CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter summarizes the existing environment of the affected Project area and the potential changes to those environments that would result from implementation of the No Action Alternative (Alternative 1), the Proposed Action (Alternative 2), and the Proposed Action with route modifications (Alternative 3) that includes route modifications in seven specific areas to address identified issues. It also presents the scientific and analytical basis for comparison of alternatives presented in Chapter 2. The information presented here is based on analysis prepared by resource specialists from the interdisciplinary team (IDT) using field observations and surveys, past experience and professional recommendations, aerial photography, resource modeling, literature review, information obtained through monitoring, Forest Plan direction and associated analysis, and public participation. The specialist reports containing additional information are included in the Project file, which is located at the Black Hills National Forest, Hell Canyon Ranger District, 330 Mount Rushmore Road, Custer, South Dakota; at the Thunder Basin National Grassland, Douglas Ranger District, 2250 East Richards St., Douglas, Wyoming; and at the BLM Newcastle Field Office, 1101 Washington Boulevard, Newcastle, Wyoming.

To develop the environmental analysis, existing environmental conditions were described within a Project analysis area centered on the proposed route for the line. The width of this Project analysis area varies from one mile to six miles depending on the resource and the geographic extent where impacts to that resource could occur. The Project analysis area width is designed to ensure that impacts are analyzed within an appropriate distance from the proposed line and to allow the flexibility to make relatively minor route adjustments for the proposed transmission line ROW to respond to resource concerns and issues that may be identified along the proposed route. The Project analysis area was one-mile wide for Hydrology, Timber, Fire/Fuels, Wetlands, Range, Weeds, Botany and South Dakota Wildlife. It was two miles for Hazardous Materials, Land Use, Soils, Transportation and Wyoming Wildlife, four miles for Greater Sage- grouse and six miles for Scenery. The Project analysis area was defined by county boundaries for some resources (Socioeconomics) or by recreational facilities (Recreation).

A 100-foot ROW width for the proposed line route was used to develop the analysis of potential impacts (environmental consequences) that would result from the construction and operation of the proposed transmission line and alternatives.

All resource specialists used the best available science in completing their analysis, in accordance with Forest Service Manual (FSM) 1920.

Analysis of cumulative effects include past, present, and reasonably foreseeable future activities that could affect the biological, cultural or social environments. See **Appendix C**

for a listing of past, present, and future activities considered in the T-O-RC Project cumulative effects analysis. The Project area boundary was used to address cumulative impacts, unless otherwise noted in the resource discussions. Rationale for cumulative effects boundaries is noted in the cumulative effects discussions by resource.

The Proposed Project is consistent with BHNF, TBNG and BLM management plans unless otherwise stated.

3.1 LAND USE / LAND MANAGEMENT

3.1.1 Existing Conditions

3.1.1.1 SOUTH DAKOTA

In South Dakota, the proposed transmission line and alternative cross both private lands and federal lands managed by the BHNF. **Table 3-1** below shows the amount of private land and public land that would be crossed in South Dakota.

TABLE 3-1 - LAND OWNERSHIP CROSSED IN SOUTH DAKOTA

Ownership	Miles
Private	9.1 miles
NFS Lands	36.3 miles
TOTAL	45.4 miles

The Proposed Action would utilize an existing unused 40-50 foot wide cleared transmission line ROW between the Pactola and Osage substations. In South Dakota, this ROW covers approximately 31.5 miles. This cleared ROW once accommodated a BHP 69 kV transmission line that has been removed and BHP maintains rights to the easement/ROW.

In addition, the analysis area includes other transmission lines. A network of 69 kV lines crisscrosses Rapid City in the eastern portion of the Area. Additional 69 kV lines extend north-south between Deadwood and Pactola, between Sturgis and Rapid City, and between Pactola, Hill City, Custer, and Hot Springs. A 230 kV transmission line extends north-south between Rapid City and Hot Springs. Another 230 kV line extends northeast-southwest between Deadwood and Osage.

There are also several existing abandoned mines in the vicinity of the Proposed Action's ROW just east of Pactola Reservoir and between the reservoir and Deerfield Lake.

3.1.1.1.1 Private Land

Private land in the two-mile-wide Project analysis area for land use consists of commercial, industrial, and residential developments, as well as undeveloped, forested land. All private lands in South Dakota are located in Pennington County.

Land use on the private lands in the area generally follows the County Zoning Ordinance designations with commercial developments in the General Commercial District; industrial

developments in the Light Industrial District and Heavy Industrial District; and residential developments in the Low Density Residential District. Per Section 316(F)(2)(d) of the County's Zoning Ordinance, and applicable to the districts above, "monopoles or replacement poles that would support utility lines shall be permitted within utility easements or rights-of-way" such that the easement or ROW is at least 100 feet wide and that overhead utility transmission structures are at least 80 feet tall".

Commercial and industrial developments are concentrated adjacent to Interstate 90 and Deadwood Avenue, just west of the Lange substation. Commercial developments include equipment sales and service establishments. Industrial developments include quarries.

The largest residential development is situated along South Dakota Highway 44, just east and west of Big Bend. Residences in the area are primarily low-density, single-family homes and are located along Gillette Prairie Road, in the Clinton area, along Mystic Road near the Mickelson Trail, approximately one mile southwest of the Seth Bullock Lookout, near the intersection of US Highway 385 and Custer Gulch Road, and along South Canyon Road/Nemo Road. The Terra Sancta Retreat Center, a Catholic retreat center, and St. Elizabeth Seton Catholic Elementary School are located approximately two miles west of Interstate 90. The remainder of private land is undeveloped.

3.1.1.1.2 Public Land

The principal laws that regulate land use in BHNF include the National Forest Management Act of 1976 (NFMA), the Multiple-Use Sustained-Yield Act of 1960, and the National Environmental Policy Act of 1969 (NEPA). Per the NFMA, the US Department of Agriculture (USDA) Secretary must prepare a renewable resource assessment to include a comprehensive inventory of all National Forest System lands and renewable resources. The NFMA also requires the USDA Secretary to develop a renewable resource program to conform to principles contained in the Multiple-Use Sustained-Yield Act and NEPA. These two acts, respectively, guide timber sales in national forests and analyze anticipated environmental impacts of projects that receive federal funding and/or require federal permits or approval.

Additionally, the USDA Secretary must implement a resource management plan and update the plan at least once every 15 years. The following describes BHNF's current Land and Resource Management Plan (LRMP). **Figure 3-1** presents jurisdictional boundaries for federal land in the two-mile-wide analysis area in South Dakota.

3.1.1.1.2.1 BHNF Land and Resource Management Plan

The US Forest Service (USFS) manages BHNF in accordance with its 1997 Revised LRMP, which it amended in 2005. In general, the LRMP provides a programmatic management strategy that covers the entire BHNF over a course of ten to 15 years and "provides guidance for all resource management activities on the Black Hills National Forest" (USFS

1997). The LRMP provides management Standards and Guidelines (S&G) that apply Forest-wide.

Those specific to transmission lines on the BHNF are listed in Chapter 1 of the EIS and other S&Gs are included in **Appendix D**.

The LRMP divides the Forest into 20 management areas and includes policies and direction for each. The Proposed Action's two-mile-wide analysis area crosses five BHNF management areas, including:

- Management Area 3.7 – Late Successional Forest Landscapes
- Management Area 4.1 – Limited Motorized Use and Forest Products
- Management Area 5.1 – Resource Protection Emphasis
- Management Area 5.4 – Big Game Winter Range Emphasis
- Management Area 8.2 – Developed Recreational Complexes

Table 3-2 below shows the number of miles of each of these management areas that would be crossed by the Proposed Action. The majority of the existing cleared ROW that would be used by the Proposed Action is located in BHNF Management Areas 5.1 and 5.4.

TABLE 3-2 - BHNF MANAGEMENT AREA DESIGNATIONS CROSSED BY THE PROJECT

Management Area	Miles
3.7 – Late Successional Forest Landscape	0.4
4.1 – Limited Motorized Use & Forest Product Emphasis	0.5
5.1 - Resource Production Emphasis	15.4
5.4 – Big Game Winter Range Emphasis	19.5
8.2 – Developed Recreation Complexes	0.5
Total NFS	36.3

3.1.1.1.2.1.1 BHNF Management Area 3.7

In Management Area 3.7, the USFS limits construction of new roads and does not seek to permit transmission corridors that might alter significant areas of vegetation. This management area covers 1,567 acres in the Project analysis area and is located on the Project analysis area's northern half between Hisega and Pactola Reservoir. This management area consists primarily of undeveloped, forested land and includes some recreational uses including the Tamarack Trailhead and Rapid Creek Trailhead, both of which lie east of Pactola Reservoir and cover two acres.

3.1.1.1.2.1.2 BHNF Management Area 4.1

In Management Area 4.1, the USFS promotes non-motorized recreation, timber and forage production, visual quality, and wildlife. Existing roads in this area are used to provide access to commercial activities, including timber production, and are generally closed unless opened for management or logging. This management area covers 319 acres in the Project analysis area and is situated on the Project analysis area's northern half along McCurdy

Gulch Road and Pactola Basin Road. This management area consists primarily of undeveloped, forested land and open space. Notable land use features include the Pactola Reservoir's dam, an electric power substation and transmission line, a recreational residence along McCurdy Gulch Road, and three recreational residences along Pactola Basin Road.

3.1.1.1.2.1.3 BHNF Management Area 5.1

In Management Area 5.1, the USFS manages for wood products, water yield, and forage production. Many open roads in this area are used for commercial purposes. Off-road motorized travel and motorized road travel are limited to routes and areas designated on the Motor Vehicle Use Maps (MVUM). This management area covers 19,460 acres in the Project analysis area, is situated west of the Clinton area, and covers a large portion of the Project analysis area. This management area consists primarily of undeveloped, forested land.

3.1.1.1.2.1.4 BHNF Management Area 5.4

In Management Area 5.4, the USFS manages all activities to protect deer and elk populations and, during winter months, reduces vehicle access to important deer and elk habitat. This management area covers 19,971 acres in the Project analysis area, is situated between Clinton and Rapid City, and covers a large portion of the Project analysis area in the BHNF. This management area consists primarily of undeveloped, forested land but includes land use features such as the two-acre Seth Bullock Lookout (which is not often visited) and four recreational residences, including two that lie north of South Dakota Highway 44 near Hisega, one along McCurdy Gulch Road, and three along Pactola Basin Road.

3.1.1.1.2.1.5 BHNF Management Area 8.2

In Management Area 8.2, the USFS manages properties that surround lakes to maintain high scenic integrity. This management area covers 1,498 acres in the Project analysis area and is situated on Pactola Reservoir's west side, on Deerfield Lake's south and north, and four miles south of the reservoir along Ditch Creek Road. This management area consists primarily of undeveloped, forested land and includes the north and south observation sites at Pactola (each of which covers two acres), the five-acre Black Hills Visitor Center at the Pactola Reservoir, and the two-acre Gold Run Trailhead on Deerfield Lake's south side.

3.1.1.2 WYOMING

In Wyoming, the proposed transmission line and alternatives crosses private lands, state lands, and federal lands managed by the TBNG and BLM. **Table 3-3** below shows the amount of private land and public land that would be crossed in Wyoming.

TABLE 3-3 - LAND OWNERSHIP CROSSED IN WYOMING	
Ownership	**Miles**
Private	80.9 miles
State	10.3 miles
BLM	2.6 miles
NFS lands	4.7 miles
TOTAL	98.5 miles

The Proposed Action would utilize an existing unused 40-50 foot wide cleared transmission line ROW between the Pactola and Osage substations. In Wyoming, this existing ROW covers approximately 17.5 miles.

In Wyoming, the analysis area also includes existing transmission lines. A network of existing 69 kV lines link the Osage substation to points north, south, and east, as well as west along Oil City Road/ Wyoming (WY) Highway 451. An existing 69 kV line and a 230 kV line extend north-south between the Teckla Substation and Gillette, generally paralleling WY Highway 59's east side. Three existing 230 kV lines connect to the Osage Substation, one line each from Deadwood, Gillette, and Hot Springs. Additional transmission lines are situated along WY Highway 450 at the Black Thunder Mine.

There are many active coal mining activities in Campbell County. In addition, oil and gas development and production activities are common in both Campbell and Weston Counties.

3.1.1.2.1 Private Land

In Wyoming, the analysis area includes both Campbell and Weston Counties. Private land in the two-mile-wide project analysis area consists of commercial, industrial, residential, and agricultural land. Neither county has zoning regulations.

3.1.1.2.1.1 Campbell County

In Campbell County, land use on private lands is guided by the Campbell County Comprehensive Plan that was adopted in 1994 and updated in 2013.This is provides the plan for Campbell County's future physical development and is a generalized blueprint for how the County should develop over the next 20 years.

The majority of the land in the two-mile-wide analysis area for land use in Campbell County is currently used for agriculture. However, industrial sites associated with mineral exploration and development and single-family residences are also present. Industrial sites (including coal mining) in the Project analysis area are approximately one mile north of WY Highway 450, one mile south of WY Highway 450, approximately one-half mile east of Matheson Road, and approximately three miles east of the Teckla Substation. Single-family residences are approximately two miles north of Keeline Road, along Keeline Road, and at the Keeline Road-Hilight Road intersection. Single-family residences are also located along Edwards Road and at Bridle Bit Ranch, which lies approximately two miles east of WY Highway 59.

Private lands and federal lands that are underlain by federally-owned mineral resources may be leased for oil and gas and coal mining activities in the Campbell County portion of the Project area. These federal mineral resources are managed by the BLM.

Campbell County occupies a portion of the Powder River Basin which contains significant amounts of mineral resources, both federally and privately owned. This basin is among the most prolific oil and gas producing basins in the United States. It contains proven oil and gas reservoirs in fields of various sizes and high potential for future exploration and development activity. Campbell County led Wyoming in oil and gas production in 2012, accounting for 9.6 million barrels.

The Powder River Basin also contains significant coal resources. In July 2010, the BLM issued the Final EIS for the Wright Area Coal Lease Applications. The BLM prepared the EIS to evaluate environmental impacts likely to occur should the BLM approve six pending coal lease applications near the Black Thunder and North Antelope Rochelle mines in eastern Campbell County. In the EIS, under the BLM's Proposed Action, a competitive lease sale would be held and maintenance leases for the tracts would be issued as applied for by the applicants. However, the BLM's preferred alternative would reconfigure the tracts, hold a competitive lease sale for the reconfigured tracts, and issue a maintenance lease for a tract that is larger than the original applied-for tract. As of November 2013, three of the six lease-by-application (LBA) tracts have been leased (South Hilight, North Porcupine and South Porcupine), and three of the six leases are pending (West Hilight, North Hilight Field and West Jacobs Ranch). Of the three remaining "pending" leases, only one (North Hilight) has a signed Record of Decision (ROD). The other two RODs (West Jacobs Ranch and West Hilight) are in draft.

Five of the six lease-by-application (LBA) tracts are in the area of the proposed transmission route: West Jacobs Ranch, North Porcupine, North Hilight Field, South Hilight Field, and West Hilight Field. The proposed transmission route would come within seven miles of these five LBA tracts.

West Jacobs Ranch

The West Jacobs Ranch LBA tract covers approximately 5,944 acres. This tract is approximately three miles east of the Town of Wright. There are no lands on the TBNG that are a part of the West Jacobs tract. The BNSF and Union Pacific Railroad (UPRR), North Hilight Field LBA tract, and the Black Thunder Mine border this tract to the east. WY Highway 450 and the West Hilight Field LBA tract border this tract to the south. Agricultural land borders this tract to the north and west.

North Porcupine

The North Porcupine LBA tract covers approximately 7,367 acres, of which 5,120 acres are on the TBNG. This tract is approximately 11 miles southeast of the Town of Wright. The North Antelope/Rochelle Mine borders this tract to the south. The School Creek Mine borders this tract to the east. The Antelope Ridge North LBA tract borders this tract to the

north. Agricultural land and the BNSF and UPRR border this tract to the west. On September 30th, 2011 the USFS provided consent to the BLM for North Porcupine LBA. On June 28th, 2012 the North Porcupine tract was sold to BTU Peabody Powder River Resources and is in the process of being incorporated into the North Antelope Rochelle State Permit to Mine.

South Porcupine

The South Porcupine LBA tract covers approximately 3,186 acres, of which 1,637 acres are on the TBNG. This tract is approximately 14 miles southeast of the Town of Wright. The North Antelope/Rochelle Mine borders this tract to the north.

North Hilight Field

The North Hilight Field LBA tract covers approximately 4,530 acres, of which approximately 81 acres are on TBNG. This tract is approximately six miles east of the Town of Wright. The BNSF and UPRR border the tract's west side. The Black Thunder Mine borders the tract to the south. Agricultural land borders the tract to the east and north. The West Jacobs Field LBA tract borders this tract on the west.

South Hilight Field

The South Hilight Field LBA tract covers approximately 1,977 acres, of which 1,625 acres are on the TBNG. This tract is approximately seven miles southeast of the Town of Wright. Agricultural land and the BNSF and UPRR border this tract to the west. The Antelope Ridge North LBA tract borders this tract to the south. The Black Thunder Mine borders the tract to the east and north. On August 18th, 2011 the USFS provided consent to the BLM for the South Hilight tract. On December 14th, 2011the South Hilight tract was sold to Thunder Basin Coal Company and is in the process of being incorporated into the Black Thunder Mine State Permit to Mine.

West Hilight Field

The West Hilight Field LBA tract covers approximately 7,192 acres of which approximately 2,857 acres are on the TBNG. This tract is approximately four miles southeast of the Town of Wright. The BNSF and UPRR and the Black Thunder Mine border this tract to the east. Agricultural land borders this tract to the south and west. WY Highway 450 and the West Jacobs Ranch LBA tract border this tract to the north. This tract has not yet been consented upon or offered for sale.

In addition to the tracts above, it is also important to note two future tracts: the Antelope Ridge North LBA tract and the Antelope Ridge South LBA tract. The Antelope Ridge North and South tracts cover approximately 5,800 acres and 2,600 acres, respectively. The North Porcupine LBA tract separates these two future tracts. The Teckla Substation is situated inside the Antelope Ridge South LBA tract.

For each of the above LBA tracts, not all of the land is mineable because state and local highways overlie some of the coal resources. The Surface Mining Control and Reclamation Act of 1977 (SMCRA) prohibits mining within 100 feet of either side of the ROW of any public road. Should state and local government authorities relocate roads, the underlying coal resources could be mined. Should these authorities choose not to relocate roads, an applicant could mine coal adjacent to the 100-foot buffer beside the highway ROW.

3.1.1.2.1.2 Weston County

As with Campbell County, the majority of the land in the two-mile-wide Project analysis area within Weston County is used for agriculture. However, commercial, industrial, and residential developments are present and are concentrated in and around Osage. There is also residential development in the Oil Creek area and new residences are located on a ranch within the analysis area. Commercial developments include the Sage Brush Bar and Lounge and Judy's Café. The Flying V Cambria Inn and RV Park Campground is situated on US Highway 85's west side north of Newcastle. The Inn includes lodging, RV and camping sites, an events venue and a bar and lounge. Industrial developments include Osage Partners, LLC and Bridger Pipeline, LLC, oil and gas facilities, and associated electric power transmission and distribution lines, and associated pipelines, just west of Osage on Oil City Road and Butcher Road. Also, there are other small, individual operators of oil and gas wells in the area

Residential developments include single-family housing units and mobile homes with single-family residences along Beaver Creek Road near the Wyoming-South Dakota state line; along Big Plum Creek Road and Plum Creek Road; at the Upton Fairview Road-Jesse Road intersection; off of WY Highway 116 at Shepperson Ranch; and along Raven Creek Road at Hoffman Ranch.

An existing 50 foot wide cleared, and currently unused transmission line ROW extends east of the Osage substation. The cleared ROW once accommodated a BHP 69 kV transmission line. The majority of the cleared ROW is situated on private land, and other portions of the cleared ROW are on public lands.

3.1.1.2.2 Public Land

The Proposed Action intersects BLM land, NFS lands that are part of TBNG, and State of Wyoming land. **Figure 3-2** presents jurisdictional boundaries for public land in the two-mile-wide analysis area in Wyoming. The following describes each of these of public lands, its general location in the Wyoming portion of the two-mile-wide Project analysis area, and land uses.

3.1.1.2.2.1 BLM Land

BLM-administered land in the Project analysis area covers approximately 5,397 acres but only 2.6 miles of it would be crossed by the 100-foot ROW of the Proposed Action. BLM-

administered surface and private lands with underlying federal mineral resources may be leased for oil and gas and coal mining activities. Access to oil and gas resources would be unconstrained by the proposed transmission line since drilling could occur near or adjacent to the ROW to access these resources. Development of coal resources however, could affect or be affected by the transmission line

The BLM's mission is to "sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations" (BLM 2001). The two principal laws that guide BLM land use planning activities include the Federal Land Policy and Management Act (FLPMA) of 1976 and NEPA. The BLM, in accordance with FLPMA, develops and implements resource management plans (RMPs) for the public lands and mineral resources within its jurisdiction.

Land use planning policies for BLM-administered lands in the T-O-RC Project area are included in the RMP prepared for the BLM Newcastle Field Office and are described below.

3.1.1.2.2.1.1 Newcastle, Wyoming RMP

The Newcastle BLM field office (NFO) covers Weston County, Wyoming. The Proposed Action would cross about 2.6 miles of BLM-administered surface managed by this field office. Five parcels in the NFO are intersected- ranging from 80 to 3,000 acres in size. The land is just east of the Campbell County-Weston County line - east and west of Osage. The land near the county line and east of Osage is undeveloped. The BLM manages for multiple uses under FLPMA unless the RMP or other policy otherwise constrains. The land just west of Osage includes a network of wells and drilling pads for oil exploration and development. The Newcastle RMP's (USDI BLM 2000) land and realty management policy for utility lines is to locate them adjacent to existing facilities whenever practical. Such facilities might require screening, painting, and/or a design that complements the surrounding landscape. Additionally, the RMP indicates that power lines should not be placed within 0.25 mile of developed or semi-developed recreation sites. Also, the Newcastle RMP includes a goal for ROWs to avoid "resource conflicts and sensitive areas" (BLM 2000).

The majority of BLM-administered lands within the analysis area in Weston County are in five geographically-separate tracts. These tracts are situated along the Wyoming-South Dakota state line, east of Osage along Oil Creek Road, just east of the town of Osage, and west of Osage between US Highway 16 and Oil City Road. The remainder of BLM land lies just north of the TBNG boundary between Baker Fork and West Bacon Creek and one small parcel lies approximately two miles north of WY Highway 450, just east of WY Highway 59. Land uses on these BLM-administered lands include oil and gas facilities, and associated electric power transmission and distribution lines. The remainder of BLM land in the Project analysis area is primarily undeveloped. In the Osage area, the Proposed Action would be located within a currently unused transmission line ROW.

Three of the five BLM-administered parcels within the analysis area have legal public access for recreationists. Public access within the NFO is limited and thus these parcels

have relatively high recreational value when compared to other non-accessible lands administered by the NFO. The Recreation section of this document provides further details regarding these parcels.

3.1.1.2.2.2 TBNG

The analysis area contains approximately 9,113 acres of TBNG and the Proposed Action would cross about 4.7 miles of NFS lands within the TBNG.. The majority of this land is concentrated in two locations: along the Weston County-Campbell County line in the vicinity of Baker Fork and West Bacon Creek and between WY Highway 450 and the Teckla Substation. The remainder of TBNG lies just north of Oil City Road, south of Sheep Canyon Creek near Jesse Road, northeast of Hoffman Ranch, south of Raven Creek Road near the Lone Tree Oil Field, and approximately two miles east of WY Highway 116. Land uses on TBNG include the Teckla Substation, coal mining developments, oil and gas facilities, and associated electric power transmission and distribution lines. Other parcels are used primarily for grazing and wildlife.

The TBNG is managed in accordance with the NFMA, FLPMA, the Multiple-Use Sustained-Yield Act of 1960, and NEPA. The following describes the management direction in the TBNG's current LRMP.

3.1.1.2.2.2.1 Land and Resource Management Plan

The USFS manages the TBNG per its 2002 Revised LRMP, which includes policies for TBNG's six geographic areas. The two-mile-wide analysis area includes three of these six areas – Fairview Clareton, Hilight Bill, and Upton Osage. The USFS' desired condition in the Fairview Clareton area emphasizes livestock grazing among land featuring rural and agricultural landscapes but oil and gas operations can dominate some landscapes, but should be less pronounced in other portions of this area. Similar livestock grazing and minerals development is the desired condition in the Hilight Bill area. The desired condition for the Upton Osage area emphasizes primitive conditions with minimal facility development to include camping and picnicking opportunities. The Plan also provides Standards and Guidelines (S&G) for each Geographic Area and these are described below.

The TBNG Plan provides management Standards and Guidelines that apply across the National Grasslands. Those specific to transmission lines on National Grasslands are listed in Chapter 1 of this EIS. All LRMP Standards and Guidelines could apply depending on the resource affected by a given project. **Appendix D** contains a list of the Forest Plan S&Gs and those potentially applicable to this project are included below.

