	0.00	14.18	1.25	0.00	**26.97**
Spruce/fir	0.00	0.00	0.00	0.00	1.05	0.00	**1.05**
Wetland/ riparian	0.03	0.00	0.00	0.00	0.73	0.00	**0.76**
Totals	***62.53***	***59.80***	***59.79***	***50.56***	***247.93***	*0.00*	***480.61***

Table 3.5-5. Acres of Existing Vegetation within the Alternative B Project Area

DESCRIPTION	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Grass	0.48	0.00	0.00	0.00	0.00	2.97	**3.45**
Mixed conifer	0.00	0.00	0.00	0.00	0.00	1.41	**1.41**
Other	13.33	0.00	4.29	0.00	0.05	0.15	**17.82**
Pinyon-juniper	7.36	1.44	55.92	0.00	6.39	7.43	**78.54**
Ponderosa pine	17.07	0.18	0.00	0.00	27.46	11.77	**56.48**
Rock/dune	2.40	0.01	21.09	0.00	0.00	9.11	**32.61**
Sagebrush	97.74	44.19	54.96	0.00	21.31	0.81	**219.01**
Shrub/scrub	5.46	0.00	0.00	0.00	0.00	0.78	**6.24**
Spruce/fir	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Wetland/ riparian	2.28	0.00	0.40	0.00	0.00	0.00	**2.68**
Totals	***146.12***	***45.82***	***136.66***	***0.00***	***55.21***	***34.43***	***418.24***

Table 3.5-6. Acres of Existing Vegetation within the Alternative C Project Area

DESCRIPTION	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Grass	0.00	0.00	0.00	0.24	1.54	0.00	**1.78**
Mixed conifer	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Other	3.97	00.00	2.95	0.00	1.37	0.00	**8.29**
Pinyon-juniper	1.61	0.38	11.12	1.71	40.23	0.00	**55.05**
Ponderosa pine	22.12	0.00	0.00	0.00	86.57	0.00	**108.69**
Rock/dune	2.20	0.00	0.00	0.16	22.15	0.00	**24.51**
Sagebrush	96.56	32.57	47.98	34.27	62.62	0.00	**274.06**
Shrub/scrub	0.00	0.00	0.00	14.18	1.15	0.00	**15.39**
Spruce/fir	0.00	0.00	0.00	0.00	0.24	0.00	**0.24**
Wetland/ riparian	3.25	0.00	0.00	0.00	3.66	0.00	**6.91**
Totals	***129.71***	***32.95***	***62.05***	***50.56***	***219.53***	***0.00***	***494.80***

Table 3.5-7. Acres of Existing Vegetation on USFS-Managed Lands within the Interconnect Options Project Areas

DESCRIPTION	NORTH-SOUTH	EAST-WEST
Grass	0.00	0.2
Mixed conifer	0.00	0.25
Other	0.00	0.00
Pinyon-juniper	0.2	2.38
Ponderosa pine	15.28	17.27
Rock/dune	0.00	0.00
Sagebrush	11.75	28.5
Shrub/scrub	0.00	0.00
Spruce/fir	0.00	0.00
Wetland/riparian	0.00	0.06
Total	***27.23***	***48.66***

3.6. FOREST PRODUCT RESOURCES

For the purpose of this analysis, forest products resources include forest products typically directly derived from lands within the Project Area, including timber, posts, poles, firewood, and Christmas trees.

There are two forestry product areas located in the GSENM: Rock Springs Bench area and Buckskin Mountain area. Neither of these areas are within the Project Area; therefore, forest product resources within the GSENM would not be impacted by the project and will not be discussed further.

The NPS Management Policies (2006a) state, "Natural resource products that accumulate as a result of site clearing for development, hazard tree removal, vista clearing, or other management actions will be recycled through the ecosystem when practicable." Therefore, all trees that may be downed within BRCA would not be considered timber for the purpose of this analysis and would be left in place. These impacts would be evaluated in **Section 4.5**, Vegetation and will not be discussed further in this section.

3.6.1. Data and Methods

GIS data for lands suitable for timber management were obtained from DNF. The purpose of these data is to provide boundary information on lands suitable for timber management as well as information on areas unsuitable for timber management. These data were derived from soils data on the DNF. The data used identify areas that are capable forest lands due to the vegetation and soil types. These data were used rather than data from the 1986 LRMP as they more accurately represent current conditions on the Forest.

Baseline GIS data were generated from existing DNF, KFO, GSENM, BRCA, NRCS, USGS, and State of Utah vegetation data. Southwest Regional GAP Analysis Project GIS data were used to characterize vegetation types within the Project Area (USGS 2007). Specific field data collected by Transcon Environmental, as well as readily available data collected previously, were also used.

3.6.2. Existing Conditions

Data on the acreage of vegetative types within the Project Area are provided in **Tables 3.5-4** through **3.5-7**. Forest products on lands potentially affected under any of the Action Alternatives are derived from ponderosa pine, mixed conifer, and pinyon-juniper species. **Table 3.6-1** details acreages of these species that would have the potential to produce forest products within the Project Area by alternative.

Table 3.6-1. Acres with Potential to Produce Forest Products within the Project Area by Alternative

ALTERNATIVE	TOTAL ACRES PERCENT OF PROJECT AREA	LAND MANAGEMENT AGENCY	ACRES
Alternative A	152.10 31.5%	USFS	140.94
		BLM	9.64
		SITLA	1.52
Alternative B	91.39	USFS	33.85

Alternative	Total Acres Percent of Project Area	Land Management Agency	Acres
	22.0%	BLM	55.92
		SITLA	1.62
Alternative C	85.79 17.3%	USFS	74.29
		BLM	11.12
		SITLA	0.38
North-South Interconnect	15.30 56.0%	USFS	15.30
East-West Interconnect	19.90 40.9%	USFS	19.90

3.6.2.1. Dixie National Forest

Forest products on the DNF within the proposed Project Area include areas designated as suitable for timber management as well as utilization of timber resources for fuelwood and Christmas trees. DNF criteria for areas suitable for timber management are included in the Forest Products Specialist Report in the project record.

Timber Resources

Within the DNF a total of 467,865 acres are managed as suitable for timber management. **Table 3.6-2** details acreages of DNF within the proposed right-of-way designated as suitable for timber management.

Figure 3.6-1 displays areas on the DNF that are suitable for timber management in relation to the project alternative routes.

Table 3.6-2. Suitable Timber Management Acres on USFS Lands within the Project Area by Alternative and by Land Cover Type

Alternative	Acres Suitable for Timber Management Percentage of Project Area	Vegetative Cover Type
Alternative A	11.28 2.3%	Ponderosa pine
Alternative B	7.48 1.8%	Ponderosa pine
Alternative C	16.71 3.4%	Ponderosa pine
North-South Interconnect	1.3 4.8%	Ponderosa pine
East-West Interconnect	0	N/A

Figure 3.6-1. DNF Areas Suitable for Timber Management

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Other Forest Product Resources

In addition to timber, the DNF issues permits for firewood and Christmas tree cutting on the Forest. Individual firewood permits are sold by the DNF for 10 dollars per cord with a two-cord minimum and eight-cord maximum. The DNF stipulates that firewood cut under individual permits may not be sold. Commercial firewood permits allow for sale of firewood. Given the availability of pine and mixed conifers on the DNF, those species are predominantly chosen for firewood. Christmas tree permits are 10 dollars each for trees under 10 feet tall and 20 dollars each for trees over 10 feet tall. Most individuals cutting Christmas trees on the DNF choose fir trees (personal communication, Bill Wais, August 28, 2008). All areas within the proposed right-of-way are open for firewood and Christmas tree cutting.

3.6.2.2. Kanab Field Office

Forest product resources in BLM lands that would be within the proposed right-of-way include firewood and harvesting of trees for posts and poles. Pinyon-juniper stands, the most common utilized for firewood, posts, and poles on BLM lands, are not considered to be an important timber resource by the BLM. Pinyon-juniper found on BLM lands in the Project Area are 9.64, 55.92, and 11.12 acres, respectively, for Alternatives A, B, and C.

Firewood may be collected from dead and downed trees, and permits are 5 dollars per cord with a 10 dollar (two-cord) minimum. Posts and poles can be cut from live trees. Permits for posts and poles are 5 dollars for 25 posts, with a 10 dollar (50-post) minimum. Permits for 10 cords of fuelwood or 250 posts are considered commercial; however, there is no difference in the permitting requirements or charges (personal communication, John Reese, BLM Kanab Field Office, July 28 and August 25, 2008).

3.6.2.3. State Institutional and Trust Lands Administration

Absent specific direction from SITLA, and in keeping with direction from other land management agencies in the vicinity, ponderosa pine and other conifers would be the primary species of value for forest products. Ponderosa pine are present on SITLA lands in the Project Area on 1.14, 1.44, and 0.0 acres, respectively, for Alternatives A, B, and C.

3.7. WILDLIFE AND WILDLIFE HABITAT

3.7.1. Data and Methods

The DNF, BLM, NPS, and UDWR were consulted to identify biological resources, issues, and concerns. Scientific literature was used whenever possible to provide baseline data on each species. Publications and other agency documents used for many different species include Rodriguez (2008), for Management Indicator Species on the DNF; Bosworth (2003), for vertebrates in Utah, compiled by the Utah Natural Heritage Program; Parrish et al. (2002), for birds of concern in Utah, compiled by UDWR; UDWR (2005a), for all species of concern in Utah; and Utah Natural Heritage Program (2008), which is a website containing information on most animals in Utah maintained by UDWR. All other information sources are cited in the text.

Transcon biologists performed pedestrian field surveys of the Project Area between April and June of 2008 (Transcon 2008c, Biological Resources Report). General wildlife species and Management Indicator Species were noted incidentally during surveys for special status species.

In order to assess impacts to wildlife and fish, vegetation within the Project Area was classified into 11 different communities that represent habitat types. Data used for the classification and more detailed information on the components of each community are described in **Section 3.5**.

Results of the vegetation community type classification showed that the Project Area is made up primarily of three types of habitat: (1) pinyon-juniper woodland, (2) ponderosa pine woodland, or (3) sagebrush (either sagebrush steppe or shrubland with a dominant sagebrush component). These three types make up 90–94 percent of each alternative with more than 50 percent of each alternative consisting of sagebrush steppe/shrubland (see Special Status Species, **Section 3.8**).

3.7.2. Existing Conditions

3.7.2.1. Terrestrial Wildlife

DNF Management Indicator Species

Management Indicator Species (**Table 3.7-1**) are species associated with certain vegetation types that are used in the planning process to monitor certain habitats on the DNF. Management Indicator Species are selected based on five criteria: (1) the species must have a strong, but not exclusive, affinity for one vegetation type; (2) the vegetation type is key habitat to the life cycle of the species; (3) the species must be sensitive to habitat alteration; (4) the species must be highly visible and in adequate numbers as to make monitoring easy; and (5) the species must be somewhat representative of all species that utilize the vegetation type.

The USFS uses Management Indicator Species presence/absence to analyze impacts to habitat types within an EIS.

Table 3.7-1. Management Indicator Species on the DNF and Their Associated Habitats.

MANAGEMENT INDICATOR SPECIES	ASSOCIATED HABITAT
Rocky Mountain elk *Cervus canadensis*	Grass-forb, sapling to mature aspen, sapling to old growth conifer
Mule deer *Odocoileus hemionus*	Grass-forb, sagebrush, mountain brush, pinyon-juniper, sapling to mature aspen, sapling to mature conifer
Northern goshawk *Accipiter gentilis*	Riparian trees, mature aspen, mature to old growth conifer
Northern flicker *Colaptes auratus*	Mature aspen, mature conifer
Wild turkey *Meleagris gallopavo*	Mountain brush, pole to mature aspen, mature to old growth conifer

Source: DNF LRMP.

Note: All species may be present in the Project Area.

Mule Deer. Mule deer are adaptable ungulates that occur in a wide variety of habitats including early- to intermediate-staged coniferous forests, desert shrublands, chaparral, and grasslands. They prefer habitats with a mosaic of vegetation stages that provide cover, open areas, and water (Rodriguez 2008). Mule deer habitat is nearly always characterized by areas of thick brush or trees interspersed with small openings (UDWR 2003). Depending on the alternative, there are 141-161 acres of crucial and substantial fawning habitat, 338-371 acres of crucial and substantial winter range, and 91-136 acres of crucial and substantial summer range for mule deer in the Project Area.

Figure 3.7-1 identifies areas of crucial and substantial habitat. Mule deer are herbivorous, grazing and browsing on new growth of shrubs, forbs, some grasses, and salt or mineral licks. Major predators of mule deer include humans, mountain lions, and coyotes. Competition for food may occur with domestic livestock, wild horses, wild pigs, and black bears (Rodriguez 2008).

- **Seasonal movements and fawning areas.** Mule deer often migrate from lower to higher elevations, where water and forage are more available, in spring and summer. In winter, mule deer concentrate at lower elevations. Migration between seasonal ranges generally occurs along well-established routes (USFS 1995b:23). Fawning occurs in moderately dense shrublands and forests, dense herbaceous stands, and high-elevation riparian and mountain shrub habitats with available water and forage. Fawn production is closely tied to the abundance of succulent, green forage during spring and summer months (UDWR 2003). Deer fawning areas occur across the western half of the Project Area. Mule deer fawning occurs from May through June, during which time mule deer are sensitive to human activities and disturbance.
- **Utah Division of Wildlife Resources population objectives.** Mule deer are the most important game animal in Utah. Mule deer populations have been declining for the past 30 years, due mainly to loss and degradation of habitat (UDWR 2003), although numbers in the past 4 years have increased (Rodriguez 2008). Mule deer habitat occurs across the Project Area, and mule deer are well distributed. Populations have increased in all management units in the Project Area, including Mt. Dutton, Plateau (Boulder), Paunsaugunt, and Panguitch Lake, as of 2006 (USFS 2006a; UDWR 2006). Population estimates after 2006 in these herds were 2,000 (Mt. Dutton), 17,000 (Plateau), 6,500 (Paunsaugunt), and 8,925 (Panguitch Lake; UDWR 2006). Mule deer herds are monitored (populations estimated) by the UDWR and managed by hunting (USFS 2004a).

Rocky Mountain Elk. Elk are migratory ungulates that formerly ranged over much of North America. In general, elk require mature, semi-open stands of deciduous and conifer forest and dense brush understory for feeding, escape, and thermal cover. Elk habitat also includes foothills, plains, valleys, mountain meadows in summer, and travel corridors, although some elk herds do not migrate. In general, elk prefer to live within 0.5 mile of a water source (UDWR 2005b). Depending on the alternative, there are 19-54 acres of crucial and substantial calving habitat, 338-371 acres of crucial and substantial winter range, and 91-136 acres of crucial and substantial summer range for elk in the Project Area. **Figure 3.7-1** identifies areas of crucial and substantial habitat.

Elk are herbivorous, grazing and browsing in herbaceous and brush stages of forests as well as open areas such as meadows, open parklands, and riparian areas. Major predators of elk include humans, mountain lions, and coyotes. Competition for food may occur with domestic livestock, wild horses, and mule deer (Rodriguez 2008).

- **Seasonal movements and calving areas.** Elk usually migrate from high mountain meadows to lower elevations when snow cover increases and food becomes less available, seeking out river bottoms, canyons, and lower mountain meadows. Migration between seasonal ranges generally occurs along well-established routes (USFS 1995b:23). Calving occurs in areas with available water and brushy vegetation that provides dense cover near openings and seclusion from human disturbance. Elk calving areas occur across the Johnson Bench area in the middle portion of the Project Area. Elk calving occurs from April to June during which time elk are sensitive to human activities. Elk have specific habitat needs for calving, and calving areas are slightly more sensitive than deer fawning areas (USFS 1995b).

Utah Division of Wildlife Resources population objectives. Elk herds have increased dramatically in Utah over the past 30 years, although in the past 10 years elk herds have been relatively stable (UDWR 2005b) and in recent years have declined in response to UDWR management strategies aimed at reducing the number of elk in some management units (Rodriguez 2008). Elk habitat occurs across the Project Area, and elk are well distributed. The herd units in the Project Area, including Mt. Dutton, Plateau (Boulder), Paunsaugunt, and Panguitch Lake, are healthy and close to objectives (USFS 2006a). Population estimates after 2006 in these herds were 1,270 (Mt. Dutton), 500 (Plateau), 24 (Paunsaugunt), and 875 (Panguitch Lake; UDWR 2006). Elk herds are monitored by UDWR, and populations that are above objectives are managed by hunting (USFS 2004a).

Northern Goshawk. Goshawk is a Sensitive species and is discussed under Special Status Species, Section 3.8.

Wild Turkey. Wild turkeys are large game birds that use distinct habitats during different periods of the year. Preferred winter habitat contains at least 50 percent mature forest, either ponderosa pine or cottonwood, depending on the subspecies (Merriam's and Rio Grande, both found in southern Utah). Summer and fall habitats consist of mowed hay fields, grazed pastures, glades, or open woods. Nesting habitat is varied, but hens usually nest near the edges of old fields, along trails, in hay fields, or in patches of briar or similar vegetation, and close to a source of permanent water. Nests are frequently abandoned if disturbed (Rodriguez 2008). Large areas of high value habitat for Merriam's turkey exist in the southwest corner of the Powell Ranger District, more than 10 miles south/southwest of the Project Area. Crucial habitat covers most of the central portion of the Escalante Ranger District and occurs in Blue Fly Canyon. Crucial habitat for the Rio Grande subspecies is located between the Escalante and Powell Ranger Districts (USFS 1995b:25). Numbers of both subspecies are either stable or have increased over the past 10 years (USFS 2004a). Hillsdale Canyon and nearby private lands provide key habitat for wild turkey. Turkeys are found roosting and breeding throughout this canyon.

Northern Flicker. Northern flicker is a migratory woodpecker that excavates its nest in dead tree trunks, dead parts of live trees, or telephone poles. Northern flickers have been found in a variety of habitats, including wooded areas with stands of dead trees, open areas, forest edges, clear-cuts, burns, agricultural lands, and residential areas. Flickers feed mainly on ants but will consume a variety of other insects. This species migrates to the southern part of its range in the United States and to northern Mexico for winter; it has also been found on Grand Cayman, Cuba, and the Nicaraguan highlands (Rodriguez 2008). Northern flickers are common and occur on all four ranger districts of the DNF. None were observed during surveys of the Project Area (Transcon 2008c), although they are encountered frequently by DNF biologists.

Mammals

Mammals are hairy, warm-blooded vertebrates that give birth to live young, and they can be found in a variety of habitats. Mammals common in south-central Utah include small animals such as shrews, bats, lagomorphs (rabbits and hares), chipmunks, and mice; larger mammal predators include coyotes (*Canis latrans*), bobcats (*Lynx rufus*), weasels (*Mustela spp.*), badgers (*Taxidea taxus*), kit foxes (*Vulpes macrotis*), and cougars (*Felis concolor*). Raccoons (*Procyon lotor*), black bears (*Ursus americanus)*, and big game are also present. These mammals may occur in the disturbance areas. Mammal species encountered during surveys (Transcon 2008c) include antelope ground squirrel (*Ammospermophilus sp.*), red squirrel (*Tamiasciurus hudsonicus*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), mule deer (*Odocoileus hemionus*), Rocky Mountain elk (*Cervus canadensis*), pronghorn antelope (*Antilocapra americana*), and coyote. Big game (mule deer, elk, and pronghorn antelope) are discussed below.

Figure 3.7-1. Crucial and Substantial Habitat

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Big Game. Big game are the most visible wildlife in the Project Area. The area occupied by big game throughout the year and over an entire life cycle is large because many animals migrate between ranges and move long distances in search of resources or suitable habitat. The area covered by big game often includes many different seasonal habitats such as crucial and substantial summer range (**Figure 3.7-1**), crucial and substantial winter range, and calving (elk) or fawning (mule deer) areas. Mule deer and elk are discussed under DNF Management Indicator Species.

Road density is particularly relevant to big game due to their wide-ranging movements. The USDA recommends a road density threshold of 2 miles per square mile of habitat; habitat effectiveness for big game is thought to decrease where density is higher. Road density is above the threshold in several subwatershed areas (6^{th}-level Hydrologic Unit Code) intersecting the Project Area. The subwatersheds with the greatest road density per square mile of habitat are located in the central and western portions of the Project Area. There are ten total subwatersheds crossed by all alternatives, and seven are either close to (1.9+) or above the 2-mile threshold. The more densely roaded areas overlap areas of big game winter range as well as summer range.

Pronghorn Antelope. Pronghorn habitat ranges from desert scrub and grasslands to sagebrush and grasslands on higher plateaus and mountain basins. Pronghorns occur in areas of rolling or dissected hills and mesas with grasses and scattered shrubs (USFS 1995b:24); open landscapes are preferred. Pronghorn rely on keen vision and speed to elude predators on the open plain. Herds cover large areas during the year, especially if range conditions are not ideal. Pronghorn graze on forbs and other plants, including cacti and several poisonous and noxious weeds (NDFG 2006).

The Paunsaugunt Plateau is considered to be high value habitat for pronghorn, and the area is considered to be a nursery area for many pronghorn. Pronghorn were observed consistently at greater sage-grouse observation points that covered the majority of the Project Area (Transcon 2008c). Pronghorn are widespread in all open habitats (e.g., grassland, sagebrush, scrub/shrub) within the Project Area. Pronghorn are also found throughout the ponderosa pine component within the Project Area and can be found frequently fawning in this vegetation type.

Population objectives for pronghorn are not tracked as closely as those for mule deer or elk. Current counts on pronghorn show the unit over objective (personal communication, J. Schoppe, March 26, 2009). Population objectives for the Plateau (Boulder) herd are being met. Population objectives in smaller herds that intersect the Project Area (Mt. Dutton/Paunsaugunt and Panguitch Lake) are considered stable but may be below objectives (UDWR 2007).

Reptiles

Reptiles are cold-blooded, egg-laying vertebrates that are generally small and located in warm habitats. Reptiles are present in the disturbance areas in relatively low abundance due to the lack of low-elevation, warm desert scrub habitat, although some reptiles can also be found in sagebrush or pinyon-juniper. Reptiles encountered during surveys (Transcon 2008c) include desert horned lizard (*Phrynosoma platyrhinos*), sagebrush lizard (*Sceloporus graciosus*), and Western rattlesnake (*Crotalus oreganus lutosus*).

Migratory Birds

The decline of migratory bird species is well documented and has been attributed to a complex set of interacting factors that consist mainly of habitat losses. Migratory birds are protected under the Migratory Bird Treaty Act, which prohibits “take” (harassment, harm, pursuit, hunting, shooting, killing, capture, or collection) of migratory birds and emphasizes conservation of migratory bird populations and long-term sustainability of their habitats. Direction from the USFWS regarding migratory birds on USFS-administered lands states that activities occurring within migratory bird habitats should “minimize direct take of individual migratory birds when feasible” (USFS 2007). The

USFS is considered compliant with the Migratory Bird Treaty Act if this direction is followed and habitats as well as populations of migratory birds are sustained over the long term. The BLM follows Instructional Memorandum 2008-050 (BLM 2007b) for migratory bird guidance, which recommends management of habitat for migratory bird species of concern (i.e., those listed as "priority" in Parrish et al. 2002, IWJV 2005, or USFWS 2002; see below) through avoidance or minimization of negative impacts and by maintaining and improving habitat quantity and quality. The BLM is considered compliant with the Migratory Bird Treaty Act (through implementation of Executive Order 13186) if this direction is followed. Most raptors are protected under the Migratory Bird Treaty Act, and bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*) have additional protection from the Bald and Golden Eagle Protection Act of 1940, as amended. The Bald and Golden Eagle Protection Act prohibits the taking, possession, and commerce of individual birds. Although the Bald and Golden Eagle Protection Act was modeled from the Migratory Bird Treaty Act, its civil and criminal penalties are more severe.

A wide variety of migratory birds are found in the Project Area either seasonally, as transients, or as permanent residents. Most migratory birds nest in trees, on the ground, or below/within shrubs. Raptors generally nest in forested and riparian areas, in large trees, on cliffs, or in open areas on the ground or beneath shrubs. Raptors roost in trees or cliffs or on power poles, fences, or other man-made structures. Most forage in open areas such as agricultural fields, grasslands, or shrub habitats. Nesting habitat for migratory birds, including raptors, is found throughout the Project Area.

Migratory birds potentially occurring in the Project Area that have been identified by USFWS as meriting special attention include those on the following lists: Intermountain West Joint Venture (IWJV 2005), Birds of Conservation Concern (USFWS 2002), and Partners in Flight priority species (Parrish et al. 2002). Migratory bird species of concern are listed in **Table 3.7-2**.

Table 3.7-2. Migratory Bird Species of Concern that May Occur in the Project Area

SPECIES	STATUS/ PROTECTION[1]	BREEDING HABITAT	OCCURRENCE
American avocet *Recurvirostra americana*	PIF, BCC, IWJV	On the ground near desert wetlands or shallow ponds; nests north of DNF	Common summer resident
American bittern *Botaurus lentiginosus*	BCC	On the ground near wetlands	Uncommon summer resident
Bald eagle *Haliaeetus leucocephalus*	FS-S, BGEPA, IWJV	Forested stands near water (winter roosting); platform nest on cliff or in large tree	Uncommon winter and summer resident; most likely to occur at Panguitch Lake, Pinto Creek, Enterprise Reservoir, or Duck Creek. Pairs have been observed and may begin nesting on the DNF.
Bendire's thrasher *Toxostoma bendirei*	PIF, BCC, IWJV	In a shrub; low desert scrub	BLM lands only
Black-chinned sparrow *Spizella atrogularis*	BCC, IWJV	Desert scrub	BLM lands only
Black rosy-finch *Leucosticte atrata*	BCC	Cup nest in crevice in cliff or on the ground; Alpine	Uncommon winter resident

SPECIES	STATUS/ PROTECTION[1]	BREEDING HABITAT	OCCURRENCE
		habitats above timberline	
Black-throated gray warbler *Dendroica nigrescens*	PIF, BCC, IWJV	In trees; pinyon-juniper woodland or oak	Common summer resident
Brewer's sparrow *Spizella breweri*	PIF, BCC, IWJV	In a shrub; shrub steppe obligate	Common summer resident; observed in Project Area during surveys (Transcon 2008c)
Broad-tailed hummingbird *Selasphorus platycercus*	PIF, IWJV	In a deciduous tree or conifer; primarily riparian habitats	Common summer resident; observed in Project Area during surveys (Transcon 2008c)
Brown-capped rosy-finch *Leucosticte australis*	BCC	Open cup nest in rock cavity on the ground; mountain meadow habitat	Uncommon summer resident
Burrowing owl *Athene cunicularia*	BLM-S, IWJV	Underground burrows in open habitat; usually desert scrub, sagebrush steppe, or grassland	Uncommon summer resident; may occur in association with prairie dog towns on BLM or DNF
California condor *Gymnogyps californianus*	E, IWJV	Chaparral-covered mountains; roosting in large snags, cliffs Platform; in cave, pothole, sheltered rock outcrop	Rare; reported sightings in Cedar City Ranger District and BRCA
Cassin's finch *Carpodacus cassinii*	BCC	Cup nest in tree; aspen or subalpine conifer habitat	Common year-round resident
Ferruginous hawk *Buteo regalis*	BLM-S, PIF, BCC, IWJV	Open habitats; pinyon-juniper, shrub steppe, or grassland; Platform nest in conifer or other tree, on cliff, ground outcrop, or utility structure	Uncommon summer resident
Flammulated owl *Otus flammeolus*	FS-S, BCC, IWJV	In snag; mature ponderosa pine and Douglas-fir	Uncommon summer resident
Golden eagle *Aquila chrysaetos*	BGEPA. BCC, IWJV	Open habitats, especially mountainous regions; Platform nest, usually on cliff or rocky outcrop. Often on top of existing nests and materials from previous structures	Common; year-round resident; observed in Project Area during surveys (Transcon 2008c)
Grace's warbler *Dendroica graciae*	BCC, IWJV	In trees; ponderosa pine or other coniferous forest	Common summer resident; observed in Project Area during surveys (Transcon 2008c).
Grasshopper	IWJV	On the ground; grassland	On BLM or DNF only

SPECIES	STATUS/ PROTECTION[1]	BREEDING HABITAT	OCCURRENCE
sparrow *Ammodramus savannarum*		habitats or sagebrush steppe	
Gray vireo *Vireo vicinior*	PIF, BCC, IWJV	In fork of juniper tree or shrub; pinyon-juniper woodland or oak	Common year-round resident; observed in Project Area during surveys (Transcon 2008c)
Greater sage-grouse *Centrocercus urophasianus*	FS-S, BLM-S, PIF, BCC, IWJV	Base of live sagebrush plant; sagebrush steppe obligate	Uncommon, year-round resident; observed in Project Area during surveys (Transcon 2008d)
Juniper titmouse *Baeolophus ridgwayi*	BCC	Cavity nest in deciduous tree or snag; pinyon-juniper habitat	Common year-round resident
Lewis's woodpecker *Melanerpes lewis*	BLM-S, PIF, BCC, IWJV	Open, ponderosa pine forests; nests in a cavity within deciduous tree or snag; breeds mainly in northern Utah	Uncommon year-round resident
Loggerhead shrike *Lanius ludovicianus*	BCC, IWJV	High desert scrub or pinyon-juniper woodland	Common summer resident
Long-billed curlew *Numenius americana*	BLM-S, PIF, BCC, IWJV	On the ground; rangeland and pastures; also sagebrush steppe, grassy shorelines, and arid grasslands	Uncommon summer resident; one breeding record in Cedar City Ranger District (Bosworth 2003)
Lucy's warbler *Vermivora luciae*	PIF, IWJV	Tree cavities, usually mesquite (*Prosopis* spp.), cottonwood (*Populus* spp.), or willow (*Salix* spp.) in lowland riparian habitat	On BLM or DNF
Mexican spotted owl *Strix occidentalis*	T, PIF, IWJV	On a cliff; canyons with mixed conifer or pinyon-juniper stands below/on slopes	Unlikely but possible occurrence on DNF or BRCA
Mountain plover *Charadrius montanus*	PIF, BCC, IWJV	On the ground; high desert scrub	On BLM lands only
Northern flicker *Colaptes auratus*	FS-MIS	Snags; lowland riparian	Common year-round resident
Northern goshawk *Accipiter gentilis*	FS-S, FS-MIS, IWJV	Montane coniferous and deciduous woodland (ponderosa pine or aspen) interspersed with small openings; platform nest in conifer or deciduous tree	Uncommon year-round resident; response heard during surveys of the Project Area (Transcon 2008e)
Peregrine falcon *Falco peregrinus*	FS-S, BCC, IWJV	On cliff or in tree in open habitats	Rare; eight nest sites are known in Cedar City and Powell Ranger Districts.

SPECIES	STATUS/ PROTECTION[1]	BREEDING HABITAT	OCCURRENCE
			Also several historic and active eyries in BRCA.
Pinyon jay *Gymnorhinus cyanocephalus*	BCC, IWJV	In conifer tree; pinyon-juniper or ponderosa pine habitat	Observed in Project Area during surveys (Transcon 2008c)
Prairie falcon *Falco mexicanus*	BCC, IWJV	On a cliff in open habitats; plains and prairies	Common; year-round resident; observed in Project Area during surveys (Transcon 2008c)
Pygmy nuthatch *Sitta pygmaea*	BCC, IWJV	In live conifer or snag; ponderosa pine woodland	Uncommon year-round resident
Sage sparrow *Amphispiza belli*	PIF, BCC, IWJV	In a shrub or on the ground; shrub steppe obligate	Common summer resident
Short-eared owl *Asio flammeus*	BLM-S, IWJV	On the ground; wetland, sagebrush steppe, or grassland habitat	BRCA, DNF, or along the Sevier River north of Hatch
Swainson's hawk *Buteo swainsoni*	BCC, IWJV	Platform nest on cliff or in deciduous tree; open habitats; shrub and grassland	Uncommon summer resident
Three-toed woodpecker *Picoides tridactylus dorsalis*	FS-S, BLM-S, IWJV	In a snag; subalpine conifer habitat	Uncommon year-round resident
Veery *Catharus fuscescens*	BCC	Cup nest on the ground or in a shrub; lowland riparian obligate	Uncommon summer resident
Virginia's warbler *Vermivora virginiae*	PIF, BCC, IWJV	On the ground in chaparral and montane habitats; oak or mountain shrub or ponderosa pine	Common summer resident; observed in Project Area during surveys (Transcon 2008c)
Williamson's sapsucker *Sphyrapicus thyroideus*	BCC, IWJV	In a cavity within deciduous tree or conifer; mixed conifer habitat	Uncommon summer resident; most likely in Cedar City and Powell Ranger Districts (high elevation plateaus). Also occurs in BRCA.