The TBNG has designated management areas that designate the management emphasis for specific areas. Below are the Geographic Areas that would be crossed by the Proposed Project. Each Geographic Area also has several Management Area designations.

3.1.1.2.2.2.1.1 Geographic Area Direction – Standards and Guidelines

Management direction is provided within each Geographic Area and this direction applies specifically to the lands that are crossed by the Proposed Action as described below.

Fairview Clareton Geographic Area

Vegetation

1. Use existing monitoring information and stocking rate guidelines for livestock grazing to help design and implement range management strategies for meeting desired vegetation objectives. (Standard)

2. Manage vegetation by Management Area (MA) to achieve the desired seral stage (plant species composition) objectives. The table has a target percent displayed, with an acceptable range of percent included.(Guideline)

SERAL CONDITION BY MANAGEMENT AREA (MA)								
	Late		Late Intermediate		Early Intermediate		Early	
MA	Target	Range	Target	Range	Target	Range	Target	Range
2.1	15%	15-20%	35%	30-35%	35%	30-35%	15%	15-20%
4.32	15%	15-20%	35%	30-35%	35%	30-35%	15%	15-20%
5.12	15%	15-20%	35%	30-35%	35%	30-35%	15%	15-20%
6.1	15%	15-20%	35%	30-35%	35%	30-35%	15%	15-20%

3. Manage vegetation by MA to achieve the desired structural objectives. The table has a target percent displayed, with an acceptable range of percent included.(Guideline)

STRUCTURAL CONDITION BY MANAGEMENT AREA (MA)						
	High		Moderate		Low	
MA	Target	Range	Target	Range	Target	Range
2.1	30%	30-35%	50%	30-35%	20%	15-20%
4.32	30%	30-35%	50%	30-35%	20%	15-20%
5.12	40%	40-45%	40%	30-35%	20%	15-20%
6.1	30%	25-30%	50%	30-35%	20%	15-20%

Wildlife

Sage Grouse (MIS)

1. A range of 27,639 to 32,245 acres of high structure sagebrush understory is prescribed. A substantial amount of this should be located where it would optimize sage grouse habitat and associated species. The following criteria will be considered during site- specific project level planning to help determine the best locations to manage for high structure grasslands:

- Presence of moderate to highly productive soils and range sites,
- Plant composition dominated by mid and/or tall grasses with sagebrush canopy cover of 10 to 35%.
- Proximity to sage grouse display grounds: two miles in uniform patches and three miles in irregular patches. (Guideline)

2. Establish and maintain quality foraging habitat for sage grouse and associated species by enhancing and/or maintaining productive sagebrush stands with a diversity of forb species. (Guideline)

3. At the onset of drought, evaluate the need to modify land use practices in sage grouse habitat to avoid significantly magnifying the adverse effects of drought on their populations and vegetation for nesting, brooding and foraging. (Standard)

Hilight Bill Geographic Area

Vegetation

1. Use existing monitoring information and stocking rate guidelines for livestock grazing (See Appendix I) to help design and implement range management strategies for meeting desired vegetation objectives. (Standard)

2. Manage vegetation by MA to achieve the desired seral stage (plant species composition) objectives for the Geographic Area. The table below shows a target percent with an acceptable range of percent included. (Guideline)

SERAL CONDITION BY MANAGEMENT AREA (MA)								
	Late		Late Intermediate		Early Intermediate		Early	
MA	Target	Range	Target	Range	Target	Range	Target	Range
3.68	25%	25-30%	35%	30-35%	25%	25-30%	15%	10-15%
6.1	15%	15-20%	35%	30-35%	35%	30-35%	15%	15-20%
8.4	15%	15-20%	35%	30-35%	35%	30-35%	15%	15-20%

3. Manage vegetation by MA according to the following table to achieve the desired structural objectives for the Geographic Area. The table below shows a target percent with an acceptable range of percent included. (Guideline)

STRUCTURAL CONDITION BY MANAGEMENT AREA (MA)						
	High		Moderate		Low	
MA	Target	Range	Target	Range	Target	Range
3.68	40%	40-45%	50%	45-50%	10%	10-15%
6.1	30%	25-30%	50%	50-55%	20%	15-20%
8.4	30%	25-30%	40%	50-55%	20%	15-20%

Wildlife

Sage Grouse (MIS)

1. A range of 25,195 to 30,234 acres of high structure sagebrush understory is prescribed for this geographic area. A substantial amount of this should be located where it would optimize sage grouse habitat and associated species. The following criteria will be considered during site specific project level planning to help determine the best locations to manage for high structure grasslands:

- Presence of moderate to highly productive soils and range sites,
- Plant composition dominated by mid and/or tall grasses with sagebrush canopy cover of 10 to 35%.

- Proximity to sage grouse display grounds, two miles in uniform patches and three miles in irregular patches. (Guideline)

2. Establish and maintain quality foraging habitat for sage grouse and associated species by enhancing and/or maintaining productive sagebrush stands with a diversity of forb species. (Guideline)

3. At the onset of drought, evaluate the need to modify land use practices in sage grouse habitat to avoid significantly magnifying the adverse effects of drought on their populations and vegetation for nesting, brooding and foraging. (Standard)

Upton Osage Geographic Area

Vegetation

1. Use existing monitoring information and stocking rate guidelines for livestock grazing (See Appendix I) to help design and implement range management strategies for meeting desired vegetation objectives. (Standard)

2. Manage vegetation by MA according to a target percent with acceptable range of percent to achieve the desired seral stage (plant species composition) objectives for the Geographic Area. The table below shows a target percent with an acceptable range of percent included. (Guideline)

SERAL CONDITION BY MANAGEMENT AREA (MA)								
	Late		Late Intermediate		Early Intermediate		Early	
MA	Target	Range	Target	Range	Target	Range	Target	Range
3.68	25%	25-30%	35%	30-35%	25%	25-30%	15%	10-15%
4.32	15%	15-20%	35%	30-35%	35%	30-35%	15%	15-20%

3. Manage vegetation by MA according to the following table to achieve the desired structural objectives for the Geographic Area. The table below shows a target percent with an acceptable range of percent included. (Guideline)

STRUCTURAL CONDITION BY MANAGEMENT AREA (MA)						
	High		Moderate		Low	
MA	Target	Range	Target	Range	Target	Range
3.68	40%	40-45%	50%	45-50%	10%	10-15%
4.32	30%	25-30%	50%	45-50%	20%	15-20%

Forest Vegetation

1. When doing planned vegetation treatments, emphasize the maintenance and development of forest structural stages 4 (mature) and 5 (late successional). (Guideline)

2. Replicate biological processes found in the areas and strive to replicate natural vegetative patterns and patch size when doing management activities. (Guideline)

3. When developing openings in vegetative communities, simulate naturally shaped edges. (Guideline)

4. Don't make wood fiber production, Christmas tree cutting, or fire wood harvest the primary objectives of vegetative manipulation. (Standard)

Snags and Dead Woody Material Management

1. During vegetation treatments, maintain an average of four hard snags per forested acre. (Guideline)

2. If there are fewer than four hard snags per forested acre, projects to increase snag numbers may be implemented. (Guideline)

3. Snags can be clumped or individual but should be well distributed throughout the planning unit. (Guideline)

4. In areas not meeting the snag standard, consider snag cutting restrictions and treating live replacement trees to create snags. (Guideline)

5. Retain all soft snags unless they are a safety hazard. (Guideline)

6. Leave large woody debris on harvested or thinned sites to help retain moisture, prevent soil movement, provide micro-sites for establishment of forbs, grasses, shrubs, and trees and to provide habitat for wildlife. Locate woody debris concentrations where fuel loading is not a concern. (Guideline)

7. On conifer-forested sites (ponderosa pine), retain an average of at least 50 linear feet per acre of coarse woody debris with a minimum diameter of ten inches (where materials are available) or largest woody material found on-site. (Guideline)

SNAGS AND DEAD WOODY MATERIAL					
	Hard Snags			Downed Logs	
Forest Type	Minimum Diameter	Average per Acre *	Minimum Height	Minimum Diameter	Linear Feet per Acre *
Ponderosa pine	10 inches	4.0	25 feet	10 inches	50 feet

*This does not mean that every acre will have a snag or downed log; these are averages across the geographic area

Infrastructure

1. Maintain or increase average pasture size. (Guideline)

2. Maintain or reduce the net classified road density. If new short-term roads are constructed, existing unclassified or classified roads should be decommissioned. (Guideline)

Wildlife

Sage Grouse (MIS)

1. A range of 11,308 to 12,924 acres of high structure sagebrush understory is prescribed for this geographic area. A substantial amount of this should be located where it would optimize sage grouse habitat and associated species. The following criteria will be considered during site specific project level planning to help determine the best locations to manage for high structure grasslands:

- Presence of moderate to highly productive soils and range sites,
- Plant composition dominated by mid and/or tall grasses with sagebrush canopy cover of 10 to 35%.

- Proximity to sage grouse display grounds, two miles in uniform patches and three miles in irregular patches. (Guideline)

2. Establish and maintain quality foraging habitat for sage grouse and associated species by enhancing and/or maintaining productive sagebrush stands with a diversity of forb species. (Guideline)

3. At the onset of drought, evaluate the need to modify land use practices in sage grouse habitat to avoid significantly magnifying the adverse effects of drought on their populations and vegetation for nesting, brooding and foraging. (Standard)

3.1.1.2.2.2.1.2 Management Area Direction

Table 3-4 below identifies the management areas crossed by the proposed project. The general policies for each area are described below. There are many existing USFS authorizations for power lines, pipelines, railroad ROW, and roads throughout these areas.

TABLE 3-4 - MANAGEMENT AREA DESIGNATIONS IN THE TBNG CROSSED BY THE PROJECT

MANAGEMENT AREA	MILES
5.12 General Forest and Rangelands Range Vegetation Emphasis	3.2
6.1 Rangeland with Broad Resource Emphasis	1.0
8.4 Mineral Production and Development	0.5
Total NFS	4.7

TBNG Management Area 5.12, (page 3-24 of Plan)

The management emphasis in this area is a balance of resource uses and opportunities including livestock grazing, wildlife habitat, dispersed recreation, minerals management, and timber harvest. Some areas produce substantial forage for livestock and wildlife but, even if forested, they usually do not produce commercial wood fiber because of poor site potential.

Recreation facilities may be present and range and other management activities are coordinated with recreation so they do not conflict with the managed use season. Signs of motorized travel, hunting, hiking, timber harvest, mining, and livestock grazing may be evident. Recreation use is moderate throughout the summer and increases during hunting seasons.

TBNG Management Area 6.1 (page 3-25 of the Plan)

This area is managed for low to high levels of livestock grazing, oil and gas facilities, and roads. Livestock graze most of these areas annually but a variety of vegetation structure and a high degree of biodiversity is also present. Livestock grazing intensity varies but moderate use occurs over most of this area. Rest from grazing and prescribed fires is incorporated into range management. Prairie dog colonies are common in some portions of this area. When no substantial threat to high-value resources occurs, natural outbreaks of native insects and disease are allowed to proceed without intervention.

TBNG Management Area 8.4 (page 3-26 of the Plan)

This area is managed for solid mineral operations to effectively and efficiently remove available commercial mineral resources concurrent with other on-going resource uses and activities. Mineral operations include development and production of coal, bentonite, uranium, and hard rock minerals with open-pit mines and stock-piled overburden and top soil. Facilities and landscape modifications are visible but reasonably mitigated to blend and harmonize with natural features as much as possible. Reclamation activities are designed to restore the area to a reasonable level of its pre-mining condition. Grazing occurs, except on areas being actively mined and areas under reclamation but have not yet had their bond released. Restrictions are placed on public use to ensure public safety and to avoid unreasonable interference with mineral operations. Frequent encounters with people, heavy equipment, and noise can be experienced in this management area.

3.1.2 Environmental Consequences

3.1.2.1 ALTERNATIVE 1 – NO ACTION

3.1.2.1.1 South Dakota

3.1.2.1.1.1 Direct/Indirect Effects

Under the No Action Alternative, the T-O-RC Project would not be constructed. There would be no effect to land uses on federal and county-administered lands or their corresponding land management policies and regulations. The existing, but currently unused ROW would not be expanded and adjacent forested areas would not be cleared.

3.1.2.1.1.2 Cumulative Effects

The No Action Alternative would not add to the cumulative land use and land management effects of other past, present, and reasonably foreseeable future actions in the analysis area.

3.1.2.1.2 Wyoming

3.1.2.1.2.1 Direct/Indirect Effects

Under the No Action Alternative, the T-O-RC Project would not be constructed. There would be no affect to land uses on federal, state, and county-administered lands or their corresponding land management policies and regulations. The Wyoming portion of the existing but currently unused ROW would not be expanded and adjacent forested areas would not be cleared. There would be no affect to private property or their values.

3.1.2.1.2.2 Cumulative Effects

The No Action Alternative would not add to the cumulative land use and land management effects of other past, present, and reasonably foreseeable future actions in the analysis area. Other activities will continue to occur in the area.

3.1.2.2 ALTERNATIVE 2 – PROPOSED ACTION

3.1.2.2.1 South Dakota

3.1.2.2.1.1 Direct/Indirect Effects

3.1.2.2.1.1.1 Private Land

The Proposed Action would be expected to have direct and indirect effects to uses and management of private land in South Dakota. During construction, activities would disturb soils and vegetation and create associated traffic and noise. As a result, use of the ROW and some adjacent areas would be temporarily restricted. This could include reducing the amount of land available for cattle grazing or recreational activities. Construction could also interfere with activities at the Big Bend Presbyterian Church, which is located approximately 600 feet south of the proposed transmission line depending on the timing of construction versus activities at the church.

After construction, the potential for development on private land would be restricted within the ROW. No structures could be built within the ROW for safety reasons. Other compatible uses could occur within the ROW. Fourteen residences are located within 150 feet of the proposed transmission line.

The Proposed Action would be visible from some private lands and this is discussed in more detail in the visual resources section. Operation and maintenance activities are not expected to impact uses or management of private lands as they would occur very infrequently.

Other direct and indirect effects on private land would be similar to the effects described below for federal land. The same BMPs and mitigations identified in **Appendix B** would be implemented on private land as on federal land. Construction and operation of the T-O-RC Project on private lands would be required to meet all applicable federal, state, and local government permit requirements.

3.1.2.2.1.1.2 Public Land / BHNF

The direct effects of the Proposed Action on land use / land management would occur where it would alter or infringe on the use of the land according to applicable policies of the BHNF LRMP. The Proposed Project is consistent with BHNF management plans unless otherwise stated.

Management Areas 5.1 and 5.4 account for the majority of the NFS lands along the Proposed Action route. In these areas, wildlife foraging habitat and wood production would

be impacted by the development of structure work areas, construction yards/staging areas, decking yards, and wire-pulling, tensioning, and splicing sites and the needed access to these areas. Accessing structure locations via overland travel, assuming a 16-foot-wide path, would disturb approximately 14 miles (28 acres) of NFS lands, mostly in Management Area 5.1. Accessing structure locations via existing roads, some of which may need to be widened to 16 feet, would disturb approximately 44 miles (85 acres) of NFS lands, mostly in Management Area 5.4. Constructing new access roads would disturb approximately 11 miles (21 acres) of NFS lands, mostly between Edelweiss Mountain and Pactola Reservoir in Management Area 5.4.

Structure work areas would disturb approximately 69 acres of NFS lands, mostly in Management Areas 5.1 and 5.4. The T-O-RC Project would require one 20-acre construction yard/staging area, which BHP proposes to locate in the western portion of the BHNF, approximately two miles west of Boles Canyon Road in Management Area 5.1. Decking yards would disturb approximately 34 acres, while wire-pulling, tensioning, and splicing sites would disturb approximately 11 acres of NFS lands, mostly in Management Areas 5.1 and 5.4 in the BHNF.

The above construction activities, except for siting the construction staging area, would also be expected to have direct impacts to land uses in Management Areas 3.7, 4.1, and 8.2. In Management Area 3.7, just west of Big Bend, ROW clearing would alter vegetated areas. Similarly, in Management Area 4.1, just south of Pactola Basin Road, ROW clearing would reduce forage and timber production. Additionally, in Management Area 8.2, just east of Pactola Reservoir and south of Deerfield Lake, the T-O-RC Project's construction activities and transmission structures may reduce the high scenic integrity that the USFS maintains near these developed recreation complexes.

On the BHNF, the Proposed Action's 100-foot wide ROW would impact approximately 258 acres of previously undisturbed land. Along the 30 miles of existing but currently vacant ROW, the widening of the existing ROW required to accommodate the Proposed Action would impact approximately 182 acres. Along the remaining six miles, the Proposed Action would impact approximately 76 acres. During construction activities, cattle grazing would be restricted in the vicinity of the ROW.

BHP would comply with the USFS' Guideline 8305 presented in Chapter 1 and implement mitigation measures to minimize the Proposed Action's impacts to land use and land management. BHP situated the majority of the proposed transmission route in the BHNF in a currently abandoned transmission ROW. In using a disturbed but abandoned ROW, BHP would help consolidate utility corridors in accordance with Guideline 8305. In this way, BHP would also minimize the amount of previously undisturbed land needed for ROW and the number of trees cleared. After construction activities are complete, BHP would also revegetate disturbed areas and repair roads and trails to pre-construction conditions.

Mitigation measures including repairing roads and reseeding and revegetating disturbed areas would resolve the short-term disturbance impacts associated with construction. After construction is complete, most wildlife foraging habitats would be reclaimed and available

forage would be expected to return to levels similar to those prior to construction. Wood production would be expected to return in all disturbed areas except for within the 100-foot ROW where the re-establishment of tall woody vegetation would be discouraged. Design criteria and mitigation measures are contained in **Appendix B**.

The Proposed Action's indirect effects would likely occur where construction, operation, and maintenance activities create other tangible changes to land use patterns. Constructing and operating the proposed transmission line may alter the visual quality of an area such that visitors do not feel the same affinity toward the area, potentially reducing utilization of designated recreation areas. These effects are also discussed in the recreation and visual sections.

3.1.2.2.1.2 Cumulative Effects

The Proposed Action would not add appreciably to past, present, and reasonably foreseeable future actions. Past actions included logging activities, many of which were aimed at thinning timber stands to prevent wildfires in the BHNF. Widening the existing ROW and clearing new ROW may create a fire break that could help limit the spread and intensity of wildfires and aid in fire suppression. Present and reasonably foreseeable future actions include timber sales, subdivision developments for residential purposes, range developments for cattle grazing, permit holders collecting firewood and cutting Christmas trees, and on-going activities on non-USFS lands. Additionally, a proposed quarry operation and new additions to the Terra Sancta religious retreat center, St. Elizabeth Seton Catholic Elementary School and the Good Samaritan retirement center are situated just south of Hidden Valley Road. The proposed quarry operation lies on private land immediately adjacent to the Proposed Action's ROW. The Terra Sancta, private elementary school, and retirement center facilities also lie on private land approximately 0.3 miles east and south of the Proposed Action's ROW.

Development of the Proposed Action would be expected to have no measurable impacts on long-term grazing operations, firewood and Christmas tree collection, road and utility projects, the proposed quarry, or on the Terra Sancta, private elementary school, and retirement center facilities. Except for restricting the construction of structures and discouraging the establishment of tall woody vegetation within the 100-foot transmission line ROW, the Proposed Action would not impact other potential uses of land within the vicinity.

Because most of the portion of the Proposed Action in South Dakota would be located within an existing cleared ROW that had previously included a transmission line for many years, it is not expected that development of the Project would contribute significantly to cumulative land use or land management impacts when combined with other projects.

3.1.2.2.2 Wyoming

3.1.2.2.2.1 Direct/Indirect Effects

3.1.2.2.2.1.1 Private Land

The Proposed Action would be expected to have direct and indirect effects to uses and management of private land in Wyoming. Ten residences are located within 1,000 feet of the proposed transmission line and one residence is located within 150 feet.

During construction, activities would disturb soils and vegetation and create safety concerns associated with traffic and noise. As a result, use of the ROW and some adjacent areas would be temporarily restricted. This could include reducing the amount of land available for cattle grazing or recreational activities such as hunting.

After construction is complete, disturbed areas would be reclaimed per methods approved by each landowner. Grazing and hunting in and around the ROW would be expected to return to pre-construction levels. Any fences or gates temporarily affected during construction would be repaired / replaced to pre-construction conditions.

Following construction, the Proposed Action would be visible from private lands and this is discussed in more detail in the visual resources section. Operation and maintenance activities are not expected to impact uses or management of private lands as they would occur very infrequently.

All existing authorizations would continue to be allowed and administered under their current authorizations, including grazing, other mineral developments, and all other special use authorizations. When construction is complete, grazing, hunting, and other uses would continue in the transmission ROW.

After construction, development within the 125-foot ROW on private lands would be restricted. No structures could be built within the ROW for safety reasons. The Project would not be expected to adversely impact oil and gas development or operations or existing active mining claims or operations on private lands. Oil and gas minerals could continue to be accessed from locations outside the ROW.

Other direct and indirect effects on private land would be similar to the effects described below for federal land. The same BMPs would be implemented on private land as on federal land. Construction and operation of the T-O-RC Project on private lands would be required to meet all applicable federal, state, and local government permit requirements.

3.1.2.2.2.1.2 Public Land

####### *3.1.2.2.2.1.2.1 TBNG*

Construction of the Proposed Action would temporarily disturb soils and vegetation via overland travel, preparing wire-pulling, tensioning, and splicing sites, and installing the

transmission line's structures. Overland travel would be the only means for accessing structure work areas on public lands, including TBNG, BLM, and state lands, in Wyoming. BHP would then reseed and revegetate disturbed areas to resolve short-term construction impacts in accordance with agency specifications. No construction yards or decking yards would be located on federal lands in Wyoming.

The 100-foot wide ROW would cover approximately 89 acres of federal land in Wyoming. The 4.7 mile segment of the Proposed Action on the TBNG would require approximately 57 acres of ROW. The 2.6 mile segment on BLM land would require approximately 32 acres. The T-O-RC Project would be consistent with the TBNG Plan guidelines to increase electrical capacity.

The Project would be consistent with the Wyoming Board of Land Commissioners' rules and regulations for easements granted on state lands. In accordance with Chapter 3, Section 4(b) of the Board's rules and regulations, BHP would, to the maximum extent practicable, purchase easements that follow previously established roads or utility corridors. In accordance with Chapter 3, Section 5(a)(ii), BHP would also restore land to a condition and forage density that is reasonably similar to the land's original condition.

Construction of the Proposed Action would temporarily impact grazing and hunting in the immediate vicinity of these activities. Given the short duration of transmission line construction in any one area (a few weeks at a time), these impacts would be minimal overall but potentially disruptive to individual ranchers. After construction is complete, grazing operations and hunting opportunities would be expected to return to pre-construction levels. Should construction activities temporarily affect fences or gates, BHP would repair and replace these structures in the same manner described above for private land.

The Project would not be expected to adversely impact oil and gas development or operations or existing active mining claims or operations. Oil and gas minerals could continue to be accessed from locations outside the ROW. In accordance with the Mineral Leasing Act of 1920, Federal Coal Amendments Act, and other applicable mining laws and regulations, the half mile area around the Teckla Substation has a high potential of being affected by coal mining and associated ancillary facilities. Any other authorizations that exist prior to land being included in a coal lease sale (such as a transmission and substation ROW) could be required to be revoked upon the time that the land is added to the Mining Plan. The effects of that are typically covered in the analysis for the pending coal lease, but only pertain to such activities that are permitted and constructed prior to the NEPA analysis for the coal lease tract. Any authorizations that occur after the consent decision is made or during the analysis of a new LBA would have conditions placed upon them such that the proponent should be aware that additional costs or analysis would be required to evaluate alternative locations for the activities.

The Proposed Action's indirect effects could occur where construction, operation, and maintenance activities create other tangible changes to land use patterns. The proposed

transmission line may reduce interest in camping and picnicking in specific locations within the Project analysis area, and particularly the Upton Osage area.

3.1.2.2.2.1.2.2 BLM Land

The Project would be consistent with the BLM Newcastle Field Office's lands and realty management decision to locate utility systems adjacent to existing utility systems whenever practical. The 2.6 miles of ROW on BLM land would require approximately 32 acres.

Oil and gas exploration and development on federal lands or federal minerals would not be affected by the proposed project, as these minerals could be accessed from outside the ROW. If coal mining were proposed in the future in an area crossed by the transmission line ROW, the transmission line could need to be relocated to accommodate coal extraction as described above.

Public access to public lands is scarce within the Newcastle Field Office's lands. The proposed action intersects three parcels that provide legal access and opportunities for recreation that are unique within the regional context of BLM-administered parcels. Recreation impacts are discussed further in the Recreation section of this document.

3.1.2.2.2.2 Cumulative Effects

The Proposed Action would not be expected to substantially contribute to land use and land management impacts associated with past, present, and reasonably foreseeable future actions. Past actions included grazing, logging activities to reduce the potential for wildfires, drilling wells for oil, gas, and coal exploration, leasing federal land for coal mining, moving power lines, and railroad improvements. Present actions include grazing and a TBNG Plan amendment to implement more conservation measures for the Greater Sage-Grouse. Reasonably foreseeable future actions are expected to include continued coal mining activities, oil and gas development, grazing, land exchanges, and a geophysical exploration project. It is also important to note that a feasibility study is underway to determine a new location for the Teckla Substation. A new location and a timeline for moving the substation is unknown. The relocation of the Teckla Substation is also addressed in **Appendix C** – Past, Present and Future Projects.

When added to the actions above, construction of the Wyoming portion of the Proposed Action may cause mild interruptions to grazing and logging operations and to oil, gas, and coal exploration and development. However during the long-term operation and maintenance of the Project, the Proposed Action would not be expected to adversely impact these land uses because these activities would be able to continue with the transmission line present. The proposed transmission line would be designed in accordance with industry standards and would not interfere with existing lines coming into and out of the Teckla Substation.

3.1.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

3.1.2.3.1 South Dakota

Alternative 3 would have similar effects as the Proposed Action, with some differences as described below.

3.1.2.3.1.1 Direct/Indirect Effects

Modifications 3b, 3c and 3d would have similar effects on BHNF land uses and management policies as the Proposed Action because they are located in the same management areas as the segments of the Proposed Action they would replace. Modification 3e (Pactola) and 3f (Pactola South) are located in Management Area 5.4 and implementing either would not be expected to directly or indirectly change land use or management compared to the Proposed Action. However, the Proposed Action route to the Pactola substation is adjacent to lands in Management Area 8.2. The LRMP assigns a relatively low sensitivity to lands in Management Area 5.4, while assigning a relatively high sensitivity to lands in Management Area 8.2. Therefore, implementing either Modification 3e or 3f could result in lower land use impacts than the Proposed Action. Implementing Modification 3f would be expected to have even fewer land use impacts than Modification 3e as it would use an existing cleared ROW where 3f would not.

Modification 3b in the Mountain View area just west of Gillette Prairie Road and Modification 3c in the Clinton area just west of Slate Prairie Road would move the proposed transmission ROW further from private residences. Modification 3g in the Hidden Valley area would minimize impacts on a proposed quarry operation just west of Rapid City. Modification 3g would be expected to decrease the length of the transmission line from 0.25 acres for the Proposed Action to approximately 0.1 miles along the proposed quarry's eastern boundary. Adjacent to the proposed quarry, Modification 3g would be expected to reduce the number of trees cleared for the transmission line. In this way, Modification 3g would be expected to minimize impacts on quarry operations. Per the Pennington County Zoning Ordinance, the T-O-RC Project is compatible with the permitted uses in the commercial, industrial, and residential zoning districts mentioned above.

3.1.2.3.2 Wyoming

3.1.2.3.2.1 Direct/Indirect Effects

Using Modification 3a to avoid a Greater Sage-Grouse lek would have the same land use and management impacts to private land as the Proposed Action. This modification would bolster TBNG land use/land management efforts to provide more conservation measures for the Greater Sage-Grouse. Therefore, Modification 3a would be expected to have fewer effects on federal land use/land management policies relative to the Proposed Action.

3.2 WILDLIFE

The analysis area for this Project contains a variety of wildlife habitats including that utilized by threatened, endangered and sensitive species; Management Indicator Species (MIS); and Species of Local Concern.

3.2.1 Existing Conditions

3.2.1.1 SOUTH DAKOTA

This analysis for the South Dakota portion of the Project area tiers directly to the revised Forest Plan and the Phase II Forest Plan Amendment EIS (USFS 1996, 2005a) and the associated Biological Assessment/ Biological Evaluations (BA/BE) (Appendices H and C of the Forest Plan, respectively). Fragmentation and connectivity of habitat communities as it relates to MIS and Region 2 Sensitive species were analyzed as part of the Forest Plan EIS (USFS 1996), and analyzed in relation to Species of Local Concern (SOLC) species in the Phase II EIS (USFS 2005a).

The Project analysis area supports a diversity of plant community types as a result of the range of elevation and variations in geology and geomorphology. There were 83 unique plant community associations documented during surveys, with ponderosa pine (*Pinus ponderosa*) being the most abundant throughout the analysis area (**Table 3-5**). White spruce (*Picea glauca*) stands occur in the higher elevations of the western part of the analysis area, mostly on north facing slopes, drainage bottoms, and riparian areas where mesic conditions exist. Hard wood species such as quaking aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*), and boxelder (*Acer negundo*) are prevalent in mesic to dry sites along forest edges, drainages, and riparian areas. Understory components such as western snowberry (*Symphoricarpos occidentalis*), ironwood (*Ostrya virginiana*), common juniper (*Juniperus communis*), and ninebark (*Physocarpus spp.*), along with hardwoods and regenerating pine contribute to some degree in providing forage, hiding or screening cover, and nesting habitat for a variety of wildlife species. Important browse species for big game include quaking aspen, bearberry (*Arctostaphylos uva-ursi*), creeping barberry (*Mahonia repens*), chokecherry (*Prunus virginiana*), Saskatoon serviceberry (*Amelanchier alnifolia*), common snowberry (*Symphoricarpos albus*), ceanothus (*Ceanothus* spp.) and lead plant (*Amorpha canescens*).

Dominant habitat types on the BHNF in the analysis area for the Proposed Action include grassland, aspend, wetland/meadow/riparian, ponderosa pine forest, spruce forest, aquatic, and cave/cliff. **Table 3-5** presents the acreages for each of these dominant habitat categories as they occur in the South Dakota analysis area and within the proposed ROW. **Table 3-6** lists the acreages by ponderosa pine structural stages for the South Dakota analysis area and proposed ROW.

TABLE 3-5 - BHNF HABITAT TYPES WITHIN THE ANALYSIS AREA AND ROW		
Habitat Type	**Analysis Area**	**ROW**
Grassland	1,913 acres	33 acres
Aspen	592 acres	10
Wetland/meadow/riparian*	44 acres	11 acres
Ponderosa Pine forest	19,426 acres	434 acres
Spruce forest	316 acres	8 acres
Aquatic*	Three named permanent streams, five named intermittent water bodies, two named reservoirs	Two named permanent streams, three named intermittent streams
Cliff/Cave	No cliff/rock tallus/scree slope identified in USFS remotely identified vegetation data. BHNF personnel indicate isolated instances of potential habitat not included in USFS 2009b does occur. Seven known mines and caves.	None identified in USFS vegetation data. BHNF personnel indicate isolated instances of potential habitat not included in USFS 2009b does occur.
Acres based on USFS 2009b, NWI, and field observations from BHP surveys.		
* Wetland/meadow/riparian and Aquatic habitat will be spanned by conductors and will not be impacted by the Proposed Action.		

TABLE 3-6 - PONDEROSA PINE FOREST STAND CLASSIFICATIONS IMPACTED BY ROW		
Forest Stand	**Acres within 0.5 mile**	**Acres in ROW**
3A – Sapling/pole cover <40%	1,406	40
3B – Sapling/pole cover 40% - 70%	898	17
3C – Sapling/pole cover >70%	283	6
4A – Mature tree cover <40%	9,260	191
4B – Mature tree cover 40% - 70%	6,056	140
4C – Mature tree cover >70%	971	27
5 – Late Successional Habitat	0	0
Acres based on USFS 2009b.		

In the analysis area, there are three perennial creek crossings, 64 intermittent creek crossings, and 76 wetlands including one documented fen. In addition, there is an intermittent creek crossing (Prairie Creek) in the proposed ROW that has fen-like properties due to its hummocky and spongy substrate. Fens are waterlogged ecosystems with waters rich in mineral nutrients, vegetation rooted in wet peat (partially decomposed plant material), a winter water table at ground-level or above, and are usually dominated by sedges (Lincoln et al. 1998). Many USFS R2 Sensitive plant species are associated with fen habitats. Within the impact area, there are four crossings of three perennial creeks (including one outside of the analysis area), seven crossings of five intermittent creeks having summertime standing or flowing water, and nine wetlands (see **Table 3-7**). There are an additional 42 intermittent creeks in the impact area that did not have summertime standing or flowing water.

TABLE 3-7 - RIPARIAN AND WETLAND AREAS ON BHNF LANDS IN THE IMPACT AREA	
Riparian or Wetland Feature	**Within Impact Area**
Nichols Creek (Perennial)[1]	1 creek crossing
Slate Creek (Perennial)	1 creek crossing
South Fork Castle Creek (Perennial to Intermittent)	4 creek crossings (2 perennial and 2 intermittent) and perennial portion parallels road for approximately 2 miles
Unnamed Creek (Intermittent)	1 creek crossing
Unnamed Creek (Intermittent)	2 creek crossings
Dutchman Creek (Intermittent)	1 creek crossing
Prairie Creek (Intermittent)	1 creek crossing: fen-like habitat present
Wetlands	9 wetlands: includes 1 pond with seeps, 1 impounded stock pond, and 1 pond in exclosure

[1]Nichols Creek is outside of the analysis area, but within the impact area because it is crossed by an existing road that may be improved which extends just beyond the analysis area.

Note: All intermittent creeks listed had standing or flowing water during summer 2012 fieldwork. There are numerous other intermittent creeks that would be crossed by different Project disturbance types, but were dry when visited in June and/or August 2012.

3.2.1.1.1 Federal Endangered Species Act Protected Species

A BA/BE has been completed for the analysis area as part of the EIS process, and can be found in the project file. The effects of the proposed Project were evaluated for all Endangered, Threatened, Proposed, and Region 2 Sensitive species, and their habitat. The BA/BE was prepared in accordance with legal requirement set forth under Section 7 of the Endangered Species Act (ESA) (19 U.S.C. §1536 (c)), and follows standards established in USFS Manual direction (2672.42) and the Code of Federal Regulations (50 CFR Part S401). The Regional Forester issued a Sensitive species list for the Rocky Mountain Region (FSM 2670), and revised Sensitive species list (FSM Regional Supplement No. 2600-2011-1, dated June 10, 2011). The BA/BE tiers directly to the Final EIS for the Phase II Amendment to the Forest Plan (USFS 2005a). The BA/BE does not address species listed as threatened or endangered by the state of South Dakota, or species tracked by the South Dakota Natural Heritage Program (SDNHP).

Based on the USFWS South Dakota Ecological Services Office county species distribution lists, four species protected under the ESA may occur in Pennington County: Whooping Crane (*Grus americana*), Least Tern (*Sterna antillarum*), Sprague's Pipit (*Anthus spragueii*), and black-footed ferret (*Mustela nigripes*). Whooping Cranes may occur in eastern Pennington County during spring and fall migrations, but would be highly unlikely to occur in the mountainous forested habitats of the BHNF. The Least Tern nests on sand bars of large, braided prairie rivers and may occur in eastern Pennington County. Sprague's Pipit is a small song bird which nests in open prairies and grasslands with little to no tree and shrub cover. No black-footed ferrets populations are known to occur on BHNF. Discussions with

BHNF biologists have indicated that none of these species are known to occur within the BHNF. Therefore, the Proposed Action will have no effect on species or their habitat protected under the ESA on BHNF.

3.2.1.1.2 BHNF Management Indicator Species (MIS)

MIS are wildlife species whose habitat is most likely to be affected by management practices, thereby serving as indicators for other wildlife species groups and habitat quality. They provide a measure of assessing the effects of vegetation and land management practices. The MIS analysis focuses on how the alternatives would influence the Forest-wide population trend (if available), the Forest-wide habitat trend, and attainment of Forest Plan Objective 238. Trend data for all species was obtained from either the FY 2008 or FY 2009 Forest Plan Monitoring and Evaluation Reports (FPMER) (USFS 2009, 2010) unless otherwise indicated. Viability analysis has been completed at the Forest Plan level (USFS 2005a), and therefore beyond the scope of this project level analysis. The BHNF LRMP as amended (USFS 2006) designates nine species as MIS on the BHNF: Black-backed Woodpecker (*Picoides arcticus*), Brown Creeper (*Certhia americana*), Golden-crowned Kinglet (*Regulus satrapa*), Grasshopper Sparrow (*Ammodramus savannarum*), Ruffed Grouse (*Bonasa umbellus*), Song Sparrow (*Melospiza melodia*), beaver (*Castor canadensis*), white-tailed deer (*Odocoileus virginianus*), and mountain sucker (*Catostomas platyrhynchus*). The Phase II Amendment Final EIS (USFS 2005; Sec. 3-3.3.6 through Sec. 3-3.3.8.2) provides in-depth information (i.e., range, distribution etc.) for each MIS selected for analysis. The T-O-RC 230 kV Transmission Line Project analysis for MIS is tiered to that document and to the 1997 Forest Plan FEIS (USFS 1996). Information from these documents is summarized for each MIS.

The analysis area for BHNF MIS is one-half mile on each side of the Proposed Action. The temporal boundary analyzed for BHNF MIS includes the period of active construction and generally for the life of the transmission line. **Table 3-8** provides a brief habitat description for each MIS, likelihood of occurrence within the analysis area, and whether the species will be considered for further study. A species is not carried forward in this analysis if the species has a low likelihood of occurrence or the species is unlikely to be impacted by the Proposed Action.

TABLE 3-8 - MIS ON BHNF				
SPECIES	**MIS ASSOCIATED HABITAT[1]**	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE[2]**	**FURTHER ANALYSIS WARRANTED**
Black-backed Woodpecker (*Picoides arcticus*)	Ponderosa pine forests which have recently burned or have infestations of bark beetle.	Highly associated with ponderosa pine forests that are recently burned or have high infestations of bark beetle. Healthy ponderosa pine forests with dense mature or late successional structure also important (USFS 2010).	High	Yes
Brown Creeper (*Certhia americana*)	Late successional pine and spruce forests.	Mature, old growth coniferous and mixed coniferous-deciduous forests. Large trees with closed canopy are an important habitat component (USFS 2010).	High	Yes
Golden-crowned Kinglet (*Regulus satrapa*)	White spruce forests.	Closely associated with mature white spruce forests at higher elevations (USFS 2010).	High	Yes
Grasshopper Sparrow (*Ammodramus savannarum*)	Mixed grass prairies.	Mixed grass prairies of intermediate height with a mixture of taller grasses, forbs, and shrubs used as singing perches (USFS 2005).	Moderate	Yes
Ruffed Grouse (*Bonasa umbellus*)	Aspen stands of various age.	Aspen stands of varying age with dense understory (USFS 2010).	High	Yes
Song Sparrow (*Melospiza melodia*)	Riparian areas.	Riparian and wetland habitat, including willow and other shrub thickets. Also found in white spruce stands adjacent to riparian habitat (USFS 2010).	High	Yes
Beaver (*Castor canadensis*)	Riparian areas.	Semi aquatic habitat with riparian vegetation ranging from lakes and reservoirs to small rivers and streams (USFS 2005).	High	Yes
White-tailed Deer (*Odocoileus virginianus*)	Hardwood and ponderosa forest understory.	Hardwood forests with well-developed understory for browse and screening cover (USFS 2005).	High	Yes
Mountain Sucker (*Catostomus platyrhynchus*)	Aquatic habitats.	Cool, clear mountain streams from three to 12 meters in width. May also be found in larger rivers, lakes, and reservoirs (USFS 2005).	High	Yes

[1]. USFS 2005, 2010

[2]. High: suitable habitat present and species known to occur in analysis area through documentation by field work or SDNHP (SDGFP 2012), or Rocky Mountain Bird Observatory (RMBO 2009) data ((Panjabi 2005); Moderate: suitable habitat present but no previous occurrences documented in analysis area by field work or SDNHP (SDGFP 2012) or Rocky Mountain Bird Observatory (RMBO 2009) data (Panjabi 2005); Low: no suitable habitat present and no previous occurrences documented.

3.2.1.1.2.1 Applicable Laws, Regulations, Policy, and Forest Plan Direction

The BHNF LRMP as amended (USFS 2006) Goal 2, Objective 238a through 238d, and Chapter 2 page 32 describes the regulatory setting for MIS on the BHNF. These Objectives direct the BHNF to maintain or enhance a specific habitat type for each MIS (**Table 3-8**). Goals and Objectives which may be applicable to the Proposed Action include:

Goal 2, Objective 238a: Maintain or enhance habitat for ruffed grouse, beaver, song sparrow, grasshopper sparrow, white-tailed deer and brown creeper; as outlined in specific direction pertaining to aspen, other hardwoods, riparian areas, grasslands, spruce and ponderosa pine (e.g., Objectives 201, 205, 211, 239-LVD, 5.1-204).

Goal 2, Objective 238b: Maintain habitat opportunities for black-backed woodpeckers across the Forest, as outlined in specific direction pertaining to conifer habitat, snags and recently burned habitat (e.g., Objectives 211, 11-03, 5.1-204, Standard 2301).

Goal 2, Objective 238c: Maintain habitat for golden-crowned kinglets, as outlined in specific direction pertaining to spruce habitat (e.g., Objective 239-LVD).

Goal 2, Objective 238d: Maintain or enhance habitat quality and connectivity for mountain suckers, as outlined in specific direction pertaining to aquatic resources (e.g., Objectives 103, 104, 215, Standards 1201, 1203, 1205, Guideline 1115).

Standards and Guidelines outline specific management directions toward MIS which may be applicable to the Proposed Action and are in **Appendix D**

3.2.1.1.2.1.1 Black-backed Woodpecker

3.2.1.1.2.1.1.1 Species Ecology

In the Black Hills, Black-backed Woodpeckers are associated with ponderosa pine habitats that support high populations of their main prey: the larvae of wood-boring beetles, engraver beetles, and bark beetles (Anderson 2003). Recently burned pine forests and areas infested with mountain pine beetles are most preferred by this species. The species can also be found in forests that are relatively unaffected by beetles, but occurrence is considered rare in these habitats.

Black-backed Woodpecker populations are often irruptive as they follow outbreaks of wood-boring beetles after fires (Dixon and Saab 2000; USFS 2000). Large movements have been noted across North America in response to changing habitat and insect conditions. Abundance peaks within the first few years after a fire but decreases as snags decay and beetle numbers decrease.

In many areas, nest productivity of woodpeckers is higher in burned areas than unburned areas. This has led researchers to hypothesize that burned areas provide surplus birds opportunities to augment or repopulate areas where mortality exceeds reproduction (Vierling

2004; Hutto 1995). Thus, periodic fires may be important toward sustaining Black-backed Woodpecker populations over long periods of time. Though burned forests are suspected to function as a source habitat, there is a lack of information on movements and mortality to support this.

In unburned, uninfested pine habitat of the Black Hills, Black-backed Woodpeckers typically select mature or late successional pine stands with high canopy cover, high tree densities, and high snag densities (Mohren 2002; Panjabi 2001 and 2003; USFS 2000). These conditions are found primarily in structural stages designated as 4C (mature tree cover <70%) and 5 (over-mature trees).

Black-backed Woodpeckers nest in hard snags or live trees with diameters of nine to 18 inches (Anderson 2003). They excavate nest cavities into the tree's sapwood and thus often prefer smaller diameter trees than other woodpecker species (Dixon and Saab 2000; Mohren 2002). Live nest trees generally have heart rot, which makes excavation easier (Anderson 2003; Mohren 2002). Ponderosa pine appears to be the most important nest tree in the Black Hills, as all recent studies report nests in only that species (Vierling 2004; Mohren 2002; Rumble 2002). The distribution, arrangement, and size of patches of snags needed are uncertain, but the literature suggests that snags should be clumped (Dixon and Saab 2000).

Forest monitoring indicates the Black-backed Woodpecker is distributed in low densities throughout most of the BHNF, including within the analysis area. Where numerous wildfires and insect outbreaks have recently occurred (within five years), the species is likely to be observed in much greater densities. Forest-wide relative density for this species is probably higher than "normal" given the current habitat conditions. Black-backed Woodpecker populations are 'eruptive" as reflected in their densities in burned habitat. This pattern of rapid colonization and subsequent decline is consistent with findings of other studies (Anderson 2003a). This species' Forest-wide population trend is likely to decline in the future as vegetation management efforts to reduce the fire-hazard and insect-risk continue. Overall, habitat for this species is being provided consistent with Objective 238b, Objective 221 and Objective 11.03. The "aging" of large burned areas, such as the Jasper Fire, into habitat less suitable for black-backed woodpeckers is likely being offset by the increasing acreage of insect-infested timber stands and the stable acreage of large diameter, older pine trees, though additional time is needed to grow more of Structural Stage 5 (USFS 2010c). Black-backed Woodpeckers had a density of approximately 0.6 birds/km^2 in 2000, and approximately 6.8 birds/km^2 in 2009.

Current estimates state that over 200,000 acres of BHNF is currently infected with mountain pine beetle. The goal of the USFS's pine beetle response efforts are to treat recently infested mountain pine beetle areas within 'High Risk' stands on NFS lands to reduce and slow the spread of mountain pine beetle, and reduce wildfire hazard on the Forest. The response efforts would further reduce Black-backed Woodpecker habitat within the next five to ten years in addition to those older previously infested stands that no longer provide suitable habitat for the Black-backed Woodpecker. However, an active fire season in 2012

has likely increased standing dead timber which could serve as potential Black-backed Woodpecker habitat across BHNF.

3.2.1.1.2.1.1.2 Analysis Area

The analysis area provides 392 acres of forest stands with ten or more live trees greater than five inches in diameter per acre showing signs of insect damage, and 971 acres of ponderosa pine stands classified as 4C (mature trees cover > 70%). No stands classified as 5 (over mature trees) occur within the analysis area. Fire history data, provided by BHNF, only identified two major fires within the analysis area within the past 25 years. The Horse Creek Fire burned 2,673 total acres in 1991 and the Westberry Trails Fire burned 4,778 total acres in 1988. However, according to the BHNF available GIS vegetation data (USFS 2009a), the analysis area contains 4,472 acres of forest stands in which old burns reduced the stands timber productivity. These areas may provide habitat for the Black-backed Woodpecker.

Assuming 5,835 acres of potential Black-backed Woodpecker habitat in the analysis area (392 + 971 + 4,472), and assuming approximately seven birds/square kilometer (km2), the analysis area would support approximately 161 Black-backed Woodpeckers. During the course of surveys in July 2012, Black-backed Woodpeckers were regularly observed throughout the analysis area (more than 18 territories noted) in conifer stands that included at least some recently beetle-killed trees.

3.2.1.1.2.1.2 Brown Creeper

3.2.1.1.2.1.2.1 Species Ecology

The Brown Creeper is considered an uncommon resident of the Black Hills (USFS 1996), largely tied to late successional pine and white-spruce habitats (Panjabi 2003, 2004). A small, well-camouflaged tree climber, the Brown Creeper is often observed scaling the bark of trees gleaning spiders, beetles, moths, and other insects from crevices and behind pieces of loose bark (Kingery 1998).

The Brown Creeper is typically associated with mature, old growth coniferous and mixed-coniferous-deciduous forests. The preferred nesting habitat for this species is mature, old growth forest that is undisturbed and has a closed canopy (Hejl et al. 2002; Wiggins 2005b). Brown Creepers tend to prefer dense, late successional coniferous, deciduous, or mixed habitats (DeGraaf et al. 1991). Panjabi (2001, 2003, 2004, 2005) has found that Brown Creepers are closely associated with dense mature and late successional ponderosa pine stands (Structural Stages 4C and 5) and white spruce in the Black Hills. They are also found in lower densities in other structural stages of ponderosa pine (Panjabi 2001, 2003, 2004, 2005). Evidence also suggests that this species is sensitive to the effects of timber management and forest fragmentation (Franzreb and Ohmart 1978; Keller and Anderson 1992; Crompton 1994; Anderson and Crompton 2002).

Other important habitat requirements are areas of large trees (greater than ten inches in diameter), loose bark, areas infested with bark beetles, and snags (DeGraaf et al. 1991; Peterson 1993; Kingery 1998; Wiggins 2005b). Dead or decaying trees and snags provide substrate for nests and foraging. Nesting habitat generally includes trees with a diameter at breast height (dbh) greater than nine inches (Hejl et al. 2002, p. 15).

The Brown Creeper is well distributed throughout the late-successional forests of the BHNF, including the analysis area. While the species occurs in relatively low densities across the entire BHNF, it is most abundant in late-successional pine forests and white spruce habitats. Brown creepers have been monitored on the Black Hills since 2001 in cooperation with the Rocky Mountain Bird Observatory (Panjabi 2001, 2003, 2004, 2005). Four years of data suggest the brown creeper is well distributed in low abundance throughout the Black Hills (Panjabi 2001, 2003, 2004, 2005). At least 90 percent of all brown-creeper observations in each of these years have occurred in white spruce and mature and late successional pine habitats (Structural Stages 4 and 5; Panjabi 2001, 2003, 2004).

According to FPMER, the short-term relative densities declined for this species in 2007 compared to previous years, but rebounded in 2009 in most habitats sampled (White et al. 2010). Blakesly et al. (2008) projected it would take 25 to 30 years to detect a three percent annual decline in this species. The Forest-wide preferred habitat has been stable or slightly increasing over the past five years. Although preferred habitat defined by Structural Stages 4C and 5 decreased slightly, the acres of Structural Stage 4C with very large trees (>16 inches DBH) has increased. It appears that Objective 238a is being met. Continued effort and additional time is needed to increase the acres of Structural Stage 5 across the Forest (USFS 2010c).