Source: Transcon 2008c, Parrish et al. 2002, DNF Bird List.

[1]BCC = Birds of Conservation Concern, BLM-S = BLM Sensitive (KFO or GSENM), IWJV = Intermountain West Joint Venture; etc.

During surveys of the Project Area, one stick nest and three passerine nests were identified in proximity to the alignments. The stick nest was found at the bottom of Blue Fly Canyon on a cliff ledge (see Special Status Species, **Section 3.8;** possibly a peregrine falcon). An active Cassin's kingbird (*Tyrannus vociferans*) nest and an active white-crowned sparrow (*Zonotrichia leucophrys*) nest were observed along Alternative B, within 1-2 miles (east) of the proposed East Valley Substation. One unidentified passerine nest was found along the North/South Interconnect, close to Alternative C (Transcon 2008c). A stick nest (likely to be a raptor nest) was also discovered at the

bottom of Hillsdale Canyon during a site visit in the spring of 2008, and a sharp-shinned hawk nest directly behind the private cabins in Hillsdale Canyon was active during 2008 (personal communication, J. Schoppe, March 26, 2009). Many migratory birds, including raptors, were observed or heard in the Project Area during surveys (Transcon 2008c). Species of concern are noted in **Table 3.7-2**.

Snag surveys were also conducted along the proposed alignments. Snags were defined as standing dead trees that could be used by raptors and other birds as perches and nest sites; 199 snags were recorded and measured. Alternative C contained the most snags (138), followed by Alternative A (75 snags) and Alternative B (24 snags; Transcon 2008c). Tree species were not recorded, but based on forest percentages and maps of vegetation and snags in the Project Area most snags were probably ponderosa pine or pinyon-juniper trees. It is unlikely that many were spruce or fir or other conifer species because these trees are rare in the Project Area (**Section 3.5**).

3.7.2.2. Aquatic Habitat and Species

Aquatic habitats in the Project Area are critical ecosystem components because water sources in the region are rare. The overall health of aquatic habitats is a direct result of the condition of the entire watershed (i.e., uplands, riparian corridor, and the stream channel), particularly the upland plant community. The condition and health of vegetation throughout a watershed is the major factor determining the quantity and quality of the associated flow regime, which is naturally regulated by healthy and diverse bank vegetation. Vegetation in good condition provides greater ground cover, which reduces runoff and increases infiltration rates, and diverse plant communities contain microsites that extend the runoff period through variable snowmelt. Collectively, these factors produce more stable base flows that are essential for high quality fish and riparian habitats (WFGD 2004).

Aquatic Habitat

Streams within 0.5 mile of the alignments occur mainly as ephemeral systems, conveying water only during significant rainfall events. There are a few intermittent systems (seasonal or regular flow) and two perennial streams (year-round flow) within the Project Area: the Sevier River and Tropic Ditch. Detailed information on all individual drainages and their characteristics is provided in **Section 3.4**.

The Sevier River reach within the Project Area is characterized by well-defined banks (20-50 feet wide), flowing water (perennial), and thick, tall sagebrush (*Artemisia* spp.) and rabbitbrush (*Chrysothamnus* spp.; Transcon 2008b). Based on a 2006-2008 UDWR sampling effort (UDWR 2008a),the Sevier River reach in the Project Area (Hillsdale to Hatch) contains several native and non-native fishes, including southern leatherside chub (*Lepidomeda aliciae*), speckled dace (*Rhinichthys osculus*), mottled sculpin (*Cottus bairdii*), redside shiner (*Richardsonius balteatus*), mountain sucker (*Catostomus platyrhynchus*), and Utah sucker (*Catostomus ardens*). Brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) were also present (UDWR 2008a).

The Tropic Ditch is a 10-mile-long canal along SR 12 dug to divert water from the East Fork Sevier River to the Paria River and the Tropic area for irrigation. It is characterized by incised banks and riparian vegetation such as water birch, Wood's rose, willows, and mountain alder. Few aquatic species are found in the ditch, and it contains no trout. Small springs along Water Canyon and near Mossy cave provide a year-round source of water.

The East Fork Sevier River flows only during runoff events within the Project Area. During a 2007 UDWR sampling effort in the East Fork, about 2 miles north of the Alternative A alignment, brown trout and brook trout (*Salvelinus fontinalis*) were collected, in addition to the native species southern leatherside chub, redside shiner, and mountain sucker (UDWR 2007). This segment of the East Fork

appeared to be highly unstable during the 2007 fish sampling; however, large numbers of native fish were observed (UDWR 2007). Above Tropic Reservoir (5+ stream miles upstream of the Project Area), the following native species were collected in 2004: brown trout, brook trout, cutthroat trout, redside shiner, speckled dace, and mountain sucker (UDWR 2004). Benthic invertebrate indices of Biological Integrity on the DNF in 2007 reported Low Biological Integrity scores for this area. Downstream of the Project Area, the East Fork Sevier River runs through the steep-sided Black Canyon (25+ stream miles downstream), which contains mostly brown trout with some rainbow (*Oncorhynchus mykiss*) and cutthroat (*Onychorhynchus clarki*) also present (UDWR 2008b).

Fish

Trout species that may occur in the Project Area (i.e., Sevier River) are DNF Management Indicator Species. Information on DNF's use of Management Indicator Species is provided under Terrestrial Wildlife, above. Trout species that are Management Indicator Species on the DNF are listed in **Table 3.7-3**.

Table 3.7-3. Management Indicator Species on the DNF and Their Associated Habitats

MANAGEMENT INDICATOR SPECIES	ASSOCIATED HABITAT
Bonneville cutthroat trout *Oncorhynchus clarkii utah*	Headwater streams
Brook trout *Salvelinus fontinalis*	Streams, rivers, lakes, and reservoirs
Brown trout *Salmo trutta*	
Cutthroat trout (other spp.) *Onychorhynchus clarki*	
Rainbow trout *Oncorhynchus mykiss*	

Source: DNF LRMP.

Note: All species except Bonneville cutthroat and brook trout may be present in the Project Area.

In general, the key components of trout habitat include cool, clear water; deep pools and cover, typically associated with well vegetated stream banks and large woody debris; floodplain habitat for rearing and velocity refugia; and the availability of suitable spawning gravels, which should include a minimal amount (<25 percent) of fine substrate less than 6.35 mm in diameter (Sigler and Sigler 1996; Harrig and Fausch 2002; Chapman 1988; Magee et al. 1996). Spawning is influenced primarily by water temperature and flow, which are influenced by latitude and elevation. Generally, the distance trout migrate to spawn is short and the post-spawning mortality rate is high (Sigler and Sigler 1996). From 2003 to present, DNF personnel have collected fish population data at various sites across the DNF in cooperation with UDWR.

Brook Trout. Brook trout are a coldwater char native to the eastern United States and Canada. Brook trout are more suited to high, cold lakes and small, cold streams than either rainbow or brown trout (Sigler and Sigler 1996). As a result, they have been stocked in high mountain lakes and streams across Utah and have become established (UNHP 2007). High mountain lakes on the Boulder Mountain area of the Escalante Ranger District support popular recreation fisheries for brook trout. Brook trout are voracious feeders and are omnivorous, feeding on drifting invertebrates in streams and on zooplankton in lakes. While brook trout will prey on native cutthroat trout, they are not

usually piscivorous (fish eating). Brook trout more often displace cutthroat trout populations via interference competition (Quist and Hubert 2004). Brook trout do not occur in the Sevier River (Sigler and Sigler 1996) but are present in the East Fork Sevier River just north of Alternative A (UDWR 2007) and upstream of the Project Area in and above the Tropic Reservoir (UDWQ 2006c).

Brown Trout. Brown trout are a largely piscivorous fish native to Europe and western Asia introduced to Utah prior to 1900 (Sigler and Sigler 1996). Brown trout are a highly adaptable species present in most streams and reservoirs at the foot of many mountain ranges (Rodriguez 2008). In Utah, the species has been established in many cold water areas and is a popular sport fish (UNHP 2007). Although they prefer cool lakes and streams, brown trout do not normally inhabit these areas but are present in many of the lower elevation waters that can be relatively warm and are sometimes polluted. Brown trout do not hybridize with native cutthroat trout. However, brown trout exert considerable predation pressure on native cutthroat trout (Quist and Hubert 2004). Brown trout occur within the Project Area in the Sevier River (between Hillsdale and Hatch; UDWR 2008a), in the East Fork Sevier River (UDWR 2007), downstream of the Project Area in the East Fork Sevier River (Black Canyon; UDWR 2008b) and in the Lower Sevier River (UDWR 2008c).

Cutthroat Trout. There are four subspecies of cutthroat trout in Utah, three of which are native (Sigler and Sigler 1996; UNHP 2007). Non-native trout, including rainbow, brown, and brook trout, impact native cutthroat trout primarily through hybridization (rainbow trout) and competition (brown and brook trout). As a result, cutthroat trout are often limited to small headwater streams; however, prior to the introduction of non-native fishes, cutthroat trout were found throughout streams and large river systems (Quist and Hubert 2004). In general, cutthroat trout function better than nonnative species in relatively cold, high-altitude headwaters (Behnke 1992). Cutthroat trout occur in the East Fork Sevier River upstream of the Project Area above Tropic Reservoir (UDWR 2004), and downstream of the Project Area in Black Canyon (UDWR 2008b).

Rainbow Trout. The native range of rainbow trout includes drainages of the Pacific coast from Alaska to Mexico. The species is not native to Utah and has been introduced to cold waters throughout the state (Sigler and Sigler 1996). Rainbow trout feed primarily on invertebrates and other fishes. Stream-resident rainbow trout are primarily drift feeders but will also feed on the surface. Lake-resident rainbow trout are more often piscivorous (fish-eating) than stream-resident trout (Sigler and Sigler 1996). Because the species is popular with anglers and most Utah rainbow trout do not reproduce in the wild, the UDWR stocks millions of rainbow trout in Utah waters each year (UNHP 2007). Where rainbow and cutthroat trout co-exist, similarities in spawning time and location often lead to the production of rainbow-cutthroat hybrids (UNHP 2007). Rainbow trout occur downstream of the Project Area in the East Fork Sevier River (Black Canyon; UDWR 2008b) and in the Lower Sevier River (UDWR 2008c).

Amphibians

Amphibians are likely to occur in any relatively high quality aquatic or riparian habitat in the Project Area. Most amphibians would be found in slow water near streams, or stream margins, including riparian areas and floodplains. They would also be expected in and around wetlands. No amphibians were observed during field surveys.

3.8. SPECIAL STATUS SPECIES

Special status species described in this section include federally (i.e., USFWS) listed species protected under the ESA, which may be designated as Endangered, Threatened, or Candidate (only Endangered and Threatened species receive full protection under the ESA). According to the ESA, Endangered species are animals or plants in danger of extinction within the foreseeable future throughout all or a significant portion of their range. Threatened species are those that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range. Candidate species have been studied and the USFWS has concluded that they should be proposed for addition to the federal Endangered and Threatened species list (USFWS 2007a).

Special status species also include species designated as Sensitive by the USFS or BLM. The Regional Forester identifies Sensitive species as those for which population viability ("persistence") is a concern, as evidenced by significant current and predicted downward trends in population numbers, density, and/or habitat capability that would reduce a species' existing distribution. Sensitive species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that could result in the need for federal listing (FSM 2672.1). BLM sensitive species are species that require special management consideration to avoid potential future listing under the ESA. In compliance with existing laws, including the BLM multiple use mission, the BLM shall designate Bureau sensitive species and implement measures to conserve these species and their habitats and reduce the likelihood and need for such species to be listed pursuant to the ESA.

3.8.1. Data and Methods

See **Section 3.7.1** for a list of agencies consulted and documents referenced. Further, Transcon performed pedestrian field surveys of the Project Area between April and June of 2008 to document special status species occurrences and habitats. Habitat was evaluated for its potential to accommodate special status species with a concentrated effort to identify signs and/or the presence of special status species (Transcon 2008c). Dedicated surveys were conducted for northern goshawk (Transcon 2008e) and greater sage-grouse (Transcon 2008d).

3.8.2. Existing Conditions

Vegetation in the Project Area is made up primarily of four types of habitat that may be used by special status species: (1) cliff/canyon areas, (2) pinyon-juniper woodland, (3) ponderosa pine woodland, or (4) sagebrush (either sagebrush steppe or shrubland with a dominant sagebrush component). These four types make up 88–100 percent of each right-of-way area (**Table 3.8-1**) with about 50 percent of each area consisting of sagebrush steppe/shrubland (**Table 3.8-1**). Refer to **Section 3.5**, Vegetation for locations of vegetation types along each alignment (A, B, and C).

Table 3.8-1. Percentage of Each Vegetation/Habitat Type within Each Alternative's Project Area (Used to Analyze Long-Term Disturbance)

Vegetation Type	Vegetation Type Percentage* of Project Area				
	Alternative A	Alternative B	Alternative C	North-South Interconnect	East-West Interconnect
Grassland	0.3	0.8	0.4	0.0	0.4
Mixed conifer (includes aspen/conifer)	0.0	0.3	0.0	0.0	0.5

Vegetation Type	Vegetation Type Percentage* of Project Area				
	Alternative A	Alternative B	Alternative C	North-South Interconnect	East-West Interconnect
"Other" (includes disturbed areas, water,[1] agriculture)	1.2	6.6	2.1	0.0	0.0
Pinyon-juniper woodland	12.6	17.4	10.6	0.7	5.0
Ponderosa pine woodland	20.6	12.5	21.1	56.6	36.0
Cliff or canyon[2]	3.0	4.8	3.6	0.0	0.0
Other rock or dune	4.2	7.2	4.7	0.0	0.0
Sagebrush steppe or shrubland with dominant sagebrush	52.3	48.4	53.1	43.5	58.0
Other shrub or scrub	5.5	1.4	3.0	0.0	0.0
Spruce fir	0.2	0.0	0.1	0.0	0.0
Wetland or riparian	0.1	0.6	1.3	0.0	0.1
TOTAL Primary habitats[3]	**85.5**	**78.3**	**84.8**	**100**	**99**
GRAND TOTAL[3]	***100%***	***100%***	***100%***	***100%***	***100%***

Note: Primary habitat types are bolded.

*Percentage of Project Area was calculated using Table 3.5-4, 5, and 6 by dividing the acres of each vegetative type by the total Project Area acreage.

[1]Open water makes up 1–2 percent of the "Other" type.

[2]Cliff or canyon habitats were not a separate type in **Section 3.5,** Vegetation but were included in "Rock or Dune."

[3]May not add up exactly due to rounding.

Unique Habitats in the Analysis Area

Designated Critical Habitat for the Mexican spotted owl makes up 20 percent of the proposed rights-of-way for Alternatives A and C due to their overlap with Colorado Plateau Unit Number 12 in Cedar Fork Canyon.

About 50 percent of the rights-of-way for each alternative are made up of brooding habitat or "use" areas for greater sage-grouse. UDWR-mapped brooding habitat for greater sage-grouse covers more than one-third of the Alternative A, B, and C rights-of-way (**Table 3.8-2**).

Sensitive plant occurrences and habitat are also found throughout the Project Area (**Table 3.8-2**). For all sensitive plants discussed in this report (including BRCA sensitive species), these numbers are a conservative estimate because suitable habitats and occurrences of species are mapped only on the DNF and those in BRCA are not included. Most of the Project Area in the BRCA is made up of the Claron Formation and can be considered suitable habitat for sensitive plants.

Table 3.8-2. Percentage of Each Alternative's Project Area that is Unique Habitat

Habitat Type	Percent Habitat in each Project Area				
	Alternative A (483 acres)	Alternative B (416 acres)	Alternative C (495 acres)	N-S Interconnect (27 acres)	E-W Interconnect (48 acres)
Designated Critical Habitat for Mexican spotted owl	15.0% (72 acres)	0.0	14.6% (72 acres)	0.0	0.0
Utah prairie dog colonies	3.1% (15 acres)	7.9% (33 acres)	2.2% (11 acres)	0.0	0.0
Sage-grouse UDWR-mapped brooding habitat	38.7% (187 acres)	42.6% (177 acres)	40.0% (197 acres)	29.6% (8 acres)	58.3% (28 acres)
Sage-grouse use areas (DNF and surrounding)[1]	22.0% (106 acres)	26.9% (112 acres)	10.0% (48 acres)	0.0	0.0
Sensitive plant occurrences and suitable habitat	11.0% (53 acres)	12.7% (53 acres)	7.5% (37 acres)	81.5% (22 acres)	50.0% (24 acres)

[1]Sage-grouse brooding habitat was mapped by UDWR across Utah and described as "brooding use." Sage-grouse use areas were mapped by DNF and UDWR biologists and described as "areas used in and around the DNF."

All Endangered, Threatened, or Candidate species that may occur in Garfield County are presented in **Table 3.8-3**.

The BLM adopts the State (Utah Division of Wildlife Resources) Sensitive List for sensitive species. For BLM-Sensitive plants, BLM has a Utah State Director's Sensitive Plant Species List that was completed in 2002, to be updated again in December 2009. NPS Sensitive plants described below include taxa for which "current information indicates that proposing to list as Endangered or Threatened is possible" (NPS 2008a); species on the list were generated for an internal NPS report. There are no GSENM-sensitive species on lands within the Project Area. Sensitive species that may occur on the DNF, KFO, and BRCA are listed in **Table 3.8-3**. Species descriptions follow **Table 3.8-3**.

Table 3.8-3. Occurrence of Special Status Species, by Alternative and Segment

Species	Type & Status[1]	Alternative A	Alternative B	Alternative C	North-South	East-West
Threatened (T), Endangered (E), and Candidate (C)						
Autumn buttercup *Ranunculus aestivalis*	Plant (E)	NO—No suitable habitat. This species prefers low, herbaceous wet meadow communities on islands of dry, peaty hummocks. Only two populations are known; the closest is Sevier River Valley area north of Panguitch.				
Bonytail chub *Gila elegans*	Fish (E)	NO—No suitable habitat. This species occurs in mainstem rivers within deep, swift, rocky canyon regions; also found in reservoirs.				
Colorado pikeminnow *Ptychocheilus lucius*	Fish (E)	NO—No suitable habitat. This species is endemic to the Colorado River system and occurs in large mainstem rivers and lower reaches of major tributaries and deep-water habitats.				
Humpback chub *Gila cypha*	Fish (E)	NO—No suitable habitat. This species occurs in large rivers and primarily canyon-bound reaches of the Colorado River drainage. Adults are found in deep water habitats.				
Razorback sucker *Xyrauchen texanus*	Fish (E)	NO—No suitable habitat. This species is endemic to the Colorado River system and occurs in Lake Mojave and Lake Mead, Nevada; individuals inhabit pools, slow runs, backwaters, and flooded off-channel areas.				
Jones cycladenia *Cycladenia humilis* var *jonesii*	Plant (T)	NO—No occurrences known. Grows on gypsiferous soils derived from the Summerville, Cutler, and Chinle Formations. Closest occurrence is near Escalante, Utah.				
Maguire daisy *Erigeron maguirei*	Plant (T)	NO—No occurrences known. This species grows on sand and detritus weathered from Navajo sandstone. Closest occurrence is on the Fishlake National Forest, northeast of the proposed disturbance areas.				
Ute ladies' tresses *Spiranthes diluvialis*	Plant (T)	NO—No occurrences known. This species prefers stable wetland and wet, seepy areas within historical floodplains of major rivers or near freshwater lakes or springs. Closest occurrence is along Henrieville Creek, about 5 miles northeast of Henrieville and about 7 miles east of the Project Area.				
Utah prairie dog *Cynomys parvidens*	Mammal (T)	YES—Habitat and colonies mapped (all areas)	YES—Habitat and colonies mapped (all areas) Present—3	YES—Habitat and colonies mapped (all areas)	YES—Habitat	YES—Habitat

SPECIES	TYPE & STATUS[1]	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	NORTH-SOUTH	EAST-WEST
			active colonies found			
Mexican spotted owl *Strix occidentalis*	Bird (T)	POSSIBLE—Designated Critical Habitat in Cedar Fork Canyon (A-1)	UNLIKELY—No Designated Critical Habitat and very little suitable habitat in Bryce Canyon	POSSIBLE—Designated Critical Habitat in Cedar Fork Canyon (C-1)	UN-LIKELY—No Designated Critical Habitat and very little suitable habitat	UNLIKELY—No Designated Critical Habitat and very little suitable habitat
Southwestern Willow flycatcher *Empidonax traillii extimus*	Bird (T)	NO—No suitable habitat. None of the 5 riparian areas in the Project Area have vegetation dense or extensive enough from the streambank to be suitable for this species.				
Western yellow-billed cuckoo *Coccyzus americanus*	Bird (C)	NO—No suitable habitat. Riparian habitat patches are not dense or extensive (25+ acres) enough to support the species.				
Sensitive Animal Species						
Colorado River cutthroat trout *Oncorhynchus clarki pleuriticus*	Fish DNF-S	NO—No suitable habitat. This species requires cool, well-oxygenated waters typical of high elevation mountain streams.				
Bonneville cutthroat trout *Onchorhynchus clarki utah*	Fish DNF-S	NO—No suitable habitat. This species requires cool, well-oxygenated waters typical of high elevation mountain streams.				
Bluehead sucker *Catostomus discobolus*	Fish BLM-S	NO—Outside species' distribution. This species is found in mainstem rivers and tributary streams from mouth of the Grand Canyon upstream to the Green and Colorado River headwaters.				
Flannelmouth sucker *Catostomus latipinnis*	Fish BLM-S	NO—Outside species' distribution. This species is found in pools and deeper runs of larger rivers in the Colorado Basin; cool waters not usually above 6,000 feet.				
Roundtail chub *Gila robusta*	Fish BLM-S	NO—Outside species' distribution. This species is found in pool-riffle habitats with sand-gravel substrates in mainstem and larger tributaries of the Colorado River Basin.				
Black Canyon	Mollusk	NO—No occurrences known. The species is known only from a complex of springs in				

SPECIES	TYPE & STATUS[1]	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	NORTH-SOUTH	EAST-WEST
springsnail *Pyrgulopsis plicata*	BLM-S	East Fork Sevier River (Black Canyon), 20 miles north of the Project Area.				
Utah physa *Physella utahensis*	Mollusk BLM-S	NO—No occurrences known. The species occurs in small pools associated with springs; two known populations in Box Elder Co.				
Pygmy rabbit *Brachylagus idahoensis*	Mammal DNF-S BLM-S	Habitat (A-1, A-3) burrows [no rabbits observed]—East Valley Substation (A-1)	Habitat	Habitat (C-1, C-2, C-3) burrows [no rabbits observed]—East Valley Substation (C-1)	Habitat	Habitat
Townsend's big-eared bat *Corynorhinus townsendii*	Mammal DNF-S BLM-S	Habitat (all areas); most likely in Cedar Fork and Hillsdale canyons (A-1)	Habitat (all areas); most likely in BRCA	Habitat (all areas); most likely in Cedar Fork Canyon (C-1)	Habitat	Habitat
Spotted bat *Euderma maculatum*	Mammal DNF-S BLM-S	Habitat (all areas); most likely in Cedar Fork Canyon (A-1)	Habitat (all areas); most likely in BRCA	Habitat (all areas); most likely in Cedar Fork Canyon (C-1)	Habitat	Habitat
Allen's big-eared bat *Idionycteris phyllotis*	Mammal BLM-S	Habitat (all areas); most likely in Cedar Fork Canyon (A-1)	Habitat (all areas); present in BRCA	Habitat (all areas); most likely in Cedar Fork Canyon (C-1)	Habitat	Habitat
Fringed myotis *Myotis thysanodes*	Mammal BLM-S	Habitat (all areas); most likely in Cedar Fork Canyon (A-1)	Habitat (all areas); present in BRCA	Habitat (all areas); most likely in Cedar Fork Canyon (C-1)	Habitat	Habitat

SPECIES	TYPE & STATUS[1]	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	NORTH-SOUTH	EAST-WEST
Kit fox *Vulpes macrotis*	Mammal BLM-S	NO—Out of species' distribution; occurs in desert scrub mainly west of I-15				
Northern goshawk *Accipiter gentilis*	Bird DNF-S BLM-S	Habitat (all areas) Present (A-1)	Habitat (all areas); observed in BRCA and Red Canyon	Habitat (all areas) Present (C-1, C-2)	Habitat	Habitat
Short-eared owl *Asio flammeus*	Bird BLM-S	NO—No occurrences known. Short-eared owls breed (and sometimes winter) in wetland habitats and are generally absent from the DNF and not known to occur in the Project Area				
Burrowing owl *Athene cunicularia*	Bird BLM-S	Yes—present in Johns Valley. Habitat in grassland, shrub/scrub and agricultural (A-1) Also may occur in prairie dog habitat (all areas)	Yes—suspected. Habitat in grassland, shrub/scrub and agricultural Also may occur in prairie dog habitat (all areas)	Yes—suspected. Habitat in grassland, shrub/scrub and agricultural (C-1) Also may occur in prairie dog habitat (all areas)	Yes—suspected.	Yes—suspected.
Ferruginous hawk *Buteo regalis*	Bird BLM-S	Habitat in grassland, shrub/scrub and agricultural (A-1)	Habitat in grassland, shrub/scrub and agricultural	Habitat in grassland, shrub/scrub and agricultural (C-1)	Habitat	Habitat
Greater sage-grouse *Centrocercus urophasianus*	Bird DNF-S BLM-S	Brood-rearing habitat (A-1, A-3); use areas (A-1, A-3)present (A-1)	Brood-rearing habitat; use areas Present	Brood-rearing habitat (all areas); use areas (C-3) present (C-2)	Brood-rearing habitat	Brood-rearing habitat

SPECIES	TYPE & STATUS[1]	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	NORTH-SOUTH	EAST-WEST
Black swift *Cypseloides niger*	Bird BLM-S	NO—No suitable habitat; this species requires waterfalls surrounded by coniferous forests for nesting.				
Bobolink *Dolichonyx oryzivorus*	Bird BLM-S	NO—Out of species' range; this species nests and forages in wet meadows, wet grassland, and irrigated agricultural areas in northern Utah. It does not occur on the DNF and is not known to occur in the Project Area.				
Peregrine falcon *Falco peregrinus*	Bird DNF-S	Habitat (A-1, A-3)	Habitat; present in BRCA	Habitat (C-1, C-3)	Habitat	Habitat
Bald eagle *Haliaeetus leucocephalus*	Bird DNF-S BLM-S	Habitat in Sevier River Valley (wintering)	Habitat in Sevier River Valley and BRCA (wintering)	Habitat in Sevier River Valley (wintering)	NO—No suitable habitat.	NO—No suitable habitat.
Lewis's woodpecker *Melanerpes lewis*	Bird BLM-S	Potential habitat in ponderosa pine (all areas)	Potential habitat in ponderosa pine (all areas)	Potential habitat in ponderosa pine (all areas)	Potential habitat in ponderosa pine	Potential habitat in ponderosa pine
Long-billed curlew *Numenius americanus*	Bird BLM-S	NO—Out of species' range. The species is a summer resident and migrant mainly in central and northern valleys of Utah.				
Flammulated owl *Otus flammeolus*	Bird DNF-S	Potential habitat in ponderosa pine (all areas)	Potential habitat in ponderosa pine (all areas)	Potential habitat in ponderosa pine (all areas)	Potential habitat in ponderosa pine	Potential habitat in ponderosa pine
Three-toed woodpecker *Picoides tridactylus*	Bird DNF-S BLM-S	Potential habitat in spruce-fir (A-2)	NO—No suitable habitat.	Potential habitat in spruce-fir	NO—No suitable habitat.	Potential habitat in spruce-fir
American white pelican *Pelecanus erythrorhynchos*	Bird BLM-S	NO—No suitable habitat. This species nests colonially on islands; foraging areas are shallow lakes, marshlands, and rivers. American white pelicans are an uncommon summer resident on DNF water bodies and may occur at Tropic Reservoir, 4 miles south of the Project Area.				

Species	Type & Status[1]	Alternative A	Alternative B	Alternative C	North-South	East-West
Arizona toad *Bufo microscaphus*	Amphibian BLM-S	NO—No known occurrences. The species occurs in scattered lowland riparian areas; the closest occurrence is Moody Wash on the DNF (Pine Valley Ranger District)				
Common chuckwalla *Sauromalus ater*	Reptile BLM-S	NO—No known occurrences. The species occurs in low-elevation Mojave desert scrub and blackbrush scrub in southwestern Utah, near cliffs, boulders, or rocky slopes.				
Desert night lizard *Xantusia vigilis*	Reptile BLM-S	NO—No known occurrences. This species occurs in low-elevation Mojave desert scrub and blackbrush scrub across southern Utah.				
Western toad *Bufo boreas*	Amphibian BLM-S	NO—No known occurrences. The species occurs in high-elevation wetlands and woodland habitat (seasonal); the closest occurrence is Tropic Reservoir on the DNF (4 miles south of the alignments). It is unlikely that western toads would traverse the distance from Tropic Reservoir to the Project Area because although individuals have been found to use a variety of terrestrial habitat types, western toads have generally not been found to migrate distances longer than 1.6 miles between breeding sites and hibernacula (Keinath & McGee 2005).				
Sensitive Plant Species						
Dana's milkvetch *Astragalus henrimontanensis*	Plant DNF-S	NO—No known occurrences. This species occurs in washouts and gravelly loam soil between 7,000 and 9,200 feet. The closest known occurrences in the area are the Henry Mountains and other locations on the Aquarius Plateau (Escalante Ranger District).				
Table Cliff milkvetch *Astragalus limnocharis tabulaeus*	Plant DNF-S	NO—No known occurrences. This species occurs on steep, unstable limestone slopes of pink Wasatch Limestone between 9,200-10,170 feet. The closest known occurrence in the area is the Table Cliff Plateau (Escalante Ranger District).				
Ward's milkvetch *Astragalus wardii*	Plant BRCA-S	No known occurrences on the DNF or in the Project Area	Suitable habitat	No known occurrences on the DNF or in the Project Area	No known occurrences on the DNF or in the Project Area	No known occurrences on the DNF or in the Project Area
Reveal paintbrush *Castilleja parvula revealii*	Plant DNF-S BRCA-S	Suitable habitat (central Paunsaugunt Plateau)	Suitable habitat (central Paunsaugunt Plateau)	Suitable habitat (central Paunsaugunt Plateau); Present (C-2)	Suitable habitat (central Paunsaugunt Plateau)	Suitable habitat (central Paunsaugunt Plateau)

SPECIES	TYPE & STATUS[1]	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	NORTH-SOUTH	EAST-WEST
Yellow-white catseye *Cryptantha ochroleuca*	Plant DNF-S BRCA-S	Suitable habitat; Present (A-1)	Suitable habitat	Suitable habitat; Present (C-2)	Suitable habitat	Suitable habitat
Pinnate spring-parsley *Cymopterus beckii*	Plant BLM-S	NO – No known occurrences.				
Cedar Breaks biscuitroot *Cymopterus minimus*	Plant DNF-S BRCA-S	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)
Hole-in-the-Rock prairie-clover *Dalea flavescens* var. *epica*	Plant BLM-S	NO – No known occurrences.				
Abaho daisy *Erigeron abajoensis*	Plant BRCA-S	No known occurrences on the DNF or in the Project Area	Suitable habitat	No known occurrences on the DNF or in the Project Area	No known occurrences on the DNF or in the Project Area	No known occurrences on the DNF or in the Project Area
Widtsoe wild buckwheat *Eriogonum aretioides*	Plant DNF-S BRCA-S	Suitable habitat (Paunsaugunt Plateau); Present (A-1)	Suitable habitat	Suitable habitat (Paunsaugunt Plateau); Present (A-1)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)
Cronquist's buckwheat *Eriogonum corymbosum* var. *cronquistii*	Plant BLM-S	NO – No known occurrences.				
Utah spurge *Euphorbia nephradenia*	Plant BLM-S	NO – No known occurrences.				