The BHNF LRMP Phase II Amendment EIS (USFS 2005) indicates that Brown Creeper may be sensitive to the effects of habitat fragmentation, but this is in reference to larger timber management practices. The BHNF is currently bisected by numerous USFS and public roads, as well as transmission lines and distribution lines. An active fire season in 2012 may have reduced Brown Creeper habitat across BHNF. Additionally, the infestation of mountain pine beetle on over 200,000 acres of BHNF lands has reduced, and will continue to reduce, Brown Creeper habitat. Mountain pine beetle response efforts focused on reducing impacts from mountain pine beetle would reduce the rate of habitat loss for Brown Creeper long-term.

3.2.1.1.2.1.2.2 Analysis Area

The analysis area includes 971 acres of late-successional ponderosa pine forest stands classified as 4C (mature trees cover > 70%). Of these 971 acres, 21 acres had a tree size classification of “very large”, the preferred habitat of the Brown Creeper; an additional 875 acres were classified as “large”. No stands classified as 5 (over mature trees) occur within the analysis area (USFS 2009a). The *BHNF FY 2009 Monitoring and Evaluation Report* (USFS 2010) used these habitat classifications to address Brown Creeper habitat throughout the BHNF. Field surveys in the summer of 2012 observed numerous individuals.

3.2.1.1.2.1.3 Golden-crowned Kinglet

3.2.1.1.2.1.3.1 Species Ecology

Golden-crowned Kinglets that breed in the Black Hills are separated from their main breeding range across the boreal forests of Canada and in the Western United States. The Golden-crowned Kinglet is an uncommon permanent resident at higher elevations in the Black Hills, where they are found primarily in white-spruce forests (Tallman et al. 2002; Panjabi 2003 p. 81). Golden-crowned Kinglets are uncommon in the Black Hills during the winter, but are common spring and fall migrants (Tallman et al. 2002).

Golden-crowned Kinglets are found primarily in white-spruce forests (Tallman et al. 2002; Panjabi 2003). Panjabi (2003, p. 81) also found them in small numbers in mature ponderosa pine, aspen, and wet meadows, although these areas likely had a spruce component. Golden-crowned Kinglets occurrence and distribution on the Black Hills are likely limited by the abundance, distribution and condition of spruce habitat. White spruce occurs at high elevations, on north aspects, and in cool canyon bottoms of the Forest where it forms nearly even-aged climax stands (USFS 1996a). Fire suppression during the last century has allowed spruce to increase in abundance and density in the Black Hills, generally at the expense of quaking aspen (Parrish et al. 1996, p. 11). The Golden-crowned Kinglet primarily occurs in the northern half of BHNF, although it is found in more localized portions of the Southern Hills and Bearlodge Mountains. Golden-crowned Kinglet density was highest in 2005 with approximately 63 birds per square kilometer of suitable white spruce habitat. That density has since dropped to approximately 23 birds per square kilometer of suitable white spruce habitat; however monitoring found a density approximately 16 birds per square kilometer of late-successional pine habitat (USFS 2010).

Forest-wide monitoring data suggests in the short-term, the golden-crowned kinglet relative density in 2007 was the lowest since the forest bird monitoring program began in 2001. Blakesly et al. (2008) projected it would take 20 years to detect a three percent annual decline for this species in white spruce habitat. Relative densities rebounded considerably in 2009 in both late successional and white spruce habitats (White et al. 2010). Spruce habitat for the golden-crowned kinglet has increased over the long-term and is exceeding the USFS-wide target of 20,000 acres (Objective 239-LVD). The USFS is meeting Objective 238c based on the acres of preferred habitat.

3.2.1.1.2.1.3.2 Analysis Area

The analysis area provides 316 acres of mature white spruce habitat, and 971 acres of late-successional ponderosa pine forests (USFS 2009b). The *BHNF FY 2009 Monitoring and Evaluation Report* (USFS 2010) used these habitat classifications to address Golden-crowned kinglet habitat throughout the BHNF. Golden-crowned Kinglets were observed by field personnel performing surveys within the analysis area.

3.2.1.1.2.1.4 Grasshopper Sparrow

3.2.1.1.2.1.4.1 Species Ecology

The Grasshopper Sparrow occurs widely in native mixed-grass prairies in the southern Black Hills, and locally further north in the central Black Hills (Panjabi 2005). Panjabi (2005) found them in the highest density in mixed-grass prairie habitat. They may also occur in other types of grasslands (Panjabi 2003). The Grasshopper Sparrow is found in a variety of open grassland types, but appears to be area sensitive, preferring grasslands greater than 20 acres in size (Slater 2004). They may select larger patches to avoid predation associated with edge habitats (Slater 2004). In South Dakota, they are primarily found in mixed-grass prairies (Slater 2004). Within these grassland patches, they prefer grasslands of intermediate height and avoid habitats where vegetation is less than four inches tall (Slater 2004). They require some areas of bare ground for foraging and some taller vegetation (tall grasses, forbs, or scattered shrubs) for singing perches (Slater 2004). This species can be locally abundant in some prairies, especially where there is a greater proportion of tall grass (Panjabi 2005).

According to the FPMER, density estimates for the grasshopper sparrow have continued to increase since 2002. Forest-wide grassland cover types are currently below management objectives. The general perception is that grassland habitats have been declining due to pine encroachment. However, for the ten-year monitoring period, grassland acreages have shown an increase then a decrease that is likely explained by inconsistencies in what cover types have been queried in the vegetation database not reflecting on the ground conditions which may have only changed slightly. The Forest is maintaining existing grassland habitat consistent with Objective 238a and additional time and effort is needed to achieve the grassland acreage identified in Objective 205 (USFS 2010). Density estimates of the number of Grasshopper Sparrows per square kilometer of potential grassland habitat steadily increased from 2002 through 2008, potentially as the result of the prolonged drought currently affecting the western Great Plains (USFS 2009b). In 2002, the Grasshopper Sparrow density was approximately 17 birds per square kilometer. This number increased to approximately 37 birds per square kilometer in 2008.

3.2.1.1.2.1.4.2 Analysis Area

The analysis area provides 1,913 acres of grassland habitats which would suit Grasshopper Sparrows. These 1,913 acres of grasslands habitat consists of approximately nine acres of oatgrass, 492 acres of bluegrass, and 1,412 acres of unidentified grasslands. Assuming that all 1,913 acres of grassland habitat identified by available GIS vegetation coverage provides suitable habitat for Grasshopper Sparrow, and assuming that the BHNF grassland habitat still supports approximately 37 birds per square kilometer, the analysis area supports approximately 285 Grasshopper Sparrows. This species is assumed to occur in suitable habitats within the analysis area.

3.2.1.1.2.1.5 Ruffed Grouse

3.2.1.1.2.1.5.1 Species Ecology

The Ruffed Grouse is a year-round resident in the BHNF and occurs widely but in low abundance (Panjabi 2003). The Ruffed Grouse is classified by the South Dakota Game, Fish and Parks Department as an upland game bird. There is an annual fall hunting season for this species. Distribution on the BHNF roughly correlates to the distribution of aspen. Aspen is more abundant in the northern and central Black Hills and Bear Lodge Mountains. Aspen becomes sparse in the southern BHNF.

In South Dakota, Ruffed Grouse are typically found in young-to-medium age aspen stands, other hardwood stands, and open pine forests (Tallman et al. 2002). It nests in forests or woodlands with some deciduous trees and is closely associated with hardwoods; particularly aspen (McCaffery et al. 1997). On the BHNF, this species is associated with aspen in a variety of structural stages. Individuals of this species feed on aspen buds and catkins in the winter and spring, respectively (USFS 1996). Historic fire suppression has resulted in reduced vigor of existing aspen stands and inhibited aspen regeneration (Parrish et al. 1996). Fire suppression has resulted in loss of some optimum habitat (Tallman et al. 2002). Aspen abundance and distribution may limit this species' abundance and distribution.

Stands dominated by aspen in 2009 occupied 45,805 acres of the entire BHNF. This represents approximately a one percent increase since 1997. Since the beginning of fire suppression on the BHNF, aspen stands have been replaced by pine and spruce forests in many areas. According to FPMER, the long-term habitat trend for ruffed grouse is one of decline given the reduction of aspen acreage compared to historic condition. It is likely that there has been an associated population decline in ruffed grouse. Loss of aspen habitat is attributed to decadence of stands, to conifer encroachment and lack of periodic natural fire that would stimulate regeneration and suckering. The BHNF continues to meet Objective 238a by maintaining aspen habitat. Additional time and effort would be needed to increase aspen acreage. Monitoring protocol specific to ruffed grouse has been developed (Hansen et al. 2008). During this study, baseline estimates indicate probability of occupancy at 0.111 in suitable habitat forest-wide. Implementation of ruffed grouse monitoring protocol should allow for the detection of long-term population trend (USFS 2010).

3.2.1.1.2.1.5.2 Analysis Area

The analysis area provides 592 acres of aspen stands of varying density and age classification which could potentially provide habitat for Ruffed Grouse (USFS 2009c). This species is expected to occur in suitable Aspen habitats associated with the analysis area.

3.2.1.1.2.1.6 Song Sparrow

3.2.1.1.2.1.6.1 Species Ecology

Song Sparrows are dependent on riparian areas across much of its range and Panjabi (2001) found them closely associated with riparian and wetland habitat on the Black Hills Forest. They are uncommon winter residents in the Black Hills, many likely spending the winter on adjacent prairie habitat (Tallman et al. 2002). This species is found throughout much of the BHNF, but is more common in the northern portion. The species occurs mainly in streamside thickets, especially willows, and is dependent upon these habitats (Panjabi 2001). Panjabi (2001, 2003) found them in the highest density in riparian habitat. He also found them in white spruce adjacent to riparian stringers. The Song Sparrow breeds in a wide range of forest, shrub and riparian habitats, but in dry areas are normally limited to those close to fresh water (Arcese et al. 2002). Year-round residents are often found near breeding areas during winter (Arcese et al. 2002).

Riparian areas account for approximately one percent of public and private land in the Black Hills and are typically located adjacent to streams and around natural springs, seeps, fens, and reservoirs (USFS 1996). Based on the presence of water, these areas frequently receive a disproportionate amount of use from wildlife, livestock, and humans. Human-related influences on riparian habitats include the following: mining within streams and floodplains; browsing by domestic livestock; road construction for timber harvest activities; water table disruptions as part of beaver trapping and eradication; a reduction of fire frequency as a result of fire suppression; vegetation disturbance from recreation activities; insect infestation of willow species and the clearing or spraying of willows for agricultural purposes (USFS 1996); dumping of mining, mill and domestic effluent into streams, water diversions for milling and domestic uses; and draining wet meadows (Parrish et al. 1996).

Forest-wide monitoring data suggests in the short-term, the relative density of song sparrows in 2008 had slightly declined since the forest bird monitoring program began in 2001. Blakesly et al. (2008) projected it would take 20 years to detect a three percent annual decline for this species in the three riparian habitat types monitored (Rocky Mountain Bird Observatory [RMBO] 2001-2010). Riparian habitats have decreased in quantity and quality since the pre-European settlement era, indicating a long-term declining habitat trend (Parrish et al. 1996). Implementation of Forest Plan Standards and Guidelines and best management practices maintain riparian habitat, but at less than its full potential (USFS 2009).

3.2.1.1.2.1.6.2 Analysis Area

The analysis area includes approximately 11 acres of willow cover type which may provide habitat for Song Sparrows (USFS 2009b). The analysis area includes three named perennial streams that may support Song Sparrow: South Fork of Castle Creek, Slate Creek, and Rapid Creek. Intermittent named streams occurring in the analysis area include Gold Run, Dutchman Creek, Horse Creek, and Prairie Creek. In addition to the perennial

streams previously mentioned, these intermittent streams may also support Song Sparrow. Additional suitable Song Sparrow habitat may be found in isolated wetlands (e.g., springs) and unnamed intermittent streams identified in the analysis area.

Despite the lack of potentially suitable Song Sparrow habitat identified in available GIS vegetation data (USFS 2009b), Song Sparrows were observed during surveys within the analysis area and this species is expected to occupy suitable habitats. Because beaver and Song Sparrow occupy similar habitat, impacts analyses for these species has been combined below.

3.2.1.1.2.1.7 Beaver

3.2.1.1.2.1.7.1 Species Ecology

Historically, beavers on the BHNF influenced riparian vegetation and changed stream flows, often converting intermittent drainages to perennial streams (Parrish et al. 1996). This species was selected as a MIS based on its relationship with riparian/aquatic habitats, status as a keystone species, available monitoring protocols, and dependence on riparian forest and shrub habitat. The beaver is North America's largest rodent, with adults weighing between 30 and 60 pounds (Higgins et al. 2000, p.119). Beavers are semi-aquatic and widely distributed in large rivers and lakes with constant water levels, marshes, small lakes, and streams with weak flows adequate for damming (Higgins et al. 2000, p.120).

General habitat requirements of beavers include suitable riparian habitat dominated by stands of willow, aspen, or cottonwood (Streubel 1989). Beavers are not found in areas without permanent water and suitable woody vegetation; they build dams by felling trees and shrubs and packing mud between the branches. They also build lodges with feeding and sleeping chambers that are accessed through underwater entrances. The beaver is nocturnal and active year-round. This species is vegetarian, preferring aspen, willow, cottonwood, and alder (Higgins et al. 2000, p.120). At one time, beavers were likely the most important biological influence on riparian systems on the BHNF. Through dam construction, they can enhance and maintain aquatic and riparian communities by elevating water tables; reducing stream velocity and subsequent sedimentation and bank erosion; improving water quality; improving stream flow stability; and enhancing fish and wildlife habitat (Olson and Hubert 1994). Riparian and aquatic dynamics created or enhanced by beavers are considered beneficial to many plant species which are specifically managed for by BHNF.

Beavers were heavily trapped in the BHNF, and by the late 1800s beaver populations were low and restricted to remote portions of the BHNF (Parrish et al. 1996). Historic fire suppression also played a part in reducing beaver populations across the BHNF by creating reduced vigor of existing hardwood stands and inhibited regeneration (Parrish et al. 1996).

Beaver populations on the BHNF are estimated using food caches as indicators of occupied habitat (USFS 2009c). Surveys performed in 2007 identified approximately one cache for every 40 kilometers of perennial stream throughout the BHNF. Overall, 20 of the 52

watersheds sampled contained food caches which would indicate beaver presence in the area. The most recent beaver survey was completed October 29-November 2, 2012. The long-term beaver population trend has increased in the Black Hills since heavy trapping was moderated by hunting regulations but it is less than its potential. The long-term habitat trend suggests decline, as evidenced by the decreasing quality of riparian habitats since European settlement, and a decrease in the amount of aspen over the past 30 years (USFS 2009, 2010).

3.2.1.1.2.1.7.2 Analysis Area

The analysis area includes three named perennial streams that may support beavers: South Fork of Castle Creek, Slate Creek, and Rapid Creek. Intermittent named streams occurring in the analysis area include Gold Run, Dutchman Creek, Horse Creek, and Prairie Creek. In addition to the perennial streams previously mentioned, these intermittent streams may also support beavers. Additional unnamed intermittent streams were observed in the analysis area but are likely too small to support beaver habitat.

The 2012 beaver cache monitoring identified beavers or beaver caches in eight drainages which intersect the analysis area. The Hydrologic Unit Code (HUC) presented below represents the 12th level drainage associated with the known beaver activity, while the water body presented in parenthesis identifies the specific water body with known beaver activity within the HUC:

- South Fork Castle Creek HUC (Ditch Creek)
- Upper Radid Creek HUC (Gold Run)
- Lower Castle Creek HUC (Castle Creek)
- Lower Castle Creek HUC (Castle Creek)
- Lower Castle Creek HUC (Pony Gulch)
- Slate Creek HUC (Slate Creek)
- Victoria Creek/Rapid Creek HUC (Rapid Creek)
- Victoria Creek/Rapid Creek HUC (Deer Creek)

Beaver or beaver ponds were not observed during surveys within the analysis area but are expected to occupy suitable habitats.

3.2.1.1.2.1.8 White-tailed Deer

3.2.1.1.2.1.8.1 Species Ecology

White-tailed deer was selected as an MIS in order to evaluate the effects of implementation and natural change on the ability of the BHNF to support species that rely on a variety of forest conditions, including the occurrence of understory shrubs, to meet their needs.

White-tailed deer in the Black Hills require a diversity of habitat types. Juxtaposition between cover and forage is crucial year-round. Hardwood stands, which provide abundant forage

combined with screening cover, were best predictors of white-tailed deer diurnal, summer use (Stefanich 1995). Peak use of dense aspen habitats with dense, tall shrub cover indicated importance as fawning habitat in the northern and central Black Hills (DePerno et al. 2002). Bur oak also plays an important role in providing forage, especially on the Bearlodge Ranger District. Summer nocturnal habitat use is significantly different than use of open habitat types associated with meadows, riparian areas, and/or open pine relative to proximity of dense cover (Stefanich 1995). Wet meadows, riparian areas, and open stands of ponderosa pine also provide quality forage.

According to the FPMER, the most recent Black Hills South Dakota population estimate is approximately 43,000 deer (Huxoll 2010). Forest Plan Objective 217 supports habitat for management of 60,000 deer in the Black Hills, which matches state population objectives. Aspen and bur oak, grasslands and meadows, and mature and pole stage ponderosa forests with canopy cover of less than 40 percent have all remained stable or increased in recent year, increasing potential white-tailed deer habitat (USFS 2010). The Forest-wide habitat trend is stable or increasing. Open habitat that provides forage is increasing and screening cover is stable. The Forest is meeting Objective 217 and Objective 238 based on white-tailed deer habitat and population trends (USFS 2010).

3.2.1.1.2.1.8.2 Analysis Area

The analysis area provides 1,406 acres of ponderosa pine forest habitat classified as 3a (sapling/pole cover < 40%), 9,260 acres of ponderosa pine forest habitat classified as 4a (mature trees cover < 40%), 592 acres of aspen stands, and 1,913 acres of grassland habitats which would suit white-tailed deer (**Table 3-8**). The *BHNF FY 2009 Monitoring and Evaluation Report* (USFS 2010) used these habitat classifications to address forage and visual cover for white-tailed deer. White-tailed deer have been observed during surveys within the analysis area and is expected to occur in the area.

3.2.1.1.2.1.9 Mountain Sucker

3.2.1.1.2.1.9.1 Species Ecology

Mountain suckers have been observed in large rivers, lakes, and reservoirs (Moyle 1976; Baxter and Stone 1995; Wydoski and Wydoski 2002) and in small prairie streams but most often occur in cool, clear mountain streams that are three to 12 meters wide (Smith 1966; Decker and Erman 1992). These fish prefer temperatures between 13 and 23 degrees Celsius (°C) and moderately swift water velocities (Smith 1966; Sigler and Sigler 1996). In a study of the fish distributions within a stream, Gard and Flittner (1974) noted that mountain sucker occurred only in a downstream section where channel gradients were lowest and temperatures were warmer than upstream areas suitable only for trout. Underwater observations made by Decker (1989) revealed that mountain sucker were always found on the stream bottom, usually occurred in small groups, and were closely associated with cover (e.g., exposed willow or tree root masses, undercut banks, log jams, and boulders). Average depth at these locations was 0.61 meter and average water velocity was 0.2 meter per

second (Decker 1989). Substrate composition associated with mountain sucker habitat varies widely and ranges from mud to sand, gravel, and boulders, although cobbles are most common (Smith 1966; Decker 1989).

The Final EIS for the BHNF LRMP Phase II Amendment (USFS 2005) identified a decline in the Forest-wide population trend for mountain sucker when compared to historical distribution data, and this decline continues today. Detrimental habitat factors, such as reduced stream connectivity from roads and dams, altered riparian vegetation from grazing, fire prevention, and introduction of non-native fishes all likely contribute to the population declines Forest-wide (USFS 2005). The South Dakota Game, Fish and Parks surveyed 24 sites for mountain sucker in 2006. Only one of those sites contained mountain suckers (USFS 2007b). While the names of the 24 sites surveyed in 2006 were not disclosed, this provides further evidence to the population of the mountain sucker declines (USFS 2010). Research conducted in 2008 through 2010 (Shultz 2011) identified several creeks that supported measurable densities of the mountain sucker. Of these, the South Fork of Castle Creek is within the analysis area and proposed ROW. No other water bodies that occur in the analysis area or ROW are known to support populations of the mountain sucker.

The long-term trend in aquatic habitat is influenced by a variety of natural and anthropogenic factors. Increased rainfall and higher flows greatly improved stream conditions in 2008 and 2009 compared to the previous seven to eight years of drought. Stream connectivity remains fragmented due to instream structures, such as dams and road culverts. These structures impede mountain sucker passage and likely prevent this species from reoccupying upstream habitat once favorable flows have returned. The completion of riparian/stream enhancement projects along with the implementation of Forest Plan standards and guidelines, Regional watershed conservation practices and best management practices contribute to maintaining or enhancing aquatic and riparian habitat and stream connectivity for the mountain sucker consistent with Objective 238d. These habitat conservation projects and resource protection measures alone may be insufficient to increase the numbers and distribution of mountain sucker without some future transplanting efforts done in coordination with SDGFP (USFS 2010).

3.2.1.1.2.1.9.2 Analysis Area

The analysis area includes three named perennial streams which may support mountain suckers: South Fork of Castle Creek, Slate Creek, and Rapid Creek. Historical records, identified mountain suckers in each of these named streams within the analysis area; however, research performed in the 2012 only identified the species in isolated sections of Castle Creek and Rapid Creek above Pactola Basin (Schults and Betrand 2012).

Named intermittent streams occurring in the analysis area include Gold Run, Dutchman Creek, Horse Creek, and Prairie Creek and these intermittent streams may support mountain suckers in high water years. Additional unnamed intermittent streams in the area are likely too small and do not support a long enough hydroperiod to support mountain

sucker. Mountain sucker have been previously identified in Horse Creek and other tributaries of Castle Creek, which may include Gold Run and Dutch Creek (USFS 2005).

3.2.1.1.3 BHNF Forest Service Region 2 Sensitive Species

The analysis area for BHNF Region 2 Sensitive species is one-half mile on each side of the Proposed Action. The temporal boundary analyzed for these species includes the period of active construction and generally for the life of the transmission line. The determinations of effects on Sensitive species were made based on the information gathered in the pre-field review, field reconnaissance and using information provided in the BA/BE document. The bases for the determinations are potential habitat, species distribution, and anticipated effects from proposed activities. The determination language is set forth in FSM Regional Supplement No. 2600-2011-1. A review of Region 2 Sensitive wildlife and fish species can be found below. More in depth discussion of Sensitive species analyzed for the T-O-RC Project can be found in the BA/BE document in the project file.

The Phase II Forest Plan Amendment FEIS (USFS 2005a) evaluated population viability, and determined that all federally listed and Region 2 Sensitive species are likely to persist on the Forest over the next 50 years if standards and guidelines are followed, and if conditions move toward Forest Plan objectives. Project implementation would incorporate all Forest Plan Standards and Guidelines. Furthermore, all alternatives are consistent with Forest Plan Objective 221, which is to conserve or enhance habitat for Region 2 Sensitive species. Therefore, persistence of all federally listed and sensitive species would not be affected by any alternative of the T-O-RC Project.

Impacts to species identified by the Region 2 Regional Forester as sensitive that occur in BHNF are addressed in this section. Species are classified as Sensitive when they meet one or more of the following criteria: 1) the species is declining in numbers or occurrences, and evidence indicates that it could be proposed for federal listing as threatened or endangered if action is not taken to reverse or stop the downward trend; and/or 2) the species habitat is declining and continued loss could result in population declines that lead to federal listing as threatened or endangered if action is not taken to reverse or stop the downward trend. The analysis of Region 2 Sensitive Species applies to NFS lands covered by the BHNF LRMP (USFS 2006). Distribution and natural history for a majority of Region 2 Sensitive species was given a thorough overview in the Final EIS for the BHNF LRMP Phase II Amendment BA/BE (USFS 2005) and the 1996 Final EIS BA/BE (USFS 1996) which is incorporated by reference.

This section provides a broad description of the existing conditions for USFS Sensitive Species. The habitat requirements and likelihood of occurrence are summarized in **Table 3-9** for each USFS Sensitive Species. Species are grouped by habitat type to facilitate the affects analysis and reduce redundancy. Habitat types within the ROW and analysis boundary are summarized by the following categories: 1) grassland; 2) wetland/ meadow/ riparian; 3) aquatic; 4) conifer forest; and 5) cliff/caves. Aspen habitat was originally included as a habitat type for consideration; however, no sensitive species analyzed rely on aspen as

their primary habitat type. Therefore, aspen stands were not exclusively analyzed in this section. Aspen stands are the main habitat type of the BHNF MIS Ruffed Grouse, and that habitat type was analyzed above. A species was not carried forward for further analysis if the species has a low likelihood of occurrence or the species is unlikely to be impacted by the Proposed Action. The amount of each habitat type that currently occurs in the analysis area is provided in **Table 3-5**. The amount of each forest stand classification that occurs in the analysis area compared to the amount impacted by the Proposed Action is provided in **Tables 3-15** and **3-17**.

TABLE 3-9 - FOREST SERVICE SENSITIVE SPECIES ON BHNF

SPECIES	HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE IN SOUTH DAKOTA[1]	FURTHER ANALYSIS WARRANTED IN SOUTH DAKOTA
Mammals			
Townsend's Big-Eared Bat (*Corynorhinus townsendii*)	Dependent on caves and abandoned mines for roosting habitat. Forages over a variety of habitats including coniferous forests, juniper woodlands, deciduous forests, basins, and desert shrublands (WGFD 2010).	High	Yes
Hoary Bat (*Lasiurus cinerus*)	Deciduous and coniferous woodlands with dense canopy and open understory. Often found along forest edges foraging over water sources. Roosts in tree foliage (Willis and Bingham 2005, NatureServe 2012).	Moderate	Yes
Fringed Myotis (*Myotis thysanodes*)	Coniferous forests, woodlands, grasslands, and shrublands, although it is probably most common in xeric woodlands, such as juniper, ponderosa pine, and Douglas-fir. Roosts in rock crevices, tree cavities, caves, abandoned mines, and buildings with winter hibernation roosts in caves (WGFD 2010).	Moderate	Yes
Black-Tailed Prairie Dog (*Cynomys ludoviscianus*)	Low relief grasslands and sparse grassy shrublands dominated by blue grama, western wheatgrass and big sagebrush. Soils supporting burrows are fine to medium textured silty clay loam, sandy clay loam and loams.	Moderate	Yes
American Marten (*Martes americana*)	Primarily associated with mature white spruce in the Black Hills. Key habitat elements are relatively dense forests with complex physical structure near the ground, abundant coarse woody debris, and lengthy fire-return intervals (Buskirk 2002).	Moderate	Yes
Rocky Mountain Bighorn Sheep (*Ovis canadensis canadensis*)	Open, grassy areas associated with steep, cliff based escape cover as year round habitat (WGFD 2010).	High	Yes
Swift Fox (*Vulpes velox*)	Shortgrass and mixed-grass prairies with gently rolling or level landscapes. Also sagebrush steppe with low-growing vegetation, relatively flat terrain, friable soils, and high den availability (WGFD 2010).	Low	No

TABLE 3-9 - FOREST SERVICE SENSITIVE SPECIES ON BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN SOUTH DAKOTA[1]**	**FURTHER ANALYSIS WARRANTED IN SOUTH DAKOTA**
Birds			
Northern Goshawk (*Accipiter gentillis*)	Coniferous and mixed conifer/aspen forest habitat, and forages in a wide variety of forest ages, structural conditions, and successional stages. Nest sites are characterized by high canopy cover, high basal area, large tall trees, and fairly open understories, and typically are on the lower third of slopes (WGFD 2010).	High	Yes
Grasshopper Sparrow (*Ammodramus savannarum*)	Shortgrass prairies, mixed grasslands, meadows, open sagebrush-grasslands, and agricultural areas. It requires herbaceous cover and conspicuous perches, and avoids areas containing more than 35% shrubs (WGFD 2010).	Moderate	Yes
Burrowing Owl (*Athene cunicularia*)	Open prairie, grassland, desert, and shrub-steppe habitats, and may also inhabit agricultural areas. It depends on mammals, particularly prairie dogs and ground squirrels that dig burrows, which it uses for nesting, roosting, and escape (WGFD 2010).	Moderate	Yes
Ferruginous Hawk (*Buteo regalis*)	Semiarid open country, primarily grasslands, basin-prairie shrublands, and badlands. It requires large tracts of relatively undisturbed rangeland and nests on rock outcrops, the ground, cut banks, cliff ledges, or trees (WGFD 2010).	Low	No
Mountain Plover (*Charadrius montanus*)	Low, open habitats such as arid shortgrass and mixed-grass prairies with scattered clumps of cacti and forbs. Nest in large, flat grassland expanses with less than 5% slope; sparse, short vegetation (10 cm [4 in] or less); and bare ground. It is adapted to areas that have been disturbed by prairie dogs, heavy grazing, or fire (WGFD 2010).	Low	No
Northern Harrier (*Circus cyaneus*)	Nests on ground in open wetlands, including marshy meadows, wet, lightly grazed pastures, old fields, freshwater marshes, and tundra. May also utilize dry uplands, including upland prairies, mesic grasslands, drained marshlands, croplands, cold desert shrub-steppe, and riparian woodland (Sibley 2003, Smith et al. 2011).	High	Yes
Yellow-billed Cuckoo (*Coccyzus americanus*)	Riparian obligate species that prefers extensive areas of dense thickets and mature, deciduous, cottonwood gallery forests near water, and requires low, dense, shrubby vegetation for nest sites (WGFD 2010).	Low	No
American Peregrine Falcon (*Falco peregrinus anatum*)	Forages in a variety of open habitats from open woodlands and forests to shrub-steppe, grasslands, marshes, and riparian habitats. Nests on cliffs often located near water that are usually proximate to habitats with abundant prey (WGFD 2010).	Moderate	Yes

TABLE 3-9 - FOREST SERVICE SENSITIVE SPECIES ON BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN SOUTH DAKOTA[1]**	**FURTHER ANALYSIS WARRANTED IN SOUTH DAKOTA**
Bald Eagle (*Haliaeetus leucocephalus*)	Nests near large lakes and rivers in forested habitat where both adequate prey (fish, waterfowl and ungulate carcasses) are available and old, large-diameter cottonwood or conifer trees for nesting. Migrating and wintering eagles congregate near areas where concentrations of prey are available, such as carcasses of ungulate species, and spawning areas for kokanee, trout, and other fish (WGFD 2010).	High	Yes
Loggerhead Shrike (*Lanius ludoviscianus*)	Open pastures and prairies with scattered bushes, hedgerows, and trees (Sibley 2003).	Moderate	Yes
Lewis's Woodpecker (*Melanerpes lewis*)	Open or park-like ponderosa pine forests are major breeding habitat. Attracted to burned-out stands of Douglas-fir, mixed conifer, juniper, and riparian and oak woodlands, but is also found in deciduous forests, especially riparian cottonwoods (WGFD 2010).	High	Yes
Long-billed Curlew (*Numenius americanus*)	Grassland types ranging from moist meadow grasslands to agricultural areas to dry prairie uplands, usually near water. Prefers a complex of shortgrass prairies, agricultural fields, wet and dry meadows and prairies, and grazed mixed-grass and scrub communities. Nests on the ground in habitat that usually includes: grass less than 30 cm (12 in) high; bare ground; shade; abundant invertebrate prey; and a minimum of 40 hectares (100 ac) of suitable habitat (WGFD 2010).	Low	No
Black-backed Woodpecker (*Picoides arcticus*)	Highly associated with ponderosa pine forests that are recently burned or have high infestations of bark beetle. Healthy ponderosa pine forests with dense mature or late successional structure also important (USFS 2010).	High	Yes
Flammulated Owl (*Otus flammeolus*)	Semi-arid open oak and ponderosa pine forests with a mix of large old trees, thickets, and openings, and a high diversity of arthropod prey (McCallum 1994).	Moderate	Yes
Amphibians			
Northern Leopard Frog (*Lithobates pipiens*)	In or near permanent water in the plains, foothills, and montane zones comprised of swampy cattail marshes on the plains and beaver ponds in the foothills and montane zones (WGFD 2010).	High	Yes
Reptiles			
Black Hills Red-bellied Snake (*Storeria occipitomaculata pahasapae*)	Mesic sites such as wetlands, riparian areas, and wet meadows. Hibernacula located within rock fissures (USFS 2000).	Moderate	Yes

TABLE 3-9 - FOREST SERVICE SENSITIVE SPECIES ON BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN SOUTH DAKOTA[1]**	**FURTHER ANALYSIS WARRANTED IN SOUTH DAKOTA**
Fishes			
Mountain Sucker (*Catostomus platyrhynchus*)	Cool, clear mountain streams from three to 12 meters in width. May also be found in larger rivers, lakes, and reservoirs (USFS 2005).	High	Yes
Lake Chub (*Couesius plumbeus*)	Typically found in lakes and streams with cool waters and clean gravel or cobble substrates. Within South Dakota, restricted to Deerfield Reservoir (Isaak et al. 2003).	Moderate	Yes
Finescale Dace (*Phoxinus neogaeus*)	Range-wide habitat includes pools of boggy headwaters, creeks and small rivers, lakes and ponds, and often common in beaver ponds usually over silt and near vegetation (USFS 2010). This species has not been reported in the analysis area.	Low	No
Molluscs			
Cooper's Rocky Mountain Snail (*Oreohelix strigosa cooperi*)	Cooper's snail is found on calcareous soils primarily lowland wooded areas and talus slopes, generally but not always with northern or eastern exposures. Many of the largest colonies are found in ponderosa pine with a partially closed canopy, a secondary deciduous tree component, and diverse understories. At some sites, white spruce is common. Riparian woodland communities, often in areas with adjacent steep rocky slope bases, also contain substantial colonies (Frest and Johannes 2002). In contrast to other land snails, Cooper's snail can thrive with little cover and thin litter. *Oreohelix* have been observed in a variety of litter types in the Black Hills, including coniferous needles litter, deciduous litter and areas of thin litter (Anderson 2005).	Moderate	Yes
Insects			
Regal Fritillary (*Speyeria idalia*)	Open prairies. In South Dakota, most likely to be found in native tall-grass prairies composed of big bluestem *(Andropogon gerardii),* western wheatgrass *(Pascopyrum smithii),* and green needlegrass *(Stipa viridula)*. Continuous prairie greater than 1,000 acres may be required for stable populations (Royer and Marrone 1992b).	Moderate	Yes

[1] High: suitable habitat present and species known to occur in area of impact supported by previous occurrence records; Moderate: suitable habitat present but no previous occurrences documented; Low: no suitable habitat present and no previous occurrences documented.

3.2.1.1.3.1 Applicable Laws, Regulations, Policies, and Forest Plan Direction

Section 2670 of the USFS Manual delegates designation of Sensitive Species to each Regional Forester. Forest Sensitive Species are defined as, "Those plant and animal species identified by a Regional Forester for which population viability is currently a concern, as evidenced by a significant current or predicted downward trends in population numbers

or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution." Section 2672.4 requires that all USFS planned, funded, executed, or permitted programs and activities are to be reviewed for possible effects on sensitive species.

Forest-wide objectives applicable to the Proposed Action specific to USFS Region 2 Sensitive Species are provided in **Appendix D**.

In addition to Standard 3101 provided in **Appendix D**, the Bald Eagle is also protected under the Bald and Golden Eagle Protection Act (BGEPA). The BGEPA prohibits individuals from the killing (take), possession, selling of parts or whole, purchasing, bartering, transporting, exporting or importing, at any time or in any manner, any Bald Eagle and Golden Eagle (USFWS 2007a, 2007c).

3.2.1.1.3.2 Grassland/Meadow Dependent Species

USFS Sensitive Species that depend primarily on grassland habitat are covered in this section and include black-tailed prairie dog (BTPD), Grasshopper Sparrow, Burrowing Owl, Northern Harrier, Loggerhead Shrike, and regal fritillary. Other sensitive species, for which grassland provides important habitat, but not necessarily the primary or most limiting habitat, include Townsend's big-eared bat, bighorn sheep, and Peregrine Falcon; the natural histories of these species are reviewed under the section covering their primary habitat.

See the botany section for a description of grassland habitats within the analysis area. Grassland habitat on BHNF is largely limited to the eastern portion of the analysis area. Potential occurrence of grassland dependent species would likely occur in that area. Grassland habitat covers 1,913 acres of the analysis area. This habitat type includes bluegrass, oatgrass, and grasslands of unidentified species (USFS 2009a).

3.2.1.1.3.2.1 Black-tailed Prairie Dog

Habitat: The BTPD is taxonomically related to ground squirrels. The BTPD constructs burrows in low relief grasslands and sparse grassy shrublands. They typically live in large colonies organized around family units called coteries further organized into wards and extensive towns. The extent of towns is ultimately governed by soil, vegetation, and topography. BTPD densities can vary widely within towns primarily driven by recruitment, forage, predation and disease. The BTPD breeding system is polygynous organized around harems. Litters range from three to five pups. Breeding age is attained at two years with females entering estrous once each year.

Distribution, Status, and Trend: Historically, the black-tailed prairie dog ranged from Canada to Mexico throughout the Great Plains and west to southeastern Arizona, but the species is now uncommon or extirpated in many areas of its former range. On December 2, 2009, the USFWS issued a 12-month status review for the BTPD indicating that the petition to list this species was not warranted (USFWS 2009d). The finding concluded that the present or

threatened destruction of habitat from agricultural conversion and other factors was no longer a threat to this species. Sylvatic plague has been identified as a major cause of BTPD declines in recent years. Past population declines of the BTPD related to the loss of habitat across its range have been caused by conversion of prairie grassland to cropland, urbanization, habitat modification (invasion of woody species into grassland and savanna), and habitat fragmentation (BLM 2005; USFWS 2000). Forest Plan monitoring indicates a limited number of prairie dog towns are located on the Forest, most of which are found in the Southern Black Hills. The forest appears to be conserving habitat for the BTPD (USFS 2009b).

Project Review: There are no known prairie dog colonies within the analysis area. The potential for prairie dogs to occur within the BHNF portion of the analysis area is restricted to small grassland patches near the eastern end. This species was not observed by personnel conducting various field surveys on NFS lands.

3.2.1.1.3.2.2 Grasshopper Sparrow

Habitat: The highest densities of Grasshopper Sparrows typically occur in mixed-grass prairie habitat. They may also occur in other types of grasslands (Panjabi 2003). The Grasshopper Sparrow is found in a variety of open grassland types, but appears to be area sensitive, preferring grasslands greater than 20 acres in size (Slater 2004). They may select larger patches to avoid predation associated with edge habitats (Slater 2004). In South Dakota, they are primarily found in mixed-grass prairies (Slater 2004). Within these grassland patches, they prefer grasslands of intermediate height and avoid habitats where vegetation is less than four inches tall (Slater 2004). They require some areas of bare ground for foraging and some taller vegetation (tall grasses, forbs, or scattered shrubs) for singing perches (Slater 2004). This species can be locally abundant in some prairies, especially where there is a greater proportion of tall grass (Panjabi 2005).

Distribution, Status, and Trend: The grasshopper sparrow has dual management status; it is both an MIS and a Sensitive species. The Grasshopper Sparrow occurs widely in native mixed-grass prairies in the southern Black Hills, and locally further north in the central Black Hills (Panjabi 2005). Density estimates of the number of Grasshopper Sparrows per square kilometer of potential grassland habitat steadily increased from 2002 through 2008, potentially as the result of the prolonged drought currently affecting the western Great Plains (USFS 2009b). In 2002, the Grasshopper Sparrow density was approximately 17 birds per square kilometer. This number increased to approximately 37 birds per square kilometer in 2008.

Project Review: No Grasshopper Sparrows have been identified in the analysis area at this time, per GIS layers provided by BHNF representing Rocky Mountain Bird Observatory (RMBO 2009) data from 2001 through 2005 and Natural Resource Information System (NRIS 2012) occurrence data. Grasshopper Sparrows were not observed by during surveys within the analysis area but this species is assumed to occur in suitable habitats.

3.2.1.1.3.2.3 Burrowing Owl

Habitat: Burrowing Owl habitat is quite variable and ranges from relatively undisturbed mixed-grass prairie and rangelands to residential developments. Burrowing Owl habitat typically consists of open, dry, treeless areas on plains, prairies, and deserts. These areas are also occupied by burrowing mammals and other animals that provide burrows suitable for nesting (McDonald et al. 2004). Because Burrowing Owls spend most of their time on or in the ground and are extremely susceptible to predation, short vegetation structure is also a requirement (Zarn 1974; Green 1983), as it presumably allows for better detection of predators and visibility of prey (Green 1983). Given this requirement for short vegetation, Burrowing Owls are commonly found in association with cattle, prairie dogs, and other grazers that clip vegetation (Butts and Lewis 1982). A high density of available burrows for nesting is an important part of viable Burrowing Owl habitat. Because of this, Burrowing Owls are often highly associated with active prairie dog colonies (Butts and Lewis 1982; McDonald et al. 2004). Threats to Burrowing Owl populations are typically related to threats to prairie dogs which causes a loss of habitat. Loss of habitat as the result of agricultural conversion, and reduction in prairie dog populations from sylvatic plague, poisoning, and other control efforts are the main threats to Burrowing Owls (McDonald et al. 2004).

Distribution, Status, and Trend: Historically the Burrowing Owl was found in the west central and western North America. Range contractions have occurred in the northern and eastern parts of their range. Decline in population numbers has warranted this species being identified as a Bird of Conservation Concern (USFWS 2008). According to FPMER, observation data is limited in the Black Hills, where most owls occur in established prairie dog towns on the Forest. The BHNF is conserving habitat for the Burrowing Owl, even though this species is absent or so rare that they are not detected (USFS 2009b).

Project Review: No Burrowing Owls have been identified in the analysis area at this time, per GIS layers provided by BHNF representing Rocky Mountain Bird Observatory (RMBO 2009) data from 2001 through 2005 and Natural Resource Information System (NRIS 2012) occurrence data. Additionally, the SDNHP has no records of Burrowing Owl occurrences within the analysis area (SDNHP 2012) and this species was not observed during field surveys on NFS lands.

3.2.1.1.3.2.4 Northern Harrier

Habitat: The Northern Harrier is associated with a variety of habitats, including open wetlands, such as marshy meadows, wet, lightly grazed pastures, old fields, freshwater marshes, upland prairies and mesic grasslands, drained marshlands, croplands, cold desert shrub-steppe, and riparian woodland (Sibley 2003; Smith et al. 2011). Nesting may occur on the ground, in any of these habitats as nests are typically concealed by tall dense vegetation (Herkert et al. 1999; Slater and Rock 2005). Even when nests are placed in dry upland habitats, they are disproportionately positioned near wet areas such as stock ponds and streams (Simmons and Smith 1985; Slater and Rock 2005). Because Northern Harriers hunt

by using low coursing flights to surprise prey, foraging typically occurs over areas of moderate to heavy vegetative cover, such as prairies, shrub-steppe uplands, marshes, and inactive fields not heavily grazed or harvested by farmers (Slater and Rock 2005). Habitat loss and habitat degradation are the primary causes of Northern Harrier population declines. Habitat loss of wetlands and prairies to agricultural and urban environments are the most important threats to the species. Northern Harriers are characterized as an area-sensitive species with large home ranges, and they are usually associated with larger (more than 100 hectare) tracts of undisturbed habitat (Johnson and Igl 2001).

Distribution, Status, and Trend: The Northern Harrier is a holarctic species with a large range in North America. Population declines have occurred in several areas, primarily caused by habitat loss and degradation, especially loss of wetland and moist grasslands. In the Black Hills, this species is considered a seasonal migrant based on limited availability of non-forested habitats (Peterson 1995, Tallman et al. 2002). Several observations of this species have been reported through Forest monitoring (RMBO 2001-2010). Forest Plan monitoring data is inconclusive in determining population status or trend for this species in the Black Hills because of limited data. The BHNF is conserving habitat for the Northern Harrier, even though Northern Harrier are absent or so rare that they are not detected (USFS 2009b, 2010).

Project Review: Within the BHNF portion of the analysis area, Harriers are most likely to occur in suitable habitats near the eastern end. GIS occurrence data from the Natural Resource Information System (NRIS 2012), provided by BHNF, identified one documented occurrence of Northern Harrier in the analysis area in 2006. GIS occurrence data from the Rocky Mountain Bird Observatory (RMBO 2009) has no records of Northern Harrier within the analysis area (SDNHP 2012). This species was not observed during various field surveys on NFS lands.

3.2.1.1.3.2.5 Loggerhead Shrike

Habitat: The Loggerhead Shrike typically is associated with open habitats such as deserts, sagebrush, grasslands, and pastures. The range of the Loggerhead Shrike covers a broad geographic area, but regardless of the geographic location, each occupied breeding territory includes some common habitat features: 1) nesting substrate (a tree or shrub); 2) elevated perches for hunting, pair maintenance, and territory advertisement (natural and artificial perches, such as power lines or fence posts, are used); 3) foraging areas (generally, open short grass areas with scattered shrubs or perches and some bare ground); 4) impaling sites (dense multi-stemmed and/or thorny shrubs, or barbed wire fences) (Pruitt 2000). Nests are typically placed in trees or thick shrubs within pastures and grasslands. Nesting success is generally higher for nests placed in isolated trees, relative to those in shelterbelts or other linear formations, presumably as a result of decreased predation (Pruitt 2000; Wiggins 2005). Loss of habitat caused by conversion to agriculture and overgrazing are the main threats to Loggerhead Shrike populations.

Distribution, Status, and Trend: The Loggerhead Shrike breeds from Canada to Mexico and is widespread throughout the United States. Decline in population numbers has warranted this species being identified as a Bird of Conservation Concern (USFWS 2008). In the Black Hills, this species is considered an uncommon migrant and summer resident (Luce et al. 1999, Tallman et al. 2002) where observations are sporadic and rare (RMBO 2001- 2009). Forest Plan monitoring data is inconclusive in determining population status or trend for this species in the Black Hills because of limited data. Habitat trend (i.e., riparian and grassland habitat) is stable (USFS 2009b).

Project Review: Loggerhead Shrikes have not been identified in the analysis area at this time, per GIS layers provided by BHNF representing Rocky Mountain Bird Observatory (RMBO 2009) data from 2001 through 2005 and Natural Resource Information System (NRIS 2012) occurrence data. Additionally, the SDNHP has no records of Loggerhead Shrike occurrences within the analysis area (SDGFP 2012). This species was not observed during various field surveys on NFS lands.

3.2.1.1.3.2.6 Regal fritillary

Habitat: The regal fritillary requires open prairies (Royer and Marrone 1992). In South Dakota, the fritillary is most likely to be found in native tall-grass prairies composed of big bluestem *(Andropogon gerardii),* western wheatgrass *(Pascopyrum smithii),* and green needlegrass *(Stipa viridula)* (Royer and Marrone 1992). Continuous prairie greater than 1,000 acres may be required for stable populations (Royer and Marrone 1992). In smaller habitat patches, individuals will move in and out depending on habitat condition and size (Royer and Marrone 1992, USFS 2000).

Distribution, Status, and Trend: The historic range for the regal fritillary extended from southeastern Montana to Maine in the north and from eastern Colorado to northwestern North Carolina in the south. The Black Hills are at the western extent of the regal fritillary's range, possibly based on increased aridity associated with regions further west (USFS 2000). Populations seem to fluctuate from year to year and may account for the few records in the Black Hills area in favorable years. Historic accounts indicate that this butterfly was found adjacent to the analysis area along the Castle Creek drainage near Deerfield Lake (NRIS 2012). In recent years, regal fritillaries have experienced dramatic large-scale population declines and range contractions. The Black Hills is primarily forested, and as such contains only relatively small patches of prairie. The best habitats within the Black Hills occur in lower elevation prairies along the outer BHNF boundary and in interior prairies, although tall-grass species are not predominant in the interior prairies (USFS 1996). Marrone (2006) identified extant populations of regal fritillary on the BHNF; however those populations are limited to the southern portions near Custer State Park and Wind Cave National Park. It appears the Forest is conserving habitat for the regal fritillary but additional time would be needed to achieve the grassland Objective 205 (USFS 2009b).

Project Review: Although there are isolated small pockets of grassland in the eastern part of the BHNF portion of the analysis area, these are likely too small and fragmented by trees,

topography, and human development to provide habitat for the regal fritillary. While suitable habitat for regal fritillary may occur in the analysis area, it is unlikely that this habitat is occupied based on the findings of Marrone (2006). This species was not observed during various field surveys on NFS lands.

3.2.1.1.3.3 Wetland/Riparian/Aquatic Dependent Species

USFS Sensitive Species that depend primarily on wetland, meadow, riparian, or aquatic habitat are covered in this section and include Bald Eagle, Black Hills red-bellied snake, northern leopard frog, mountain sucker, and lake chub. Additional USFS Sensitive Species for which wetland, meadow, riparian, or aquatic provides important habitat, but not necessarily the primary or most limiting habitat, include Townsend's big-eared bat, fringed myotis, Northern Harrier, and Peregrine Falcon. Natural histories of these species are reviewed under the sections addressing their respective primary habitats.

See the botany and wetlands sections for descriptions of wetland/meadow/riparian habitat types which are limited within the analysis area. The analysis area supports 11 acres of willow cover type which may provide habitat for wetland/meadow/riparian dependent species (USFS 2009a). Five intermittent named streams and three permanent names streams occur within the analysis area and may provide riparian habitat which was not recognized in the available GIS vegetation data. National Wetland Inventory data identified 30 acres of wetland habitat within the analysis area (USFWS 2012).