SPECIES	TYPE & STATUS[1]	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	NORTH-SOUTH	EAST-WEST
Jones' gentian *Gentianella tortusa*	Plant BRCA-S	Suitable habitat	Suitable habitat	Suitable habitat	Suitable habitat	Suitable habitat
Cataract gilia *Gilia latifolia var. imperialis*	Plant BLM-S	NO – No known occurrences.				
Alcove bog-orchid *Habenaria zothecina*	Plant BLM-S	NO – No known occurrences.				
Cedar Breaks goldenbush *Haplopappus zionis*	Plant BRCA-S BLM-S	Suitable habitat	Suitable habitat	Suitable habitat	Suitable habitat	Suitable habitat
Jones golden-aster *Heterotheca jonesii*	Plant DNF-S BRCA-S	Suitable habitat (lower Paunsaugunt Plateau)	Suitable habitat	Suitable habitat (lower Paunsaugunt Plateau)	Suitable habitat (lower Paunsaugunt Plateau)	Suitable habitat (lower Paunsaugunt Plateau)
Paria iris *Iris pariensis*	Plant BLM-S	NO – No known occurrences.				
King's ivesia *Ivesia kingii*	Plant BRCA-S	Suitable habitat	Suitable habitat	Suitable habitat	Suitable habitat	Suitable habitat
Sevier ivesia *Ivesia sabulosa*	Plant BRCA-S	Suitable habitat; Present (A-1)	Suitable habitat	Suitable habitat	Suitable habitat	Suitable habitat
Claron pepperplant *Lepidium montanum* var. *claronense*	Plant BLM-S	Present (A-1)	Present (Red Canyon)	Present (C-1, C-3)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)
Breaks bladderpod *Lesquerella rubicundula*	Plant BRCA-S	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)

SPECIES	TYPE & STATUS[1]	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	NORTH-SOUTH	EAST-WEST
Least lomatium *Lomatium minimum*	Plant BRCA-S	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)
Jones' oxytrope *Oxytropis oreophila* var. *jonesii*	Plant BRCA-S	Suitable habitat; Present (A-1)	Suitable habitat	Suitable habitat	Suitable habitat	Suitable habitat
Paria breadroot *Pediomelum pariense*	Plant DNF-S	Suitable habitat	Suitable habitat	Suitable habitat	Suitable habitat	Suitable habitat
Sand-loving penstemon *Penstemon ammophilus*	Plant BLM-S	NO – No known occurrences.				
Red Canyon Beardtongue *Penstemon bracteatus*	Plant DNF-S	Suitable habitat (central Paunsaugunt Plateau); present (A-1)	Suitable habitat (central Paunsaugunt Plateau)	Suitable habitat (central Paunsaugunt Plateau); present (C-2)	Suitable habitat (central Paunsaugunt Plateau)	Suitable habitat (central Paunsaugunt Plateau)
Markagunt penstemon *Penstemon leiophyllus*	Plant BRCA	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)
Little (aquarius) penstemon *Penstemon parvus*	Plant DNF-S	NO—No known occurrences. This species is associated with sagebrush-grass, pinyon-juniper, and spruce communities and occurs on Tertiary volcanic gravels in sandy, gravelly loam between 8,200 and11,500 feet elevation. The closest known occurrence is on the Aquarius Plateau between Cyclone and Big Lake (Escalante Ranger District).				
Cedar Canyon phlox *Phlox gladiformis*	Plant BRCA-S	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)

SPECIES	TYPE & STATUS[1]	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	NORTH-SOUTH	EAST-WEST
Lepidote twinpod *Physaria chambersii* var. *membranacea*	Plant BRCA-S	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)
Podunk goundsel *Senecio malmstenii*	Plant DNF-S BRCA-S	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)
Peterson catchfly *Silene petersonii*	Plant DNF-S BRCA-S	Suitable habitat; Present (A-1)	Suitable habitat	Suitable habitat	Suitable habitat	Suitable habitat
Rock tansy *Sphaeromeria capitata*	Plant DNF-S BRCA-S	Suitable habitat	Suitable habitat	Suitable habitat; Present (C-2)	Suitable habitat	Suitable habitat
Bryce Canyon townsendia *Townsendia Montana var. minima*	Plant BRCA-S	Suitable habitat (Paunsaugunt Plateau); Present (A-1)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)	Suitable habitat (Paunsaugunt Plateau)

[1](E) = Endangered, (T) = Threatened, (C) = Candidate; DNF-S = Dixie National Forest Sensitive, BLM-S = BLM Sensitive, and BRCA-S = BRCA Sensitive plant.

3.8.2.1. Utah Prairie Dog

Utah prairie dogs are highly sociable, herbivorous rodents that live in underground burrow colonies called "towns." Towns are organized into discrete family units. Prairie dogs require deep, well-drained soils in which to dig burrows, vegetation low or sparse enough to see over or through, and suitable forage. Prairie dogs prefer alfalfa and grasses as forage but also eat insects, particularly cicadas. In general, drought or the lack of sufficient moist vegetation is thought to be one of the most important factors influencing the distribution of Utah prairie dogs (Rodriguez 2008). Utah prairie dogs are concentrated in the Paunsaugunt region along the east fork of the Sevier River (Powell Ranger District; USFWS 1991), which falls within the Project Area. The UDWR initiated biannual census counts in 1975 and annual counts in 1978. According to the 2000 annual report, prairie dogs in the Paunsaugunt Recovery Units have declined. From 1972 to 2000, over 18,638 animals were live-trapped and transplanted; however, the success of this program has been poor (UDWR 2002). Utah prairie dog recovery has been slowed by plague, drought, poor habitat conditions, and disturbance from human activities (USFWS 2007b). Habitat for the Utah prairie dog is found throughout the proposed alignments but mainly within the Paunsaugunt Plateau and in Hatch Valley. The most suitable habitat occurs within sagebrush and grassland communities, and prairie dog habitat occurs along each alternative (Transcon 2008c). Ponderosa pine and pinyon-juniper habitats may also support limited prairie dog populations. A June 2008 field investigation identified three active colonies associated with the existing 69 kV line (Parallel 69 kV Route) that were relatively small, consisting of five to ten burrows. The estimated number of prairie dogs associated with each colony was ten (Transcon 2008c). Protocol surveys will be conducted again in 2009 along the Preferred Alternative and the portion of the 69kV line that would be removed.

3.8.2.2. Mexican Spotted Owl

The Mexican spotted owl is a large owl that typically roosts and nests in shady, mature forests but in southern Utah prefers the cracks of deep slot canyons (USFWS 1995). In Utah, breeding spotted owls typically utilize deep, steep-walled canyons that contain mature coniferous or deciduous trees within the canyon bottom. Nest sites are generally found in Douglas-fir (*Pseudotsuga menziesii*) trees and, to a lesser extent, ponderosa pine or Gambel's oak (*Quercus gambelii*). During winter, owls tend to move out of the canyons and onto mesa-tops, benches, and warmer slopes (Rodriguez 2008). Owls forage in mature forests of mixed conifers and Gambel's oak, possibly due to the availability of preferred prey (woodrats, *Neotoma* sp.) as well as avoidance of great horned owls (*Bubo virginianus*). The Project Area overlaps the northeastern edge of Critical Habitat Unit CP-12 (Colorado Plateau-12) for Mexican spotted owls (**Figure 3.8-1)**. Seventy-two acres of CP-12 overlaps the eastern ends of the proposed rights-of-way (Cedar Fork Canyon area). A 732-acre Protected Activity Center (PAC) for Mexican spotted owls occurs 3–4 miles to the east of the alignments and is surveyed on a yearly basis. Two spotted owls have been detected in the Escalante Ranger District of the DNF (east of the Project Area) during winter. No nesting owls have been located. Marginal habitat for the Mexican spotted owl is located along Cedar Fork Canyon on the DNF and along the existing 69kV line located on BRCA. The west end of the plateau has very limited, narrow, densely vegetated canyon structure that provides suitable habitat. Surveys in Cedar Fork Canyon and BRCA in 2008 and 2009 did not detect any Mexican spotted owls (NPS 2008b, Southwest Research 2009).

Figure 3.8-1. Special Status Species

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3.8.2.3. Pygmy Rabbit

Pygmy rabbits are small, secretive rabbits that dig their own burrows. Pygmy rabbits are limited to habitat characterized by deep, friable soils and tall (often >6 feet), dense sagebrush, which provides both food (95 percent of the diet) and cover. Burrows are usually located on slopes at the base of sagebrush plants. Pygmy rabbits do not reproduce in great numbers and do not disperse over great distances; thus colonization of new habitats is slow and small populations can frequently become isolated (Nevada Online 2008). Suitable sagebrush habitat for the pygmy rabbit is found in several areas within the Project Area, including near the proposed East Valley Substation, near the bottom of Cedar Fork Canyon, along SR 12 in Tropic Valley, along the East Fork Sevier River, and along the Sevier River in Hatch Valley. Pygmy rabbit burrows were found in Hatch Valley and near the East Fork Sevier River, but no pygmy rabbits were observed (Transcon 2008c).

3.8.2.4. Allen's Big-Eared Bat

Allen's big-eared bat is a rare species that reaches the northern limit of its range in Utah, occurring throughout the southeastern and the extreme southwestern corners of the state. It was the last of the 18 bat species to be discovered in Utah. Allen's big-eared bat has been reported from a moderately wide range of habitats in Utah despite its rarity, including lowland riparian, desert shrub, sagebrush, pinyon-juniper, mountain brush, and mixed forest habitats (Oliver 2000). Little is known about the breeding activity of the species, but females have been found with single young during the late spring and early summer. Allen's big-eared bat is a nocturnal insectivore and roosts in caves or rock crevices during the day (UNHP 2008). There are no known occurrences in the Project Area; however, one Allen's big-eared bat was captured and tracked from south of the Project Area to the north part of Johnson Canyon on the Skutumpah terrace. Allen's big-eared bats have also been captured near Escalante and have been confirmed in BRCA.

3.8.2.5. Fringed Myotis

The fringed myotis is widely distributed throughout Utah, and records are concentrated in the south and south-central part of the state. It is the most abundant bat in some Utah locations and apparently is absent from other locations that provide suitable habitat (Oliver 2000). Water sources are important to the species and may affect its distribution (Bosworth 2003). The species inhabits caves, mines, and buildings, most often in desert and woodland areas, occurring in colonies of several hundred individuals (UNHP 2008). The fringed myotis has also been found in lowland riparian, desert shrub, sagebrush, pinyon-juniper, mountain meadow, ponderosa pine forest, and Douglas-fir–aspen habitat (Oliver 2000). Populations also tend to be associated with areas that have rocky outcroppings, cliffs, and canyons (Bosworth 2003). Maternity roosts in Utah have been reported in an attic of a building and (possibly) a cave, and the same cave has been speculated to be a day or night roost (Oliver 2000). Beetles are the major prey item, and the species is nocturnal (UNHP 2008). Fringed myotis has been found in the BRCA area near Alternative B (Bosworth 2003) and may occur in canyon habitat within the Project Area.

3.8.2.6. Townsend's Big-Eared Bat

Townsend's big-eared bat is one of the most common bat species in Utah, roosting in a variety of desert and forest communities at elevations between sea level and 10,000 feet elevation. Roosts occur in caves, rocky outcrops, old buildings, and mine shafts (Rodriguez 2008). In winter, both sexes hibernate in mines or caves, either alone or in small groups. In a survey of 820 potential roosting sites in northern Utah, abandoned mines and caves with small to midsize openings located at low to mid elevations, in areas dominated by sagebrush, grassland, juniper woodlands, or mountain brush communities, were most likely to be occupied by Townsend's big-eared bats (Sherwin et al. 2000).

Several individuals were located and monitored on the DNF from 1997 to 2001. According to potential bat habitat mapped by the DNF, habitat is scattered in a few areas within 0.5 mile of Alternatives A and C, and the East-West Interconnect and totals about 12 acres. Bats may be present in Cedar Fork Canyon and BRCA.

Spotted Bat

Spotted bats occur in a wide variety of habitats, including ponderosa pine forests, pinyon-juniper woodlands, canyon bottoms, open pastures, and hayfields. Limited observations indicate that spotted bats roost in relatively remote and undisturbed areas, typically in rock crevices located high on steep rock faces in limestone or sandstone cliffs (Rodriguez 2008). Spotted bats forage primarily over dry, open coniferous forest (Groves et al. 1997). Migration patterns are poorly understood, but populations from lower elevation habitats apparently do not migrate. Surveys conducted on six sites on the DNF in 1994 resulted in documented occurrence on the Cedar City Ranger District (Rodriguez 2008). Spotted bats may be present in Cedar Fork Canyon and have been confirmed in BRCA.

3.8.2.7. Northern Goshawk

Northern goshawks inhabit montane coniferous and deciduous woodland in the West, nesting in stands of intermediate to high canopy closure with a thin understory, interspersed with small openings, fields, or wetlands. Important internal components of forests where goshawks nest in Utah include snags, multiple canopies, and down woody debris. In southern Utah, goshawks are most often associated with mature to old growth stands of Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*), followed by aspen (*Populus tremuloides*; Graham et al. 1999). Goshawks generally nest in large trees adjacent to open flight corridors; they appear to prefer north-to-east aspects as well as flat to moderately sloped land for nest sites because stands are typically denser (Shuster 1980; Weber 2006). Goshawk habitat is located mainly on the DNF, and recent data show that there are at least 152 known goshawk territories across the Forest (Rodriguez 2008). The highest quality habitat for goshawk in the Project Area is found in Cedar Fork, Blue Fly, and Hillsdale Canyons and consists of high density, mature stands of ponderosa pine or mixed conifer forest with intermittent streams and steep slopes (Transcon 2008e). Less suitable habitat is present along the Alternative B alignment (personal communication, J. Schoppe, DNF wildlife biologist, November 17, 2008), although there is a known territory within 0.5 mile of the Alternative B alignment in Red Canyon. Seventy-four acres of a Protected Fledgling Area (PFA) near Wilson Peak is within 0.5 mile of the Proposed Action route. Approximately 32 miles of habitat within the Project Area were surveyed by Transcon, and two positive responses were heard. One response occurred east of the top of Blue Fly Canyon, and the other occurred in the middle of Cedar Fork Canyon. A goshawk sighting was also reported near the existing 69kV line within the park by BRCA staff in July 2008. No nests were located (Transcon 2008e).

3.8.2.8. Greater Sage-grouse

Greater sage-grouse are large, chicken-like birds that are brownish gray with conspicuous black and white markings (Parrish et al. 2002). The following habitat information is paraphrased from Connelly et al. (2004; unless cited otherwise), which provides the most recent and comprehensive information on the species. Sage-grouse are closely associated with sagebrush habitats, specifically big sagebrush (*Artemisia tridentata*) and silver sagebrush (*A. cana*) for food and cover. Sage-grouse breeding habitats are defined as those where lek attendance, nesting, and early brood-rearing occur. Breeding occurs on leks or relatively open areas with less herbaceous shrub cover than surrounding areas. Leks are typically surrounded by potential nesting habitat and are adjacent to relatively dense sagebrush stands used for escape, thermal, and feeding cover. Sage-grouse females nest in many different sagebrush-dominated cover types and most nests are located under sagebrush plants. An understory of

native grasses and forbs provides productive nesting habitat. Early brood-rearing habitat is defined as sagebrush habitat within the vicinity of the nest used by hens with chicks up to 3 weeks following hatch.

The availability of forb-rich habitats in close proximity to protective cover appears to be an important consideration for early brood-rearing. Late brood-rearing habitats are those used by sage-grouse starting later in the summer, following desiccation of herbaceous vegetation in sagebrush uplands. Sage-grouse usually select late-summer habitats based on the availability of forbs; these areas are often wet meadows or irrigated pastures adjacent to sagebrush. Winter habitats of sage-grouse are dominated by sagebrush that can provide shelter and food. Habitat selection during winter is influenced by snow depth and hardness, topography, and vegetation height and cover. Sagebrush plants must be exposed above the snow to provide forage. Sage-grouse may roost in snow burrows during this period to conserve energy.

UDWR-mapped "brooding" or brood-rearing habitat for sage-grouse is found throughout the Paunsaugunt Plateau (DNF) and the Sevier River Valley (BLM; Transcon 2008d) and occurs along all three alignments (**Figure 3.8-1**). Use areas (includes known leks) mapped within and around the DNF is concentrated in Hatch Valley and Johns Valley and also occurs along all three alignments (**Figure 3.8-1**). In the Project Area, suitable sage-grouse habitat occurs in smaller patches than most areas within its range and contains varied topography and adjacent (unsuitable) vegetation communities, such as forest, are often in close proximity. Adjacent tall trees currently provide raptor perch sites, which contribute to predation at some leks.

During 2008, Transcon completed a protocol survey for greater sage-grouse (Transcon 2008d). Surveys identified three active lek sites, including one known lek along the Proposed Action route (John L. Swale lek) and what were later identified as two historic leks (called Lek 1, in Johnson Bench area 2 miles south of SR 22, and Lek 2, on the east side of Forest Road 111), on the Paunsaugunt Plateau. The John L. Swale lek is 0.5 mile from Segment A-1. Lek 1 is 0.90 mile from Alternative B and 0.40 mile from Segment C-1, while Lek 2 is 0.25 mile from Segment A-1 and 0.20 mile from Alternative B. Individual grouse counts for each lek were 16 on the John L. Swale, 4 on Lek 1, and 17 on Lek 2.

3.8.2.9. Peregrine Falcon

Peregrine falcons occupy a wide variety of open habitats. They forage wherever prey concentrate, usually along marshes, streams, and lakes within a 10-mile radius of the nest (Rodriguez 2008). Marshes, croplands, meadows, river bottoms, and lakes that support good populations of small- to medium-sized terrestrial birds, shorebirds, and waterfowl are important hunting sites. Cliffs are preferred nesting sites, although nests also occur on river banks, tundra mounds, stick nests of other species, tree cavities, and man-made structures (USDA 2003:E-76). Eight nest sites are known on the DNF, three are known on adjacent private/BLM lands, and numerous sightings have occurred within the Forest boundary (Rodriguez 2008). Habitat for the peregrine falcon is found along all three proposed alignments: in Cedar Fork Canyon, Hillsdale Canyon, Blue Fly Canyon, Red Canyon, and BRCA. No peregrine falcons or nests were observed during field surveys (Transcon 2008d), although one non-active stick nest on a cliff face in Blue Fly Canyon was identified as a potential, abandoned peregrine nest. Peregrines are known to occur near Tom Best Springs (north of the proposed disturbance areas; UDWR 2008b) and in BRCA.

3.8.2.10. Bald Eagle

Bald eagles occur in Utah generally on a migratory or wintering basis. Bald eagles are opportunistic predators, especially in winter, when they will feed on any available fish, waterfowl, small mammal,

or carrion. Bald eagles tend to concentrate wherever food is available, roosting in large groups in forested stands that provide protection from harsh weather. They may also winter in upland habitats, feeding on small mammals and deer carrion. Marginal roosting habitat occurs wherever large trees occur along bodies of water. Bald eagles have been observed on the DNF and surrounding lands, including BRCA, during late winter (winter residents) or during fall and spring months (thought to be northern migrants). Generally, when water bodies freeze in late fall or early winter, eagles move down in elevation to forage (Rodriguez 2008). No nesting pairs are known on the DNF, although one pair has been observed for two summers at Panguitch Lake (without nesting). Potential bald eagle wintering sites within or near the proposed disturbance areas include Tropic Reservoir (south of the proposed disturbance areas), Pine Lake (Escalante Ranger District), and the Sevier River Valley (BLM). The bald eagle is a winter migrant that will roost in trees, snags, and cliffs throughout the Project Area. The Sevier River Valley is the only area where communal roosts may occur.

3.8.2.11. Flammulated Owl

Flammulated owls inhabit montane forest, specifically mature and old growth ponderosa pine and Douglas-fir habitats with open stand structure. This species typically nests in large cavities made by woodpeckers and feeds on nocturnal arthropods (USDA 2003b:F-73). Flammulated owls have a low reproductive rate, with a large variation in adult survival. Timber harvesting can have negative impacts on flammulated owls if large old trees, open stand structure, and some dense vegetation for roosting are not retained (McCallum 1994). Flammulated owl habitat is mainly on the DNF; detections are most concentrated within the Paunsaugunt Plateau (Powell Ranger District) and the Aquarius Plateau (Escalante Ranger District). The presence of flammulated owls is assumed within suitable habitat in the Project Area. The Paunsaugunt Plateau is known for high concentration of flammulated owls based on field surveys on the Powell Ranger District.

3.8.2.12. Lewis's Woodpecker

Lewis's woodpecker is an uncommon species in Utah that occurs mainly in northeastern and southeastern parts of the state (CWCS 2005). The species breeds in open, park-like ponderosa pine forests in dead trees or stumps but can also be found in burned-over mountain shrub or riparian assemblages (Bosworth 2003), aspen forests (CWCS 2005), or Douglas-fir, mixed conifer, pinyon-juniper, and oak woodlands (Parrish et al. 2002). Areas with a good understory of grasses and shrubs to support insect prey are preferred (Parrish et al. 2002). Lewis's woodpecker may be found in ponderosa pine habitats within the Project Area. No individuals were incidentally observed during surveys (Transcon 2008c).

3.8.2.13. Three-Toed Woodpecker

Northern three-toed woodpeckers are primarily associated with dense subalpine fir and Engelmann spruce forests at high elevations. They prefer mature to old-growth stands due to an abundance of insect prey in large snags and down woody debris. Three-toed woodpeckers excavate their own nest cavities in snags or occasionally in live trees. Nests are found in cavities located 5 to 12 feet above the ground in dead spruce, tamarack pine (*Larix* spp.), cedar (*Thuja* spp.), and aspen trees (Rodriguez 2008). Up to 75 percent of their diet consists of wood-boring beetles and caterpillars that attack dead or dying conifers (USDA 2003b:F-80). Populations have been shown to increase in some areas 3–5 years after forest fires, presumably in response to spruce beetle outbreaks (Koplin 1969). Formal surveys for three-toed woodpecker have been conducted on the DNFand a total of 131 detections have been documented since 1996, and the numbers of individuals are increasing presumably due to the increase of spruce bark beetle infestations. Three-toed woodpeckers have also been detected consistently on the Breeding Bird Survey Route #85020 (Navajo Lake; southwest of the proposed alignments). An average of five woodpeckers was detected each year along this route from 2000 to

2004. In the Escalante Ranger District, two nests were found along Barney Top northwest of the Table Cliff Plateau and individuals have been detected east of Antimony Creek, northeast of the Project Area. There is very little spruce-fir habitat within the Project Area, although some occurs near Wilson Peak. No individuals were incidentally observed during surveys (Transcon 2008c).

3.8.2.14. Burrowing Owl

Burrowing owls occupy open areas such as grasslands, desert scrub, and the edges of agricultural fields. They also inhabit golf courses, airports, cemeteries, vacant lots, and road embankments or wherever there is sufficient friable soil for a nesting burrow. Burrowing owls use burrows dug by badgers, ground squirrels, or prairie dogs. Their breeding habitat is distributed across much of western North America as far east as Texas, extending south through Mexico, Central America, and South America. Owls use burrows for nesting and also require access to alternate burrows for escape cover. Habitat for burrowing owls is found in the Project Area within areas associated with prairie dog towns and in Tropic Valley. The most suitable habitat within the Project Area occurs within greasewood–salt scrub and sagebrush-grassland communities; all three alternatives contain suitable habitat. In general, most of the Utah prairie dog habitat throughout the Project Area is suitable nesting habitat for burrowing owls, and burrowing owls may be present in many areas of the Project Area at low density (personal communication, J. Schoppe, DNF wildlife biologist, November 17, 2008). Alternatives A and B contain more suitable habitat than Alternative C. No burrowing owls were observed during field investigations (Transcon 2008c); however, one known burrowing owl nesting area exists near Johns Valley Road. Alternative A passes relatively close to this high-density area, on SITLA land 4 miles north of Bryce Canyon City (personal communication, J. Schoppe, DNF wildlife biologist, November 17, 2008).

3.8.2.15. Ferruginous Hawk

Ferruginous hawks can be found in open country, occurring in grasslands, agricultural lands, and sagebrush/saltbrush/greasewood shrub and at the periphery of pinyon-juniper forests. They avoid high elevations, forests, and narrow canyons. Nest sites vary from trees and shrubs to cliffs and utility structures to ground outcrops. Nests may also occur in haystacks, in abandoned buildings, or directly on the ground. During breeding, ferruginous hawks can most often be found in flat, rolling terrain within grassland or shrub steppe (UNHP 2008). Individuals are not perch predators but range over open areas and frequently hunt several kilometers away from the nest (Hawkwatch 2008). During winter, ferruginous hawks use open farmlands, grasslands, deserts, and other arid regions where lagomorphs, prairie dogs, or other major prey items are present (UNHP 2008). Habitat for ferruginous hawk is found throughout the Project Area. No ferruginous hawks were observed during field investigations (Transcon 2008c).

3.8.2.16. Sensitive Plants

Sensitive plants occur on the DNF and in BRCA. No DNF-Sensitive plants are found on the GSENM or on KFO lands within the Project Area, but some BRCA-Sensitive species are found on DNF lands. Sensitive plant habitat and occurrences are shown (by quadrangle section) on **Figure 3.8-1**. Most Sensitive plants are associated with the Tertiary Claron Formation. DNF botanists completed a survey within the Project Area in 2007 and 2008 and encountered the following species: yellow-white catseye (*Cryptantha ochroleuca*), rock tansy (*Sphaeromeria capitata*), reveal paintbrush (*Castilleja parvula* var. *revealii*), Widtsoe wild buckwheat (*Eriogonum aretioides*), Sevier ivesia (*Ivesia sabulosa*), Jones' oxytrope (*Oxytropis oreophila* var. *jonesii*), Peterson catchfly (*Silene petersonii*), Red Canyon beardtongue (*Penstemon bracteatus*), and Bryce Canyon townsendia (*Townsendia montana* var. *minima*; USFS 2008b). Transcon encountered Widtsoe wild buckwheat and Jones'

oxytrope during biological surveys (Transcon 2008c). The sensitive plants in **Table 3.8-4** are either found or are expected in suitable habitat within the Project Area.

Table 3.8-4. Description of Sensitive Plants Found or Expected in the Project Area

SPECIES	DESCRIPTION	HABITAT	KNOWN OCCURRENCES
Ward's milkvetch	Perennial herb; whitish flowers open May-Sept	Sagebrush, cottonwood, pinyon-juniper, ponderosa pine, spruce-fir; 5,000–9,000 feet	BRCA (confirmed)
Reveal paintbrush	Perennial herb; magenta to rose bracts; "flowers" open mid June to mid July	Associated with bristlecone and ponderosa pine; heavy clay soils from pink Wasatch Limestone; west to southwest-facing slopes; 7,800–8,500 feet	Central Paunsaugunt Plateau (all alternatives); Bryce Main Amphitheater Areas (confirmed); found along Segment C-2
Yellow-white catseye	Perennial herb; pale yellow flowers open May–late June	Dry, open sites on southern, warm slopes; pink Wasatch Limestone; 6,500–9,000 feet	Powell and Escalante Ranger Districts (all alternatives); BRCA (confirmed); found along A-1 and C-2
Pinnate spring parsley	Perennial; flowers open April-July	Pinyon-juniper, mountain brush, or conifer communities with sandy or stony substrate; often rock crevices and near cliff bases; 5,600-7,500 feet	Monticello and Richfield BLM
Cedar Breaks biscuitroot	Perennial; flowers pink or pale purple with white margins open July–Aug	Associated with bristlecone, ponderosa pine, and spruce-fir; Wasatch Limestone; 8,000–10,400 feet	Paunsaugunt Plateau (all alternatives); BRCA (suspected)
Hole-in-the-Rock prairie-clover	Perennial; flowers open May-June	Sandstone bedrock and sandy areas in blackbrush and mixed desert shrub communities; 4,700-5,000 feet	BLM KFO
Abajo daisy	Perennial herb; blue or white flowers open June–Aug	Dry, rocky slopes; Navajo sandstone; 7,500–11,150 feet	BRCA (confirmed)
Widtsoe wild buckwheat	Perennial herb; yellow flowers open late May–June	Dry, open ridge tops; pink Wasatch Limestone; 7,500–9,000 feet	Paunsaugunt Plateau (all alternatives); BRCA (suspected); encountered during Transcon surveys

SPECIES	DESCRIPTION	HABITAT	KNOWN OCCURRENCES
			and DNF surveys (A-1)
Cronquist's buckwheat	Perennial; flowers open Sep	Pinyon, *Holodiscus*, rabbitbrush, mountain brush, and rock-spiraea communities on steep talus slopes; 8,800-8.900 feet	Henry Mountains; BLM Richfield
Utah spurge	Annual herb; flowers open June-Aug	Mixed sandy desert shrub and grassland communities, on dark clay hills, sand dunes; Tropic Shale and Entrada Formations; 3,800-4,800 feet	BLM GSENM
Jones' gentian	Annual herb; blue or yellow-white flowers open July–Aug	Sagebrush, grass-forb, ponderosa pine, limber and bristlecone pine, and spruce-fir, on Claron Limestone Formation; 6,500–11,150 feet	BRCA (confirmed), occurs on the Central Paunsaugunt Plateau in isolated population on all alternatives (not a USFS Sensitive plant)
Cataract gilia	Annual herb; flowers open June-Oct	Mixed desert shrub communities, especially wash bottoms and at the base of ledges; 3,800-5,200 feet	BLM GSENM
Alcove bog-orchid	Perennial; flowers open late July-Aug	Seeps, hanging gardens, and moist streambanks in mixed desert shrub, pinyon-juniper, and oakbrush; 4,000-6,200 feet	BLM Moab Monticello
Cedar Breaks goldenbush	Shrub; greenish gray flowers open mid July–August	Spruce-fir and ponderosa pine on Claron Limestone Formation; 8,000–10,000 feet	BRCA (suspected) found along A-1—Escalante RD in the Claron Limestone; not USFS-sensitive
Jones golden-aster	Perennial herb; yellow ray flowers open May–Sep	On sandstone or in sand on south and west-facing slopes; 4,000–9,400 feet	Lower Paunsaugunt Plateau (all alternatives); BRCA (confirmed); Escalante Ranger District: Hell's Backbone Road
Paria iris	Perennial; flowers open May	Grass-shrub community; 4,600 feet	Known from one type collection in Kane County; State lands

SPECIES	DESCRIPTION	HABITAT	KNOWN OCCURRENCES
King's ivesia	Perennial herb; white flowers open June–Aug	Saline meadows and pans in rabbitbrush, saltgrass, shadscale, greasewood, and sedge communities; 4,800–7,800 feet	BRCA (confirmed) found along A-1—Powell RD; not USFS-sensitive
Sevier ivesia	Perennial herb; flowers open June–Aug	Sagebrush, pinyon-juniper, pygmy sagebrush, ponderosa pine, and spruce; on limestone; 5,700–9,000 feet	BRCA (confirmed); found along Segment A-1, occurs on all Tertiary Claron Limestone throughout the Project Area; not USFS Sensitive
Claron pepperplant	Perennial; flowers open May-June	Sagebrush, pinyon-juniper, and ponderosa pine/bristlecone pine communities on Claron Wasatch Limestone and other fine-textured substrates; 6,400-8.000 feet	Found along Segments A-1, C-1, and C-3.
Breaks bladderpod	Perennial herb; yellow or white flowers open May–July	Bristlecone pine, ponderosa pine, and spruce-fir communities; pink and white Wasatch Limestone; 7,700–11,000 feet	Paunsaugunt Plateau (all alternatives); BRCA (confirmed)
Least lomatium	Perennial herb; yellow or white flowers open May–June	Open, barren clay slopes in forb-grass, ponderosa pine, and bristlecone pine community; often on limestone; 7,100–10,400 feet	Paunsaugunt Plateau (all alternatives); BRCA (confirmed)
Jones' oxytrope	Perennial herb; cream or pink-purple flowers open May–Aug	Ponderosa pine, western bristlecone pine, and mixed desert shrub communities; on pink Wasatch Limestone; 6,300–7,800 feet	BRCA (confirmed); encountered during Transcon surveys and DNF surveys (A-1)
Paria breadroot	Perennial herb; cream to yellow-white flowers with purple open June–July	Ponderosa pine or pinyon-juniper; calcerous or sandy soils on Wasatch Limestone, Navajo Sandstone, and Quaternary alluvium; 5,500–8,000 feet	Associated with the Kaipairowits Formation (probably not found on Powell RD); central portion of BRCA (confirmed) and No Mans Mesa (White Cliffs—BRCA)

SPECIES	DESCRIPTION	HABITAT	KNOWN OCCURRENCES
Sand-loving penstemon	Perennial herb; flowers open late May-June	Ponderosa pine and mixed desert shrub communities; on blow sand derived from Navajo Sandstone, 5,900-7,200 feet	BLM GSENM, KFO
Red Canyon beardtongue	Perennial herb; blue to violet flowers open May–early June	Pine needle duff on clay loam soils of calcerous, gravelly slopes and rock slides along pink Wasatch Limestone; 6,900–8,300 feet	Central Paunsaugunt Plateau (all alternatives); Powell Ranger District: Bryce Main Amphitheater Area (confirmed); found along A-1 and C-2
Markagunt penstemon	Perennial herb; blue-purple flowers open in spring	Wide variety of vegetation associations, in BRCA, on open meadows in the Markagunt Range of the Cedar Breaks area, across Bryce Canyon; 6,600–11,500 feet	Paunsaugunt Plateau (all alternatives); BRCA (confirmed)
Cedar Canyon phlox	Perennial herb; whitish pink-lavender flowers open May–June	Cliffs and rocky slopes in ponderosa pine, pinyon-juniper, and bristlecone pine communities; 6,500–8,300 feet	Paunsaugunt Plateau (all alternatives); BRCA (suspected)
Lepidote twinpod	Perennial herb; white flowers open June–Aug	Various plant communities: pinyon-juniper, salt desert shrub, mountain brush, ponderosa pine, and aspen; 5,000–8,000 feet	Paunsaugunt Plateau (all alternatives); BRCA (confirmed)
Podunk goundsel	Perennial herb; yellow discoid flowers open June–Aug	Associated with bristlecone pine, spruce, fir, other conifers; talus slopes of Claron Limestone; 8,000–10,000 feet	Powell and Escalante Ranger Districts: Paunsaugunt Plateau and Canaan Mountain (all alternatives) On Forest land—none found anywhere in the Project Area

SPECIES	DESCRIPTION	HABITAT	KNOWN OCCURRENCES
Peterson catchfly	Perennial herb; bright pink flowers open late July–Aug	Associated with ponderosa pine, aspen, and spruce-fir; open calcareous limestone and igneous gravels; 7,000–11,200 feet	Powell and Escalante Ranger Districts (all alternatives); BRCA (confirmed); found along A-1, A-3, and C-2
Rock tansy	Perennial herb; yellow flowers open in July	Occurs with bristlecone pine on exposed slopes of Cedar Breaks Limestone; 5,000–7,800 feet	Garfield County only (all alternatives); found along C-2
Bryce Canyon townsendia	Perennial herb; blue, pink, lavender, or white flowers open April–June	Ponderosa pine, western bristlecone, limber pine, and Douglas-fir/white fir; white and pink Cedar Breaks Formation; 7,800–10,200 feet	Paunsaugunt Plateau (all alternatives); not USFS Sensitive; BRCA, (confirmed); found along A-1

3.9. RANGE RESOURCES

The Study Area for range resources includes the grazing allotments that intersect the Project Area. No grazing allotments exist in BRCA; therefore this land area is not discussed in this section.

3.9.1. Data and Methods

Data came from the management plans of each of the agencies involved including the DNF LRMP (1986), the BRCA General Management Plan (1987), the BLM KFO Final RMP and EIS (2008), and the GSENM Management Plan (2000).

Forest Service Annual Operation Instructions for grazing permittees provided information regarding vegetation, season of use, number of animal unit months (AUMs—the amount of dry forage one mature cow of approximately 1,000 pounds with a calf requires for 1 month), and number of permittees on DNF land. This information was accessed via the Forest website (USFS 2008c) and through personal contacts. The KFO RMP and GSENM Management Plan, as well as agency records provided by agency personnel, were the source of information for vegetation, season of use, grazing allotments, number of AUMs, and number of permittees on BLM and GSENM lands.

Background information regarding agency direction and historical insight was taken from agency websites, including the BRCA website (NPS 2006), the BLM Kanab website (BLM 2008c and 2008d), and the DNF website (USFS 2008c), as well as each agency's management plan.

Existing Conditions

Figure 3.9-1 shows the proposed transmission line right-of-way alternatives, land ownership and/or management agencies, major highways and communities, substations proposed and existing, grazing allotment boundaries, pasture boundaries (where applicable; pastures are subunits of allotments), water sources and fence lines within 2 miles of the right-of-way, and substation locations.

3.9.1.1. Grazing Allotments

The Project Area includes portions of 11 grazing allotments. Depending on the alternative selected, not all allotments would be disturbed.

Six allotments in the Project Area are on the DNF. Five of these are within the Powell Ranger District, and one is within the Escalante Ranger District. These allotments are used for summer and early fall grazing and are used with pastures in a rotational grazing system. The Hillsdale C&H and Red Canyon allotments on the Powell Ranger District are not active. There are 84 total allotments on the DNF.

Of the 120 allotments managed by the KFO, 5 allotments are in the Project Area. These allotments are generally used for summer and/or fall grazing. All affected allotments are cattle allotments.

Lands affected on the GSENM include one very large grazing allotment, the Upper Paria, and one pasture within this, called the Henderson Pasture. Most grazing in the Upper Paria allotment occurs on areas seeded with crested wheatgrass. The Henderson Pasture is not seeded and thus has a lower forage production per acre than other pastures with seeded areas in the allotment. The Henderson Pasture is used for summer range every 2 to 3 years. The number of permittees, cow/calf pairs authorized to graze, and season of use for each allotment within the direct and indirect effects area are listed in **Table 3.9-1**.

3.9.1.2. Range Improvements

Numerous water supply facilities are scattered across the Project Area. Water supply facilities located within 2 miles of proposed transmission line rights-of-way are shown on **Figure 3.9-1**.

The identification number and legal description (location) of each water supply facility within the different alternative rights-of-way and the location and condition of the next closest water supplies are listed in the Range Resources Specialist Report in the project record. There are four water supply facilities within the different rights-of-way, one each in A-1, B, C-2, and the East-West Interconnect. The pond within the Alternative A-1 right-of-way is in poor condition; the rest of the water supply facilities within the proposed rights-of-way are in good condition. With one exception, there are other water supplies within 0.5 mile of each of these tanks or ponds; the closest water to the pond on the Alternative A-1 right-of-way is approximately 1.25 miles away. The next closest water sources include wells, stock tanks, and intermittent drainages.

There are at least 24 fence crossings along the three proposed transmission line rights-of-way recorded in USFS, BLM, and GSENM GIS data. Fence location data are complete for the DNF but may not be complete for BLM or GSENM lands. Fence locations refer only to fences for range improvements and do not include fences along road rights-of-way or on private and state lands so there may be more. The Range Resources Specialist Report in the project record lists the alternative, allotment, and general locations of the fence crossings as known as of August 5, 2008. **Table 3.9-2** summarizes the number of fence crossings by alternative and segment.

Table 3.9-1. Allotment Use Data for DNF, KFO, and GSENM Allotments in the Project Area

Allotments	Federal Acres	Total Acres	Number of Pastures in Project Area & allotment	Number of Permittees	Grazing Season	Active AUMs	Alternatives & Segments within this Allotment
DNF - Powell Ranger District							
Blue Fly C&H	20,472	20,518	2 of 2	5	June 1–Oct 10	772	A-1, A-2, B, C-1, C-2, C-3, A & C Interconnects, Removal of 69 kV line
East Fork/Crawford	43,187	45,074	1 of 10	4	June 16 – Oct 5	1,947	B, C-2, Removal of 69 kV line
Pines C&H	27,755	28,288	2 of 4	4	June 1–Oct 10	2,011	A-1
Hillsdale C&H	5,713	5,991	NA	0	0	0	A-3, C-3
Red Canyon	9,526	9526	NA	0	0	0	B, Removal of 69 kV line
DNF - Escalante Ranger District							
Cameron Wash	14,033	14,192	1 of 3	4	June–October	1,068	A-1
KFO							
Hillsdale—20035	1,483	2,423	1 of 1	1	June 1–Oct 30	140	None
Rock Canyon—25046	8,281	9,151	1 of 1	2	Oct 1–Feb 28	484	A-3, B, C-3
Sevier River—25036	2,308	2,375	1 of 1	1	June 1–Oct 30	340	A-3, C-3
South Canyon—25044	18,355	19,670	1 of 2	1	June 1–Oct 15	900	B, Removal of 69 kV line
Sunset Cliffs—04103	2,014	2,141	1 of 1	1	June 1–Dec 1	188	B, Removal of 69 kV line
GSENM							
Upper Paria, Henderson Pasture	10,362	10,362	1 of 16	3	May 1–Sept 30	150	A-1, C-1

Figure 3.9-1. Land Ownership, Grazing Allotments, and Range Resources

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Table 3.9-2. Range Improvement Fence Crossings on All Alternative Rights-of-Way

	Alternative/Segment										
	A-1	A-2	A-3	A Total	B	C-1	C-2	C-3	C Total	East-West	North-South
Number of Crossings	10	1	1	**12**		10	1	0	**11**	0	1

Note: Data taken from interpretation of GIS maps.

3.9.1.3. Vegetation and Forage Production

The Vegetation Specialist Report discusses plant communities and species including invasive plants within the proposed transmission line rights-of-way.

The most productive livestock grazing lands are those that are seeded with crested wheatgrass and/or smooth brome. None of the proposed rights-of-way are located on seeded lands within the BLM lands. DNF lands have been seeded in the distant past, as early as the 1950s, and each of the proposed rights-of-way passes through portions of seeded lands.

The number of acres per AUM, by allotment or pasture, within each right-of-way area was determined by dividing total acres in each allotment by the number of AUMS in the allotment. **Table 3.9-3** lists AUM information by alternative and allotment.

Table 3.9-3. Acres per AUM on Allotments impacted by the Action Alternatives

Allotments	Federal Acres	Total Acres	Active AUMs	Acres per AUM	Alternatives & Segments within this Allotment
Powell Ranger District					
Blue Fly C&H	20,472	20,518	772	27	A-1, A-2, B, C-1, C-2, C-3, A&C Interconnects, Removal of 69 kV line
East Fork/Crawford	43,187	45,074	1,947	23	B, C2, Removal of 69 kV line
Pines C&H	27,755	28,288	2,011	14	A-1
Hillsdale C&H	5,713	5,991	0	N/A	A-3, C-3
Red Canyon	9,526	9,526	0	N/A	B, Removal of 69 kV line
Escalante Ranger District					
Cameron Wash	14,033	14,192	1,068	13	A-1
KFO					
Hillsdale—20035	1,483	2,443	17	46	None
Rock Canyon—25046	8,281	9,151	484	19	A-3, B, C-3
Sevier River—25036	2,308	2,375	340	7	A-3, C-3

ALLOTMENTS	FEDERAL ACRES	TOTAL ACRES	ACTIVE AUMS	ACRES PER AUM	ALTERNATIVES & SEGMENTS WITHIN THIS ALLOTMENT
South Canyon—25044	18,355	19,670	900	22	B, Removal of 69 kV line
Sunset Cliffs—04103	2,014	2,141	188	11	B, Removal of 69 kV line
GSENM					
Upper Paria–Henderson Pasture[1]	10,362	10,362	150	69	A-1, C-1

Sources: AUM and use data from DNF, BLM, and GSENM grazing files. Acreage data from agency GIS files.

1.This table includes information for only the Henderson Pasture of the Upper Paria allotment (both acreage and AUMs).

3.10. LAND USE

Garfield County's economy, as stated in **Section 3.15.3,** is driven by tourism and agriculture, and nearly 90 percent of the land in the county is federally administered. Land uses associated with agriculture and rights-of-way on public lands are described in this section. Land uses related to tourism including distinctive land areas (areas managed in a manner that protects their wilderness, primitive, historic, botanical, and geologic resource values) and recreation are detailed in **Sections 3.11** and **3.12,** respectively. Two other land uses, production of forest products (such as timber, posts, poles, fuel wood, and Christmas trees) and grazing, are detailed in **Section 3.6** and **3.9,** respectively.

3.10.1. Data and Methods

For land use, the Study Area has been defined as 0.5 mile from the centerline of the transmission line as impacts within the Project Area could potentially affect land use within the Study Area. To complete the land use analysis, several federal land management plans and policies were consulted. The zoning and land use ordinances of Garfield County were consulted when considering impacts to local jurisdictions. The following is a list of consulted data sources:

- GSENM Management Plan (BLM 2000).
- USFS: DNF Land and Resource Management Plan (USFS 1986).
- BLM: KFO RMP (BLM 2008a).
- NPS Management Policies (NPS 2006a).
- Utah Administrative Code Rule R850-2 (State of Utah School and Institutional Trust Lands) (State of Utah 1991).
- Garfield County General Plan, as Amended (Garfield County 1998).
- Code of Federal Regulations 14 CFR Subpart 77.11, Objects Affecting Navigable Airspace.
- U.S. Department of Transportation: Federal Aviation Administration: Advisory Circular 70/7460-1K, Obstruction Marking and Lighting (USDOT 2007).

Existing land uses on private land within the Study Area were obtained from State of Utah Automated Geographic Reference Center (AGRC). The dataset entitled "Water Related Land Use Data" was overlaid on the Study Area map to determine the amount of private land use impacts.

3.10.2. Existing Conditions

3.10.2.1. Land Ownership/Management

Garfield County covers 3.3 million acres of land in southern Utah. Approximately 90 percent of the land is under the management of six land management agencies. **Table 3.15-1** details acreages managed by various agencies within Garfield County. The BLM manages nearly 1.5 million acres, of which 588,312 acres are part of the GSENM. The NPS manages 140,864 acres in BRCA and Capitol Reef National Park, as well as 305,415 acres of land in the Glen Canyon National Recreation Area. The USFS manages 1.0 million acres within the DNF (Escalante, Powell, and Cedar City Ranger Districts) and the Box–Death Hollow Wilderness Area that comprises 25,268 acres. The USFS also manages 10,465 acres under the Bankhead Jones Farm-Tenant Act. The 10,465 acres are USFS-managed lands that are in addition to the 1,011,083 acres of National Forest. SITLA, Utah State Parks, and Utah Department of Wildlife Resources manage the remainder of government-managed lands within Garfield County (BLM 2006). See **Figure 3.10-1** for Garfield County land status.

Five percent of the land in Garfield County is privately owned and concentrated around cities and towns. Land uses on private land include farming and ranching, residential, commercial, and industrial development. See the Private Property section below for a distribution of land uses on private property.

3.10.2.2. Land Management Policies

Dixie National Forest

In general, the DNF LRMP identifies management objectives for all portions of the DNF either by general forest direction or by designated management area. Chapter 4 (Forest Management Direction), Section D (Desired Future Condition) of the LRMP states utilities will be allowed in designated corridors and planning windows.

Dixie National Forest: Powell and Escalante Ranger Districts. The USFS defines a corridor as "a linear strip of land having advantages over other areas for the present or future location of energy and utility ROWs [rights-of-way]" (1986). Lands meeting standards for potential corridor designation were identified in the 1986 LRMP and include a route through Cedar Fork Canyon. In addition to corridors, acceptable window areas have been identified by the DNF. The window areas are "critical segments of terrain through which energy transportation and utility rights-of-way could pass in traversing the Forest." The planning window areas identified in the LRMP include Hillsdale Canyon–Ahlstrom Hollow in the Powell Ranger District and the Johns Valley–Upper Valley Main Canyon in the Escalante and Powell districts.

Bureau of Land Management

Grand Staircase Escalante National Monument. The Monument is divided into four management zones: the Frontcountry, Passage, Outback, and Primitive Zones. The GSENM Management Plan states that the "designation of a management zone system will serve as the primary tool for managing visitation and other uses in a manner that will safeguard the Monuments resources" (BLM 2000). The management zones are delineated by geographic area and are used to guide the decision-making process with regard to permitting visitor uses and other Monument activities. The management zones assist in defining the uses that are permitted and any stipulations that pertain to the uses (BLM 2000).

The Proposed Action and Alternative C fall within the GSENM's Primitive Zone. Management within the Primitive Zone is detailed in **Section 3.11.2.2**.

With specific regard to utility rights-of-way, the GSENM Management Plan states that "Monument managers are committed to working with nearby communities and other land management agencies to pursue management activities which cooperatively accomplish the objectives of each agency within the constraints of Federal Law." According to Objective LAND-1, "The BLM will work with communities and utility providers to identify short and long-term community needs for infrastructure which could affect Monument lands and resources." According to Objective LAND-7, which addresses proposed actions in the Primitive Zone, "utility rights-of-way will not be permitted. In cases of extreme need for local (not regional) needs and where other alternatives are not available, a plan amendment could be considered for these facilities in the Primitive Zone." Once the right-of-way has been granted, the following specific right-of-way stipulations pertaining to transmission lines must be met:

1. Bury new and reconstructed utility lines (including power lines up to 34.5 kilovolts) unless visual quality objectives can be met without burying, geologic conditions make burying infeasible, or burying will produce greater long-term disturbance.
2. All reconstructed and future power lines must meet non-electrocution standards for raptors. If problems with existing power lines occur, corrective measures will be taken.
3. Construct all power lines using non-reflective wire. Steel towers will be constructed using galvanized steel. Power lines will not be high lined unless no other locations exist.

The existing Rocky Mountain Power/PacifiCorp 230 kV transmission line crosses the Primitive Zone of the GSENM and was built in 1964 prior to the establishment of the Primitive Zone. The proposed 138 kV line would follow that alignment, crossing the Primitive Zone under both Alternatives A and C.

Kanab Field Office. According to the BLM KFO RMP (BLM 2008a), Lands and Realty, pertinent goals and objectives for this action include the following:

1. Making public lands available for community growth and expansion needs, recreation, and public purposes as well as other infrastructure needs.
2. Striving to increase and diversify our nation's sources of traditional and alternative energy resources, improve our energy transportation network, and ensure sound environmental management in support of minerals and energy development, as required by the President's National Energy Policy and the Energy Policy Act of 2005.
3. Retaining in public ownership public lands that enhance multiple-use management, allow access to public lands, or contain Sensitive or rare resources.
4. Making public lands available for rights-of-way, permits, and leases. The suitability for these land actions would be judged on a case-by-case basis.
5. Considering energy and utility corridors to focus placement of new major rights-of-way for energy and transportation systems (BLM 2008a).

Figure 3.10-1. Garfield County Land Status

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Management actions pertaining to rights-of-way and right-of-way corridors include the following:

LAR-4—Exclude new rights-of-way (including communications sites) in the following areas:

- Wilderness Study Areas.
- Wilderness Areas.
- Suitable Wild and Scenic River corridors with a tentative classification of "wild" or "scenic."

LAR-5—Avoid new rights-of-ways in the following areas:

- The five non–Wilderness Study Area lands with wilderness characteristics managed to protect, preserve, and maintain those characteristics.
- Within 0.50 mile of active, suitable (currently inactive) Utah prairie dog habitats and within potential reintroduction sites.

LAR-6—Preference would be to locate right-of-way developments in common (within existing rights-of-way/disturbance areas).

LAR-7—Consider burying new and reconstructed utility lines (including power lines up to 24 kV) unless:

- Visual quality objectives can be met without burying.
- Geologic conditions make burying infeasible.
- Burying would produce greater long-term site disturbance.

LAR-8—New and reconstructed power lines must meet non-electrocution standards for raptors. If electrocution or line strike issues develop with existing power lines, corrective actions to meet these non-electrocution standards would be taken.

LAR-9—Construct power lines greater than 230 kV using non-reflective wire. Towers would be constructed using non-reflective material. Power lines would not be high lined unless no other location exists.

LAR-10—Linear crossings, such as pipelines, utilities, or roads, across riparian areas and/or ephemeral channels would be considered on a case-by-case basis to protect the above areas. Surface-disturbing activities would be avoided on unstable areas, such as landslides and slumps (BLM 2008a).

National Park Service

Bryce Canyon National Park (National Park Service Management Policies). A right-of-way for a utility or road may be issued "only pursuant to specific statutory authority, and generally only if there is no practicable alternative to such use of NPS lands" (NPS 2006a). Specifically, utility rights-of-way over lands administered by the NPS are governed by the statutory authorities in 16 USC 5 (electrical power transmission and distribution, radio and TV, and other forms of communication facilities) and 16 USC 79 (electrical power, telephone, and water conduits) (NPS 2006a). The NPS may issue a right-of-way under 16 USC 5 or 79 if it finds that the proposed plan "will not cause unacceptable impacts on park resources, values or purposes" (NPS 2006a).

Federal Aviation Administration

The FAA requires that any person proposing the construction of a transmission line in an area that could potentially impact air safety give adequate notice to the Administration. According to the FAA, "Any construction or alteration of greater height than an imaginary line extending outwards and upwards at a slope of 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the

nearest runway…with at least one runway more than 3,200 feet in actual length, excluding heliports," would require FAA notification and approval (14 CFR 77.13). Upon approval of the FAA, the construction of the line must be in accordance with the current Federal Aviation Administration Advisory Circular 70/7460-1 entitled "Obstruction Marking and Lighting."

State of Utah School and Institutional Trust Lands

The fundamental management objective for SITLA lands is to "optimize and maximize trust land uses for support of beneficiaries over time" (State of Utah 1991). In order to meet this objective the state lands management agency will do the following:

1. Maximize the commercial gain from trust land uses for school and institutional trust lands consistent with long-term support of beneficiaries.
2. Manage school and institutional trust lands for their highest and best trust land use.
3. Ensure that no less than fair-market value is received for the use, sale, or exchange of school and institutional trust lands.
4. Reduce risk of loss by reasonable trust land use diversification of school and institutional trust lands.
5. Upgrade school and institutional trust land assets where prudent by exchange.
6. Permit other land uses or activities not prohibited by law which do not constitute a loss of trust assets or loss of economic opportunity (State of Utah 1991).

With specific regard to rights-of-way on SITLA lands, the agency may issue a right-of-way permit when the use, occupation, or travel upon the land is consistent with agency rules and trust responsibilities (State of Utah 2002). Applications for right-of-entry must be filed and approved by the agency before access is permitted.

Garfield County

General Plan. Garfield County acknowledged the need for utility corridors in its community in a Utility Corridors Resolution signed in 1998. The resolution states that the "accommodation and development of utilities is necessary for the enhancement of life in communities" (Garfield County 1998). Specifically, the County supports utility corridors into and across the GSENM into its "gateway" communities.

Garfield County has eight established zoning districts. The purpose of each zone is to regulate land development in Garfield County. The zones include the following:

- Multiple Use Zone
- Forest Zone
- Agricultural Zone
- Residential Zone
- Residential Estate Zone
- Commercial Zone
- Light Industrial Zone
- Heavy Industrial Zone

As per the Garfield County Zoning Ordinance, public utility easements are permitted for conditional uses within each of the eight zoning districts (Garfield County 2007). Should a Conditional Use Permit be required within a zoning district, applicants must have the proposed use approved by the Garfield County Planning Commission.

3.10.2.3. Land Uses

Rights-of-Way

Some of the lands within and surrounding the Study Area are encumbered by existing rights-of-way or Special Use Authorizations. A right-of-way allows the use of a specific piece of public land managed by the BLM or NPS for specific facilities and for a specific period. A Special Use Authorization allows for the use of specific areas within USFS lands. The majority of the rights-of-way and authorizations are permitted under Title V of FLPMA, as amended, for structures, pipelines, and facilities to store and transport water, sewer, electrical, and communications systems; for flood control facilities; and for highways, roads, and other means of transportation.

Government land records were reviewed to determine the existing authorized uses of public lands within each township and range that contains the Project Area. The existing rights-of-way or authorizations may be outside of the Study Area but are located nearby within the 36-square-mile township. Listed below are authorized utility uses within federally managed lands in and around the Project Area.

There is one right-of-way permit through BRCA authorized by the NPS. In May 2005 Garkane Power was granted renewal of a right-of-way permit to operate and maintain a 69 kV overhead electrical transmission line across NPS land (NPS 2005).

Existing authorized utility designations in the DNF Escalante Ranger District include a Rocky Mountain Power/PacifiCorp 230kV transmission line, a communication tower outside of Cedar Fork Canyon, and transmission lines along SR 12 from the junction of SR 63 to Escalante. The transmission lines along the state road are within the Johns Valley–Upper Valley Main Canyon designated "window areas." According to the 1986 DNF Management Plan, a window area has been identified as a "critical segment of terrain through which energy transportation and utility rights-of-way would pass in traversing the Forest." **Table 3.10-1** depicts the existing Special Use Authorizations for power and communications rights-of-way within the DNF Powell Ranger District. **Table 3.10-2** depicts the authorized existing utility rights-of-way managed by the BLM surrounding the Project Area. Please note that the following tables include only rights-of-way relevant to the proposed project. The existing utility uses include communication sites, power transmission, telephone, and fiber optic lines. Other authorized uses and/or agency permits in the Project Area are numerous and include, but are not limited to, Utah Department of Transportation and Federal Highway Administration rights-of-way, water conveyance structures, SITLA, and Garfield County.

Table 3.10-1. Existing Authorized Power and Communications Rights-of-Way within the Powell and Escalante Ranger Districts

DESCRIPTION	LEGAL DESCRIPTION (TOWNSHIP, RANGE, SECTION)
Henderson Rim communication site	T35S, R3W, S35 (Escalante RD)
Wilson Peak communication site	T36S, R4.5W, S11
Garkane Power–Red Canyon visitor center and campground power transmission line	T35S, R4.5W, S22, 26, 27
Garkane Power–Red Canyon power	T35S, R4W, S31, 32

DESCRIPTION	LEGAL DESCRIPTION (TOWNSHIP, RANGE, SECTION)
transmission line	T35S, R4.5W, S26, 27, 35, 36 T36S, R4W, S5
Garkane Power–Wilson Peak power transmission line	T36S, R4.5W, S11
Garkane Power–Bryce Canyon Substation to Wilson Peak power transmission line	T36S, R4W, S14–18, T36S, R4W, S24, 25
Garkane Power–Ruby's Inn to Bryce Canyon power transmission line	T36S, R3W, S19 T36S, R4W, S24, 25
Rocky Mountain Power transmission line, Sigurd to Arizona	T35S, R3W, S35; T36S, R2W, S7; T36S, R3W, S1, 2, 12 (Escalante RD)
South Central–fiber optic cable	T35S, R4W, S31–33 (buried) T36S, R3W, S19 (above ground) T36W, R4W, S24–25 (above ground)

Source: Personal communication between Joseph Rechsteiner, DNF Powell Ranger District, and Laura Vernon, SWCA, November 21, 2008.

Table 3.10-2. Existing Authorized Power and Communications Rights-of-Way on BLM Land in the Study Area

DESCRIPTION	LEGAL DESCRIPTION (TOWNSHIP, RANGE, SECTION)
Power transmission line right-of-way, 3.345 acres, Garkane Power Assn	T35S, R3W, S34
Telephone line right-of-way, 6.666 acres, South Central UT Tele Assn	T35, R4W, S21, 28
Power transmission line right-of-way, 0.845 acre, Garkane Power Assn	T35, R4W, S28
Telephone line right-of-way, 1.079 acres, South Central UT Tele Assn	T35S, R4W, S21, 28
Power transmission line right-of-way, 120.101 acres, Garkane Power Assn	T35, R4W, S28, 30 T35, R5W, S25–28, 33 T36S, R3W, S22, 23, 25, 26 T36S, R4W, S4, 10–12 T37S, R2W, S3, 4, 12
Power transmission line right-of-way, 0.871 acre, Qwest Corp	T35S, R5W, S5, 8, 17, 20–24
Power transmission line right-of-way, 10.133 acres, Garkane Power Assn	T35, R5W, S11
Telephone line right-of-way, 6.666 acres, South Central UT Tele Assn	T35, R5W, S3, 11, 26, 35
Power transmission line right-of-way, 1.018 acres, Garkane Power Assn	T35S, R5W, S11
Telephone line right-of-way, 22.691 acres,	T35, R5W, S8, 17, 18

DESCRIPTION	LEGAL DESCRIPTION (TOWNSHIP, RANGE, SECTION)
South Central UT Tele Assn	
Telephone line right-of-way, 0.367 acre, South Central UT Tele Assn	T36, R3W, S7
Power transmission line right-of-way, 29.93 acres, Garkane Power Assn	T36S, R3W, S22, 23, 26 T36S, R5W, S28, 29 T37S, R2W, S12, 13
Power transmission line right-of-way, 40.0 acres, Rocky Mountain Power/PacifiCorp 230 kV transmission line (approximately 130 feet wide on average)	T36S, R2W, S16, 18, 20, 28, 29, 34 (GSENM)
Power transmission line right-of-way, 0.819 acre, Garkane Power Assn	T36S, R3W, S7
Telephone line right-of-way, 6.666 acres, South Central UT Tele Assn	T36S, R3W, S7
Power transmission line right-of-way, 0.1 acre, Garkane Power Assn	T36S, R3W, S22
Telephone line right-of-way, 1.079 acres, South Central UT Tele Assn	T36S, R3W, S7
Telephone line right-of-way, 0.252 acre, South Central UT Tele Assn	T36S, R3S, S22
Power transmission line right-of-way, 0.6 acre, Garkane Power Assn	T36S, R5W, S15, 21
Power transmission line right-of-way, 6.788 acres, Garkane Power Assn	T36S, R5W, S4, 9, 21
Power transmission line right-of-way, 3.02 acres, Garkane Power Assn	T36S, R5W, S20, 21, 29, 30
Power transmission line right-of-way, 0.5 acre, Garkane Power Assn	T36S, R5W, S21
Power transmission line right-of-way, 1.993 acres, Garkane Power Assn	T36S, R5W, S34
Telephone line right-of-way, 1.891 acres, South Central UT Tele	T36S, R5W, S34
Power transmission line right-of-way, 2.27 acres, Garkane Energy Cooperative Inc	T36S, R5W, S13, 14
Power transmission line right-of-way, 44.729 acres, Garkane Power Assn	T37, R2W, S3, 4, 12
Telephone line right-of-way, 10.242 acres, South Central UT Tele	T37S, R2W, S11, 12, 14, 15, 22 T37S, R3W, S1, 12, 13
Power transmission line right-of-way, 4.591 acres, Garkane Power Assn	T37S, R3W, S3, 4, 9

Source: BLM LR2000 2008 (BLM 2008e).

Agriculture

Garfield County has approximately 79,879 acres in farmland and a total of 225 farms. The amount of farms and farmland has decreased since 1997. According to the 2002 Census of Agriculture, the acreage of farmland in Garfield County has decreased 35 percent from 122,536 acres in 1997 to 79,879 in 2002. The number of farms has decreased 28 percent from 312 in 1997 to 225 in 2002. The average size of a farm in Garfield County is 355 acres (National Agricultural Statistics Service 2002). See the following section for detailed agricultural land uses on private lands within the Study Area.

Private Property

During the scoping process, impacts to existing land uses on private property were identified as a concern for local landowners. Specifically, private property owners expressed concern over the potential adverse impacts to farming and ranching efforts, including moving irrigation systems and potential loss of water rights. See **Figure 3.10-2** for land uses on private property. Given the concern over potential impacts to private land, the following **Table 3.10-3** provides a breakdown of land use acreages on private property within the Study Area.

Table 3.10-3. Private Property Acreage within 0.5 Mile from Centerline of Transmission Line (Acres)

	ALTERNATIVE A PROPOSED ACTION	ALTERNATIVE B PARALLEL 69 KV LINE ROUTE	ALTERNATIVE C CEDAR FORK SOUTHERN ROUTE
Pasture	124.07	124.07	164.46
Pasture—sub-irrigated	82.70	53.18	135.88
Range pasture	199.60	865.90	559.49
Grass hay	0.00	95.32	0.00
Alfalfa	6.10	529.74	5.47
Commercial/industrial	179.22	152.16	22.06
Residential	9.85	152.56	9.65
Total	***601.54***	***1,942.93***	***896.99***

Figure 3.10-2. Private Property Land Use

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3.11. DISTINCTIVE LAND AREAS

Distinctive land areas are managed in a manner that protects their wilderness, primitive, historic, botanical, and geologic resource values. This section describes resources comprising distinctive land areas within the Study Area. The Study Area for distinctive land areas includes NPS-recommended wilderness; BLM wilderness study areas and non–wilderness study area lands with wilderness characteristics; USFS IRAs and unroaded/undeveloped areas; and the Primitive Zone of the BLM's GSENM, which is adjacent to (within 1 mile) the proposed transmission line and alternative alignments.