Named perennial streams occurring within the analysis area that may provide aquatic habitat to mountain sucker, and lake chub includes South Fork of Castle Creek, Slate Creek, and Rapid Creek. Named intermittent streams which occur in the analysis area and may provide aquatic habitat include Gold Run, Dutchman Creek, Horse Creek, and Prairie Creek. Impoundments and reservoirs which occur within the analysis area and may provide habitat for these aquatic species includes Deerfield Reservoir and Pactola Reservoir.

3.2.1.1.3.3.1 Bald Eagle

Habitat: Bald Eagles typically nest near large lakes and rivers in forested habitat where adequate prey (fish, waterfowl and ungulate carcasses) are available and old, large-diameter cottonwood or conifer trees are available for nesting. As high quality nesting habitat has become saturated along major river drainages and lakes, some pairs have been found nesting along smaller drainages, but these nest sites often have lower occupancy and productivity rates (WGFD 2010). Bald Eagle winter roosts are typically located in cottonwood or coniferous trees located near an established prey base, such as rivers or large reservoirs (Buehler 2000).

Distribution, Status, and Trend: This species is found throughout North America from northern Alaska and Canada south to southern California and Florida. The Bald Eagle was de-listed on August 8, 2007, which included recommendations for management of this

species (USFWS 2007a, 2007c). The BGEPA as amended, provides protection and direction for management of the Bald Eagle (16 U.S.C. §668-668d) (USFWS 2007b).

Bald Eagles are frequently seen from October through March feeding on road-killed animals (carrion), perched near unfrozen lakes or streams, or soaring in the sky around large water sources across BHNF. The first nesting attempt on BHNF was confirmed in 2007 at Deerfield Reservoir. This nest was monitored for the second year in 2008 when one Eagle was fledged. In 2009, a nesting attempt was made in March and April (USFS 2010). The nest was abandoned in early May and did not fledge any young. In 2012, a second Bald Eagle nest was located adjacent to Deerfield Lake, resulting in one juvenile fledging from this nest (Mystic District Files). In 2006, a winter roosting area was discovered at Pactola Reservoir. Approximately 18 to 22 Eagles were observed at the roost on four separate occasions between late December 2005 and late January 2006 (USFS 2010). This species appears to be stable to increasing based on nesting attempts in the Black Hills. Habitat trend for the Bald Eagle is stable (USFS 2009b).

Project Review: While known Bald Eagle nests and winter roosts are located outside of the analysis area, suitable habitat for Bald Eagle nesting and roosting is available adjacent to Deerfield Reservoir and Pactola Reservoir and adjacent to perennial streams such as Slate Creek and Rapid Creek.

3.2.1.1.3.3.2 Black Hills Red-bellied Snake

Habitat: The Black Hills red-bellied snake is a nocturnal and secretive snake found in moist sites from the western foothills, the limestone plateau, and the central core of the Black Hills (Smith and Stephens 2003). Sites where the snake has been observed range in elevation from 4,700 to 6,400 feet (Peterson 1974). Stumps and downed woody material are important in maintaining moist conditions; as root stumps decay, they provide cover (USFS 2000; Smith and Stephens 2003). The Black Hills subspecies of the Black Hills red-bellied snake is an isolated population with the nearest population of red-bellied snakes occurring about 300 miles east near Aberdeen, South Dakota (USFS 2000). Biological experts (USFS 2000) suggest that the Black Hills red-bellied snake is reasonably common in the Black Hills. Although the Black Hills red-bellied snake does not appear to be in danger of extirpation, the population in the Black Hills is an isolated subspecies and endemic to the Black Hills; therefore, its persistence should be considered in management decisions. The most serious risk to Black Hills red-bellied snakes populations may be the loss of mesic habitats (Smith and Stephens 2003).

Distribution, Status, and Trend: Suitable environments for Black Hills red-bellied snakes are thought to be abundant and broadly distributed across the Black Hills (USFS 2000). The northern Black Hills, being generally moister and more fire resistant than the rest of the Forest, likely provides more suitable habitat than other districts of the BHNF (USFS 2000). Localized populations of varying densities are found in the Black Hills, although their abundance and population trend is unknown. The Forest appears to be conserving habitat

for the red-belled snake, although progress is needed toward demonstrating improved riparian condition and increasing aspen habitats (USFS 2009b).

Project Review: Occurrence data from the Natural Resource Information Service provided by BHNF indicates four previously documented occurrences of Black Hills red-bellied snake within the analysis area. However, presence of the species is expected to be rare based on the limited amount of mesic habitat in the analysis area.

3.2.1.1.3.3.3 Northern Leopard Frog

Habitat: The northern leopard frog occurs in a wide variety of habitats ranging to over 2,600 meters (8,500 feet) in elevation in Wyoming (WGFD 2010). They may be found in grasslands, brushlands, woodlands, and forests, further frequenting areas of permanent water such as wet meadows, bogs, ditches, slow streams, montane lakes, ponds, or reservoirs (Stebbins 2003; Elliott et al. 2009). However, preferred habitats for breeding in the Black Hills tend to be permanent water sources with emergent vegetation (e.g., cattails) and good water quality (Smith 2003). When distributing into uplands, this species is most likely to be found far from water (Stebbins 2003; McAllister 2005). Northern leopard frogs will forage among sedges, cattails, and tall grasses, primarily consuming invertebrates but also at times preying upon voles, small birds, snakes, or other amphibians (Smith and Keinath 2007).

Distribution, Status, and Trend: The range of this species encompasses most of the northern United States, north into Canada, and southward only in the western United States and in the higher elevations of the Rocky Mountains. Habitat degradation and elimination, introduction of non-native game fish, and disease are the main threats to northern leopard frog populations. Declines throughout their range have been documented, especially in the western United States. A petition to list this species under the ESA was submitted to the USFWS on June 5, 2006. On October 5, 2011, the USFWS announced its 12-month finding on the petition to list the northern leopard frog in the western United States. They found that the listing was not warranted because this species was still common in the eastern United States and Canada.

Project Review: Northern leopard frog occurrences were documented within the analysis area by the Natural Resource Information Service data provided by BHNF. Additionally, a large population of northern leopard frogs was observed during surveys on potential access roads. The population occurred at an existing dugout pond adjacent to an existing road on NFS land.

3.2.1.1.3.3.4 Mountain Sucker

Mountain sucker is discussed above under MIS.

3.2.1.1.3.3.5 Lake Chub

Habitat: The basic ecology of lake chubs has not been studied on the BHNF and is poorly understood. Only generalized descriptions of habitat requirements are known. It is found in lakes and streams that usually have cool waters and clean gravel or cobble substrates (Isaak et al. 2003). The lake chubs' diet consists primarily of mobile aquatic and terrestrial insects and zooplankton. Spawning occurs in the spring in shallow waters over cobble substrates, and eggs are given no parental care (Isaak et al. 2003). Lake populations may spawn within the lake or make a short migration into tributaries (Isaak et al. 2003).

Distribution, Status, and Trend: This species is widely distributed across Canada and the northern portions of the United States. Lake chub is native to the Black Hills. Isaak et al. (2003) describe the current status of the lake chub in the Black Hills as being extirpated from four of the five drainages in South Dakota where the species previously occurred. In the remaining drainage (Castle Creek) the lake chub no longer occurs in the stream, but is limited to Deerfield Reservoir. Deerfield Reservoir is a 414-acre impoundment completed in the late 1940s. The dam is operated and maintained by the US Bureau of Reclamation. The SDGFP manages the fisheries within the reservoir. The USFS manages recreational facilities (boat ramps, campgrounds, etc.) surrounding the reservoir. The currently restricted distribution of the lake chub in the Black Hills places this local population at greater risk of extinction (Isaak et al. 2003). A stochastic event such as a dam failure or chemical renovation of Deerfield Reservoir could be catastrophic and could threaten the continued existence of the lake chub on the Forest. In addition, the recent introduction of rock bass and yellow perch in Deerfield Reservoir poses a significant threat to the lake chub population. Lastly, the deposition of sediments in Deerfield reservoir is an ongoing process that is gradually decreasing the amount of lake chub habitat provided by the reservoir. In Deerfield Reservoir, the population has declined in recent years based on catch rates from 1994 to 2007. Habitat trend appears to be stable based on water quality conditions (USFS 2009b). No lake chub were captured during SDGFP department survey efforts on Deerfield Reservoir in 2007, 2008, or 2009 (USFS 2010).

Project Review: Portions of Deerfield Reservoir and Castle Creek occur in the analysis area. Occurrence data from the Natural Resource Information Service provided by BHNF did not identify lake chub within the analysis area.

3.2.1.1.3.4 Conifer Forest Dependent Species

USFS Sensitive Species that depend primarily on conifer forest are covered in this section and include hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, Flammulated Owl, and Cooper's rocky mountain snail. There are additional species for which conifer forest provides important habitat, but not necessarily the primary or most limiting habitat (e.g., several bat species forage and/or roost in conifers, but hibernate in caves and mines—both habitats are critical to them, but caves are more limiting than conifers based on lesser availability). Other USFS Sensitive Species that use conifer

habitat include Townsend's big-eared bat and fringed myotis. The natural histories of these species are reviewed under the section addressing their primary habitat.

Refer to the botany section for a description of conifer forest habitats within the analysis area. Conifer forest habitat covers 19,750 acres of the analysis area, which includes 316 acres of white spruce and 19,434 acres of ponderosa pine (USFS 2009a). See **Tables 3-15**, **3-16**, and **3-17** for habitats affected by the Proposed Action.

3.2.1.1.3.4.1 Hoary Bat

Habitat: This bat's occurrence is strongly associated with forested habitats, both deciduous and coniferous. It can be found in montane forests, cottonwood riparian forests, shelterbelts, tree rows, juniper woodlands, and suburban parks (Hester and Griener 2005). Hoary bats typically forage along edges associated with forests habitats. Roads, streams, lakes, or other edges in forest habitat may be used by foraging hoary bats (Christy and West 1993). Hoary bats roost primarily in the foliage of both deciduous and coniferous trees. Individuals typically roost at the edge of a clearing near the end of a branch. Roosts are well hidden from above but visible from below (Shump and Shump 1985; Willis and Brigham 2005). Degradation, fragmentation, and loss of roosting and foraging habitat, pesticides, and wind energy development are the main threats to the hoary bat (Hester and Griener 2005).

Distribution, Status, and Trend: This species was recently added to the Region 2 Sensitive species list, therefore little is known regarding the population trend of the hoary bat in the Black Hills at this time. However, according to the most recent Forest Plan monitoring report, the BHNF is conserving and enhancing habitat for this species through moving toward ponderosa pine structural stage objectives, maintaining spruce habitat and snag management (USFS 2010).

Project Review: Hoary bats have not been identified in the analysis area at this time, per GIS layers provided by the BHNF representing Natural Resource Information System (NRIS 2012) occurrence data. Additionally, the SDNHP has no record of hoary bat occurrences within the analysis area. A literature review of bat species within the BHNF identified studies that captured hoary bats on the eastern and western boundaries of the Forest, but none of these records are more recent than 1994 (Tigner and Stukel 2003).

3.2.1.1.3.4.2 American Marten

Habitat: Martens are primarily associated with mature white spruce in the Black Hills. Key habitat elements are relatively dense forests with complex physical structure near the ground, abundant coarse woody debris, and lengthy fire-return intervals (Buskirk 2002). Martens prefer moist coniferous forest types with tree species that have branches on their lower boles. White spruce is the only tree species on the Forest that provides this condition (USFS 1996). Fire suppression during the last century has allowed spruce to increase in abundance, density, and maturity in the Black Hills, usually at the expense of quaking aspen (Parrish et al. 1996; USFS 1996). One estimate suggests that there may be as much as

10,000 more acres of spruce today than existed during the late 1800s (USFS 1996); however, some of this acreage may be explained by more accurate mapping techniques available today.

Distribution, Status, and Trend: The American marten has a large range in northern and western North America, where it occurs in moist boreal forests (Buskirk 2002). Overall, this species is secure throughout its range, but timber harvest and excessive trapping have led to extirpations in some areas. The marten was extirpated from the Black Hills in the mid-1900s but was reintroduced in the 1980s and 1990s with the intent of providing trapping opportunities (Fecske et al. 2003). The SDGFP reintroduced a total of 125 individuals into the Black Hills during the 1980s and 1990s (Buskirk 2002). Fecske et al. (2003) recently estimated that 124 resident martens occur in high quality habitat on the BHNF, with additional animals occurring at lower density within lower quality habitat. The population here is considered disjunct from other populations. The greatest marten concentrations appear to be in the northern part of the BHNF southwest of Deadwood (northern subpopulation) and in and around the Norbeck Wildlife Preserve (Norbeck subpopulation) (Fecske et al. 2003). These two dominant subpopulations are likely very important in maintaining species persistence in the BHNF. The main threats to American martens are habitat fragmentation and timber harvest (Buskirk 2002). Population trend is unknown but it is assumed that this species is stable since trapping of American marten is not allowed in the Black Hills and this species was not identified as needing special conservation status. Spruce habitat is above Forest objectives, therefore the BHNF is conserving habitat for the American marten (USFS 2010).

Project Review: Natural Resource Information System (NRIS 2012) data provided by BHNF did not identify any historical American marten occurrences within the analysis area but Fecske (2003) indicated American marten were released within close proximity. Given the secretive nature of the species, it is possible that American marten occur in the analysis area.

3.2.1.1.3.4.3 Northern Goshawk

Habitat: The Northern Goshawk is a forest generalist, and occurs in most forest types throughout its geographic range; however nests are typically located in mature to over-mature forests (Hayward and Escano 1989). Known nest densities are generally higher in the northern and central hills (USFS 2001a). Goshawks exhibit a variety of movement patterns. Limited information suggests that the Goshawk is a partial migrant, usually moving less than 300 miles (Kennedy 2003). Juveniles are also known to disperse up to 100 miles from their natal nest area (Kennedy 2003). While the Black Hills population is somewhat isolated, there may be interactions with populations outside the Black Hills.

Goshawks typically nest in relatively dense (dependent on forest type) forest areas and use a mosaic of structural stages for foraging within their home range (Kennedy 2003). A wide variety of birds and mammals are taken as prey, with no single type dominating, so it is important to maintain habitats for multiple prey species (USFS 2001a). This forest raptor is

highly territorial. In the Black Hills, the Goshawk usually nests in mature ponderosa pine stands greater than 30 acres with closed canopies and high basal area (i.e., pine Structural Stages 4B, 4C and 5) but occasionally nests in other species including mature quaking aspen, depending on site conditions (USFS 2001a). A variety of conditions and structural stages provide foraging habitat, ranging from young forests to very old forests. During the breeding season, the Northern Goshawk is sensitive to disturbance that may disrupt breeding behaviors, negatively affecting reproduction.

Distribution, Status, and Trend: In South Dakota, this forest raptor is a rare to uncommon permanent resident, especially in the higher elevations of the Black Hills (Tallman et al. 2002). This species is considered a species of concern by most governmental agencies but there is a lack of evidence that this species is declining (Kennedy 2003). Throughout the Black Hills, Northern Goshawks have been found nesting in all counties. Recent BHNF monitoring reports show that in 2009, 14 to 42 historical Goshawk nesting territories were occupied. This variation may be closely tied to annual precipitation fluxes that affect prey abundance and may have been affected by several years of drought. Habitat diversity is being provided consistent with objective 221, therefore the BHNF is conserving habitat for the northern goshawk, but progress towards achieving structural stage objectives is still needed (USFS 2010).

Project Review: Goshawks are known to occur within the analysis area. Natural Resource Information System (NRIS 2012) data provided by BHNF indicate several historical Goshawk occurrences throughout the area. Northern Goshawk nest surveys were completed in suitable habitat within one-half mile of the Proposed Action in July 2012. Four active territories were detected, with evidence of breeding at two.

3.2.1.1.3.4.4 Lewis's Woodpecker

Habitat: Lewis's Woodpecker typically inhabits mature open canopy forests with brushy understory and an abundance of insect prey items (Tobalske 1997; Abele et al. 2004). Open conifer forests, particularly those that have recently burned or been infested with pine beetles, are the optimal habitat for this species (Burns et al. 2005). In southeast Wyoming, Lewis's Woodpeckers preferentially selected burned ponderosa pine forests, as reported by Linder and Anderson (1998). In this study, researchers reported that active nests occurred almost exclusively (98 percent) in burned stands, although only 41 percent and 21 percent of two study areas were burned. In the Black Hills, this species is locally uncommon permanent resident (Tallman et al. 2002). Closed canopy forests are typically avoided because the full canopy closure limits understory growth, thus reducing the preferred arthropod prey base. Unlike most North American woodpeckers, the Lewis's Woodpecker does not bore into trees to find prey. Instead, individuals typically glean aerial arthropods captured through short direct flights (Abele et al. 2004). Lewis's Woodpeckers prefer to nest in existing cavities or to excavate their own cavities in decayed and softened trees (Raphael and White 1984; Saab and Dudley 1998). Loss of breeding and wintering habitats in the form of burned pine forests, park-like ponderosa pine forests, riparian cottonwood stands,

and oak-savannas through timber harvest or fire suppression are the main threats to Lewis's Woodpecker populations.

Distribution, Status, and Trend: The Lewis's woodpecker breeds from central British Columbia, east to the Black Hills, south to northern Arizona and southern New Mexico. The Black Hills represents the northeastern extent of the species range. Decline in population numbers has warranted this species being identified as a Bird of Conservation Concern (USFWS 2008). Recent monitoring reports from BHNF indicate that Lewis's Woodpecker is widespread through the Forest (USFS 2010). Thirty-four individuals were identified during 2009 field surveys performed on the BHNF. Adequate data to determine population status or trend in the Black Hills is not currently available. Habitat trend appears to be increasing because of wildfires, prescribed fires, insect mortality, and snag habitat. The USFS is conserving habitat for this woodpecker, consistent with Objective 221 (USFS 2010).

Project Review: While no Lewis's Woodpecker historical occurrences were identified GIS layers provided by BHNF representing Rocky Mountain Bird Observatory (RMBO 2009) data from 2001 through 2005 and Natural Resource Information System (NRIS 2012) occurrence data, one pair of nesting Lewis's Woodpeckers were observed in the analysis area during surveys.

3.2.1.1.3.4.5 Black-backed Woodpecker

Black-backed woodpecker is discussed above under MIS.

3.2.1.1.3.4.6 Flammulated Owls

Habitat: Flammulated Owls are small, migratory owls that inhabit dry, open forest types (Sibley 2003). These birds show a strong nesting preference for mature ponderosa pine habitat, although Douglas fir and quaking aspen may also be used (McCallum 1994a). Young, dense stands are not typically used for breeding. Breeding pairs arrive in nesting habitat in April and May, and place nests in natural tree cavities or cavities created by other species (Bull et al. 1990). Juveniles tend to leave the breeding grounds in mid-August, while more mature birds may remain until mid to late-October. Flammulated Owls feed exclusively at night, and are mostly insectivorous, taking nocturnal insects such as owlet moths, beetles, crickets, and grasshoppers. This species is fairly tolerant to human disturbance at the nest site and often nest close to areas occupied by humans (McCallum 1994b). USFS practices that remove potential habitat, limit insect populations, or reduce the availability of nesting cavities are the greatest threats to Flammulated Owl populations range-wide.

Distribution, Status, and Trend: The Flammulated Owl breeds in montane forests throughout much of western North America. The USFWS (USFWS 2008) considers the Flammulated Owl as a Bird of Conservation Concern. This species is considered an accidental visitor in South Dakota; therefore this owl was not addressed in the Birds of South Dakota (Tallman et al. 2002). In 2002, a Flammulated Owl was observed in the northern Black Hills during the Forest monitoring program. A comprehensive survey of owl species within the BHNF was

completed by in 2009 (Drilling 2010). This survey did not identify any Flammulated Owls on the BHNF. To date, there has been no direct evidence of a breeding population on BHNF. Forest-wide monitoring cannot determine population status in the Black Hills.

Project Review: No Flammulated Owls have been identified in the analysis area, per GIS layers provided by BHNF representing Rocky Mountain Bird Observatory (RMBO 2009) data from 2001 through 2005 and Natural Resource Information System (NRIS 2012) occurrence data.

3.2.1.1.3.4.7 Cooper's Rocky Mountainsnail

Habitat: Mountainsnails (*Oreohelix* species) are calciphious, most of them restricted to limestone outcrops and their vicinity where they are protected from rapid desiccation by shade and overhanging bushes. Although calcareous substrates are important, this species can be found on other substrates (i.e., sandstone). In the Black Hills, the Cooper's rocky mountainsnail is mostly found in the higher elevations of the Limestone Plateau, along limestone outcrops, talus, and isolated exposed limestone. Many of the colonies, including most of the largest, are found in ponderosa pine with a partially closed canopy, a secondary deciduous tree component, and diverse understories. At some sites, white spruce was common. Riparian woodland communities, often in areas with adjacent steep rocky slope bases, were also found to support substantial colonies. This species generally dominates the mollusk fauna in the area of occurrence, but it has been found to occur with two other species of land snail: the callused vertigo and striate disc.

Litter is an important component for snails as food and cover. In general snails prefer a well-developed litter layer, but not thick or matted (Anderson 2005). In contrast to other land snails, Cooper's rocky mountainsnail can thrive with little cover and thin litter (Anderson 2005). Cooper's mountainsnail have been observed in a variety of litter types in the Black Hills, including coniferous needles litter, deciduous litter and areas of thin litter (Anderson 2005). Risk factors for the Cooper's rocky mountainsnail are loss of moist habitat conditions through drought, fire, vegetative management, trampling, overgrazing, development, road construction, and habitat fragmentation.

Distribution, Status, and Trend: Current taxonomic status is still not clear with *Oreohelix strigosa cooperi* (ITIS 2012, Anderson 2005). However, recent genetic and biogeography modeling suggest that the Black Hills rocky mountainsnails are *Oreohelix cooperi* and are similar to populations found in the Judith Mountains and Bighorn Mountains (Weaver et al. 2006). This subspecies is thought to be a Pleistocene relict, with disjunct populations in the Black Hills of South Dakota and Wyoming, the White Mountains of Arizona, and the Sierra Blanca of New Mexico. Adequate data to determine population status or trend in the Black Hills is not currently available. Forest-wide monitoring of the Cooper's rocky mountainsnail indicates that the USFS is conserving habitat for this species (USFS 2009b).

Project Review: Natural Resource Information System (NRIS 2012) data provided by BHNF identified one historical occurrence of Cooper's rocky mountainsnail within the analysis area.

This occurrence dates from 2008. The Proposed Action crosses the limestone plateau formation; therefore, it is likely that this species occurs in the analysis area in suitable habitat.

3.2.1.1.3.5 Cliff/Cave Dependent Species

Several USFS Sensitive Species are associated and described with this habitat because it is likely to be the most limiting habitat component. Specifically many bat species depend on caves and mines for hibernating and/or roosting, and bighorn sheep and mountain goats rely on cliff habitat for safety and escape from predators. For each of these species additional habitats are equally critical, for example foraging habitat. USFS Sensitive Species for which cliffs, caves, or abandoned mines are likely the most limiting habitat feature include Townsend's big-eared bat, fringed myotis, Rocky Mountain bighorn sheep, and American Peregrine Falcon.

No rocklands, talus, or scree slopes which would provide habitat for the mountain goat or American Peregrine Falcon were identified in the BHNF 2009 vegetation data within the analysis area (USFS 2009b). However, personal communication with BHNF biologists indicates that limestone cliffs in the South Fork Castle Creek area and near Wild Irishman Gulch may provide optimal American Peregrine Falcon nesting habitat (S. Haas,2012). Additionally, Rocky Mountain bighorn sheep year-round, lambing, and winter use areas are documented in the western portion of the analysis area.

Six known mines which may provide roosting habitat for bat species occur within the analysis area: Shanks Pit Gravel, Dexter Mine, Poisoned Ox Mine, McCurdy Gulch Mine, Sunbeam Mine, and one unnamed mine. The Edelweiss Mine is located approximately 0.7 mile north of the Proposed Action and is known to support roosting bat colonies. One additional previously unidentified cave was located during Northern Goshawk surveys on the Hell Canyon Ranger District in the western portion of the analysis area. Due to the extensive mining history of the Black Hills Region, it is possible that additional unknown mine openings which could provide suitable habitat for sensitive bat species.

3.2.1.1.3.5.1 Townsend's Big-eared Bat

Habitat: Townsend's big-eared bats utilize a variety of habitat including coniferous forests and woodlands, deciduous riparian woodland, semi-desert and montane shrublands (Arroya-Cabrales and Castaneda 2008). This non-migratory species is the only Black Hills bat species entirely dependent year-round on caves and abandoned mines for roosting. Caves with high humidity, cool temperatures, and numerous fractures are preferred for roosting. This species usually roosts on relatively open rock surfaces at underground sites where they are more susceptible to disturbance. Individuals exhibit a high rate of roost fidelity.