Because the Bryce Canyon Lodge National Historic Landmark is a few miles south of any proposed transmission line alignment and is not expected to be affected by construction or operation of a transmission line, it would be unaffected by the Proposed Action or Action Alternatives and will not be part of the analysis area for this impact analysis.

The Red Canyon Research Natural Area and Red Canyon Botanical Area are located near the Project Area. Since none of the alternative alignments under the Proposed Action or Action Alternatives would pass through the Research Natural Area or Botanical Area and there would be no anticipated surface disturbance to the botanical or geologic values of either area, they are not included in the Study Area for this resource.

3.11.1. Data and Methods

Most of the information used in the description of distinctive land areas came from the agencies that manage and administer the lands the proposed transmission line would cross—USFS, BLM, GSENM and NPS. Smaller portions of the proposed and alternative alignments cross state and private lands, but these land owners do not manage their lands for special management purposes, including wilderness characteristics, primitive management objectives, national historic landmarks, or research natural areas or botanical areas.

Information on the USFS IRAs came from the USFS "Roadless Rule" (USFS 2001), the USFS manual on land and resource planning (USFS 2006b), and DNF staff. Information on unroaded and undeveloped areas came from inventories conducted by the DNF (November 2005). Information about the BLM wilderness study area came from the agency's final wilderness EIS (BLM 1990). Information on other public lands with wilderness characteristics came from BLM's 1999 Utah Wilderness Inventory (BLM 1999) and the KFO Final RMP and EIS (BLM 2008a). Information on the primitive values and management objectives of the GSENM came from the Monument Management Plan (BLM 2000). Information on recommended wilderness in BRCA came from the General Management Plan (NPS 1987), as did information on the historic values of Bryce Canyon Lodge. Information on the Red Canyon Research Natural Area came from the establishment record for Red Canyon Research Natural Area (USFS 1987), and information on the Red Canyon Botanical Area came from the Conservation Assessment, Strategy and Agreement for Sensitive Plant Species in the Red Canyon Area (USFS 2000b).

Policy on management of IRAs can be found in the Secretary of Agriculture Memorandum 1042-154 (May 28, 2009). Policy for management of BLM wilderness study areas is guided generally by the Federal Land Policy and Management Act of 1976 (BLM 1976; P.L. 94-579) and specifically by the Interim Management Policy (BLM 1995). Management of the Primitive Zone in BLM's GSENM is guided by the Monument Management Plan (BLM 2000), and policy for management of recommended wilderness in BRCA is established in the general management plan for the Park (NPS 1987).

3.11.2. Existing Conditions

3.11.2.1. Dixie National Forest

Inventoried Roadless Areas

Inventoried roadless areas contain important environmental values that warrant protection. Their characteristics include the following:

- Soil, water, and air resources.
- Sources of public drinking water.
- Diversity of plant and animal communities.
- Habitat for Threatened, Endangered, and Sensitive species and species dependent on large undisturbed areas of land.
- Primitive and semi-primitive classes of recreation.
- Reference landscapes for research, study, or interpretation.
- Landscape character and integrity.
- Traditional cultural properties and sacred sites.
- Other locally identified unique characteristics.

As a general rule, IRAs will be managed to preserve their roadless character until the USFS completes a forest-level roads analysis and incorporates that information into its forest planning process. The USFS established a directive that prohibits road construction, road re-construction, or timber harvest in IRAs without review and approval from the Washington Office. The intent of the directive is to provide lasting protection for IRAs on National Forest lands in the context of multiple-use management (see **Section 1.6.1.6**).

There are four IRAs in and adjacent to the Project Area: Table Cliffs–Henderson Canyon (19,566 acres); Shakespear Point (751 acres); Red Canyon South (3,731 acres); and Red Canyon North (9,435 acres) (**Figure 3.11-1**).

Table Cliffs–Henderson Canyon. The 19,566-acre roadless area (see **Figure 3.11-1**) is about 5 miles northeast of the town of Tropic and 20 miles west of the town of Escalante, Utah. Access to the IRA is poor, via a low-standard, dry-weather dirt road suitable for high-clearance travel only. The Burro Canyon, Henderson Canyon, and Under the Point Trails are present in the area (USFS 2004b).

The area is north and east of BRCA. The Table Cliff Plateau is about 10,000 feet in elevation and nearly flat on top. Because of its elevation and topography, it supports mixed stands of spruce, subalpine fir, aspen, and bristlecone pine. Some of the bristlecone is estimated to be 3,000 years old. The southern tip of the area, Powell Point, provides excellent views of the southern Utah desert and prominent land features. Most noticeable are BRCA, Navajo Mountain, and the Henry Mountains. Vertical cliffs drop about 2,000 feet on either side of the plateau. The cliff faces are colored with shades of pink, red, white, and purple.

Ponderosa pine is the dominant vegetation in the upper end of Henderson Canyon. The canyon also contains some spruce and Douglas-fir. At lower elevations, the dominant trees are pinyon pine and juniper.

The area west of the Table Cliffs Plateau forms part of the headwaters of the Paria River that drains into the Colorado River at Lee's Ferry. The area has been carved by erosion leaving flat mesas and long, flat ridges divided by steep, rough canyons with nearly vertical rock walls.

Figure 3.11-1. Distinctive Land Areas in Project Vicinity

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These canyons are covered with sage brush, pinyon, and juniper. In the early 1900s, a small sawmill was set up in Henderson Canyon and a part of the ponderosa stands were logged. A communication site and the Rocky Mountain Power/PacifiCorp 230 kV transmission line and 100-foot right-of-way along with 2.25 miles of access routes are located in the western portion of the area.

The IRA is contiguous to The Blues Wilderness Study Area in BLM's GSENM.

The proposed transmission line would be located adjacent to the existing 230 kV Rocky Mountain Power/PacifiCorp line in Cedar Fork Canyon under both Alternatives A and C. The existing transmission line crosses the western portion of the Table Cliffs–Henderson Canyon IRA. A portion of the proposed right-of-way and transmission line would be located in the IRA under both alternatives.

Shakespear Point. The 751-acre roadless area (see **Figure 3.11-1**) is about 5 miles northeast of the town of Tropic and 30 miles west of the town of Escalante, Utah. Access roads to the IRA are poor, low-standard, dry-weather dirt roads suitable for high-clearance travel only. The IRA, by itself, has little wilderness potential as it is only 751 acres in size. The area, however, is contiguous to a recommended wilderness area in BRCA (USFS 2004b) and BLM's Box Canyon non–wilderness study area lands with wilderness characteristics (see **Section 3.11.2.2**).

The topography is steep and rocky. Elevations average about 9,000 feet. Surface water is sparse, and the area is vegetated primarily with pinyon pine and juniper trees. Areas of sagebrush and mountain shrubs also occur. Sparse understory ground cover in the pinyon-juniper stands facilitates considerable soil erosion during rainfall events.

The principal use of the area is dispersed recreation, mostly big game hunting. The annual recreation use is light.

The proposed transmission line would be located adjacent to the existing 230 kV Rocky Mountain Power/PacifiCorp transmission line in Cedar Fork Canyon under both Alternatives A and C. A portion of the proposed right-of-way (2.9 acres) would be located in the IRA under Alternative A. Under Alternative C, 4.3 acres of the right-of-way would be located in the IRA.

Red Canyon North. The 9,435-acre IRA (see **Figure 3.11-1**) is about 10 miles southeast of Panguitch, Utah. Access to the IRA varies from good to poor. Low-standard, dry-weather roads suitable for high-clearance vehicles provide access to the northern and eastern portions of the roadless area. SR 12 provides all-weather, year-round access to the southern part of the area (USFS 2004b).

The landform is characterized by the pink and white limestone cliffs of the Claron Formation. Surface water is extremely sparse. Vegetation is scattered and sparse. The dominant tree species are ponderosa pine and pinyon pine with lesser amounts of Douglas-fir, spruce, and bristlecone pine. Sparse understory cover facilitates considerable erosion during storms.

The principal uses are livestock trailing, hiking, horseback riding, and mountain bike riding. There is a large network of non-motorized trails in the area that draw heavy use. Outfitters and guides use the area for mountain bike and horseback riding. Stands of commercial timber are limited, and timber harvesting has not occurred recently. Some logging has occurred in the area, however, and evidence of roads and stumps is obvious.

Scenic values are high due to the colorful rock formations and highly dissected landform. Sightseeing, or viewing scenery, is a main attraction to the area. The area contains habitat for rare and endemic plants. A Research Natural Area exists within the area.

The existing 69 kV transmission line and the proposed transmission line under Alternative B would pass about 1 mile south of the southern boundary of the IRA.

Red Canyon South. The 3,731-acre IRA (see **Figure 3.11-1**) is about 10 miles southeast of Panguitch, Utah. Access to the IRA varies from good to poor. Low-standard, dry-weather roads, suitable for high-clearance vehicles, provide access to the southern and eastern portions of the roadless area (USFS 2004b).

The landform is characterized by the pink and white limestone cliffs of the Claron Formation capped with sandstones and conglomerates of the Wasatch Formation. Surface water is extremely sparse. Vegetation is scattered and sparse. The dominant tree species are ponderosa pine, pinyon pine, and lesser amounts of Douglas-fir, spruce, bristlecone pine, and limber pine. Sparse understory cover facilitates considerable erosion during storms.

The principal use of the area is dispersed recreation, mostly viewing scenery. Scenic values are high due to colorful rock formations and highly dissected topography. The Thunder Mountain Trail is located in this area and is popular with hikers, mountain bikers, and horseback riders. Outfitters and guides provide horseback-riding trips using the Thunder Mountain Trail. Annual recreation use is low.

Small amounts of logging have occurred. The stands of commercial timber are limited and scattered, which has precluded harvesting over most of the area.

The area is quite scenic due to the colorful rock formations and highly dissected landforms. Viewing scenery is the principal attraction to the area. The area also contains several threatened and endangered plants. The Red Canyon Botanical Area, designated for rare and endemic plants, is located about 0.5 mile east of the IRA (see Red Canyon Botanical Area in **Section 3.12.3.1**).

The existing 69 kV transmission line forms the northern boundary of the IRA. The proposed 138 kV transmission line would be located adjacent to the existing 69 kV line under Alternative B. If topography does not allow the proposed 138 kV line to be built within the 69 kV line right-of-way, portions of the new line may need to be located in the IRA. Since the 69 kV line would remain in service until the new 138 kV line is completed, there would be a temporary doubling of effects on the ground, pending decommissioning and rehabilitation of the 69 kV line.

Unroaded and Undeveloped Areas

As part of the DNF Plan revision process, the DNF conducted an inventory to identify lands with wilderness characteristics and to consider possible additions to the National Wilderness Preservation System. There are four unroaded and undeveloped areas in and adjacent to the Project Area: Table Cliffs–Henderson Canyon (19,614 acres), Shakespear Point (1,280 acres), Red Canyon North (15,131 acres), and Red Canyon South (5,597 acres). These areas were inventoried for their wilderness characteristics as part of the DNF LRMP revision process and are generally the same lands as the IRAs described above (see **Figure 3.11-1**). They are approximately the same size and configuration, have the same resource values, and are used for the same purposes as described above. However, there are three differences worthy of identification.

First, the southern boundary of the Red Canyon North unroaded area extends south to SR 12. The IRA boundary does not. Second, the size and configuration of the Red Canyon South unroaded area is notably different from the IRA. It extends about 1 mile east and includes the Red Canyon Botanical Area, and it extends about 1.5 miles further south than the IRA. The proposed transmission line under Alternative A would cross about 1.5 miles of the southeastern and southwestern parts of the unroaded area. Alternative A bisects the unroaded area in the Hillsdale Canyon–Ahlstrom Hollow acceptable window for power corridors. Third, the Rocky Mountain Power/PacifiCorp 230 kV transmission line forms the boundary between the Table Cliffs–Henderson Canyon and Shakespear Point unroaded areas, whereas the transmission line lies within the western portion of the Table Cliffs–Henderson

Canyon IRA. Both of these areas are within the Johns Valley–Upper Valley acceptable window for power corridors.

Since the LRMP revision is currently on hold, no direction was prescribed for these four unroaded areas. The inventory just identifies lands that have wilderness characteristics. Management of these lands is currently guided by the existing LRMP for the DNF (USFS 1986) and is not based on unroaded characteristics.

3.11.2.2. Bureau of Land Management

Wilderness Study Areas

Wilderness Study Areas (WSAs) are public lands managed by the BLM that contain wilderness characteristics as defined in the Wilderness Act of 1964 (P.L. 88-577). Under FLPMA (P.L. 94-579), the BLM is mandated to protect WSAs until Congress either designates them wilderness or releases them for other uses. To implement the protective mandate of FLPMA, BLM established the Interim Management Policy and Guideline for Lands under Wilderness Review (BLM 1995). In the Interim Management Policy, BLM identifies specific policy on management of other resource values and uses in WSAs to meet the protective requirement of FLPMA.

The basic tenet of the Interim Management Policy requires that BLM allow no permanent structures or surface disturbance that would impair the wilderness characteristics of the WSA and preclude Congress' prerogative to designate the area as wilderness, subject to allowable grandfathered uses and valid existing rights. According to the Interim Management Policy, only temporary rights-of-way that would not impair the wilderness characteristics of a WSA would be permitted. The nature and intent of this project is not likely to meet that standard.

There is one WSA in the Study Area: The Blues WSA (18,776 acres, see **Figure 3.11-1**), which is located in BLM's GSENM about 5 miles northeast of the town of Tropic. The Rocky Mountain Power/PacifiCorp transmission line access road borders its southern side and parts of its eastern side. The Tropic Valley lies to the west.

The Blues WSA is characterized by pinyon pine and juniper woodlands, cliffs, escarpments, rolling hills, and blue-gray badlands. Elevations range from 8,200 feet near the DNF to 6,400 feet on the west near the Tropic Valley.

The Blues WSA is about 6 miles long north to south and 11 miles wide east to west, and is highly natural, with few imprints of human development. The area offers outstanding opportunities for solitude due to its size, configuration, and vegetative and topographic diversity. Opportunities for primitive forms of recreation are also outstanding and include hunting, hiking, backpacking, rock climbing, sightseeing, and exploring. Supplemental wilderness values include Threatened, Endangered, and Sensitive plant and animal species.

The WSA is bordered on the north by the DNF Table Cliffs–Henderson Canyon IRA. The existing Rocky Mountain Power/PacifiCorp 230 kV transmission line right-of-way forms the western boundary of The Blues WSA. The proposed 138 kV transmission line would be located adjacent to this transmission line, but outside the WSA, under Alternatives A and C. No alternative transmission line rights-of-way or alignments are proposed in the WSA.

Non–Wilderness Study Area Lands with Wilderness Characteristics and Natural Areas

Other public lands in Utah, outside existing WSAs, were inventoried between 1996 and 1999 and found to have wilderness characteristics as defined in the Wilderness Act of 1964 (P.L. 88-577) but have not been designated wilderness by Congress. These lands are not WSAs nor managed under the

protective provisions of the Interim Management Policy (BLM 1995). They are managed according to the BLM land use plan in effect for the area.

Box Canyon Non-Wilderness Study Area Lands with Wilderness Characteristics. Box Canyon is located northeast of the town of Tropic and west of The Blues WSA across the existing 230 kV Rocky Mountain Power/PacifiCorp line. It is managed according to the GSENM management plan. The GSENM management plan (BLM 2000) allocates a large portion of the Monument (65 percent) to management as a Primitive Zone, including the Box Canyon area with wilderness characteristics. See the section titled "Primitive Zone" below for detailed information on Primitive Zone land management.

The Box Canyon non–wilderness study area lands with wilderness characteristics (see **Figure 3.11-1**)—2,928 acres—is located contiguous to the northeastern corner of BRCA, about 3 miles north of the town of Tropic. The area consists of a steep portion of Bull Dog Bench. Box Canyon, Dry Canyon, and other unnamed canyons drain south to the Paria River. The northern canyons and benches are lightly forested with pinyon pine and juniper. The lower, south-facing valleys and hills are covered with sagebrush and shrubs.

Most of the area retains its natural characteristics, with upper elevations nearly pristine. Some surface disturbance and human-made development occur adjacent to private lands, but these disturbances are naturally rehabilitating.

The area is not large enough to have wilderness characteristics of its own, but the area is contiguous to lands in BRCA that have been recommended for wilderness designation. Together, these lands offer outstanding opportunities for solitude and primitive forms of recreation including hiking, horseback riding, and sightseeing.

The existing Rocky Mountain Power/PacifiCorp 230 kV transmission line right-of-way forms the eastern boundary of the Box Canyon non–wilderness study area lands with wilderness characteristics. The proposed 138 kV transmission line would be located adjacent to this line and would cross portions of this area under Alternatives A and C.

East of Bryce Natural Area. According to the KFO RMP, BLM natural areas will be managed to protect, preserve, and maintain values of primitive recreation, the appearance of naturalness and solitude (BLM 2008). The East of Bryce natural area (867 acres) is located about 1 mile northwest of the town of Tropic, contiguous to BRCA. It is managed according to the KFO RMP (BLM 2008a), which allocates these lands to protection of their wilderness characteristics. The area includes a large mesa overlooking Tropic Valley to the east and Bryce Canyon to the west. Several drainages flow from the mesa to the south and east. Vegetation is predominantly pinyon pine and juniper on the mesa top and finger ridges, with sagebrush and shrubs on the hillsides to the south and east.

The area retains its natural characteristics, with undeveloped landscapes and little evidence of human development. The area, however, is not large enough to possess wilderness characteristics on its own but is contiguous to lands in BRCA that have been recommended for wilderness designation. Together, the lands provide outstanding opportunities for solitude and primitive forms of recreation, including hiking, backpacking, and photography. Exceptional views from the mesa top supplement the wilderness characteristics of the area.

Under the KFO RMP (BLM 2008a), 867 acres of East of Bryce natural area lands with wilderness characteristics are managed with emphasis on protection of those wilderness characteristics.

The northern boundary of the East of Bryce natural area was set a few hundred feet southwest of the existing 69 kV transmission line, enough to accommodate placement of another transmission line

right-of-way without infringing upon the lands managed for protection of their wilderness characteristics (personal communication, H. Wolfe, March 20, 2009).

Primitive Zone

Public lands administered by the BLM north of the town of Tropic, south of the DNF, and east of BRCA are included in the GSENM. This portion of the GSENM is managed as a Primitive Zone (see **Figure 3.11-1**) and includes The Blues WSA and Box Canyon non–wilderness study area lands with wilderness characteristics. This is the largest zone within the Monument, comprising 65 percent of the GSENM and totaling 1,210,579 acres. Management prescriptions within the primitive zone facilitate "undeveloped, primitive, self-directed visitor experience without motorized or mechanized access" (BLM 2000). This zone intends to connect primitive lands within the Monument to other undeveloped lands managed by other federal agencies.

Some administrative routes are included in this zone, which could allow very limited motorized access. Facilities will be non-existent, except for limited signs for resource protection or public safety. The zone is intended to facilitate landscape-scale research.

The existing Rocky Mountain Power/PacifiCorp 230 kV transmission line, which crosses the Primitive Zone of the GSENM, was built in 1964 prior to its establishment. The proposed 138 kV line would abut and parallel that alignment to the west, crossing the Primitive Zone under both Alternatives A and C.

3.11.2.3. Bryce Canyon National Park

Recommended Wilderness Areas

NPS lands that have been recommended to Congress by the President for wilderness designation are referred to as Recommended Wilderness. These lands are managed in the same manner as designated wilderness so that if they become wilderness, their wilderness character is preserved (Wilderness.net 2008).

The general management plan for BRCA, prepared in 1987, zoned 62 percent (22,325 acres) of the national park as the wilderness subzone. Two parcels within BRCA are recommended for wilderness: one unnamed area north of SR 12 at the northern end of the Park (2,592 acres) and a second, much larger, unnamed parcel in the eastern portion of the park, south of SR 12 and east of the main park road (19,038 acres). See **Figure 3.11-1**. These lands are located primarily below the rim of the canyon.

3.12. RECREATION

Many of the resources and terms discussed in this section are shared with **Section 3.11**, Distinctive Land Areas; therefore, the two sections are frequently cross-referenced.

3.12.1. Data and Methods

General information used for the analysis of recreation resources came from several sources outlined below.

The 1986 LRMP for the DNF (USFS 1986) and subsequent data collected routinely by the Forest or in preparation for future planning efforts were used to identify and assess the recreational attributes of the DNF. Acreage analysis for the DNF was obtained through the analysis of GIS data provided by DNF. These data used the Recreation Opportunity Spectrum (ROS) classification system as the basis for analysis for lands administered by DNF.

The NPS Management Policies 2006 (NPS 2006a) and the 1987 BRCA General Management Plan/Development Concept Plan (NPS 1987) were used in analysis of recreation resources within the Park. Acreage analysis for the Park was obtained from the 1987 BRCA General Management Plan/Development Concept Plan (NPS 1987).

The BLM KFO's 2008 RMP and Final EIS were used to assess BLM lands under the direction of the BLM KFO (BLM 2008a). Acreage analysis for BLM Kanab lands were generated using GIS data provided by the BLM KFO.

The 2000 GSENM Management Plan (BLM 2000) was used during the evaluation of the Monument's recreation resources. The shared, eastern portion of the Alternative A/C alignment is situated within Primitive Zone lands administered by GSENM. Acreage analysis for these alternatives was generated using GIS data provided by GSENM.

3.12.2. Existing Conditions

3.12.2.1. Dixie National Forest

DNF comprises four Ranger Districts: Pine Valley, Cedar City, Powell, and Escalante. All of the alternatives within the Project Area are located in either the Powell or Escalante Ranger Districts.

General Recreation Resources

Recreation Opportunity Spectrum (ROS) classes describe the desired recreation experiences a person could expect in an area. The ROS is a framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences are arranged along a continuum or spectrum divided into seven classes: Primitive (P), Semi-Primitive Non-Motorized (SPNM), Semi-Primitive Motorized (SPM), Roaded Natural (RN), Roaded Modified (RM), Rural (R), and Urban (U). The DNF does not contain any Roaded Modified, Rural, or Urban settings.

The transmission line alternatives that have been developed for this project are located within Semi-Primitive Non-Motorized (SPNM), Semi-Primitive Motorized (SPM), and Roaded Natural (RN) classes. Each of these classes is described in detail below.

Semi-Primitive Recreation Sites. The 1986 LRMP does not distinguish between SPM and SPNM ROS classes for the purposes of management, although the two classes were separated in the Forest inventory. Separating SPM and SPNM is more widely accepted by the USFS today, and the DNF continues to make that distinction in its current inventory. Throughout this report we use the most current inventory of ROS classes. The following is excerpted from the 1986 Plan (USFS 1986):

> Characteristics
>
> The Recreation Opportunity Spectrum Semi Primitive management setting provides a special kind of outdoor experience, one dependent upon a perception of remoteness. In some cases, it also provides Forest managers with opportunities for active management, including habitat improvement, timber harvest, and travel coordinated management prescriptions can be developed. The term semi primitive refers to a management objective and not to a land classification.
>
> Desired Future Condition
>
> This area will provide the user with a moderate to high probability to experience isolation from the sights and sounds of human [sic], independence, closeness to nature, tranquility and self-reliance through the application of woodsman and outdoor skills in an environment that

offers challenge and risk. This opportunity exists for users to have a high degree of interaction with the natural environment.

Management Area Direction

Visual resources are managed so that management activities are not evident or remain visually subordinate. Past management activities such as historical changes caused by early mining, logging, and ranching may be present which are not visually subordinate, but appear to have evolved to their present state through natural processes. Landscape rehabilitation is used to restore landscapes to a desirable visual quality. Enhancement aimed at increasing positive elements of the landscape to improve visual variety is also used.

Mineral and energy resources activities are generally compatible with goals of this management area subject to appropriate stipulations.

Local roads may be constructed for non-recreation purposes to a minimal standard compatible with a primitive environment and located so they will not detract from the objective. Once the activity is completed, the traffic will be controlled to whatever degree necessary to maintain the desired forest setting. This will continue until the road is again needed for more intensive management purposes.

For the purpose of inventorying the DNF, the distinction between SPM and SPNM can be characterized as follows (USFS 1986). Although these ROS classes are managed as one class under the 1986 plan, their differences are noteworthy.

Semi-Primitive Non-Motorized. Semi-Primitive Non-Motorized areas are characterized by a natural or natural-appearing environment. Although concentration of use is low, some evidence of human activity can be observed. A high probability of experiencing isolation from other user groups exists, and opportunities for challenge and risk are available. The setting may have subtle modifications, but they remain unobtrusive to users moving through the area. Areas that are classified as Semi-Primitive Non-Motorized are dispersed throughout the DNF and generally occur where no roads exist. Within the Semi-Primitive Non-Motorized area of Cedar Fork Canyon, there are 3.97 miles of existing access routes associated with the Rocky Mountain Power/PacifiCorp 230 kV transmission line.

Semi-Primitive Motorized. Semi-Primitive Motorized areas are characterized by a predominantly natural or natural-appearing environment. Although concentration of use is low, evidence of human activity can be observed throughout the area. A moderate probability of experiencing isolation from other user groups exists, and opportunities for challenge and risk are available. The setting may have subtle modifications, but they remain visually unobtrusive to users traveling the trails and primitive roads in the area. Motorized travel is allowed. Semi-Primitive Motorized areas usually occur at a distance greater than 0.5 mile from highly modified, constructed roads.

Roaded Natural Recreation Sites. Roaded Natural areas are characterized by a predominantly natural-appearing environment with moderate evidence of human activity. An equal probability of experiencing isolation from or affiliation with other user groups exists. There are opportunities for a high degree of interaction with the natural environment, but opportunities for challenge and risk are minimal. Resource modification and utilization are evident but harmonize with the natural environment. From sensitive travel routes and use areas, these alterations should remain visually subordinate. Roads within these areas consist of paved and gravel through highways, local roads, and primitive forest roads that form a large network throughout the DNF. Most of the secondary paved highways take travelers through the Forest to other destinations while many of the gravel roads and primitive forest roads lead to developed recreation sites or dispersed recreation areas and private residences. The following is excerpted from the 1986 Plan (USFS 1986 as amended):

Characteristics

This management area consists of travel corridors along major traveled routes across the Forest or to specific recreational attractions on the Forest.

Desired Future Condition

This area is characterized by a modified natural environment. Resource modification and utilization practices usually harmonize with the natural environment. In some of the more modified zones within this area utilization practices enhance recreation activities, maintain vegetative cover, and soil. The opportunity to have a high degree of interaction with the natural environment and to face challenges associated with more primitive forms of recreation will not be important. Both motorized and non-motorized forms of recreation are possible in this area. The natural features of the landscape will dominate.

Management Area Direction

Conventional use of highway-type vehicles is provided for in design and construction of facilities. Motorized travel may be prohibited or restricted to designated routes, to protect visual and biological resources.

Visual resources are managed so that management activities maintain or improve the quality of recreation opportunities. Management activities are not evident, remain visually subordinate, or may be dominant, but harmonize and blend with the natural setting. Landscape rehabilitation is used to restore landscapes to a desirable visual quality. Enhancement aimed at increasing positive elements of the landscape to improve visual variety is also used.

Of the lands inventoried most recently under the ROS on the DNF, 701,257 acres (43 percent) are classified as Semi-Primitive Non-Motorized; approximately 560,334 acres (34 percent) are classified as Semi-Primitive Motorized; and approximately 266,573 acres (16 percent) are classified as Roaded Natural. **Table 3.12-1** exhibits the number of acres that each alternative's right-of-way would occupy within each ROS class. **Figure 3.12-1** shows the locations of these areas in relation to the Action Alternatives.

Figure 3.12-1. ROS Inventoried Areas, Developed Recreation Sites and Trails

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Table 3.12-1. Acres of ROS Class within the Project Area

ROS CLASS	SEMI-PRIMITIVE NON-MOTORIZED	SEMI-PRIMITIVE MOTORIZED	ROADED NATURAL	TOTAL
Segment A-1	38.42	12.54	102.18	**153.14**
Segment A-2	0.00	25.28	1.36	**26.64**
Segment A-3	14.26	46.73	0.00	**60.99**
Alternative A – 69 kV Line Removal	2.27	0.21	4.83	**7.31**
Alternative A—Total	***54.95***	***84.76***	***108.37***	**248.08**
Alternative B—Total*	***34.38***	***3.62***	***37.88***	**75.88**
Segment C-1	3957	24.41	26.96	**90.94**
Segment C-2	0.00	38.74	0.00	**38.74**
Segment C-3	10.66	67.81	0.00	**78.47**
Alternative C 69 kV Line Removal	2.27	0.00	7.26	**9.53**
Alternative C—Total	***52.50***	***130.96***	***34.22***	**217.68**
North-South Interconnect Option	**0.00**	**23.75**	**3.48**	**27.23**
East-West Interconnect Option	**0.00**	**48.67**	**0.00**	**48.67**

*Alternative B Project Area totals include removal of the existing 69 kV transmission line.

Red Canyon Geographic Area

The Red Canyon Geographic Area lies on the western side of the Powell Ranger District and is a popular tourist destination offering outstanding scenery and numerous trails that are popular with hikers, mountain bikers, and equestrian enthusiasts. The dominant features of this area are sandstone, red rocks, hoodoos, and cliffs. The area is also known for its habitat for endemic plants and bristlecone pine. It is largely defined by the geologic formations of Red Canyon and Casto Canyon. SR 12, the first All-American Highway in Utah, passes through the middle of the area. The area contains the very popular Red Canyon Visitor Center, campground, and paved bike path. The existing 69 kV line is located south of these facilities and is not visible from them.

Red Canyon Research Natural Area. The Red Canyon Research Natural Area is a small watershed near the western edge of the Paunsaugunt Plateau. It encompasses an entire small watershed containing xeric forests, woodlands, and shrublands near the lower western edge of the Paunsaugunt Plateau. The Red Canyon Research Natural Area is completely within an IRA.

The objective for management of the Research Natural Area is to protect the ecosystem structure and function of the xeric forest and woodland, typical of parts of the Utah high plateaus, and to maintain the habitat for endemic and rare plants. The objectives are accomplished without any special management actions other than protection against uses that might jeopardize the values for which the Research Natural Area was designated.

The proposed 138 kV transmission line under Alternative B would be located south of SR 12, about 1 to 1.5 miles south of the Research Natural Area. The transmission line would not cross the Research Natural Area under any alternative.

The Thunder Mountain Bike Trail crosses under Alternative B right-of-way and the existing 69kV line near the western edge of the Powell Ranger District. The existing 69kV line is also highly visible from the popular Golden Wall Trail which originates near the visitors center. Portions of this trail cross under the line, and the line becomes highly intrusive along the descending portion of the trail.

The Red Canyon trails are popular destinations for guided horseback trips and self-guided equestrian touring. The Red Canyon Equestrian Campground is located approximately 0.25 mile south of the Alternative B right-of-way and the existing 69kV Line Route.

Red Canyon Botanical Area. The Red Canyon Botanical Area measures 203.3 acres and is located on the Powell Ranger District, on the eastern fringe of Red Canyon, south of SR 12. It is 3 miles south/southeast of the Red Canyon Research Natural Area, which is administratively separate and does not overlap the Red Canyon Botanical Area. The Red Canyon Botanical Area is a small watershed characterized by soils derived from the pink Tertiary Claron (Limestone) Formation and seven endemic, rare plant species that are confined to these substrates. The area is characterized by barren slopes, hills, plateaus, and cliffs with limited vegetation cover and soils derived from the highly erosive Claron Limestone (USFS 2000b). The Red Canyon Botanical Area is under management prescription 10C within the 1986 LRMP, which was added by amendment to the LRMP in 2001. Ensuring the persistence of sensitive plants is the main objective of the Red Canyon Botanical Area. Management objectives of the greater Red Canyon area include monitoring the impacts of off-highway vehicles and regulating recreational activities and road construction (USFS 2000b).

To achieve the management objective, several actions would be implemented, including monitoring the effects of off-highway vehicle use, regulating recreational use, and regulating road construction. The botanical area contains no foot trails, though walking is permitted in the area. The botanical area is located about 0.50 mile south of the existing 69 kV transmission line and the proposed 138 kV line under Alternative B, and about 1 mile north of the proposed 138 kV line under Alternative A. The botanical area is within the Red Canyon South unroaded/undeveloped area. The transmission line would not cross the Red Canyon Botanical Area under any alternative.

Tropic Reservoir Vicinity. The area in the vicinity of Tropic Reservoir provides several recreation opportunities. The area is located approximately 8 miles south of SR 12 and is accessed via Forest Road 30087 (East Fork Road). Tropic Reservoir provides fishing opportunities. Adjacent to Tropic Reservoir is the King Creek campground. Both the Paunsaugunt OHV trail and the Grand View trail can be accessed nearby.

Inventoried Roadless Areas

IRAs within the DNF are defined and described in detail in **Section 3.11**, Distinctive Land Areas. Many qualities of roadless areas contribute to the value of an area as a recreational resource or may govern types of recreation that can take place. Therefore IRA qualities will factor into analysis of impacts of the proposed project on recreation resources as described in **Chapter 4,** Environmental Consequences.

3.12.2.2. Bureau of Land Management

Grand Staircase–Escalante National Monument

Under Alternatives A and C, 44.58 acres of right-of-way would be within the Primitive Zone within GSENM. Visitor use to this area is minimal and is already impacted by the presence of the Rocky Mountain Power/PacifiCorp transmission line (personal communication, H. Wolfe, BLM, March 12, 2009).

Special Recreation Management Areas. The SR 12 SRMA and the Paria/Hackberry SRMA are located near the Project Area. Because the proposed transmission line alternative rights-of-way are not located directly within or visible from these areas, they will not be analyzed further.

Visual Resources Management. The GSENM is divided into two Visual Resource Management (VRM) Classes. The Project Area crosses and is visible from both VRM II and VRM III management classes. While visual resources are a component of recreation, they are described in detail separately in **Section 3.13**.

Wilderness Study Areas. The Blues WSA is located directly to the east of the Alternatives A and C right-of-way along the existing Rocky Mountain Power/PacifiCorp transmission line access. The Blues WSA, including recreational resources, is described in detail in **Section 3.11**.

Natural Areas. Attributes of East of Bryce natural area (867 acres; BLM 2008a) are described in detail in **Section 3.11**. The primitive and backcountry landscape of this area is managed for its undeveloped character and to provide opportunities for primitive recreational activities and experiences of solitude, as appropriate.

Access

Detailed information on the transportation network within the Project Area that would be used to access recreation resources on public lands described above is presented in **Section 3.15,** Transportation.

Kanab Field Office Land Management Areas

Table 3.12-2 lists the acreage that would be affected by each alternative.

Table 3.12-2. Project Area Acreage within BLM Kanab Lands for All Alternatives

Land Management	Alternative A	Alternative B	Alternative C	North-South Interconnect Option	East-West Interconnect Option
BLM Kanab	59.82	115.61	62.08	0.00	0.00

Land Use and Management. Off Highway Vehicle (OHV) use on all of the BLM-administered lands within the Project Area is classified as Limited to Designated Roads and Trails. GSENM lands that would be impacted by the proposed project are closed to off-road vehicle travel. The existing Rocky Mountain Power/PacifiCorp transmission line access is not open for public vehicular access. Right-of-way access is granted to Rocky Mountain Power through terms and conditions of its right-of-way grant to service the existing transmission line. Similar access arrangements would be made with Garkane in conjunction with issuance of a right-of-way for the project. Public use of KFO lands within the Project Area is minimal and consists primarily of hunting and horn hunting (personal communication, H. Wolfe, BLM, March 12, 2009).

Special Recreation Management Areas. There are no Special Recreation Management Areas (SRMA) within or adjacent to the Project Area lands administered by KFO. Therefore, SRMAs within lands administered by the Kanab-BLM will not be discussed further.

Non-Wilderness Study Area Lands with Wilderness Characteristics. Attributes of Box Canyon non-WSA lands with wilderness characteristics (2,928 acres; BLM 1999) are described in detail in **Section 3.11**. The primitive and backcountry landscape of these areas is managed for its undeveloped character and to provide opportunities for primitive recreational activities and experiences of solitude, as appropriate.

3.12.2.3. Bryce Canyon National Park

Land Use and Management

BRCA is 35,835 acres in size. The 1987 BRCA General Management Plan divides the park into four basic land classifications: Natural, Development, Special Use, and Historic. Alternative B is the only alternative that would be located on NPS land and would be located entirely within the Natural Zone; specifically the Natural Environment Subzone. The Natural Environment Subzone occupies 13,325 acres (37 percent) of the Park and consists of lands not included in the Wilderness Subzone that are not yet developed. Most of these lands are above the escarpment rim. Management of these lands is based on preservation; that is, these lands are protected against development and lack true wilderness characteristics (NPS 1987). Some of BRCA's most popular hiking trails are located in this subzone within the main Bryce amphitheater, but a majority of the hiking trails are located in the Wilderness subzone.

The 100-foot project right-of-way for Alternative B would occupy 33.97 acres of the Natural Environment Subzone within the Park. This represents less than 0.25 percent of this type of subzone within the Park.

Night Skies and Soundscape

Dark night skies are a valuable resource in BRCA, which experiences some of the darkest skies in the conterminous United States. Of the 44 parks that have been measured, Bryce Canyon is among the five darkest (others in the region include Capital Reef and Natural Bridges, which are darker; NPS 2005). Night sky resources are discussed in Visual Resources, **Section 3.13**.

Natural quiet is another resource of value to the Park and its visitors. One study in BRCA found that 30 percent of 410 visitor groups named solitude and quiet as a reason for visiting the Park. This is especially remarkable given the front country nature of BRCA; many visitors never get far away from roads, parking lots, and crowded overlooks.

The quiet, however, is degraded by the high number of overflights, comprising both intercity commercial air service and tour operators providing flightseeing tours (NPS 2005). A study done in 1995 showed that aircraft could be heard throughout the Park 19 percent of the time; at Fairyland Overlook aircraft could be heard 29 percent of the time. Aircraft are of three source types: helicopters used for sightseeing, fixed wing aircraft used for sightseeing, and commercial jets. The latter are flying high overhead and are less disruptive for visitors throughout the Park.

The Park does not yet have an Air Tour Management Plan (ATMP) in place, and although the Federal Aviation Agency (FAA) intends to create one, the Park is first planning to collect sound data and develop a sound management plan in order to quantify the impact of noise levels in the Park. Park managers believe that noise from overflights impacts the visitor experience and impacts to wildlife are possible although unknown; thus the Park has concerns about a possible increase in air tours. The FAA ATMP process first asks existing operators how many flights they are conducting in order to create baseline data; Park managers point out that flight operators have an incentive to overstate their number of flights in order to create a higher baseline. Also, because sightseeing flights originate from as far away as Las Vegas, the number of flights is hard to track.

Trails and Overlooks

The Mossy Creek Trail is accessed from the south side of SR 12. The existing 69kV line is visible from the trail; however, it is very difficult to see. Only one pole along this segment of the line is highly visible. Overall, the existing line does not detract from the hiking experience. The Mossy Creek Trail is located within the Natural Environment Subzone.

The Fairyland Trail and Overlook is very distant from the existing 69kV line, which is difficult to see unless visitors are specifically looking for the line.

Visual resources within BRCA are described in detail in Visual Resources, **Section 3.13**.

3.13. VISUAL RESOURCES

3.13.1. Data and Methods

3.13.1.1. Data

The Study Area for visual resources includes (1) the proposed transmission line construction and removal rights-of-way and (2) the viewshed from paved and/or unpaved travel routes, hiking trails, scenic viewpoints and overlooks, and population centers that are near or adjacent to the proposed Project Area.

The following data sources were referenced when conducting the field survey, visual resource characterization, and subsequent analyses:

- GIS—Field maps, including GIS coverages of visual management within BRCA, DNF, the GSENM, and the KFO were prepared and reviewed for use in field surveys and impacts analysis. A GIS-based viewshed analysis was conducted to determine the extent of visibility along the major thoroughfares in the Project Area.
- Field survey—A field survey was conducted in July 2008 along and within the Garkane Project Area, including trails within the DNF and BRCA. Surveys were also conducted along SR 12 and U.S. 89, SR 63, a portion of SR 22, and the existing transmission line route. Analysis observation points were selected based on the results of the surveys.
- DNF LRMP—The LRMP was considered for its policy and management directions (USFS 1986). The DNF LRMP Amendment to update the methods used for scenic inventory and management was used as the reference for visual analysis within DNF (USFS 2000c).
- GSENM Management Plan—This Plan was considered for its policy and management directions (BLM 2000).
- KFO Final RMP and EIS—The recently approved RMP and EIS was considered for its policy and management directions (BLM 2008a).
- NPS—BRCA General Management Plan (NPS 1987) and the NPS Management Policies related to scenic quality (NPS 2006c) were reviewed for direction and guidance on resource impacts and management direction. Other NPS NEPA documents were considered for additional information on impacts thresholds for visual resources (NPS 2003).
- Garkane—Project-related data and construction details were considered for their potential impacts on visual resources.

3.13.1.2. Assessment Methodology

Federal land use management agencies have developed a variety of methods for describing landscapes and for analyzing the impacts to the scenic quality of a landscape. The common goal of these methods is to apply a level of objectivity and consistency to the process and to reduce the subjectivity associated with assessing landscape visual quality. One concept commonly used by federal land managers in the BLM, NPS, and USFS to assess impacts to scenic quality is contrast analysis. Contrast analysis can be summarized as the degree to which a project or activity affects

scenic quality or visual resources depending on the visual contrasts created or imposed by a project on the existing landscape. The contrasts can be measured by comparing the project's features with the major features in the existing landscape (BLM 1986). Each land use agency applies the concept differently (e.g., different terminology, different methodologies for assessing impacts); however, the essential contrast analysis process described below is common to the USFS, BLM, and NPS. The appropriate terminology and applicable analysis methods required by each federal agency with jurisdiction where the Garkane project would lie were used in applying the contrast analysis process throughout the Project Area. The process was used to characterize scenic quality and assess potential scenic quality impacts from new transmission line construction and removal of the existing line.

Visual contrast analysis compares the existing, characteristic features and contrasts of the landscape to the contrasts imposed on that landscape by a proposed project. The landscape features used in the comparison are the forms, colors, textures, and lines that comprise the existing and potentially modified landscape. Landscape form refers to the unified masses or shapes of the landscape being analyzed, such as existing structures, topography, and natural objects (e.g., conical peaks, blocky mesas, rolling grassland). Landscape color refers to the colors of structures, vegetation, soil, water, rock, and sky. Landscape textures are the variations, patterns, density, and graininess of the landscape surface (e.g., uneven, sparse, and seemingly random-ordered shrubs in an arid landscape; even, orderly, and dense rows of trees in an orchard), and the dimensions of those surface variations (e.g., tall conifers, short grasses). Linear landscape features are the real or imagined paths that the eye follows when perceiving abrupt changes in form, color, or texture. These are often noticeable as the edge effect created at the boundary of two contrasting areas (e.g., a line of trees along a rocky slope or ledge, the abrupt boundary between forest and grassland, a dark ridgeline silhouetted against a bright sky). It should be noted that all of these observable landscape features (line, form, color, and texture) can be affected by environmental factors that include the viewing distance, the angle of view, atmospheric effects (e.g., haze, fog, dust, smoke), lighting conditions, and time of day.

In general, the project-related landscape changes that repeat the natural features of the landscape or are well integrated with existing landscape features are considered to be in harmony with their surroundings. These changes produce low levels of contrast and are considered to have a low impact on existing scenic quality or on the aesthetic values of the landscape. Landscape modifications that do not harmonize with the surrounding landscape are considered to be in contrast with that landscape. The contrasts appear obvious, they stand out, and they can be scenically displeasing to viewers because they are not well integrated with the existing natural landscape.

For the Project Area, aesthetic or visual analysis involves determining the degree of visual change between the existing landscape and the landscape that would be produced by the proposed development described in the **Chapter 2**. The degree of change to the landscape is determined for areas of "high scenic value" or "high visual sensitivity," that is, landscapes that are most interesting and appealing. These tend to be the undeveloped, natural landscapes with a harmonious blend, abundance, and diversity of lines, forms, colors, and textures. In general, the landscapes viewed from the Project Area that meet the above criteria include the BRCA overlooks and trails; the DNF trails, scenic roadways, and areas in and adjacent to Red Canyon; the SR 12 and U.S. 89 Scenic Byways within the BLM KFO; and the northern portion of the GSENM near the town of Tropic.

3.13.1.3. Contrast Analysis Process

In general, an evaluator analyzes contrast by doing the following:

1. Obtaining a description of the proposed project or plan to ascertain the types of activities proposed.

2. Identifying the designated scenic or visual management objectives within the proposed Project Area.

3. Selecting representative viewpoints from which the plan or Project Area's landscapes are described and determining the plan's impacts on visual resources. The criteria for selecting representative viewpoints are as follows:

   - Areas with visual sensitivity (as discussed above), which for the Garkane Project Area would include the BRCA scenic overlooks, Park approaches, and hiking trails; areas designated as having High or Very High scenic integrity, Red Canyon, and scenic backways within the DNF; scenic byways within the KFO; areas with designated high BLM Visual Resource Management Class objectives (typically VRM Management Class I and Class II), trails, and scenic byways within the GSENM; the SR 12 Scenic Byway (a designated All-American Road), and U.S. 89 (a designated Utah State Scenic Byway).

   - The potential number of viewers of the Project Area. The most comprehensive views of the Project Area would be from major thoroughfares (along U.S. 89 and SR 12 [both designated scenic byways as mentioned above]); scenic backways, popular hiking trails and overlooks, and major travel intersections.

   - The length of time the Project Area is in view. Motorists on the major thoroughfares that stop at a byway wayside or pullout and pass through or close by the Project Area (typically along SR 12 and U.S. 89, and also SR 63) would have the best views of existing scenic quality and any changes to that quality.

   - The angle of observation. More weight is given to potential viewpoints that show more of the Project Area, as more potential impacts would be visible. Views that are elevated and present slopes and aspects that show more of the Project Area are preferred. Conversely, flat areas are not considered ideal representative viewpoints because a relatively small portion of the Project Area is likely to be visible.

     Typically, viewpoints used for analysis are selected along well-used roadways and trails and near communities, as these are areas where the greatest number of people will see the project impacts for the longest time. Based on the above criteria, 15 representative viewpoints were selected within the Project Area. These viewpoints provide representative views of the existing landscape and of potential impacts to the landscape from project development and were established along U.S. 89, SR 12, in Red Canyon, along a DNF scenic backway, in BRCA, and north of the town of Tropic.

4. Describing the Project Area landscape from the selected viewpoints, using the landscape elements or features of form, line, color, and texture as discussed above. The purpose of characterizing or describing the landscape is to establish a baseline of existing scenic values and aesthetic quality. Typically, the landscape is digitally photo-documented from the selected viewpoints, the precise location of the viewpoint is recorded using GPS, and any relevant field notes are recorded at that time. The digital photographs are then used to prepare the landscape description.

5. Having reviewed the project description, determined the types and intensities of proposed development, described the Project Area landscape, and noted the visual management objectives for the area, conducting contrast analysis to determine the potential impacts to the baseline scenic quality. Visual simulations of the proposed project development and visual contrasts are produced as an aid in visualizing the degree of change that would be imposed on the existing landscape.

6. Using a mental process aided by visual simulations of potential impacts and landscape photographs to mentally overlay the proposed project activities and changes to the scenic environment onto the Project Area's existing baseline scenic landscape.
7. Determining if the degree of proposed impacts and project-created visual contrasts meets or exceeds visual resource management objectives or scenic integrity objectives of federal agencies on the portion of the Project Area that lies within its jurisdiction. The impacts to visual resources would be considered important, substantial, an impairment of the resource, or significant if the effects of the Proposed Action or the alternatives were to exceed the BLM, USFS, and NPS visual resource objectives on lands under their jurisdiction within the Project Area.

3.13.1.4. Federal Visual Resource Management Systems

As mentioned above, the BLM, USFS, and NPS all use the contrast analysis concepts in analyzing impacts to visual resources. However, each agency applies its own system to establish visual resource management objectives or scenic integrity levels.

U.S. Forest Service

The USFS uses a Scenery Management System (SMS), which replaces the USFS's older Visual Management System (VMS). Similar to the BLM's system, both of these rely on visual inventory and scenic quality classes to manage visual resources. Note that during the preparation of the current DNF Plan the older VMS concepts were used and that the LRMP was amended in 2000 to adopt the SMS (USFS 2000c). The SMS concepts and terms are used in this report.

The amended DNF Plan applies four of the five SMS Scenic Integrity Objectives to manage visual resources (the Very Low Scenic Integrity Objective is not applicable in the DNF). They are described in **Table 3.13-1**. The Scenic Integrity Objective, as described in the amended Forest Plan, refers to the "degree of acceptable change or alteration of the landscape." The SMS also considers Concern Levels, which are a categorization of the importance of scenic resources to forest visitors. This concept is analogous to the BLM's viewer sensitivity levels (see the analysis Methodology description above). Concern Level 1 is applied to roads, trails, and travelways where people have a concern for scenic resources, where there is a high degree of visitation, and where there is a sense of the area having regional or national significance. Examples of Concern 1 areas include designated scenic byways and areas such as Red Canyon (USFS 2000c).

Table 3.13-1. USFS SMS Scenic Integrity Objectives

LANDSCAPE THEME	SCENIC INTEGRITY OBJECTIVE
The landscape is intact, with only minute, if any, deviations. The existing character and sense of place should be expressed at the highest level. Human influence from historic use or management should appear completely natural to the majority of viewers.	Very High
The landscape appears unaltered and intact. Deviations may be present but should repeat the line, form, color, and textures of the existing landscape character so completely, and at such a scale, that they are not evident.	High
The landscape appears slightly altered. Noticeable changes should remain visually subordinate to the landscape character being viewed.	Moderate

LANDSCAPE THEME	SCENIC INTEGRITY OBJECTIVE
The landscape appears moderately altered. Deviations and changes to the landscape may begin to dominate the landscape character. These changes should borrow valued landscape attributes such as size, shape, edge effects, patterns of natural openings, vegetative type changes, or architectural styles that are outside of the altered landscape.	Low

Source: USFS 2000c.

Bureau of Land Management

The BLM (which for this project includes the KFO and the GSENM) uses a VRM system to manage visual resources on public lands. The primary objective of VRM is to maintain the existing visual quality of BLM-administered public lands and to protect unique and fragile visual resources. The VRM system uses four management classes to describe the different degrees of modification allowed to the basic elements of the landscape (i.e., line, form, color, and texture; BLM 1980).

The VRM Classes and their objectives are described in **Table 3.13-2**.

Table 3.13-2. VRM Classes and Objectives

VRM MANAGEMENT CLASS	OBJECTIVE DESCRIPTION
I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and should not attract attention.
II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	The objective of this class is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements of the landscape (BLM 1992).

National Park Service

The NPS does not apply a classification system to managing scenic quality within National Parks. However, it should be noted that Bryce Canyon was designated as a National Park to preserve its extraordinary and unique rock formations. The variety and type of rock colors and forms within the canyon are at least comparable to those found in Red Canyon (DNF, Powell Ranger District), which has been designated by the USFS for management with High visual quality objectives. As stipulated in the Park's mission statement, preservation, conservation, and protection of the Park's spectacular geologic formations is a primary and overarching objective in park planning and management (NPS 2006a). As mandated under the Organic Act (16 U.S.C. 1; NPS 1916), all visual resources and scenic quality within National Parks are to be conserved and managed in an unimpaired condition for the enjoyment of future generations. Potential impairment of the resource is determined using context, intensity, duration, and timing to gauge the level of impacts of proposed projects within the National Park System.

3.13.2. Existing Conditions

3.13.2.1. Visual Resources Field Survey

Prior to conducting the field survey, a GIS viewshed analysis was conducted to ascertain the areal extent of Project Area visibility from the major thoroughfares within the Garkane Project Area: U.S. 89, SR 12, SR 63, and SR 22. The result of the viewshed analysis showed that substantial segments of the Proposed Action and alternatives transmission lines would be visible from these major roadways. The conclusion derived from the viewshed analysis results was that, with a few exceptions, most of the Project Area needed to be considered when trying to establish representative visual analysis viewpoints. It should be noted that the visibility information derived from the viewshed analysis was not used to modify the proposed and alternate transmission line alignments into areas of lower visibility.

Representative viewpoints for analyzing impacts to scenic quality within the Project Area were selected through consultation with USFS, NPS, and BLM resource specialists to determine what areas they considered to possess visual quality and visual sensitivity along the proposed transmission line rights-of-way. The SWCA visual resource specialist visited each of these proposed sites, accompanied by either a USFS or NPS agency specialist (depending on the jurisdiction within which the viewpoint lay) for most locations, to photographically record, establish GPS locations, take compass bearings, and take field notes. For some proposed viewpoints, the locations were suggested by the agency specialist and then visited alone at a later date by the SWCA resource specialist (e.g., Golden Wall Trail, SR 89 Scenic Byway). Several viewpoints were independently selected by the SWCA resource specialists, based on the proposed route alignments and visibility from the major travel routes within the Project Area.

A total of 15 viewpoints were selected from the viewpoint data collected during the field survey, based on the criteria described under the Contrast Analysis Process above and agency input (**Table 3.13-3**). The locations for all of the selected viewpoints were mapped and are shown in **Figures 3.13-1** and **3.13-2**.

Table 3.13-3. Visual Analysis Viewpoints

VIEWPOINT NUMBER	VIEWPOINT
1	U.S. 89
2	U.S. 89/SR 12 junction
3	SR 12 Red Canyon eastbound

VIEWPOINT NUMBER	VIEWPOINT
4	SR 12 Red Canyon westbound
5	Golden Wall Trail
6	USFS boundary/SR 12
7	USFS Scenic Backway
8	Bryce Airport Wayside
9	SR 12/SR 63 junction
10	Park boundary–SR 12
11	SR 12 wayside
12	Fairyland Overlook
13	Mossy Cave Trail
14	Tropic/SR 12
15	GSENM primitive road

3.13.2.2. Project Area Visual Character

A mentioned above, a viewshed analysis was conducted to determine the visibility of the Project Area as seen from major thoroughfares. A viewshed analysis map is included in the Visual Resources Specialist Report (JBR 2008) in the project record. Based on the results of that GIS analysis, discussions with agency resource specialists, and a field survey, the following viewpoints were selected as representative of the potential impacts from the proposed transmission line alignments within the Project Area. Representative photographs are shown in **Appendix B** to give the reader a sense of the landscape being described and analyzed.

Viewpoint 1 (U.S. 89 Scenic Byway)

This viewpoint along U.S. 89 (**Figure 3.13-1**) was selected because it is representative of scenic quality along U.S. 89 (a State Scenic Byway) north of Hatch and because it is located approximately 0.25 mile north of the highway crossing of Segment A-3 of the Proposed Action or Segment C-3 of the Cedar Fork Southern Route Alternative. Views to the east and west in the foreground and middleground are designated VRM Management Class III. Background and far middleground views lie within the DNF and have a Moderate scenic integrity. From this perspective, the proposed transmission line and impacts to the viewscape would likely be observed for a relatively long time by southbound motorists.

Foreground views to the east and south are of a flat to gently rolling topography covered by sagebrush, forbs, shrubs, and grasses, and interspersed with scattered, taller juniper and deciduous trees. Tan to buff-colored soil lies exposed along the Sevier River bank just to the east of the roadway. Landscape colors also include dark green trees, gray-green sagebrush, light green grasses and forbs, gray asphalt roadway, and gray-green water within the river. The river and river bank create a distinct linear feature within the landscape. Foreground views to the west are of tree-, shrub-, and grass-covered low, steep slopes and cliffs that lie adjacent to the roadway. Vegetation colors and soil exposure are similar to the south and east foreground views. Middleground views to the east and south are of a flat topography, with a fairly uniform covering of light green vegetation, occasionally broken by exposed tan-colored soil. Low hills covered with dense stands of conifers lie at the far end of the middleground. Middleground views to the west are obscured by the steep slopes and cliffs in the foreground.

Background views to the south and east are dominated by the rugged, steep slopes and escarpments of red rock and dark green conifer that comprise the Sunset Cliffs. The background view to the west is obscured by the foreground steep slopes and cliffs along the roadway.

Viewpoint 2 (Junction of U.S. 89 and SR 12)

This viewpoint lies at the intersection of U.S. 89 and SR 12 (**Figure 3.13-1**), where visitors to Red Canyon, BRCA, and the GSENM would turn onto the SR 12 Scenic Byway and leave the U.S. 89 State Scenic Byway. This location was chosen because it would provide the first views of the Parallel Line Route to travelers at the junction of two scenic byways and because the views of the line would be in view for a relatively long time while motorists proceed through the intersection.

Foreground views on privately owned lands to the east and south are of a relatively flat to hilly topography, covered with light and dark green shrubs, grasses, and forbs. Clumps of conifers lie along the steeper slopes. Surface disturbances from road construction, road signs, light and sign posts, commercial and residential buildings, and transmission lines are visible within and intermingled with the natural landscape. Foreground views to the west are of a steep sagebrush-covered slope at the intersection. Landscape colors include exposed, buff-colored soil and gray rock, and light green sagebrush. Road shoulder surface disturbance, sign posts, light poles, and eroded soil are also visible within the natural landscape.

Managed as VRM Management Class III, the middleground views that are not obscured by the hilly foreground show a fairly indistinct, flat, uniformly light green landscape to the east and south. Middleground views to the west are blocked by the steep slopes in the foreground.

Background views to the east (managed for High Scenic Integrity Objectives within the DNF) and south (managed as VRM Class III) show a landscape very similar to that described in Viewpoint 1: red rock cliffs and conifer-covered steep lower slopes of the Sunset Cliffs to the south, and the western entrance to Red Canyon. Background colors include red rock and green conifers. The background views to the west are blocked by the steep slopes in the foreground.

Viewpoint 3 (SR 12 Red Canyon Eastbound)

Located near the western boundary of the Powell Ranger District of the DNF, this viewpoint (**Figure 3.13-1**) was selected because it provides motorists traveling along SR 12 with views of the existing and proposed Alternative B and right-of-way clearing. The existing line and line clearing would be on the forested slopes leading into Red Canyon. The viewpoint viewscape and area of concern lie to the south of SR 12. The immediate foreground viewscape is designated as VRM Management Class III under the Kanab RMP. Middleground and background views lie within the Powell Ranger District and are designated as High for scenic integrity.

Foreground views are of a topographically flat, gently rising slope. The existing SR 12 roadway, road shoulder, road right-of-way fence, and sagebrush-covered flats are the predominant features in this view. Colors range from the gray roadway, tan grasses, and dark green shrubs along the right-of-way to light green sagebrush in the distance. Landscape linear features include the road edge and right-of-way fence.

Middleground views are of the steep, forested slopes that rise abruptly from the light green sagebrush flats in the foreground. The conifer-covered slopes are uniformly dark green, and the transmission line clearing is clearly visible within the surrounding dense conifer vegetation.

Background views are of the sparsely vegetated, rugged, redrock cliffs and steep slopes at the western entrance to Red Canyon.

Figure 3.13-1. Viewpoints used for Visual Analysis in Western Portion of Project Area

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Viewpoint 4 (Red Canyon Westbound)

This viewpoint is located near the west end of the SR 12 Scenic Byway (**Figure 3.13-1**) as it approaches the SR 12-U.S. 89 junction. The viewscape ranges from the southeast to the west. Within the exception of privately owned lands along the highway corridor, the landscape is designated as VRM Management Class III within the KFO. The viewpoint was selected because of its elevation above the landscape to the west that provides an unobscured view of the existing transmission line and the proposed Parallel Line Route as it proceeds west out of the Red Canyon and Sunset Cliffs area, crossing U.S. 89, to the existing Hatch Mountain Substation.

The foreground view to the southeast is similar to that described in Viewpoint 3 (Approach to Red Canyon): a topographically flat to gently rising slope in the near foreground whose dominant features are dense, uniformly distributed, light green colored sagebrush. Looking to the southeast, the far middleground comprises a heavily forested west-facing slope that rises abruptly from the relatively flat near-foreground slope. An obvious edge effect is visible along the boundary between trees and sagebrush; a strong color difference is similarly visible between the dark green conifers and light green sagebrush. The existing transmission line clearing is partially and indistinctly visible on the wooded slope. The foreground view to the south is of a relatively featureless flat, sagebrush-covered landscape that gently slopes to the west. Westward foreground views are a continuation of the south view.

The middleground and background view to the southeast is a continuation of the steep-sloped, wooded landscape described above. The middleground view to the south is the same as the foreground view. Middleground views to the west include the indistinctly visible roadcuts and the disturbed area along U.S. 89, with weak, but visible, color differences between light green vegetation and tan exposed rock; the gently rising slopes on the opposite side of the U.S. 89 roadway present an indistinct color difference between light green vegetation on the lower slopes with dense, dark green conifer on the upper slopes and ridge tops. The existing transmission line clearing on the distant, wooded slopes to the west is obviously visible from this perspective.

Background views to the southeast are obscured by the foreground and middleground slopes. Background views to the south are simple: low, long, ridges with indistinct color, shading, and forms except for a fairly distinct, undulating ridgeline. Background views and landscapes to the west are similarly indistinct and generally featureless, except for a long, slightly irregular ridgeline along the horizon.

Viewpoint 5 (Golden Wall Trail)

The Golden Wall trail viewpoint is located south of SR 12 in Red Canyon and is part of the canyon's trail system. This location was chosen because the trail lies within the existing and proposed Parallel Line Route Alternative, because of the trail's popularity and use by Red Canyon campers and day hikers, and because of the high scenic quality within and surrounding this locale. The viewpoint location lies at an intersection of the trail and the transmission line right-of-way (**Figure 3.13-1**), at a point where the transmission lines pass directly overhead and stretch cross-canyon. The USFS has designated and manages this locale for High scenic integrity.

Looking west, the foreground view is very simple: a smooth, moderately steep, rising slope composed of rocky reddish-tan soil with very sparse vegetation. Widely spaced dark green, individual pinyon trees and shrubs and a random scattering of yellow and gray, low-growing forbs are visible among the reddish soil. The view is back up the trail and ends at a ridgeline dominated by the existing transmission line's power pole and lines. The pole creates very strong line, color, and form contrasts with the surrounding landscape from this perspective as the light brown poles are highly visible

against a dark blue sky. Middleground and background views are obscured by the proximity of the rising slope and ridgeline.

The opposite view, looking downslope along the trail, is highly variable. The foreground view looking southeast down the trail is similar to that just described: sparse clumps of pinyon-juniper and a scattering of shrubs and low-growing forbs on rocky, reddish soil. The existing transmission line is entirely visible as it extends down slope and across the canyon to the opposite ridgeline. The north-facing slopes on the south side of the trail are covered with dense, uniformly scattered stands of dark green pinyon-juniper and gray tree snags. Views to the north are of the Golden Wall rock formation with its yellow, gray, and red vertical cliffs; horizontal, banded rock strata; and smooth talus slopes interspersed with clumps of dark green conifers. Middleground views are of the slopes and ridgeline on the opposite side of the canyon. The topography is variable, consisting of a steep, highly eroded canyon slope composed of the same reddish, coarse, rocky soil. Dark green conifers are unevenly scattered across the red-rock slopes and red soil at the base of the slopes.

Background views are almost entirely obscured by the proximity of the Golden Wall formation and the high slopes and ridgeline on the opposite side of the canyon. Background views that are visible are of an indistinct, horizontal ridgeline and rocky tan-green slopes beneath it.

Viewpoint 6 (USFS Boundary along SR 12)

This USFS viewpoint (**Figure 3.13-1**) is located near the eastern boundary of the DNF along SR 12. It was chosen because the USFS has designated this area for High scenic integrity management in the foreground along the highway corridor. The Proposed Action route (in Segment A-2) would cross SR 12 just to the west of this viewpoint, and motorists traveling both east and west along the highway would have this transmission line clearly in view for a relatively long time (the roadway is straight and there are few view-obscuring features). The view is to the west, along the SR 12 Scenic Byway.

Foreground views are of a relatively flat topography. Vegetation to the north of the roadway is predominantly grass within the road right-of-way and low-growing light green sagebrush and regularly spaced dark green juniper and pinyon beyond. Buff-colored soil is exposed along a roadcut, and the roadway is a strong linear landscape feature. Views to the west and south are of light green grassland occasionally interrupted by solitary conifers.

Middleground views to the north (also designated for High scenic integrity management) are obscured by the tall pinyon-juniper stand. To the south and west (designated for Moderate scenic integrity management), the landscape is dominated by a low, heavily wooded steep-sloped ridge. Dark green trees and exposed reddish soil are the predominant colors. Redrock and patchy, green vegetation on steep slopes are visible to the west, near the entrance to Red Canyon.