Distribution, Status, and Trend: The Townsend's big-eared bat ranges from southern British Columbia through the western United States to Mexico, and east to central South Dakota,

with isolated populations occurring as far east as Virginia. One of the largest hibernacula in the western United States is at Jewel Cave National Monument in the Black Hills, where 800 to 900 big-eared bats hibernate (Tigner and Stukel 2003). While the species is fairly common in the Black Hills, Tigner and Stukel (2003) considered it to be at the greatest risk of decline among all Black Hills bat species, because big-eared bats have exceptionally specific roost requirements and are sensitive to disturbance.

Nearly all records of this species on the BHNF occur in mines and caves (Tigner and Stukel 2003). Only three maternity and nursery roosts have been identified on the BHNF, two of which are located in the northern portion of the Black Hills, while the third is located near Hot Springs in the southern portion (Tigner and Stukel 2003). Known winter hibernacula include the same caves used as maternity and nursery roosts, a large population at Jewel Cave, and a natural cave north of Jewel Cave. Population trend in the Black Hills has been estimated as downward based on a loss of suitable maternity and hibernation roosts (Tigner and Aney 1994). Because of its rarity and limited range, Townsend's big-eared bat is listed as a state species of concern. The most recent Forest Plan monitoring report indicates the BHNF is conserving and enhancing habitat for this species through roost protection (i.e., caves and mines) and meeting snag objectives (USFS 2010).

Project Review: None of the known hibernacula, maternity roosts, or nursery roosts occur in the analysis area. However, given the difficult nature of locating winter hibernacula, it is possible that previously unidentified winter colonies occur.

3.2.1.1.3.5.2 Fringed myotis

Habitat: The fringed myotis occupies a variety of habitats including mid-elevation desert, grass, and woodland habitats and is found at higher elevations in spruce-fir and in mixed timber (Schmidt 2003; Burns et al. 2005). Keinath (2004) has also described associated habitats to include, dry habitats where open areas (e.g., grasslands and deserts) are interspersed with mature forests, usually ponderosa pine, pinyon-juniper, or oak, creating complex mosaics with ample edges and abundant snags (Keinath 2004). Snags, caves, mines, and buildings may be used as roosts (Schmidt 2003). Roosts in relatively permanent structures, such as caves, buildings, and rock crevices, appear to elicit high fidelity while roosts in trees do not (Weller and Zabel 2001). This species feeds mainly on small moths high in the forest canopy or in thick vegetation near the ground (USFS 1996), particularly along stream courses (Schmidt 2003). Riparian areas and water sources are important features of habitat. Open water is important because bats obtain water while flying. Riparian areas and water sources are important habitat features, providing both prey species and drinkable water (Burns et al. 2005). Roost disturbance is the primary threat to populations of fringed myotis. Logging of mature forests, removal of snags in forests, mine closures, bridge alterations, and human cave exploration all contribute to disturbance of roosting myotis bats. Unlike other bat species included in this analysis, the fringed myotis typically hibernates singly or in small groups and does not use large, established hibernacula (Tigner and Stukel 2003). As a result, fringed myotis may occur at any rocky fissure or crevice throughout the

BHNF. Maternity and nursery colonies are also small and commonly located in rock fissures or crevices.

Distribution, Status, and Trend: This subspecies occurs only in the Black Hills of South Dakota and Wyoming, and northwestern Nebraska. It is considered a rare to uncommon year round resident in the Black Hills. The population trend of the fringe-tailed myotis in the Black Hills is unknown at this time. However, according to the most recent Forest Plan monitoring report, the USFS is conserving and enhancing habitat for this species through cave, mine, and snag management (USFS 2010).

Project Review: While no known hibernacula, maternity roosts, or nursery roosts have been identified within the analysis area to date, the small number of individuals attending and the use of cracks in rocky surfaces make locating these important habitats difficult. Previously unidentified hibernacula, maternity roosts, or nursery roosts may occur in the analysis area.

3.2.1.1.3.5.3 Rocky Mountain Bighorn Sheep

Habitat: Rocky Mountain bighorn sheep inhabit alpine meadows, foothills, cliffs, and rock outcrops (Luce et al. 1999; Clark and Stromberg 1987). Their diet includes a variety of grasses, forbs, and browse (Luce et al. 1999). Merwin (2000) noted that bighorn sheep often selected areas with good visibility (less than 40 percent canopy closure) within suitable distance of water and escape terrain. Limits to persistence include limited availability of habitat on the BHNF, vulnerability of habitat to residential development on adjacent private lands, and disturbance from recreation (Benzon and Halseth 1999). Bighorn sheep are often susceptible to diseases that could affect populations. Diseases can be transmitted from domestic sheep and goats.

Distribution, Status, and Trend: Rocky Mountain bighorn sheep are distributed throughout the mountainous regions of western North America. Although bighorn sheep numbers have declined dramatically with the settling of the West, they are still considered somewhat secure throughout much of their range. However, small numbers and isolated herds have undergone changes in population numbers. Their susceptibility to massive heard die-offs caused by disease have placed this species on sensitive species lists.

In 1991 and 1992, 31 Rocky Mountain bighorn sheep were transplanted into Spring Creek Canyon in the Black Hills (Benzon and Halseth 1999). The 2003 estimate of the population was approximately 220 sheep (SDFGP 2003). Population estimates have steadily increased since re-introduction (SDGFP 2003). The 2007 population estimate was 325 (Beecham et al. 2007). SDGFP has issued two to five licenses each year since 2000, and hunter success has been 100 percent for each year (SDGFP 2011). However, the 2013 estimate of the population was approximately 230 sheep in the Black Hills (SDGFP 2013). The USFS is conserving habitat for the bighorn sheep consistent with Objective 221 based on the trend in bighorn sheep numbers (USFS 2010).

Three distinct herds occur in the Black Hills: the Rapid City herd, the Custer State Park herd, and the Elk Mountain herd. The Rapid City herd is located primarily on NFS land within the analysis area between Hill City, Pactola Reservoir, and Rapid City (Merwin 2000). The Custer State Park and Elk Mountain herds are each located outside of the analysis area and are not considered in this EIS (SDGFP 2013).

Project Review: BHNF GIS data indicate the presence of bighorn sheep lambing areas, year-round use areas, and winter use areas in the eastern portion of the analysis area between Hill City, Pactola Reservoir and Rapid City.

3.2.1.1.3.5.4 American Peregrine Falcon

Habitat: The American Peregrine Falcon can inhabit a wide variety of habitats, including open woodlands and forests, shrub-steppe, grasslands, wetlands, and riparian habitat, so long as suitable cliff nesting habitat is present (Burns et al. 2005; WGFD 2010). Optimal cliff nesting habitat is 200 to 300 feet high and provides expansive views of the surrounding landscapes (White et al. 2002; Burns et al. 2005). These falcons typically hunt over open areas, such as grasslands, shrublands, and open wetlands, where they can maneuver to capture small to medium sized birds in flight. Disturbance of eyries and pesticides are the most prominent threats to American Peregrine Falcon populations range-wide.

Distribution, Status, and Trend: This species has a nearly cosmopolitan distribution, breeding on every continent except for Antarctica. The American Peregrine Falcon was listed as federally endangered under the ESA in 1970 in response to a substantial population decline. The species was removed from protection under the ESA in 1999 and remains one of the greatest success stories demonstrating the effectiveness of the ESA. In the Black Hills, the American Peregrine Falcon is an uncommon spring, rare fall, and winter visitor (Tallman et al. 2002). Prior to 1970, American Peregrine Falcons bred in the Black Hills. No American Peregrine Falcons have been detected during Forest Plan monitoring efforts (RMBO 2001-2010). Therefore, population status and trend in the Black Hills cannot be determined. The USFS is conserving habitat for this falcon, consistent with Objective 221 (USFS 2010).

Project Review: Rocky Mountain Bird Observatory (RMBO 2009) data and Natural Resource Information System (NRIS 2012) data do not have record of American Peregrine Falcon occurrences within the analysis area. Potential nesting habitat occurs on limestone cliff habitat in the analysis area.

3.2.1.1.4 BHNF Species of Local Concern

SOLC are defined as species that do not meet the criteria for sensitive species status but show a decline in only a portion of Region 2, or those that are important components of diversity in a local area. A list of SOLC for the BHNF can be found in FSM 2620, Supplement r2_bh_2600-2011-1. The Phase II Amendment FEIS (USFS 2005; Sec 3-3.3.3 through Sec 3-3.3.5.8) provides in-depth information (i.e., range, distribution etc.) on Forest

SOLC analyzed for this Project. The T-O-RC 230 kV Transmission Line Project analysis for SOLC is tiered to that document, which is summarized in each species section.

This section provides a broad description of the existing conditions for BHNF SOLC. The habitat requirements and likelihood of occurrence are summarized in **Table 3-10** for each SOLC. SOLC are grouped by habitat type to facilitate the affects analysis and reduce redundancy. **Table 3-10** describes species which have been designated as SOLC by the BHNF.

TABLE 3-10 - SPECIES OF LOCAL CONCERN ON BHNF

SPECIES	HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE IN SOUTH DAKOTA[1]	FURTHER ANALYSIS WARRANTED IN SOUTH DAKOTA
Mammals			
Northern Long-Eared Myotis (*Myotis septentrionalis*)	Coniferous forest (Tigner and Stukel 2003). Summer maternity roosts in buildings, under loose bark, and in tree cavities (Arroyo-Cabrales and Castaneda 2008b). Winter hibernacula in caves and abandoned mines (Tigner and Stukel 2003).	Moderate	Yes
Small-Footed Myotis (*Myotis ciliolabrum*)	Grasslands, canyons, and ponderosa pine woodlands. Roosts in cliff crevices, under tree bark, in mines, caves, and buildings (Arroyo-Cabrales and Castaneda 2008d). Hibernates in caves and mines (Tigner and Stukel 2003).	Moderate	Yes
Long-Eared Myotis (*Myotis evotis*)	Mixed coniferous forests, woodlands, grasslands, and shrublands; probably most common in xeric coniferous woodlands (e.g. juniper, ponderosa pine, and Douglas-fir). Roosts in tree cavities, rock crevices, caves, mines, and abandoned buildings. Hibernates in caves. (Arroyo-Cabrales and Castaneda 2008a).	Moderate	Yes
Long-Legged Myotis (*Myotis volans*)	A variety of forested habitats. Roosts in trees, rock crevices, fissures in stream banks, and buildings (Arroyo-Cabrales and Castaneda 2008c). Hibernates in caves and mines (Tigner and Stukel 2003).	Moderate	Yes
Northern flying squirrel (*Glaucomys sabrinus*)	Primarily coniferous or mixed forest, but also in deciduous forest and wooded riparian (Linzey and Hammerson 2008). In the Black Hills in spruce, pine, and oak forest, especially near recently burned areas (Stukel 2012).	Moderate	Yes
Meadow Jumping Mouse (*Zapus hudsonius campestris*)	Primarily in riparian areas or other moist habitats with adequate herbaceous ground cover. In the Black Hills in marshy areas around lakes and reservoirs and in less typical areas such as upland meadows and ponderosa pine covered hillsides (NatureServe 2012).	Moderate	Yes
Mountain Goat (*Oreamnos americanus*)	Alpine and subalpine habitat, including steep grassy talus slopes, grassy ledges on cliffs, and alpine meadows. They utilize subalpine forests in winter, and use steep, rocky terrain for escape and giving birth (NatureServe 2012).	Moderate	Yes

TABLE 3-10 - SPECIES OF LOCAL CONCERN ON BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN SOUTH DAKOTA[1]**	**FURTHER ANALYSIS WARRANTED IN SOUTH DAKOTA**
Birds			
Sharp-shinned Hawk (*Accipiter striatus*)	Occur within most forest types within their range, particularly in forests with a conifer component, a dense structure, and a well developed canopy. Relative to the other *Accipiters*, Sharp-shinned Hawks tend to nest in denser forests, with younger, shorter trees (Bildstein and Meyer 2000).	High	Yes
Cooper's Hawk (*Accipiter cooperii*)	Coniferous, mixed, and deciduous forests, often in extensively forested landscapes, but sometimes in patchy woodlots, including urban environments, and riparian areas. On average, Cooper's Hawks nest in older, sparser stands than those used by Sharp-shinned Hawks and younger, denser stands than Northern Goshawks (Curtis et al. 2006).	High	Yes
Broad-winged Hawk (*Buteo platypterus*)	Deciduous and mixed forests, often with small openings in the canopy and water nearby (Goodrich et al. 1996).	High	Yes
Northern Saw-whet Owl (*Aegolius acadicus*)	Inhabits most forest and woodland habitats, with densities highest in coniferous forests, especially those adjacent to riparian areas (Rasmussen et al. 2008).	High	Yes
Pygmy Nuthatch (*Sitta pygmaea*)	Almost exclusively inhabit long-needled pine forests, principally ponderosa pine. Because they use cavities year-round for nesting and roosting, they reach their highest densities in mature pine forests, with abundant snags (Kingery and Ghalambor 2001).	High	Yes
American Dipper (*Cinclus mexicanus*)	Inhabits clear, fast-flowing streams with abundant aquatic invertebrates. Feeds primarily on aquatic insects and insect larvae. Nests within 25 feet of a stream on rocky streamside ledges and cliffs, boulders, behind waterfalls, and under bridges (Anderson 2002).	Moderate	Yes
Black and White Warbler (*Mniotilta varia*)	Breeds in mature and second growth deciduous and mixed deciduous-coniferous forests, most often in moist areas. Quality habitat has a high canopy closure and a dense understory of shrubs and small trees. In the Black Hills, most commonly encountered during migration, when it is primarily found in riparian areas but also in a variety of wooded habitats (USFS 2005).	Moderate	Yes
Invertebrates			
Atlantis fritillary (*Speyeria atlantis pahasapa*)	Riparian areas adjacent to openings and moist meadows and in boreal forests (NatureServe 2004). Within the Black Hills, in wet meadows and moist canyons (Marrone 2002). Although adults are regarded as general nectarivores, feeding on a variety of flowers, larvae of this genus feed exclusively on violets (*Viola* spp.; NatureServe 2004).	Moderate	Yes

TABLE 3-10 - SPECIES OF LOCAL CONCERN ON BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN SOUTH DAKOTA[1]**	**FURTHER ANALYSIS WARRANTED IN SOUTH DAKOTA**
Tawny Crescent (*Phycoides batesii*)	Open meadows, stream bottoms, roads, trails, and riparian woodlands (Stefanich 2001). Also in mesic forest corridors across an ecotone between grasslands and woodlands (Royer and Marrone 1992a). Elsewhere in the Dakotas, adults are known to forage for nectar from a variety of floral species, including dogbane leafy spurge and various composite flowers (Stefanich 2001). Males of this species are often observed taking moisture at springs and stream banks (Marrone 2002). Tawny crescent larvae appear dependent on asters as a food source (Stefanich 2001).	Moderate	Yes
Callused Vertigo (*Vertigo arthuri*)	Wet, relatively undisturbed forest, most often white spruce or ponderosa pine with a varied understory. Most common at sites with relatively diverse floras and deep litter, generally on shaded north-facing slopes, and often at the slope base or extending slightly onto the adjacent floodplain. Down woody material that helps maintain moist soil conditions and lessens sun exposure is an important habitat element. Foraging substrate appears to consist of decayed deciduous leaves and herbaceous plants (Frest and Johannes 2002).	Moderate	Yes
Mystery Vertigo (*Vertigo paradoxa*)	Generally restricted to rich lowland wooded sites, often in the white-spruce community, and occasionally in the ponderosa pine community. The forest canopy is generally closed or nearly so, with well-developed litter and a rich understory. Sites are usually in leaf litter at the base of a wooded, north-facing slope on limestone or schist substrates. Down woody material that helps maintain moist soil conditions and lessens sun exposure is an important habitat element. Appears to feed on the organic coating of rock surfaces and partially decayed leaves (Frest and Johannes 2002).	Moderate	Yes
Frigid Ambersnail (*Catinella gelida*)	Usually found on limestone but also on schist soils, and colonies often found in somewhat dry wooded limestone talus, generally near the slope base. Most often found in rather open ponderosa pine forest, often with a secondary deciduous tree and shrub component, although white spruce is a minor component at a few sites (Frest and Johannes 2002).	Moderate	Yes

TABLE 3-10 - SPECIES OF LOCAL CONCERN ON BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN SOUTH DAKOTA[1]**	**FURTHER ANALYSIS WARRANTED IN SOUTH DAKOTA**
Striate Disc (*Discus shimekii*)	Most often found in litter in rich mesic forest, generally on shaded, north-facing slope bases, often bordering or ranging slightly onto stream floodplains. Most frequently in white-spruce communities but also aspen and riparian habitats, at the base of slopes where deciduous trees and shrubs are often common. Most sites have soils derived from weathered limestone, sometimes on schist substrate. Foraging substrate consists of decayed deciduous leaves and herbaceous plants. Down woody material that helps maintain moist soil conditions and lessens sun exposure is an important habitat element (Frest and Johannes 2002).	Moderate	Yes

[1] High: suitable habitat present and species known to occur in area of impact supported by previous occurrence records; Moderate: suitable habitat present but no previous occurrences documented; Low: no suitable habitat present and no previous occurrences documented.

3.2.1.1.4.1 Applicable Laws, Regulations, Policies, and Forest Plan Direction

SOLC are species that failed to meet the criteria for region-wide sensitive status, yet qualify for SOLC designation within the BHNF based on several criteria, including seasonality, local and range-wide distribution, abundance, population trend, vulnerability of habitat, dispersal ability, and demography. These could include species with declining trends in only a portion of a USFS Region, or those that are important components of diversity in a local area. The USFS Manual 2622.01 directs the USFS to:

Consider Species of Local Concern during project design and evaluate the effects to the species from alternatives considered through the NEPA process.

Forest-wide objectives which may impact the Proposed Action and are directed at SOLC include:

> Goal 2. Objective 221. Conserve or enhance habitat for Region 2 Sensitive Species and SOLC. Monitoring will be conducted at a Forest-wide level, not at the project level, and will be done for habitats or populations.

Standards and Guidelines are provided in **Appendix D**.

3.2.1.1.4.1.1 Grassland/Meadow Dependent Species

There are no SOLC species that requires Grassland/Meadow as their primary habitat. Other SOLC, for which grassland provides important habitat, but not necessarily the primary or most limiting habitat, include small-footed myotis and mountain goat; the natural histories of these species are reviewed under the section covering their primary habitat.

3.2.1.1.4.1.2 Wetland/Riparian Dependent Species

SOLC that depend primarily on wetland, meadow, or riparian habitat are covered in this section and include meadow jumping mouse, Black-and-white Warbler, Atlantis fritillary, tawny crescent, callused vertigo, and mystery vertigo. Additional SOLC for which wetland, meadow, or riparian provides important habitat, but not necessarily the primary or most limiting habitat, include Broad-winged Hawk, American Dipper, and striate disc. Natural histories of these species are reviewed under the sections addressing their respective primary habitats.

3.2.1.1.4.1.2.1 Meadow jumping mouse

Meadow jumping mouse ranges from Alaska to Labrador, south to Georgia, and west to Wyoming and eastern Montana. Subspecies *campestris* inhabits only the Black Hills region of South Dakota, Wyoming, and Montana. This mouse occurs primarily in riparian areas or other moist habitats with adequate herbaceous ground cover. In the Black Hills the species has been captured in marshy areas around lakes and reservoirs and in less typical areas such as upland meadows and ponderosa pine covered hillsides (NatureServe 2012). The meadow jumping mouse is rare with habitat decreasing in South Dakota; and classified as S3 (rare and/or locally distributed; SDGFP 2012). Overgrazing of riparian areas by domestic stock is considered to be the primary threat to this subspecies (Linzey and Hammerson 2008). While SDGFP (2012) indicates that the meadow jumping mouse is rare across the state, Cryan and Ellison (2005) captured numerous individuals while completing focused trapping efforts in BHNF. Trap locations along Ditch Creek, Beaver Creek, Iron Creek, and Willow Creek all captured meadow jumping mice.

According to FPMER, no Forest-wide monitoring data for the meadow jumping mouse or riparian resource condition (Objective 213) was collected in FY 2009. Implementation of Forest Plan standards and guidelines and best management practices maintain riparian habitat Forest-wide, but probably at a level less than its full capability. Progress is being made in achieving Objective 214 (USFS 2010c). Projects to restore riparian and wetland habitat or to rehabilitate stream reaches have increased in the last five years, which could partially indicate trend of jumping mouse habitat. These projects have a small positive influence on the habitat trend for these mice to meet the intent of Objective 221.Limited data suggest that the Forest is conserving habitat for the meadow jumping mouse (USFS 2009b, 2010c).

It is unknown if any of the trapping locations from Cryan and Ellison (2005) occurred within the analysis area, however, based on their results it is likely that meadow jumping mice occupy suitable habitat within the area.

3.2.1.1.4.1.2.2 Black-and-white Warbler

Black-and-white Warbler breeds in mature deciduous forests of the eastern United States and throughout Canada. Overall, populations of this species are stable throughout North

America (Sauer et al. 2003). Habitat fragmentation is probably the main threat to the Black-and-white Warbler. The Black Hills is at the edge of the Black-and-white Warbler's distribution in the United States.

The Black-and-white Warbler is a rare breeder in the Black Hills, with breeding records confirmed in South Dakota, but not in Wyoming (Tallman et al. 2002; Luce et al. 1999). Panjabi (2001, 2003, 2004) detected only a few individuals during surveys in 2001, 2002, and 2003 though not all habitat types were sampled in 2003. During the breeding season, Black-and-white Warblers are found in mature and second growth deciduous and mixed deciduous-coniferous forests (Kricher 1995). A forest-interior specialist, this species tends to prefer moist, swampy forests. Mature aspen stands are also used. Quality habitat has a high canopy closure and a dense understory of shrubs and small trees. Nests are placed on or near the ground and are well concealed at the base of a stump, log, or rock (Kricher 1995). Individuals of this species are found in a variety of habitats during migration, including forests and woodlands, but especially riparian areas (Kricher 1995). The Black-and-white Warbler is probably more commonly encountered during migration in the Black Hills (Tallman et al. 2002).

Limited observations of this species during Forest bird monitoring do not provide adequate data to determine densities (RMBO 2001-2009). There are no population trends available from breeding bird survey routes in the Black Hills or in South Dakota (Sauer et al. 2011). In terms of habitat availability, progress is being made to achieve the desired condition for bur oak (Objective 201); subsequently, habitat is being conserved for this species (USFS 2009). Overall, black-and-white warbler populations are stable throughout North America (Sauer et al. 2011).

Black-and-white Warblers have not been identified in the analysis area at this time, per GIS layers provided by BHNF representing the Rocky Mountain Bird Observatory (RMBO 2009) data from 2001 through 2005 and Natural Resource Information System (NRIS 2012) occurrence data. Additionally, the SDNHP has no record of the Black-and-white Warbler occurrences within the analysis area. However, bur oak does occur at lower elevations of the analysis area, therefore this species may occur in the project area.

3.2.1.1.4.1.2.3 Atlantis fritillary

Atlantis fritillary is an endemic butterfly of the Black Hills (NatureServe 2012). In general, it occurs in riparian areas adjacent to openings and moist meadows and in boreal forests (NatureServe 2012). In the Black Hills, this subspecies is restricted to Custer, Lawrence, and Pennington counties (Marrone 2002). It prefers wet meadows and moist canyons such as those near Dalton Lake and Lakota Lake (Marrone 2002). It is assumed that habitat requirements and preferences are similar to other species of this genus. Although adults are regarded as general nectarivores, feeding on a variety of flowers, larvae of this genus feed exclusively on violets (*Viola* spp.) (NatureServe 2012). Based on the restricted nature of the Atlantic fritillary's distribution in the Black Hills, development or management activities within

suitable habitats pose a risk to long-term persistence. Much of the fritillary's habitat is privately owned.

According to FPMER, no Forest-wide monitoring data regarding this fritillary or riparian resource condition (Objective 213) was collected in FY 2009. Implementation of Forest Plan standards and guidelines and best management practices maintain riparian habitat Forest-wide, but probably at a level less than its full capability. Progress is being made in achieving Objective 214. Projects to restore riparian and wetland habitat or to rehabilitate stream reaches have increased in the last five years, which could partially indicate trend of riparian butterfly habitat. These projects have a small positive influence on the habitat trend for these butterflies to meet the intent of Objective 221 (USFS 2009b, 2010c).

Marrone (2005; 2006) identified 19 new sites where Atlantis fritillary was present during his survey efforts. While it is unknown if any of the sites identified by Marrone (2005; 2006) occur within the analysis area, one reproducing population of Atlantis fritillary was identified in Natural Resource Information Service data provided by the BHNF. The prevalence of individuals identified by Marrone (2006) and the known population identified in Natural Resource Information Service data indicate that Atlantis fritillary is likely to inhabit suitable wetland habitat within the analysis area.