Background views to the north are obscured by the foreground pinyon-juniper stand. To the west, the background view is obscured by the middleground ridge and the red hills near Red Canyon. To the south, the background comprises long, low, wooded slopes similar to that in the middleground.

Viewpoint 7 (USFS Scenic Backway)

The viewpoint (**Figure 3.13-2**) lies between the DNF boundary to the north and the proposed Cedar Fork Southern Route Alternative (in Segment C-2) to the south, along a USFS Scenic Backway (East Fork of the Sevier River Road, Forest Road 30087). It was chosen because of its proximity to the point where the proposed Southern Route transmission line would cross the backway and because the backway crossing area has been designated for High scenic integrity management in the foreground.

The viewpoint lies just north of the existing (Wilson Peak) line and proposed Cedar Fork Southern Route (Segment C-1) crossing, and foreground views show the existing single-pole line stretched along an east-west orientation and crossing the roadway. A USFS guard station (with access roads,

main station, and out buildings) lies at the base of a gentle, conifer-, shrub-, and grass-covered slope. To the south, the landscape is flat and covered with dense stands of dark green conifers. To the west, the landscape becomes gently undulating, and a vegetation transition from light green grass and exposed buff-colored soil to random scattering and then dense stands of conifer is obvious.

Middleground and background views to the east and south are obscured by the tall, dense conifer stands. To the west, the middleground is dominated by the steep-sided and heavily wooded Wilson Peak and by a long, low, dark green, wooded ridge. Exposed red-rock outcrops surrounded by dark green vegetation are visible in the far middleground.

Background views to the west are of a gently north-sloping range that borders the Red Canyon area. Vertical, red-rock cliffs and patchy, dark green vegetation growing on the top and along the lower slopes of the range are the dominant landscape features.

Viewpoint 8 (Bryce Airport Wayside)

This viewpoint is located along SR 12 at an interpretive wayside, southwest of the Bryce Canyon Airport (**Figure 3.13-2**). This point was chosen because it provides unobstructed views of the Proposed Action Route to the northeast at a location along the SR 12 Scenic Byway where motorists are encouraged to stop to view the landscape and become informed about the historic Bryce Canyon Airport (visible to the north) and the surrounding Paunsaugunt Plateau. The viewscape is to the north, ranging from the northeast to the northwest.

The foreground views (predominantly under private ownership except for small parcels designated as VRM Management Class IV within the KFO) are of topographically flat landscape, uniformly covered with low-lying shrubs and grasses. Scattered, unevenly distributed, low-lying dark green conifers are visible in the far foreground. The landscape texture is smooth. Visible foreground structures include the highway right-of-way fence and interpretive signs in the immediate foreground; electrical distribution transmission lines, occasional private houses, sheds, and outbuildings, unpaved roads, and airport structures are visible in the far foreground.

The near middleground to the northwest is managed for Moderate scenic integrity and is dominated by an intermittent line of long, low, low-sloped hills (the Pine Hills). The hills are uniformly, but sparsely, vegetated with tall, dark green conifers. The exposed rock and soil on the hill slopes are brown, buff, and tan. The landscape texture is medium. The far middleground to the north (within private and State ownership) is defined by a rugged, steep-sloped, moderately high and undulating ridge. The ridge slopes are uniformly and densely covered with dark green vegetation. Exposed rock and soil on the slopes appear dark brown. To the northeast, beyond the foreground airport structures, the far middleground is bounded by a long, steep-sloped, heavily vegetated ridge. Exposed cliff faces and rocky outcrops visible along the ridge slopes are tan to reddish-pink. Textures appear coarse.

Background views are of a series of long, high, very rugged ranges. The ridgelines are undulating to horizontal, and the numerous high, exposed cliff faces show numerous highly visible, horizontal rock strata with colors that range from reddish-pink, light orange, and tan to brown. Dense, patchy dark green vegetation covers the ridge tops and steep slopes. Landscape textures appear coarse.

Viewpoint 9 (Junction of SR 12 and SR 63)

This viewpoint was chosen because it lies at the road turnoff and access to BRCA (**Figure 3.13-2**). At this point, all eastbound motorists on SR 12 would have clear, long views of the proposed Cedar Fork Southern Route Alternative (in Segment C-1) as it runs north-south along the Park boundary.

Looking east along SR 12, the foreground view (on privately owned lands) is dominated by the roadway intersection and road signs; tall, vertical light poles; billboards; and commercial buildings.

The foreground landscape is flat to undulating, light green grassland. A line of dark green conifers is visible, growing along the top of a long, low hill in the far foreground.

The middleground view is to the northeast and within the Park boundary and consists of a long, low hill of exposed redrock outcrops within variably dense, dark green wooded slopes. SR 22 (Antimony Road) is also visible in the middleground as it proceeds northeast.

Background views are also to the northeast, and comprise a continuous line of horizontal to undulating, high mountain ranges that ends abruptly in a steep cliff. Landscape colors are visible as horizontal bands of red and tan rock and as dark green vegetation growing along the ridge slopes.

Viewpoint 10 (Park Boundary along SR 12)

This viewpoint is located along SR 12 at the western Park boundary (**Figure 3.13-2)**. The viewpoint was chosen because it provides a motorist's SR 12 westbound and eastbound view of the proposed Cedar Fork Southern Route Alternative (in Segment C-1) as it crosses the highway along a north-south axis at the Park boundary.

The foreground eastward view (all of which lies within the Park boundary) is similar to the foreground view described under Viewpoint 7 but closer and more detailed: flat to undulating, light green/brown grassland that rises to a long, low ridge in the far foreground. A line of dark green conifers is visible, growing along the top of the ridge in the far foreground. Exposed, tan to buff-colored rock and soil is visible to the north at the toe of the rising slope. Right-of-way fences bound SR 12 and converge at a point in the far foreground where the highway begins its descent into Tropic Canyon. Landscape textures appear smooth in grass-covered areas and moderately rough where conifers are visible. The Park boundary to the south is defined by a low wire fence that tends to blend in with the surrounding vegetation and landscape. To the north, the boundary fence appears more distinct but gradually blends in with the surrounding landscape in the distant middleground. The near foreground is dominated by wide gravel-covered road pullouts that lie on both sides of the highway. The foreground westward view, most of which is on privately owned lands with the immediate foreground on Park land, is of a topographically flat landscape, uniformly covered in low, green, tan, and brown grasses and shrubs. Road and Park signs, highway right-of-way and Park fences, and the gravel pullout are visible. Landscape textures appear smooth.

Middleground and background views to the east, north, and south are generally obscured by the foreground ridge at the head of Tropic Canyon, with the exception of an indistinct view of distant, background ranges that is visible through the ridgeline road cut into Tropic Canyon. Middleground views to the west are similar to those described for the foreground: a relatively bland and homogenous, flat topography dominated by uniformly distributed low grasses and shrubs, interrupted by an occasional conifer. A long, low, flat ridge is visible in the far middleground to the northwest, whose dominant landscape characteristics are a continuous face of exposed, reddish-tan rock outlined by a line of dark green vegetation on the ridge top and at the base of the rock face.

Background views to the west consist of undulating ridgelines underlain by dark green vegetation and of high, exposed rocky outcrops and escarpments of reddish-tan-buff rock and soil.

Figure 3.13-2. Viewpoints Used for Visual Analysis in Eastern Portion of Project Area

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Viewpoint 11 (SR 12 Wayside)

The SR 12 Wayside viewpoint (**Figure 3.13-2**) is located at a scenic pullout along SR 12, near the mid-point of Tropic Canyon. This viewpoint was selected because it provides unobstructed views within the Park of the existing 69 kV transmission line and right-of-way between lower Tropic Canyon and the rim of the Pink Cliffs (at the eastern edge of the Paunsaugunt Plateau). The viewscape is generally to the south, ranging from southeast at the lower end of the canyon to the southwest where the Pink Cliffs define the edge of the plateau.

Foreground views (all of which lie within the Park) are of a highly variable landscape and topography that ranges from vertical, rugged cliffs and rock outcrops down-canyon and along the Pink Cliffs escarpments to gently undulating, smooth hills and ridges within the central portion of the canyon. Dark green, tall conifers and brown snags are densely and regularly spaced throughout the foreground except on the cliffs and on the tops of ridges and hills, where vegetation gradually becomes more diffuse and unevenly sparse. Low-growing shrubs appear gray and light green. Soil and rock are visible though the vegetation covering, and colors range from brown, tan, and buff to reddish-pink.

Middleground views are similar to the foreground (also within the Park boundary) but with additional views of tan and reddish-pink cliffs on the far side of the canyon and distant views of the Pink Cliffs as they extend southwest into the Park interior. The existing transmission line and right-of-way are topographically hidden from the casual view in the middleground except for a single power pole that is clearly visible on the southwest horizon at the edge of the Pink Cliffs escarpment, on the plateau.

Background views are obscured by the viewpoint's lower elevation in relation to the surrounding cliffs and canyon walls in the middle distance, with the exception of the view to the southeast through Tropic Canyon. This abbreviated background view shows an indistinct, receding series of flat to undulating ridgelines within the GSENM. Background colors include lines and patches of dark green vegetation covering the ridge slopes interspersed with patches of tan-buff exposed rock and soil.

Viewpoint 12 (Fairyland Overlook)

The Fairyland Overlook viewpoint (**Figure 3.13-2**) was chosen because of the major BRCA overlooks (including Sunset, Sunrise, and Bryce Point overlooks) and because it is the closest to the existing transmission line that passes through the Park and to the proposed Parallel Line Route Alternative. The viewpoint lies at the edge of the Pink Cliffs, and the view extends from north to east along the existing transmission line route.

Foreground views lie within the Park and are of deeply incised, eroded, steep slopes and cliffs, mounds, towers and columns, walls, and standing stones. The landscape topography and form features are extremely variable and diverse, ranging from vertical cliffs and towers to flat or gently sloping canyon bottoms. Foreground colors are also extremely variable and diverse, ranging from red to yellow/tan to gray to white/cream within exposed rock strata overlain with patches, dense clusters, and lines of dark green conifers. Landscape line and texture contrasts are extreme, caused by tall, isolated and clusters of vertical columns, a multitude of short and long, horizontal ridgelines, and bands of horizontal rock strata. A network of hiking trails is visible along the less steep slopes. All of these foreground natural landscape features create an extremely variable and visually complex landscape, producing a scenic quality of the highest degree because of the high degree of diversity of landscape features.

Middleground views, also within the Park, are of a relatively indistinct series of roughly parallel, low, rugged, ranges receding into the background. Highly visible horizontal, linear ridgelines predominate. Exposed redrock outcrops and dense stands of vegetation are visible on the ridge tops and slopes.

Background views are similar to the middleground: parallel series of horizontal, linear ranges of brightly colored rock and dark green vegetation.

Viewpoint 13 (Mossy Cave Trail)

The Mossy Cave Trail viewpoint (**Figure 3.13-2**) is located near the cave and trail end, at a point where the existing transmission line passes directly overhead. This viewpoint was chosen because of the proximity of the existing line and proposed Parallel Line Route Alternative to a popular, highly accessible trail within BRCA.

Located within a narrow, high canyon, there are no middleground or background views. The foreground view is of exposed red, dark brown, yellow, and buff-colored soil, rock outcrops, boulders, and smooth talus slopes on steeply sloped canyon walls. Vegetation is predominantly composed of tall dark green conifers and a scattering of light green shrubs clinging to the talus slopes and relatively stable areas around rock outcrops. The tall conifers are rough textured. A single power pole is visible at the top of the canyon wall but is partially obscured by the canyon walls from this perspective. Transmission lines run overhead but are also not obviously visible to the casual observer.

Viewpoint 14 (North of Tropic along SR 12)

The North of Tropic viewpoint (**Figure 3.13-2**) was selected because it includes views of the existing and proposed Parallel Line Route at a point where the line crosses the SR 12 Scenic Byway, because the line would be visible to all motorists traveling westward during the day toward BRCA, because of its proximity to Tropic and the impacts of the proposed line on visual quality as seen from town, and because the line lies within the foreground of public lands managed under the jurisdiction of the GSENM. From this viewpoint's perspective, the viewscape ranges from south along SR 12 into Tropic Valley, east into East Valley, and then northeast and north along SR 12 into the GSENM.

The foreground view to the south and southeast is privately owned and consists of a flat to rolling landscape interspersed with isolated, flat-topped, low hills; power distribution lines and poles stretched across and along SR 12; and residential dwellings and access roads. Vegetation colors range from dark green trees, light-colored shrubs, and buff and tan grasses. Distant foreground views include patterned, irrigated fields surrounded by buff and light green scattered vegetation. To the east, irrigated fields are predominant in the near foreground, with landscape features similar to those described above. The far foreground is dominated by gray, tan, light brown, and buff-colored steep slopes and escarpments of The Backbone. The existing transmission line power poles are visible from this foreground view; the line appears to lie directly below The Backbone slopes and creates a weak to moderately strong vertical line contrast with the surrounding landscape. The near foreground view to the north, along SR 12 as it turns toward the entrance to Tropic Canyon, is on privately owned lands and is a continuation of the east view, with green, irrigated fields surrounded by tan and buff-colored vegetation in a topographically flat landscape. The distant foreground view lies within the GSENM (designated as VRM Management Class II) and is of the steep lower slopes along the toe of the above-mentioned escarpments. From this perspective, the existing transmission line appears closer, is more clearly in view, and appears to converge with and cross the SR 12 roadway several hundred yards to the north.

Middleground and background views on privately owned lands to the south are obscured by a low hill that crosses the roadway. To the southeast and east, the landscape is dominated by a series of long, low, flat-topped hills or mesas. Exposed, relatively unvegetated, gray and tan rock and soil are visible on the hill or mesa slopes. Dark green vegetation grows on top of these features, but the viewing distance tends to diminish these landscape features. To the north, the middleground is dominated by the rugged, uniformly vegetated slopes and cliffs that are a continuation of The Backbone feature.

Background views to the southeast and east are simple: a low, undulating range and ridgeline is the only background landscape feature, and its distance from the viewpoint causes its features to appear indistinct. Background views to the north are obscured by the high slopes and cliffs in the middleground.

Viewpoint 15 (GSENM Primitive Road)

The Primitive Road viewpoint (**Figure 3.13-2**) is located within the boundary of the GSENM (and designated as VRM Management Class II and Class III) at a point where an existing power transmission line and line maintenance road proceed northwest into the northernmost portion of the GSENM. This location was chosen because of its proximity to East Valley, SR 12, and the town of Tropic; it was also chosen because it lies within the GSENM and because the Proposed Action route or Cedar Fork Southern route would lie adjacent to this existing transmission line. The viewscape is to the northwest, looking into the GSENM.

Immediate foreground views lie within designated VRM Management Class III areas, with the far foreground to the north within a designated VRM Management Class II area. Foreground views are of a topographically flat landscape that rises abruptly in the far foreground into a long, low, gently sloping ridge. The abrupt rise of the low ridge creates a strong linear edge effect at the base of the ridge, where it meets the flat landscape. The existing dark brown, vertical power poles, horizontal transmission lines, and access road are clearly visible and also create landscape line and edge effects with the surrounding and background landscape as they recede into and converge in the far foreground–near middleground. With the exception of surface disturbances within the access road, vegetation is uniformly distributed within the foreground: dense, low-lying, brown, reddish, and green shrubs and grasses cover the flats; uniform, but more sparsely distributed, vegetation covers the ridge slopes. Tan, exposed soil is clearly visible on the slopes and on the access road. The foreground texture is smooth.

Middleground views lie within designated VRM Management Class II and Class III areas (views to the northwest are generally within VRM Management Class III; views to the north lie within VRM Management Class II). The views are dominated by rugged, steep-sloping to vertical cliff faces that extend across most of the middleground landscape. These features are reddish-pink, buff to tan, with cliff tops and talus slopes irregularly topped with patches and lines of dark green vegetation. Background views are obscured by the high cliff faces in the far middleground.

3.13.2.3. Agency Visual Resource Management Areas

The Proposed Action and alternatives cross both USFS SMS Scenic Integrity Objectives and BLM VRM Management classes. Segments of the proposed rights-of-way that intersect the agency visual resource management areas are summarized in **Table 3.13-4** and shown in **Figures 3.13-1 and 3.13-2**.

Table 3.13-4. Agency Visual Resource Management Areas by Alternative

Alternative Segment	DNF–SMS (miles)			GSENM–VRM (miles)		KFO–VRM (miles)		
	High	Mod	Low	II	III	II	III	IV
A-1	2.98	8.25	0.00	0.81	2.82	0.00	0.00	0.00
A-2	0.35	1.44	0.00	0.00	0.00	0.00	0.00	0.00
A-3	2.79	1.50	0.00	0.00	0.00	0.00	3.15	0.16
B	4.01	1.32	0.26	0.00	0.00	0.71	4.49	3.09

Alternative Segment	DNF–SMS (miles)			GSENM–VRM (miles)		KFO–VRM (miles)		
	High	Mod	Low	II	III	II	III	IV
C-1	1.64	2.93	1.20	0.81	2.82	0.00	0.00	0.00
C-2	0.22	2.25	0.00	0.00	0.00	0.00	0.00	0.00
C-3	2.47	1.09	1.76	0.00	0.00	0.00	3.27	0.16
East-West	0.18	1.74	1.78	0.00	0.00	0.00	0.00	0.00
North-South	0.00	1.27	0.57	0.00	0.00	0.00	0.00	0.00

3.14. CULTURAL RESOURCES

Cultural Resources are non-renewable indications of a past cultures' use of a region. These resources are not necessarily limited to, buildings, structures, objects, districts and sites. Federal regulations obligate federal agencies to protect and manage cultural resources. The NHPA of 1966, as amended, and the Archaeological Resource Protection Act of 1979 (ARPA) are the primary laws regulating preservation of cultural resources.

3.14.1. Data and Methods

Information regarding cultural resources in the Project Area was collected through literature searches and field inventory. A cultural resources report was completed by Transcon (Bassett 2008) and submitted to the DNF, KFO (which also administers cultural resources in the GSENM), and BRCA agency archaeologists for review. The descriptions of the data sources and methods provided here are derived from the Transcon report (Bassett 2008).

A records review was undertaken to identify previous survey projects and previously recorded sites within 1 mile of the Project Area. Records were reviewed at the Utah Division of State History, DNF, and KFO and through General Land Office maps and plats.

A pedestrian survey was undertaken following standard agency protocols. The ground surface was surveyed by walking approximately 50-foot transects along the route of the proposed alignments. A 100-foot-wide survey area (in two parallel transects), centered on each alternative, was walked, and a 50-foot-wide survey area (one transect) was walked along the existing 69 kV transmission line. Where a new alignment ran parallel to the existing line, these were combined and a 150-foot survey (in three parallel transects) was walked. These areas are also referred to as the Area of Potential Effect (APE).

Several additional areas were also surveyed. Along the existing 69kV transmission line, a 50-foot radius was surveyed around each existing pole since these are likely to be cut down. Also, at each turning point on an alignment, a 100-foot-wide, 400-foot-long conductor pulling area was surveyed. At numerous locations along the alignments, lay-down areas were surveyed to provide locations for poles and other equipment to be stored. These typically measured approximately 200 by 600 feet. Larger substation locations were surveyed at the proposed East Valley and Bryce Canyon substations and at the existing Hatch Substation. As with the linear right-of-way, the block lay-down and substation surveys employed 50-foot transect widths. No access roads were surveyed since it is unlikely that any access roads outside of the previously defined survey areas will be necessary. However, the need for an access road survey will be revisited once an alignment is selected and engineered.

Several segments of the Project Area were excluded from survey. The DNF archaeologist approved excluding areas of extreme terrain from survey, especially areas of 60 degree slope or greater, such as in canyons or areas with degraded sandstone hoodoos. Experience indicated that there is little or no likelihood for cultural material in this terrain, and the safety of the surveyors is a consideration. Segments deleted for this reason occur in Cedar Fork Canyon at the east end of the Project Area and in Red, Hillsdale, and Bluefly Canyons on the west side of the Project Area. However, BRCA requested that similar terrain under National Park jurisdiction be surveyed if this could be carried out safely. No segments of the Park were excluded from survey.

Although 39 previous surveys overlap to some extent with the current project, only one area was excluded from survey due to prior coverage. This was a segment at the base of Hillsdale Canyon that had been twice previously surveyed, once for the Hillsdale Timber Sale Survey (U-76-FS-0132) and again for the Garkane Bryce Canyon to Hatch 69kV Transmission Line (U-88-AS-0482). In addition, a 1.7-mile-long segment of the existing 69kV line from the proposed East Valley Substation, west across Tropic Valley, had been recently rebuilt and upgraded to carry a 138kV load. Since no action is proposed along this stretch of the line, this segment was not surveyed.

Much of the proposed route is adjacent to existing transmission or distribution lines or section line fences. Where such features did not exist, an archaeologist walked the alignment centerline in front of the survey archaeologists with a Trimble sub-meter GPS on which the project alignment had been downloaded. Where trees or terrain reduced satellite reception, the survey was halted until the alignment centerline could be re-established. Substation locations were also downloaded onto the GPS unit. Likely lay-down areas were selected, surveyed, and mapped by the survey archaeologists at locations indicated by Garkane.

Surface visibility was generally good to excellent except in some areas that had thick grass cover or pine duff accumulation. On the west edge of the Paunsaugunt Plateau, in unburned areas to the east of the Hatch Mountain Substation, and on the bottomlands of the Sevier River, visibility was poor. In other areas, such as in Joe's Valley and in canyon bottoms, erosive stream channels had disturbed the ground surface.

Where cultural resources were identified, field notes and photographs were taken and a Trimble sub-meter GPS unit was used for mapping. Field forms were used to inventory all prehistoric surface artifacts on small sites and sampled areas for larger sites. Previously recorded sites and historic locations mapped within 200 feet of the project alignment were relocated in order to determine whether or not they extended into the proposed Project Area. Standard professional guidelines were used in deciding whether identified cultural materials warranted designation as a site or whether they could be recorded as isolated occurrences.

3.14.2. Existing Conditions

3.14.2.1. Culture History

The following discussion of the region's prehistory and history has been taken verbatim from Bassett (2008). The reader is directed to this volume for details of the references cited therein.

Professional investigations of the Project Area were initiated in the 1950s and, since that time, the cultural history of Utah and of the project vicinity has been reviewed by a number of authors (Steward 1938; Chidester and Bruhn 1949; Wormington 1957; Euler 1966; Marwitt 1970; Jennings 1978; Madsen 1989; Holt 1992; Caywood and Grant 1994; Cordell 1997; Madsen and Simms 1998; Newell and Talbot 1998; and Reed et al. 2003). Studies have included extensive excavations of Archaic Period habitation sites and, since the 1970s, cultural resource management surveys.

Prehistory and Ethnohistory

The region that includes the Project Area contains no clear-cut evidence of Paleo-Indian (c. 10,000–7000 BC) presence. However, isolated Paleoindian points have been found in the region, especially near the Escalante Valley, Sevier Lake, and the Mineral Mountains (Copeland and Fike 1988) and a probable occupation has been identified at the Two Springs site north of Milford (Reed et al. 2003). These remains probably represent nomadic groups hunting large animals and collecting plant foods. Radiocarbon dates indicate a relatively late occupation of the region.

The later Archaic occupation began in this region sometime around 6500 BC with the extinction of the megafauna and lasted until the first millennium AD. In Utah this occupation is often subdivided into the Early (6500–3500 BC), Middle (3500–1500 BC), and Late (1500 BC–AD 1) Archaic periods; these last two are characterized by a gradual occupation of wooded upland environments and the abandonment of many lower, lacustrian locations.

The Archaic peoples followed a seasonal round of hunting and gathering, utilizing a wide range of plants and smaller animals than previously, as well as processed seeds and tubers. These sites can often be differentiated from later ones by an absence of cultigens, pottery, and small arrow points. Important new technologies included nets, traps, atlatls, and milling stones; obsidian from sources west of the Project Area was used and widely traded. Numerous Archaic sites have been identified in the region. These site locations are often associated with good viewpoints, the availability of raw material suitable for stone tool manufacture, and pinyon groves.

By the first millennium AD, Formative cultures were present in south-central Utah. The Formative is identified by maize agriculture, ceramics, and greater sedentism, often involving permanent or semi-permanent housing. Formative period sites in the vicinity of the Project Area tend to be associated with the Sevier Fremont culture, although an Anasazi influence has been noted at sites along the Paria River.

Most Fremont village sites are associated with well-watered areas of good soil at low to moderate elevations. In the vicinity of the Project Area these may have included terraces along the Paria River and its tributaries. Although the agriculturally oriented Fremont also used higher altitude areas for hunting and some resource collection, those remains are often limited and can be confused with non-Formative uses of the area. Between AD 1200 and 1500 there was a gradual abandonment of the region by Formative groups, possibly due to drought or warfare.

By 1300 Numic-speaking Shoshonean peoples entered the Project Area from the west. These groups followed a lifeway more similar to the Archaic than the immediately preceding Formative groups. They were highly mobile, relying on seasonal hunting and gathering and living in temporary structures called wickiups. Numic sites can be identified by Desert Side–notched projectile points and Numic ceramics and often include hearths and roasting pits. Subsistence options for these groups included plant collecting, small and large game hunting, fishing, and some limited agriculture. The descendants of these groups lived in southern Utah at contact and included the Shivwit, Koosharem, Kanosh, Indian Peaks, and Cedar City bands of the Southern Paiute. Protohistoric and historic Southern Paiute sites are not commonly found but have been identified in the vicinity of the project.

History

The first Europeans in Utah were Spanish explorers, missionaries, and traders. The route they followed looped up from the pueblos of the Four Corners region and ran north of the Project Area and then south-southwest to the west of the Project Area. This Old Spanish Trail was first established as a trade and migration route by Native Americans and, later, was used by fur trappers, traders, and soldiers. Goods from Santa Fe, including Native American slaves, were transported along this route to

Los Angeles; other goods, especially horses and mules, were traded back. The Spanish also traded with the mounted Utes along this route for Southern Paiutes captured as slaves. The route was especially heavily traveled during the 1830s and 1840s, but the first wagons on the trail were probably those of the Mormon Battalion traveling from San Diego to Salt Lake City in 1849.

Settlers first arrived in the area surrounding Bryce Canyon in 1864. Exploration in 1852 by Mormon pathfinders had resulted in the determination that Panguitch Valley and the Sevier Valley to the south was a suitable area for 50 to 100 families to settle (Chidester and Bruhn 1949).

Hatchtown, a small town on the Sevier River 20 miles south of Panguitch, was founded when Meltiar Hatch moved there to coordinate the Panguitch's cattle co-op (Newell and Talbot 1998). Several families followed and, by 1880, Hatchtown had about 100 residents. Hatchtown remained at this location through two failed attempts at creating a dam along the Sevier River. In 1901, the entire town was broken down, moved to higher ground, and renamed Hatch. In November 1908, a reservoir was successfully completed; the dam held until 1914 when it broke, destroying crops, a flour mill, a house, and canals and irrigation ditches. Currently, seven buildings constructed prior to 1939 remain in the town. The smaller community of Hillsdale (formerly Johnson's Fort) is located near the junctions of U.S. 89 and SR 12. The site was first settled in 1871 by Joel Hills Johnson and George Deliverance Wilson, who established a sawmill nearby (Chidester and Bruhn 1949; Newell and Talbot 1998).

The construction of the 10-mile-long Tropic Canal, which runs from the East Fork of the Sevier River, across the Paunsaugunt Plateau to the Paria Valley, began in 1889. Within the next 2 years, anticipating the benefits of this irrigation system, several families moved into the area. In 1892 the canal was completed and the following year the Tropic and East Fork Irrigation Company was established to administer this and another canal. Residents of Tropic, including about 35 families by 1895, grew alfalfa, grains, corn, apples, and plums. Tropic was largely isolated from its neighbors until a road was constructed through Little Henderson Canyon (Chidester and Bruhn 1949; Newell and Talbot 1998).

The publicizing of Bryce Canyon and its inclusion in the National Park system contributed to the success of both Tropic and Hatch, bringing better roads and a steady stream of tourists and allowing locals to invest in the creation of hotels and restaurants. BRCA was named after one of its first settlers, Ebenezer Bryce, a Scottish emigrant. Tourism increased when the Union Pacific Railroad built a rail line to Cedar City, where tourists could secure a bus tour starting in Cedar Breaks and continuing on to Bryce Canyon, Zion National Park, and the north rim of the Grand Canyon (Chidester and Bruhn 1949; Caywood and Grant 1994; Newell and Talbot 1998).

Two local homesteaders, Clara (Minnie) Armeda and Reuben (Ruby) Carlson Syrett, responded to the sudden influx of tourists by building Tourist's Rest near Sunset Point. Their lodge and large dance floor were soon bought out by the Union Pacific. After moving back to their homestead, Ruby convinced state engineers to place the road being built into Bryce Canyon across his property. Ruby and Minnie then opened another hotel, Ruby's Inn, which still operates today. To acquire the lumber for construction, the Syrett's built a saw mill which also provided lumber to the Union Pacific and the National Park (Chidester and Bruhn 1949; Caywood and Grant 1994; Newell and Talbot 1998).

3.14.2.2. Previously Recorded and Newly Recorded Cultural Resources

Previous Work

Records were reviewed at the Utah Division of State History, DNF, and BLM KFO and through historic General Land Office maps and plats. The file search resulted in the identification of 101 previous cultural resource surveys that had been conducted within 1 mile of the project alignments.

Of these, 39 previous projects overlapped to some degree with the cultural resources Survey Area identified for the current project, within 200 feet of the alignment.

Previously Recorded Cultural Resources

As a result of prior cultural work in the area, 279 previously recorded cultural resources sites were identified within 1 mile of the project alignments. The majority of these were outside of the project APE. Twenty-three of the 279 previously recorded sites had been mapped as crossing or with boundaries located within 200 feet of the currently defined project Survey Area. Each of the 23 sites was searched for in the field, and all except 2 were relocated.

Of sites recorded as within the project APE, six were either previously recommended or determined to be eligible for the NRHP. An additional two linear sites—42Ga3916 (Historic SR 12) and 42Ga4992 (Historic U.S. 89)—also cross the project APE, but the segments of these sites where they cross the project APE have been evaluated as non-contributing to their respective site's eligibility status and will therefore not be given further consideration. Previously recorded NRHP eligible sites within the project APE and their alternative alignment segment locations are listed in **Table 3.14-1**.

Table 3.14-1. Previously Recorded NRHP Eligible Sites in the Project APE

SITE NUMBER	TYPE	DESCRIPTION	ALTERNATIVE
42Ga1241	Prehistoric	Lithic scatter	A
42Ga3358	Prehistoric	Lithic scatter	A, B, C
42Ga3363	Prehistoric	Lithic scatter	B
42Ga3605	Prehistoric	Lithic scatter	B
42Ga4506	Prehistoric	Lithic scatter	B
42Ga5970	Historic	Tropic Ditch	B, C

New Survey Results

As a result of the additional new survey of the project alignments APE, 37 archaeological sites were identified. The sites were photographed, mapped, and recorded on Intermountain Antiquities Computer System (IMACS) site forms. Of the 37 recorded sites, 9 have been recommended eligible to the NRHP. The newly recorded NRHP eligible sites within the project APE and their alternative alignment segment locations are listed in **Table 3.14-2**.

Table 3.14-2. Newly Recorded NRHP Eligible Sites in the Project APE

SITE NUMBER	TYPE	DESCRIPTION	ALTERNATIVE
42Ga6187	Prehistoric	Lithic scatter	B
42Ga6192	Prehistoric	Lithic scatter	B
42Ga6195	Prehistoric	Lithic scatter	B
42Ga6196	Prehistoric	Lithic scatter	B
42Ga6199	Prehistoric	Lithic scatter	A
42Ga6202	Prehistoric	Lithic scatter	A
42Ga6203	Prehistoric	Lithic scatter	C
42Ga6204	Historic	Saw mill	C
42Ga6207	Prehistoric	Lithic scatter	B

Detailed information on previously recorded and newly recorded cultural resource sites is confidential and included in the Cultural Resources Specialist Report in the project record.

3.14.2.3. Summary of Sites per Alternative Alignment Segment

The acreages of sites intersected by the APE are provided in **Table 3.14-3**. No sites which would be affected by construction are associated with lay-down, pulling, or splicing areas or substations. Since specific tower locations have not been defined, it is not possible to determine what proportion of sites may be totally avoided by different alternatives. However, it can be assumed that the greater the number of site acres crossed by a proposed right-of-way, the less potential there would be for total site avoidance by repositioning towers and so on.

Table 3.14-3. Summary of Sites Impacted by Alternative

ALTERNATIVE SEGMENT	ACRES IN APE
APE acres in Segment A-1	6.36
APE acres in Segment A-2	0.00
APE acres in Segment A-3	1.77
Total APE acres in Alternative A	***8.32***
Total APE acres in Alternative B	***20.68***
APE acres in Segment C-1	1.37
APE acres in Segment C-2	0.00
APE acres in Segment C-3	1.77
Total APE acres in Alternative C	***3.33***

3.15. SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.15.1. Data and Methods

Garfield County would be the area of greatest impact for both the construction and operations phases of the project and, therefore, the Study Area for both direct and indirect effects.

The social and economic effects of the project within the Study Area are analyzed for both construction and operation phases. Primary sources of baseline data include the U.S. Bureaus of the Census, Economic Analysis, and Labor Statistics, as well as state and county sources (Utah State Tax Commission, Department of Commerce, Public Services Commission) and Garkane Energy.

Garfield County is among the most rural counties in Utah. In order to put the baseline socioeconomics of Garfield County in context, parallel baseline data for the five-county Southwestern Utah Region are included in most tables for comparison. The Southwestern Utah Region consists of Beaver, Garfield, Iron, Kane, and Washington Counties and includes the county with the lowest population density (Garfield) and the county with the highest growth rate (Washington) in the state. The Southwestern Utah Region was chosen for comparison because of its geographic proximity and economic dissimilarity, providing a clear contrast. Neighboring rural counties, such as Kane, Wayne, or Piute, are similar enough to Garfield that comparison would provide only subtle distinctions, whereas comparison with booming, urbanizing counties (such as Washington County) demonstrates how restrictions on growth have permeated the economic and social structure of the county.

3.15.2. Existing Conditions

3.15.2.1. Introduction

Garfield County is located in south central Utah. The western half of the county is characterized by high forested plateaus separated by populated valleys. The eastern half is lower in elevation and mostly desert with very little population.

Garfield County is one of the most sparsely populated counties in Utah. Geographically, Garfield County is the fifth largest county in Utah, but it has the fifth smallest population. Most of the county's residents are clustered near the high alpine environment on the west side of the county where the majority of water and private land can be found (State of Utah 2003).

Garfield County is characterized by vast rangelands that include some of Utah's largest forest reserves and a low rate of private land ownership. Only 5.1 percent of the county is privately owned. Nearly 90 percent of the land in the county is federally administered.

Cities and towns within close proximity to forest lands include Panguitch, Hatch, Tropic, Antimony, Escalante, and Boulder. Panguitch is the largest city with an estimated 2006 population of 1,485.

Garfield County's economy is driven by tourism and agriculture (primarily cattle and lumber). The leisure and hospitality sector (tourism) accounts for more than 36 percent of all nonfarm jobs in the county. Agriculture accounts for almost 11 percent of all jobs (farm and nonfarm). The county's largest employer is Ruby's Inn, a resort located near Bryce Canyon that employs between 250 and 500 people and incorporated as Bryce Canyon City in 2007. The second largest non-agricultural employment sector is government, although income from government employment is greater than that from tourism.

Some socioeconomic data are provided in tables below. More extensive data are provided in the Socioeconomics Specialist Report in the project record.

3.15.2.2. Land Ownership

Nearly 90 percent of Garfield County is federally owned, including land managed by the BLM, USFS, and NPS. As shown in **Table 3.15-1**, this is in contrast to about 80 percent of public land in the Southwestern Utah Region and 75 percent of public land statewide. Privately owned land comprises 5.1 percent of the total land area of Garfield County, versus almost 15 percent regionally and over 20 percent statewide. The high percentage of public land translates into a high percentage of land that is not taxable; infrastructure such as highways and utilities must cover long distances to serve scattered population centers; infrastructure capital expenses and maintenance costs per person are increased; and limited available (private) land restricts growth potential.

Table 3.15-1. Land Ownership/Management

Owner/Managing Agency	Garfield County (acres)	Garfield County (% of total)	SW Region (acres)	SW Region (% of total)	State of Utah (acres)	State of Utah (% of total)
Bureau of Land Management[1]	1,491,099	44.8	5,886,894	52.2	22,809,674	42.0
U.S. Forest Service[2]	1,046,827	31.4	1,946,999	17.3	8,115,930	14.9
National Park Service[3]	446,281	13.4	686,676	6.1	1,950,979	3.4

Owner/Managing Agency	Garfield County (acres)	Garfield County (% of total)	SW Region (acres)	SW Region (% of total)	State of Utah (acres)	State of Utah (% of total)
Department of Defense	0		0		1,812,596	3.3
Fish & Wildlife Service	0		0		62,439	0.1
Total Federal Lands	***2,984,207***	***89.6***	***301,341***	***75.5***	***34,751,619***	***64.0***
American Indian Lands	**0**		**30,686**	**0.3**	**2,442,864**	**4.5**
State Parks	1,345	0.04	17,831	0.2	102,115	0.2
State Wildlife Lands	1,595	0.05	22,761	0.2	466,656	0.8
Other State Lands			2.5	0.0	682,024	1.3
State Trust Lands	157,282	4.7	624,754	5.5	3,419,682	6.3
Total State Lands	***160,222***	***4.8***	***675,549***	***6.0***	***4,670,839***	***8.6***
Total Water Bodies	17,617	0.5	94,840	0.8	987,426	1.8
Private Lands	**169,856**	**5.1**	**1,677,120**	**14.8**	**11,462,805**	**21.1**
Total Acres	***3,312,409***		***11,288,469***		***54,315,191***	

Source: BLM 2006.

[1]BLM-managed lands include national monuments, recreation areas, wilderness, and others.

[2]USFS-managed lands include national forests, recreation areas, wilderness, and others.

[3]NPS lands include national parks, monuments, historic sites, and recreation areas.

3.15.2.3. Demographics

Demographics include population growth and characteristics. As in the previous section, the demographics of Garfield County are compared against those of the southwestern region of Utah (of which Garfield County is a part) as a means of providing a reference point for analysis. Demographics are also the basis for determining if minority populations are being disproportionately impacted under environmental justice guidelines and reflect economic conditions as will be seen in the following sections.

Population

Table 3.15-2 shows population counts, recent growth, and projections for the future and projects the average annual growth rate (AAGR) for Garfield County. Projections of future growth are based on recent growth rates, so if, for example, population growth has been held back in an area because of limited availability of power or water, the projections will not reflect what the growth rate might be if the limiting factor is removed.

Table 3.15-2. Population Statistics

	GARFIELD COUNTY	SOUTHWESTERN REGION	STATE OF UTAH
Population 2000	4,735	140,919	2,233,169
Population 2007	4,872	203,499	2,699,554
Percentage change from 2000 to 2007	2.9	44.4	20.9
Population 2006	4,772	195,817	2,615,129
Percentage change from 2006 to 2007	2.1	3.9	3.2
Projected population—2010	5,092	237,338	2,927,643
Projected population—2020	5,843	371,946	3,652,547
Projected population—2030	6,823	533,664	4,687,831
Projected population—2040	7,656	707,035	5,171,391
Projected population—2050	8,738	891,890	5,989,089
Projected population—2060	10,356	1,083,691	6,840,187
AAGR[1] 2000–2060	1.3	3.4	1.9
Percentage urban	0.0	68.9	88.2
Percent age rural	100.0	31.1	11.8
Population density 2007 (people/sq. mi.)	0.9	11.6	31.9

Sources: 2000 Decennial Census (U.S. Bureau of Census 2000); Population projections from Utah Governor's Office of Planning and Budget, Baseline Projections (GOPB 2008a); may differ from U.S. Bureau of the Census projections. Urban and rural population distribution from 2000 Decennial Census (U.S. Bureau of Census 2000).

[1]Average annual growth rate.

The growth rate for Garfield County for the period of 2000 through 2007 is more than an order of magnitude below the rates of either the region or the state. The AAGR for Garfield County is projected as being 68 percent of the State AAGR through the year 2060 and 38 percent of the regional rate.

Despite the rural nature of the southwestern Utah geographic region, the majority of the population lives in urban areas such as St. George and Cedar City. The 2000 Decennial Census determined that 69.9 percent of the Southwestern Utah Region population lived in urban areas. Five urban areas were identified by the 2000 Decennial Census. These are St. George with a population of 62,630, Cedar City (21,978), Hurricane (8,246), Kanab (2,734), and Colorado City (1,505); these urban areas have a combined population of 97,103, which is 68.9 percent of the total population of the region (140,919). The U.S. Bureau of the Census defines urban areas as census blocks with a population density of at least 1,000 persons per square mile, adjacent blocks with population densities of 500 persons per

square mile, and adjacent blocks with lower population densities if they meet certain criteria established by the Bureau of the Census. Boundaries of urban areas do not correspond to the city limits for which the areas are named. The population figures given above are for the urban areas and are not the city populations.

Urban versus rural population distribution is based on the Census Bureau's definition (above) of what constitutes an urban area. By that definition, none of Garfield County's population lives in an urban area, while 68.9 percent of the region and 88.2 percent of the state's population live in urban areas. **Table 3.15-3** shows populations of population centers by county for the region. Note that the largest population center in Garfield County (Panguitch) is smaller than the largest population centers of the other counties and tenth in size of the 19 shown.

Table 3.15-3. Regional Population Centers by County (Four Largest per County), 2006

COUNTY	CITY/TOWN	2006 POPULATION	CITY/TOWN	2006 POPULATION
Garfield	Panguitch	1,485	Escalante	750
	Tropic	467	Boulder	178
Beaver	Beaver	2,631	Milford	1,441
	Minersville	848		
Iron	Cedar City	25,665	Enoch	4,550
	Parowan	2,549	Paragonah	465
Kane	Kanab	3,754	Orderville	606
	Big Water	413	Glendale	350
Washington	St. George	67,614	Washington	15,217
	Hurricane	12,084	Ivins	7,205

Source: 2008 Economic Report to the Governor (GOPB 2008b).

The State of Utah has a relatively young population, averaging 27.1 years statewide. The median age of the population of Garfield County is 33.8 years, as compared with the Southwest Region (29.9 years) and the State of Utah (27.1)U.S. Bureau of Census 2000). Higher median age often reflects a lack of economic opportunity, which leads younger people to leave the area for college or higher paying jobs out of the region.

Garfield County has a higher percentage of one-person households than the region or the state and a lower percentage of non-family households of two or more persons. This is shown in **Table 3.15-4**. Average household size is slightly lower than for either the region or state at 2.92 persons per household. This reinforces the profile of younger people leaving the area, since household size is strongly influenced by children in a family, either older (post–high school) children living with their parents or young families with young children.

Table 3.15-4. Household Statistics, 2000

	GARFIELD COUNTY	SOUTHWESTERN REGION	STATE OF UTAH
Households	1,576	46,361	701,281
One-person household	20.5%	17.6%	17.8%
Family household—2 or more	76.1%	77.4%	76.3%

	GARFIELD COUNTY	SOUTHWESTERN REGION	STATE OF UTAH
persons			
Nonfamily household—2 or more persons	3.4%	5.0%	5.9%
Persons per household	2.92	2.98	3.13

Source: U.S. Bureau of Census (2000).

Race and Ethnicity

Table 3.15-5 shows race and ethnicity for the three areas. As with the region and state, over 90 percent of the population is white. Race and ethnicity are used to ascertain if minority populations are located in a Project Area as a first step in the process of determining if there are environmental justice issues.

Table 3.15-5. Race and Ethnicity by Percentage

ETHNICITY	GARFIELD COUNTY	SOUTHWESTERN UTAH REGION	STATE OF UTAH
Population (2006)	4,534	184,216	2,550,063
White	95.72%	95.29%	93.47%
Black	0.26%	0.42%	1.01%
American Indian	2.40%	1.53%	1.32%
Asian	0.42%	0.88%	1.97%
Hawaiian or Pacific Islander	0.04%	0.44%	0.76%
Two or More Races	1.15%	1.44%	1.47%
Minority Total	4.30%	4.70%	6.50%
Hispanic	4.30%	6.42%	11.22%

Source: 2008 Economic Report to the Governor (GOPB 2008b).

Note: The percentages reported here are the minority populations in each area relative to the total population in each area.

3.15.2.4. Housing

Housing availability, structure, and value are indicators of economies and growth. **Table 3.15-6** shows Census 2000 housing data for the three areas, including types of housing structures. Garfield County had more than a 40 percent vacancy rate in its housing and a substantially lower median value of owner-occupied housing than either the region or the state. However, this is likely explained by the high percentage of seasonal, recreational, or occasional use housing in Garfield County, as compared with the region and the state. Data in the table support the suggestion that a high percentage of housing units in Garfield County may not be primary residences, with high percentages of mobile homes and boats, RVs, vans, and so on.

In the context of a NEPA analysis, housing occupancy and structure provide a baseline for determining housing availability for construction workers (short term) and resulting long-term population growth, if any. If housing is readily available, an increase in population, temporarily or long term, should not drive up the price of existing housing or increase property values significantly. In particular, a high percentage of construction workers who travel from job site to job site bring

mobile homes or recreational vehicles (RV) with them to use as short-term residences; if there are a substantial number of mobile home or RV parks in the Project Area, it is likely easier for these workers to find hook-ups for their rigs.

Table 3.15-6. Housing

	GARFIELD COUNTY	SOUTHWESTERN UTAH REGION	STATE OF UTAH
Housing units	2,767	59,290	798,594
Occupied	1,576	46,361	701,281
Percentage owner occupied	79.1%	72.7%	71.5%
Percentage renter occupied	20.9%	27.3%	28.5%
Vacant	1,191	12,929	67,313
Percentage vacant	43.0%	21.8%	8.8%
Seasonal, recreational, or occasional use	965 (34.9%)	8,970 (15.1%)	29,685 (3.7%)
Median value of owner-occupied housing	$90,400	$121,500	$142,600
Median year of construction	1975	1986	1976
Housing units	2,767	59,290	798,594
1-unit detached	2,180	39,116	520,101
1-unit attached	11	4,170	37,902
2 units	11	1,461	29,243
3–4 units	27	1,923	36,998
5–9 units	2	1,646	27,677
10–19 units	0	1,530	30,357
20 or more units	0	1,377	22,720
Mobile home	478 (17.3%)	6,711 (11.3%)	39,267 (5.0%)
Boat, RV, van, etc.	58 (2.1%)	740 (1.2%)	2,201 (0.3%)

Source: U.S. Bureau of the Census 2000 .

3.15.2.5. Education

Garfield County and the four other counties in the Southwestern Utah Region each have their own school district defined along county lines. The school districts are governed by elected school boards and operate independently of county governments. The Garfield County School District operates nine schools (**Table 3.15-7**). There are five elementary schools, one middle school, and three high schools spread among five communities (Utah State Office of Education 2007). Total enrollment in public schools in Garfield County declined 16 percent over the period 2000 through 2007, compared with enrollment in the Southwestern Utah Region, which increased 28 percent over the same period. The growth in school enrollment is concentrated in the Iron and Washington school districts. The other

three districts, which are more rural counties, have experienced flat or declining enrollments in recent years. Again, this may indicate that younger families with children are moving out of the area, given that Garfield County's overall population is growing but its school-age population is declining.

Table 3.15-7. Numbers of Schools and Enrollment

SCHOOLS	GARFIELD COUNTY	SOUTHWESTERN UTAH REGION	STATE OF UTAH
Elementary schools	5	44	508
Middle schools	1	14	145
High schools	3	17	110
Other schools	0	9	145
Attendance—1995	1,137	27,794	473,666
Attendance—2000	1,115	29,313	474,132
Attendance—2005	940	35,089	498,484
Attendance—2006	938	36,473	504,792
Attendance—2007	933	37,611	515,457
Percentage change in attendance 2006–07	-0.5%	3.1%	2.1%

Source: Utah State Office of Education 2008a, b.

Note: Does not include private, charter, or home school enrollment.

For 2007, the average school size in Garfield County was 104 students, while the average school size for the region and the state was 448 students and 568 students, respectively. This likely indicates that the Garfield County School District has ample buildings and infrastructure to accommodate either a short-term or long-term increase in students.

There are no institutions of higher learning in the Study Area; however there are two state institutions of higher learning in the Southwestern Utah Region: Southern Utah University (SUU) in Cedar City (Iron County) and Dixie State College (DSC) in St. George (Washington County). These institutions serve students from the region and state.

3.15.2.6. Health Care

The Garfield Memorial Hospital and Clinics, located in Panguitch, has 41 beds and is operated by Intermountain Healthcare, Inc., a nonprofit organization based in Salt Lake City. This suggests that the county hospital has access to larger medical resources and perhaps the financial backing to stay current with medical equipment and technology.

In addition to the Garfield hospital, the following hospitals are located in the Southwestern Utah Region: Dixie Regional Medical Center in St. George has 245 beds; Valley View Medical Center in Cedar City has 46 beds and (like Garfield Memorial) is operated by Intermountain Healthcare, Inc.; Kane County Hospital in Kanab has 38 beds; Beaver Valley Hospital with 49 beds and Milford Valley Memorial Hospital with 25 beds are both in Beaver County (Directory of America's Hospitals 2008).

3.15.2.7. Employment

According to the 2008 Economic Report to the Governor, nonfarm jobs in Garfield County totaled 2,260 in 2006. The county's economy is highly concentrated in tourism and government. In fact,

Garfield County relies on tourism and recreation more than any other county in the state, largely due to the presence of BRCA. In 2006, 36 percent of all nonfarm employment in Garfield County was in the leisure/hospitality sector.

Unemployment in Garfield County steadily declined from 9.4 percent in 2002 to 4.9 percent in 2006. Regional and state-wide unemployment also declined by the same proportions over the same time period. The seasonal nature of the tourist economy explains the county's high annualized unemployment rate, 4.9 percent compared with the statewide rate of 2.9 percent in 2006. Government is the second largest sector, accounting for 26 percent of all nonfarm jobs and the largest income. When combined, employment in these two sectors accounted for more than 60 percent of all nonfarm jobs in Garfield County in 2006. Major employers in Garfield County include Ruby's Inn, Garfield County School District, South Central Utah Telephone, Garfield Memorial Hospital, and the Federal Government (Utah Department of Workforce Services 2006).

By contrast, the unemployment rate for the region was 2.95 percent in 2006, which is very close to the state unemployment rate of 2.9 percent for the same time period. Trade, transportation, and utilities were the sector with the highest percentage of employment for the region and state at 21.20 percent and 19.50 percent, respectively, in 2006. This sector is much less seasonal than tourism and more stable year to year (Utah Department of Workforce Services 2006).

3.15.2.8. Wages and Income

Wage and income data for each county in the Southwestern Utah Region were obtained from the U.S. Bureau of Labor Statistics and the U.S. Bureau of Economic Analysis. Wages in Garfield County posted minimal growth (1.49 percent) from 2004 to 2005, as compared with wages in the region, which grew 5.86 percent. In the same period, wages in the state grew 3.59 percent. Garfield County experienced moderate growth in wages in the period between 2005 and 2006, growing 5.49 percent. The region experienced even greater growth in the same period, posting an increase of 7.49 percent. Overall wages in the State of Utah grew 5.41 percent during the period.

Despite strong wage growth in the region, the average annual wage in all counties stayed significantly below the 2006 state average of $35,130. In Garfield County, the average annual wage ($23,016) was more than 34 percent below the state average ($35,130). The annual wage in the Southwestern Utah Region was about 23 percent below the state average.

Garfield County had a substantially higher number of jobs in the leisure and hospitality sector than in the government sector; however, fewer numbers of jobs in the government sector paid more total wages than the greater number of employees earned in the leisure and hospitality sector. This substantiates the low average wages and seasonality of employment in the tourism industry, as well as the benefit to the economy of having government management offices in the county (GOPB 2008b).

Personal and Per Capita Income

Personal income is income received by persons from all sources (e.g., wages, investments, savings, rent). Per capita personal income is the mean income computed for every person living in a geographical area. Household income is the sum of income received in a calendar year by all household members, including household members not related to the householder, people living alone, and other non-family members (GOPB Economic Report to the Governor 2008b).

From 2005 to 2006, total personal income in Garfield County increased at an annual rate of 6.1 percent compared with 12.7 percent growth for the region and 8.2 percent statewide. Garfield County per capita personal income grew by 7.25 percent between 2005 and 2006. These show the limited economic growth in Garfield County for the period (Economic Report to the Governor 2008).

Median Household Income

Based on data from the U.S. Bureau of the Census (2000), the median household income of every county in the Southwestern Utah Region, including Garfield County, has been, and continues to be, significantly lower than the statewide median for the period of 2000 to 2005. Over the same period, household income has been rising faster in Garfield County and the region than it has been in the state as a whole. Median household income is the indicator used to determine poverty thresholds, in conjunction with household size and household members' ages. For 2005, the poverty threshold for a one-person household, under age 65, was $8,959, while the threshold for a two-person household, both under age 65, was $11,591 (U.S. Bureau of Census 2005). The threshold is calculated for a wide range of household sizes, ages, and relationships. In 2000, 374 people in Garfield county were considered to be living below the poverty level (7.9 percent of the population; USEPA 2008).

3.15.2.9. Local Government Finances

Data for local government finances include all local governments—not only county governments but also all municipalities, school districts, and special service districts within the counties. Regionally, 7.9 percent of local government revenues are from federal sources, while only 5.6 percent of Garfield County's revenue is from federal sources. Twenty-four percent of regional revenue is from state sources, but only 19 percent of Garfield County's revenue is from state sources (U.S. Bureau of Census 2002). Consequently, a higher tax burden is placed on residents, as evidenced by per capita taxes in Garfield County being 56.7 percent higher than for the region and per capita expenditures being more than three times those regionally. In other words, it is more expensive, per person, to provide services where there is a limited tax base, greater distances to deliver services, and fewer people to bear those costs.

The Utah Tax Commission Annual Report for Fiscal Year 2007 (July 2006–June 2007) showed total tax receipts for Garfield County as approximately $7,540,126, of which 62 percent came from property taxes, including the motor vehicle tax. Combined local sales and use taxes for the county, cities, and towns, including the County Option Tax, constituted 13.7 percent of receipts; tourism, transient room, and resort taxes (county and municipal) made up 13 percent of receipts; and the rural hospital tax accounted for 11 percent of the total.

Property Taxes

Property tax data from the Utah State Tax Commission are shown in **Table 3.15-8**. The table shows how tax receipts have changed over time and their relative value to Garfield County, the region, and the state. Note that property taxes include utilities.

Table 3.15-8. Property Taxes Paid, 2001–2006 (in $1,000s)

	Total Real Property	Total Personal Property	Utilities	Natural Resources	Motor Vehicle	Total Property Taxes
2001						
Garfield County	2,550	129	282	99	184	3,242
Southwest Region	71,806	3,889	6,318	522	7,217	89,752
State of Utah	1,113,901	108,044	122,080	47,612	150,291	1,541,929
2006						

	Total Real Property	Total Personal Property	Utilities	Natural Resources	Motor Vehicle	Total Property Taxes
Garfield County	3,627	124	302	186	450	4,689
Southwest Region	128,408	5,557	6,466	884	17,990	159,305
State of Utah	1,551,760	114,573	112,195	67,568	212,232	2,058,327

Source: Utah State Tax Commission (2006, 2007)

Payments in Lieu of Taxes

The Federal Government makes "payments in lieu of taxes" (PILTs) to local governments to help offset losses in property taxes due to nontaxable federal land. During 2008, PILTs for Garfield County totaled $433,138 (USDOI 2008). Based on the number of acres which would fall under the PILT program, Garfield County received only 17 cents per acre, which is less than a third of the rate received in the region or the state. PILTs are based on population, receipt-sharing payments, and the amount of federal land within a county. Over this 8-year period, payments have increased 21.1 percent to Garfield County, 31.6 percent to the region, and 30.6 percent to the state. This again shows how restraints on growth attributable to the limited base for taxation and development have affected the economy of Garfield County.

3.15.2.10. Agriculture

Since much of the Study Area is rural, agriculture and cattle ranching play a large part in the cultural identity of many of the residents. Livestock accounted for over 90 percent of agricultural production in Garfield County in 2002. Farmers in Garfield County reported average net losses, on a cash basis, during 2002 (National Agricultural Statistics Service 2002).

In most of the counties in the region, including Garfield, over 40 percent of the farmers have a principal occupation other than farming. In the remaining four counties, the majority of the farmers have nonfarm jobs in addition to their work on the farm. Although agriculture and ranching play a significant role in the culture and social makeup of the area, nonfarm employment is necessary to augment farm earnings (National Agricultural Statistics Service 2002).

3.15.2.11. Environmental Justice

This section was prepared in compliance with Presidential Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (EO 12898), dated February 11, 1994, and Title VI of the Civil Rights Act of 1964. The purpose of this section is to provide baseline information for determining whether the proposed project would have disproportionately high and adverse human health or environmental effects on minority and/or low-income populations. This analysis focuses on the populations located within the area potentially affected by the proposed project. In accordance with EO 12898, this analysis documents minority and low-income populations within Garfield County.

Both EO 12898 and Title VI address persons belonging to the following target populations:

Minority

Minority populations include all people of the following origins: Black, Asian, American Indian and Alaskan Native, Native Hawaiian or Other Pacific Islander, and Hispanic.

Low Income

Low income populations include persons whose household income is at or below the U.S. Department of Health and Human Services poverty guidelines.

As shown in **Table 3.15-5**, no significant populations of minority race or ethnicity are concentrated in Garfield County, relative to equivalent populations in either the southwestern Utah region or the state of Utah. Economically, although average annual wages in Garfield County are significantly lower than those for the region or the state, this is in large part due to the typically low wages associated with the dominant industry, tourism. It can be concluded from the above that no populations exist in Garfield County that would be considered minority populations under CEQ guidelines.

3.16. TRANSPORTATION

Figure 3.16-1 shows the Project Area in relation to the area transportation resources that would be impacted by the proposed project.

3.16.1. Data and Methods

The DNF LRMP (1986) outlines a strategy for maintaining the existing road system. In the future, transportation resources on the DNF will be managed under the DNF Motorized Travel Plan (2009). GIS data provide road numbers and approximate distances used to evaluate impacts to transportation resources on the Forest. The GSENM Management Plan (BLM 2000) was utilized for guidance on transportation and access management issues on the GSENM. The KFO RMP (BLM 2008a) provides guidance on management of transportation resources for KFO lands. Information on transportation resources within BRCA came from the NPS Management Policies (NPS 2006a) and the right-of-way permit issued to Garkane for the existing 69 kV transmission line that transects BRCA (NPS 2005). Data regarding state highway traffic volumes were obtained from the Utah Department of Transportation website. These data are used to determine traffic levels on various segments of roads and relative proportions of use of truck traffic and to determine the effect of construction and operational travel in relation to existing traffic levels. Information on management of roads on or crossing SITLA lands was obtained from Mr. Lou Brown of the SITLA Richfield office. Information about Garfield County Roads (CRs) as they relate to the proposed project was obtained from Brian Bremner, Garfield County Roads Department. The information is used to estimate the level of use and determine county requirements for use of county roads for construction of the project.

3.16.2. Existing Conditions

3.16.2.1. Transportation Routes

Transportation routes that would be affected by the proposed project are located in a remote and sparsely populated area. The primary economic driver within the Project Area is tourism (see Socioeconomics, **Section 3.15**), and the way tourists reach popular destinations in and around the Project Area is by automobile accessing the area via primary and secondary roads.

There are four major roads within the Project Area: U.S. 89 and SRs 12, 22, and 63. In addition there are one county road and a number of forest roads.

U.S. Highway 89

U.S. 89 runs north and south in the western portion of the Project Area east of and parallel to the existing 69 kV line running from the Hatch Substation to the proposed Hatch Mountain Substation. The existing 69 kV transmission line turns east-northeast from the Hatch Mountain Substation and crosses U.S. 89 approximately 6.5 miles north of the Hatch Substation.

Utah Highways (Secondary Roads)

SR 12 traverses the Project Area east and west, joining U.S. 89 north of Hatch. SR 12 crosses through and provides the main access to BRCA from U.S. 89. From BRCA, SR 12 continues east and north through the communities of Tropic and Boulder to connect to SR 24, which provides access to Capitol Reef National Park. The existing 69 kV transmission line runs nearly parallel to SR 12 northeast of Tropic and crosses the highway approximately 1.5 miles north of Tropic. SR 12 is designated an All American Road.

SR 22 provides access from SR 62 to the north, connecting to SR 12 just west of the BRCA boundary. This road is also known as Johns Valley Road or the Great Western Trail (SR 22 and 63).

SR 63 travels south from its junction with SR 12, terminating at the BRCA park boundary. At this point the road becomes Rt-010-Main Park Road, providing a driving tour through BRCA and terminating at Rainbow Point within the park. The existing 69 kV transmission line crosses SR 63 approximately 0.5 mile south of the intersection with SR 12.

County Roads

Garfield CR 7960, otherwise known as Henderson Canyon Road, travels east-northeast from its junction with SR 12 just north of Tropic, providing access to East Valley. The existing 69 kV transmission line terminates approximately 4 miles east-northeast of Tropic at a junction with CR 7960.

Other Roads

Numerous forest roads would provide access from U.S. 89, SR 12, and SR 22 to the Project Area. The forest roads that would provide access to the Project Area are roads suitable for high clearance vehicles, Maintenance Category 2. Passenger car traffic is not a consideration on these roads. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log hauling may occur at this level (USFS 2008e). As these roads are currently designated for high clearance vehicle use and receive minimal maintenance to allow for that access, the roads are anticipated to be only lightly used. Heavier seasonal use may occur during the summer or hunting seasons.

The two existing access routes for the Rocky Mountain Power/PacifiCorp transmission line access would likely require improvements in order to service the project. Forest Roads 31485 and 30419 diverge from SR 22 on state lands approximately 3 miles north of its junction with SR 12 and then converge to become Forest Road 30419 approximately 1.5 miles southeast of SR 22. Forest Road 30419 terminates approximately 1.75 miles east of the junction of the other two forest roads within the DNF.

The Rocky Mountain Power/PacifiCorp transmission line access diverges from CR 7960 approximately 4.5 miles from the junction of CR 7960 and SR 12, then travels approximately 4 miles northwest within the GSENM, and terminates within the DNF, approximately 2.7 miles from the boundary between DNF and GSENM.

The portion of GSENM traversed by Rocky Mountain Power/PacifiCorp transmission line access is designated a primitive area by the GSENM Management Plan (2000). Within the primitive zone, some administrative routes are included that could allow very limited motorized access (BLM 2000). Currently, the Rocky Mountain Power/PacifiCorp transmission line access is closed to the public within GSENM, but access for maintenance of an existing transmission line is allowed under the right-of-way. The east side of the Rocky Mountain Power/PacifiCorp transmission line access within the Primitive Zone of GSENM is the western boundary of The Blues Wilderness Study Area.

Rocky Mountain Power/PacifiCorp transmission line access continues onto DNF after it leaves the boundaries of GSENM. The area of the DNF containing both the Rocky Mountain Power/PacifiCorp transmission line access and Forest Road 30419 bisects Shakespear Point and Table Cliffs–Henderson Canyon IRAs. This access traverses the Powell Ranger District between the two IRAs within an acceptable planning window.

3.16.2.2. Traffic Statistics

The Utah Department of Transportation publishes annual traffic reports for Utah's highways providing annual average daily traffic numbers and truck percentages for specific road sections. Statistics are compiled from automated recording devices and short-time counts (UDOT 2007a) in order to annualize and average traffic estimates.

Truck percentages are the percentage of annual average daily traffic that is truck traffic, including all trucks that are greater than a two-axle, four-tire single unit (such as buses and trucks with more than four tires or two axles; UDOT 2007b).

Traffic volume estimated for Utah highways within the Project Area is summarized in **Table 3.16-1**.

Table 3.16-1. Annual Average Daily Traffic and Truck Percentages

Road Segment	Annual Average Daily Traffic	Truck Percentage
U.S. 89, Hatch to SR 12 junction	2,185	28%
SR12 between junction with U.S. 89 and SR 63	2,455	11%
SR 63 (Bryce Canyon National Park)	5,075	5%
SR 12 between junction with SR 63 and Tropic	1,805	13%

Source: UDOT 2006b.

Note: Data are averages of use; however, actual use includes major seasonal fluctuations between heavy summer traffic associated with tourism, and light winter use.

Figure 3.16-1. Affected Transportation Routes

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