3.2.1.1.4.1.2.4 Tawn crescent

Tawny crescent is a butterfly found in open meadows, stream bottoms, roads, trails, and riparian woodlands (Stefanich 2001). It is also found in mesic forest corridors across an ecotone between mixed-grass meadows or prairie grasslands to adjacent woodlands (Royer and Marrone 1992a). Elsewhere in the Dakotas, adults are known to forage for nectar from a variety of floral species, including dogbane leafy spurge and various composite flowers (Stefanich 2001). Males of this species are often observed taking moisture at springs and stream banks (Marrone 2002). Populations inhabiting the Black Hills of South Dakota are considered genetically isolated and disjunct from crescents elsewhere (Royer and Marrone 1992a). Tawny crescents were observed at two of 20 monitoring sites on the Mystic Ranger District in 2002 (USFS 2004a). However, there continue to be no reliable estimates of local abundance or population estimates for the Black Hills (Stefanich 2001). Additionally, distinguishing this species from the northern pearl crescent and the field crescent is extremely difficult, and the potential for hybridization between these species has not been resolved (Stefanich 2001). Stefanich (2001) hypothesized that the only threat to this species in the Black Hills is the destruction of this butterfly's habitat or isolation of colonies to the extent that populations are unable to disperse.

According to FPMER, no Forest-wide monitoring data regarding the tawny crescent or riparian resource condition (Objective 213) was collected in FY 2009. Implementation of Forest Plan standards and guidelines and best management practices maintain riparian habitat Forest-wide, but probably at a level less than its full capability. Progress is being made in achieving Objective 214. Projects to restore riparian and wetland habitat or to rehabilitate stream reaches have increased in the last five years, which could partially

indicate trend of riparian butterfly habitat. These projects have a small positive influence on the habitat trend for these butterflies to meet the intent of Objective 221 (USFS 2009, 2010).

Marrone (2005; 2006) did not include tawny crescents in his survey conclusions; however, the Natural Resource Information System (NRIS 2012) GIS data does indicate one known occurrences of tawny crescent in the analysis area. Suitable habitat, although limited, does occur in the analysis area.

3.2.1.1.4.1.2.5 Callused vertigo

The USFWS considered the callused vertigo a Category 2 candidate species as recently as 1994, although that designation was discontinued when the USFWS revised the candidate classification system in 1996. The callused vertigo is currently ranked imperiled globally and in South Dakota.

The callused vertigo was found in wet, relatively undisturbed forest, most often white spruce or ponderosa pine with a varied understory. The species was most common at sites with relatively diverse floras and deep litter, generally on shaded north-facing slopes, and often at the slope base or extending slightly onto the adjacent floodplain. The most common substrate was limestone, but callused vertigo also occurred occasionally on schist-derived soils. Down woody material that helps maintain moist soil conditions and lessens sun exposure is an important habitat element. Foraging substrate appears to consist of decayed deciduous leaves and herbaceous plants. The species was mostly found at sites with high mollusk diversity; including mystery vertigo, striate disc, and Cooper's rocky mountainsnail (Frest and Johannes 2002).

Land snails, in general, are susceptible to habitat changes that increase sun exposure, disturb ground cover, reduce micro site humidity, or compact the soil. Additional risks include direct loss of habitat, barriers to dispersal (e.g., roads), predation, trampling by grazing ungulates, intense wildfire, herbicide or pesticide application, and toxic leachates from mining activities. According to Frest and Johannes (2002), the callused vertigo may be negatively affected by road construction, livestock grazing, timber harvest, herbicides and pesticides, and high-intensity forest fires. Timber harvest and grazing may affect snails if these actions alter the amount of litter, soil moisture or temperature on snail colonies (Anderson 2004a). Although fire is a natural disturbance, it can potentially eliminate snail habitat (Anderson 2004a). It is unknown what level of fire exposure or intensity this species is capable of surviving. (Anderson 2004a).

Monitoring for this snail was not funded in 2008. Forest Plan Standard 3103 requires known SOLC snail colonies to be managed to retain favorable site conditions and to avoid/minimize the effects of land management activities to protect SOLC snails and their habitat. Subsequently, habitat is likely to be conserved for these species consistent with Objective 221 (USFS 2009).

Natural Resource Information System (NRIS 2012) data provided by BHNF indicates rare snail occurrences at three locations within the analysis area. However, these occurrences were only identified as "vertigo" snails. It is possible that callused vertigo occur in the analysis area at these three known snail occurrences. Suitable habitat, although limited, does occur in the analysis area.

3.2.1.1.4.1.2.6 Mystery Vertigo

The USFWS considered the mystery vertigo a Category 2 candidate species as recently as 1994, although that designation was discontinued when the USFWS revised the candidate classification system in 1996. The mystery vertigo is currently ranked vulnerable globally and critically imperiled in South Dakota. In 2002, the BHNF received the final report for a contract to inventory and/or monitor 357 sites for land snails (Frest and Johannes 2002). Many of the sites had been surveyed in the early to mid-1990s, and some were revisited in 1999 to help assess population changes. More than 100 new sites were inventoried for the first time in 1999, six at which the mystery vertigo was located. Mystery vertigos were found at a total of 23 of the 357 sites inventoried/monitored. They were not generally abundant at any site.

Mystery vertigo is generally restricted to rich lowland wooded sites, quite often in the white-spruce community, but occasionally in the ponderosa pine community. The forest canopy is generally closed or nearly so, with well-developed litter and a rich understory. Sites are usually in leaf litter at the base of a wooded, north-facing slope on limestone or schist substrates. Down woody material that helps maintain moist soil conditions and lessens sun exposure is an important habitat element. Mystery vertigo was not common in taluses but could be found crawling on rock surfaces in moist weather and appears to feed on the organic coating of rock surfaces and partially decayed leaves. Associated snail species include callused vertigo, cross vertigo, Cooper's rocky mountainsnail, and striate disc. All sites with mystery vertigo were in the central or northern Black Hills or the Bear Lodge Mountains.

Land snails, in general, are susceptible to habitat changes that increase sun exposure, disturb ground cover, reduce micro site humidity, or compact the soil. Additional risks include direct loss of habitat, barriers to dispersal (e.g., roads), predation, trampling by grazing ungulates, intense wildfire, herbicide or pesticide application, and toxic leachates from mining activities. According to Frest and Johannes (2002), road construction, livestock grazing, timber harvest, herbicides and pesticides, and high-intensity forest fires may negatively affect the mystery vertigo. The land snail's relatively immobile nature gives it limited ability to disperse and colonize adjacent habitats.

Monitoring for this snail was not funded in 2008. Forest Plan standard 3103 requires known SOLC snail colonies to be managed to retain favorable site conditions and to avoid/minimize the effects of land management activities to protect SOLC snails and their habitat. Subsequently, habitat is likely to be conserved for these species consistent with Objective 221 (USFS 2009).

Natural Resource Information System (NRIS 2012) data provided by BHNF indicates rare snail occurrences at three locations within the analysis area. However, these occurrences were only identified as "vertigo" snails. It is possible that mystery vertigo occur in the analysis area at these three known snail occurrences. Suitable habitat, although limited, does occur in the analysis area.

3.2.1.1.4.1.3 Aquatic Species

SOLC that depend primarily on aquatic habitat (lakes and streams) are covered in this section and include American Dipper.

3.2.1.1.4.1.3.1 American Dipper

American Dipper is a unique, aquatic songbird of mountain streams. The Black Hills population is at the eastern edge of its global distribution (Panjabi 2001). The American Dipper is not considered migratory, but movements within or between drainages are common to find near open, moving water during the freeze-up months of winter (Anderson 2002). American Dippers inhabit clear, fast-flowing streams. It feeds primarily on aquatic insects and insect larvae that it catches by diving underwater. Dippers nest within 25 feet of a stream on rocky streamside ledges and cliffs, boulders, behind waterfalls, and under bridges (Anderson 2002). During the winter, American Dippers move to areas of open water (Anderson 2002) and may move to lower elevations. The availability of food in open water is likely important during winter. The primary risk factor appears to be the degradation of water quality based on sedimentation and other pollutants that affect prey availability (Anderson 2002, Biodiversity Conservation Alliance et al. 2003). Flow reductions, especially in the winter, also likely pose a risk. Limiting factors are thought to be adequate summer foraging habitat, suitable winter habitat, stream connectivity, and availability of nest sites.

On October 27, 2009, the USFWS released its finding on a 90 day petition to list the Black Hills population of American Dipper as threatened or endangered under the ESA. However, the USFWS determined the American Dipper population in the Black Hills would not meet the qualifications as a Distinct Population Segment under the ESA, and listing status was denied (FR.74:206 (27 October 2009) p. 55177).

In the Black Hills, the American Dipper occurs in Spearfish Creek, several of its tributaries and Whitewood Creek. It has also been found at Rapid Creek and some of the streams between Rapid Creek and Spearfish Creek. According to FPMER, nesting attempts in Spearfish Creek have remained fairly stable and then declined in 2009. Nesting attempts and success have declined in Whitewood Creek but remained stable in 2009. Additional monitoring is needed to determine long-term trends (USFS 2010). Recent BHNF monitoring reports (USFS 2010) and Lovett (2010) supports the statement that breeding American Dipper only occur over a limited distribution – Spearfish Creek and Whitewood Creek. However, Natural Resource Information System (NRIS 2012) data identified one American Dipper occurrence in the analysis area in 2010. Suitable habitat for the American Dipper, although limited, does occur in the analysis area.

3.2.1.1.4.1.4 Conifer Forest Dependent Species

SOLC that depend primarily on conifer forest are covered in this section and include northern flying squirrel, Broad-winged Hawk, Sharp-shinned Hawk, Cooper's hawk, Northern Saw-whet Owl, Pygmy Nuthatch, frigid ambersnail, and striate disc. Additional SOLC that use conifer habitat include small-footed myotis, long-eared myotis, long-legged myotis, meadow jumping mouse, mountain goat, callused vertigo, and mystery vertigo. The natural histories of these species are reviewed under the section addressing their primary habitat.

Refer to the botany section for a description of conifer forest habitats within the analysis area. Conifer forest habitat covers 19,750 acres of the analysis area (19,434 acres ponderosa pine, 316 acres spruce). The large majority of this habitat consists of ponderosa pine forests of varying ages; however, white spruce stands occupy 316 acres of the conifer forest within the analysis area (USFS 2009a). See **Tables 3-15, 3-16,** and **3-17** for habitats affected by the Proposed Action.

3.2.1.1.4.1.4.1 Broad-winged Hawk

Broad-winged Hawk is a small, stocky species of the *Buteo* genus. Individuals breed throughout the eastern United States and southeastern Canada and they winter in the Caribbean, Central America, and northern South America. Individuals of this abundant species are conspicuous during migration, but during the breeding season they spend most of their time beneath the forest canopy, perch-hunting for a variety of small vertebrate prey. They breed primarily in deciduous and mixed forests, occasionally in coniferous forests; habitat often contains small openings in the canopy and water nearby (Goodrich et al. 1996). In South Dakota, this hawk is a common migrant, but locally rare or uncommon in the Northern Black Hills (Tallman et al. 2002). The global population appears to be increasing, possibly based on reforestation in the northeastern United States since the mid-1900s (Goodrich et al. 1996, BirdLife International 2012c). Within South Dakota, its population is classified as S2 (imperiled because of rarity; SDGFP 2012). Within the Black Hills, habitat loss based on deforestation or stand structure alteration is the primary conservation concern for this species (Stephens and Anderson 2003).

According to FPMER, the highest number of broad-winged hawks occurred in 2004 in aspen habitat, but this species has been documented in other habitats. Broad-winged hawk pine habitat is quantified as Structural Stages 4B, 4C, and 5, especially with "very large" tree size. Forest management areas are moving towards objectives in pine Structural Stage 5 but meet or exceed Forest Plan objectives for 4B and 4C. The Forest is above large tree objectives for Management Area 5.1 (13%), but slightly below this objective in Management Area 5.4 (9%). Aspen habitat is currently below Forest Plan objective 201 (45,805 acres). Spruce habitat is above Forest Plan Objective (25,749 acres). Progress is being made towards meeting Forest Plan objectives for pine structural stages and aspen, though it may take some time to achieve the desired amounts of some structural stage habitat to meet this species needs (USFS 2010c).

Recent BHNF monitoring reports indicate that Broad-winged hawks are typically observed in the northern portions of the BHNF, with occasional migrants identified throughout the forest (USFS 2010). GIS occurrence data from the Natural Resource Information System (NRIS 2012), provided by BHNF identified one documented occurrence of Broad-winged Hawk in the analysis area in 2007. GIS occurrence data from the Rocky Mountain Bird Observatory (RMBO 2009) has not record of Broad-winged Hawk within the analysis area.

3.2.1.1.4.1.4.2 Northern flying Squirrel

Northern flying squirrel ranges across forested parts of Canada and the northern United States and extending southward in mountains to California, Utah, Tennessee, and with a disjunct population in the Black Hills. The species is most often found in coniferous or mixed forest, but will also utilize deciduous forest and riparian woods (Linzey and Hammerson 2008). Within the Black Hills the northern flying squirrel has been observed in spruce, pine, and oak forests, particularly near recently-burned areas. The species prefers cavities in mature trees or snags for denning, but will also use leaf nests, or underground burrows. A diverse diet includes mushrooms, lichens, nuts, seeds, fruit, tree buds, sap, and bird eggs. Habitat management for northern flying squirrels includes conserving snags for nest cavities, sustaining a mixture of tree species in patches for travel corridors, and maintaining plant diversity (Stukel 2012). The species global population is considered stable (Linzey and Hammerson 2008). Within South Dakota its population is classified as S2 (imperiled because of rarity; SDGFP 2012).

According to FPMER, the Forest is conserving habitat for the northern flying squirrel in regards to spruce habitat, snag habitat, and very large tree components. Progress towards increasing the acres of Structural Stage 5 and Structural Stage 3C is still needed to enhance habitat. Hough (2008) determined that the population appeared to be stable.

Natural Resource Information System (NRIS 2012) data provided by BHNF identified two historical occurrence of northern flying squirrel within the analysis area. These occurrences date from 2007 and 2008.

3.2.1.1.4.1.4.3 Sharp-shinned Hawk

Sharp-shinned Hawk is a small, agile *Accipiter* hawk, well adapted for hunting songbirds in forested environments. Individuals breed in forested environments throughout western and northeastern North America, and much of South America; and they winter throughout most of the contiguous United States and Central America. This species is a year-round resident in the Black Hills region. They nest in most forest types within their range, particularly in forests with a conifer component, a dense structure, and a well-developed canopy. Relative to the other A*ccipiters*, the Sharp-shinned Hawk tends to nest in more dense forests, with younger, shorter trees (Bildstein and Meyer 2000). Overall populations appear to be increasing (BirdLife International 2012a), though the species is difficult to survey and monitor and reliable population estimates are lacking (Bildstein and Meyer 2000). Within South Dakota its population is classified as S3 (rare and/or locally distributed; SDGFP

2012). In the Black Hills, they have been observed at all elevations (Peterson 1995), but estimates of local abundance are not available based on their low numbers (Panjabi 2003).

Recent BHNF monitoring reports indicate that Sharp-shinned Hawks may occur throughout the forest but are likely the rarest *Accipiter* on the forest and the Monitoring Breeding Bird Habitat (MBBH) program may not be adequate to effectively monitor this species (USFS 2010). Forest-wide surveys in 2009 identified four individual Sharp-shinned Hawks. Forest management areas are moving towards objectives in pine Structural Stages 3B and 3C but are below Forest Plan objectives for these pine stages (4.65% and 3.13% respectively). Spruce habitat is above Forest Plan Objective 239-LVD (25,749 acres). Progress is being made towards meeting Forest Plan objectives for pine structural stages though it may take some time to achieve the desired amounts of some structural stage habitat to meet this species needs (USFS 2010).

Natural Resource Information System (NRIS 2012) data provided by BHNF identified five historical occurrence of Sharp-shinned Hawk within the analysis area. These occurrences date from 1989 to 2008. Rocky Mountain Bird Observatory (RMBO 2009) survey data did not identify any Sharp-shinned Hawk within the analysis Area, nor were they detected during surveys completed in association with the Proposed Project.

3.2.1.1.4.1.4.4 Cooper's Hawk

Cooper's Hawk is a crow-sized, agile *Accipiter*, well adapted for hunting birds and small mammals in forested environments. This species has a typical body size that is larger than the Sharp-shinned Hawk and smaller than the Northern Goshawk. Individuals breed throughout southern Canada, the contiguous United States, and the Sierra Madre Mountains of Mexico; they winter throughout Mexico and the southern and central United States, as far north as southern South Dakota. Cooper's Hawks occupy coniferous, mixed, and deciduous forests, often in extensively forested landscapes, but sometimes in patchy woodlots, including urban environments, and riparian areas. Typically, Cooper's Hawks nest in older, sparser stands than those used by Sharp-shinned Hawks and younger, denser stands than Northern Goshawks, but habitat characteristics overlap, especially with Goshawks (Curtis et al. 2006). Though the species is still designated as locally threatened in many eastern states, it has recovered well from population declines in the mid-1900s, and populations appear to be increasing (Curtis et al. 2006, BirdLife International 2012b). Within South Dakota its population is classified as S3 (rare and/or locally distributed; SDGFP 2012). Within the Black Hills, the species appears to be widespread, but uncommon (Panjabi 2004).

According to FPMER, Cooper's hawk was not detected during bird monitoring surveys in 2009. However, in the past this species has been detected in all major habitats, with no affinity to one particular habitat. Cooper's hawk pine habitat is quantified as Structural Stages 4B, 4C, and 5, especially with "very large" tree size. Forest management areas are moving towards objectives in pine Structural Stage 5 but meet or exceed Forest Plan objectives for 4B and 4C. The Forest is above large tree objectives for Management Area

5.1 (13%), but slightly below this objective in Management Area 5.4 (9%). Aspen habitat is currently below Forest Plan objective 201 (45,805 acres). Spruce habitat is above Forest Plan Objective 239-LVD (25,749 acres). Progress is being made towards meeting Forest Plan objectives for pine structural stages and aspen, though it may take some time to achieve the desired amounts of some structural stage habitat to meet this species needs (USFS 2010c).

Cooper's Hawks are known to occupy the analysis area. During surveys in July 2012, three occupied Cooper's Hawk territories were observed and one active nest was found within the analysis area.

3.2.1.1.4.1.4.5 Northern Saw-whet Owl

Northern Saw-whet Owl is one of the most common owls in forested habitats across southern Canada and the northern United States. Its year-round range includes southern Alaska, all of southern Canada, New England, the Great Lakes region, and in low to mid-elevation areas of mountains within the western United States and Mexico. This cavity-nesting species inhabits most forest and woodland habitats, with the highest densities in coniferous forests, especially those adjacent to riparian areas. Saw-whet Owls are not restricted to dense forests, but will use a broad range of habitat as long as nest cavities are available and prey is abundant. The species' primary prey is *Peromyscus* spp. mice, which it hunts at night from low perches (Rasmussen et al. 2008). The global population trend appears to be decreasing; but based on the large range and abundance of the species its population is not particularly vulnerable (Birdlife International 2012d). Within South Dakota its population is classified as S3 (rare and/or locally distributed; SDGFP 2012).

According to FPMER, northern saw-whet owls were not recorded during forest bird monitoring surveys in 2009. However, Drilling (2010) found that saw-whet owls are the most common and widespread owl in the Black Hills. They were detected at 15% of all survey points and 93% of all routes and at all elevations and in all months. Forest management areas are moving towards objectives in pine Structural Stage 5 but meet or exceed Forest Plan objectives for 4A, 4B, and 4C. The Forest is above large tree objectives for Management Area 5.1 (13%), but slightly below this objective in Management Area 5.4 (9%). Aspen habitat is currently below Forest Plan objective 201 (45,805 acres). Spruce habitat is above Forest Plan Objective 239-LVD (25,749 acres). Progress is being made towards meeting Forest Plan objectives for pine structural stages and aspen, though it may take some time to achieve the desired amounts of some structural stage habitat to meet this species needs (USFS 2010c). Drilling (2010) identified 35 individual Northern Saw-whet Owls during their surveys, and 93 percent of routes surveyed contained this species. Several survey locations are within or in close proximity to the analysis area. However, neither Rocky Mountain Bird Observatory (RMBO 2009) data nor Natural Resource Information System (NRIS 2012) occurrence data identify Northern Saw-whet Owl in the analysis area.

3.2.1.1.4.1.4.6 Pygmy Nuthatch

Pygmy Nuthatch is a small, energetic, vocal, gregarious songbird characteristic of ponderosa pine forests of the western United States. They range throughout much of the western United States, Mexico, and southern British Columbia, but tend to occur in isolated pockets based on their habitat specificity. Individuals almost exclusively inhabit long-needled pine forests, principally ponderosa pine, where they are typically one of the most abundant species. Because they use cavities year-round for nesting and roosting, they reach their highest densities in mature pine forests, with abundant snags (Kingery and Ghalambor 2001). The Black Hills are at the eastern edge of the species range. Good estimates of Pygmy Nuthatch populations in the Black Hills are lacking, but they appear to be absent or rare in many areas of apparently suitable habitat within the Black Hills (Ghalambor 2003). The global population appears to be increasing (BirdLife International 2012e), though local populations appear to fluctuate dramatically, possibly as a result of variable cone crops or winter temperatures (Kingery and Ghalambor 2001). Within South Dakota, their population is classified as S2/S3 (imperiled because of rarity/rare and/or locally distributed; SDGFP 2012). Because Pygmy Nuthatches nest and roost in cavities, snag availability may have a limiting effect on populations. Because they are a relatively sedentary bird species, with typical natal dispersal distances of less than 300 meters, they may be especially vulnerable to habitat fragmentation (Ghalambor 2003).

According to FPMER, the highest number of occurrences of Pygmy Nuthatch was recorded in 2007 but the number detected fluctuates from year to year. Forest management areas are moving towards objectives in pine Structural Stage 5 but meet or exceed Forest Plan objectives for 4B and 4C. The BHNF is above large tree objectives for Management Area 5.1(13%), but slightly below this objective in Management Area 5.4 (9%). Ponderosa pine structural stages are moving toward Forest Plan objectives and along with stable to increasing snag availability forest-wide, indicates that the Forest is conserving and enhancing habitat for the Pygmy Nuthatch (USFS 2009, 2010).

Rocky Mountain Bird Observatory (RMBO 2009) data identified one occurrence of Pygmy Nuthatch within the analysis area in 2001. However, the species is known to currently occupy the area. During surveys in July 2012, Pygmy Nuthatches were found to be common in lower elevation pine stands near the eastern end of the analysis area, with more than 13 territories noted. Throughout the rest of the analysis area the species appeared to be absent, or at best, rare.

3.2.1.1.4.1.4.7 Frigid ambersnail

Frigid ambersnail was rare at all locations, and very few live adults were observed during the surveys of the early 1990s. Locations are widely distributed geographically across the BHNF at varying elevations (3,800 to 6,800 feet). The species was usually found on limestone, but also on schist soils, and colonies were often found in somewhat dry wooded limestone talus, generally near the slope base. They were most often found in rather open ponderosa pine

forest, often with a secondary deciduous tree and shrub component, although white spruce was a minor component at a few sites. The frigid ambersnail was found to co-occur with Cooper's rocky mountainsnail and rarely with the callused vertigo and striate disc. According to Frest and Johannes (2002), the family of land mollusks that includes the frigid ambersnail is associated not only with rather moist forest sites but also with quite dry and open settings in much of the western United States.

The USFWS considered the frigid ambersnail a Category 2 candidate species as recently as 1994, although that designation was discontinued when the USFWS revised the candidate classification system in 1996. In 2009, the USFWS made a positive 90-day finding that the frigid ambersnail may warrant listing under the ESA (USFWS 2009a). The USFWS determined that substantial information exists that listing may be warranted due to the present or threatened destruction, modification, or curtailment of the frigid ambersnail's habitat or range resulting from the effects from roads, livestock trampling, and logging disturbances. In 2011, the USFWS issued their 12 month finding. After reviewing all available scientific and commercial information, they found that listing is not warranted because currently living individuals that were identified as frigid ambersnails do not constitute a unique and valid, currently living taxon (USFWS 2011c).

Land snails, in general, are susceptible to habitat changes that increase sun exposure, disturb ground cover, reduce micro site humidity, or compact the soil. Additional risks include direct loss of habitat, barriers to dispersal (e.g., roads), predation, trampling by grazing ungulates, intense wildfire, herbicide or pesticide application, and toxic leachates from mining activities. According to Frest and Johannes (2002), road construction, livestock grazing, timber harvest, herbicides and pesticides, and high-intensity forest fires may negatively affect land snails. As a result of the land snail's relatively immobile nature, it has limited ability to disperse and colonize adjacent habitats. Additionally, the frigid ambersnail was found in unusually sparse populations at all sites and thus may be more vulnerable to standard threats.

According to FPMER, monitoring for SOLC snails was not funded in 2009. Forest Plan standard 3103 requires known SOLC snail colonies to be managed to retain favorable site conditions and to avoid/minimize the effects of land management activities to protect SOLC snails and their habitat. Subsequently, habitat is likely to be conserved for these species consistent with Objective 221 (USFS 2010).

Natural Resource Information System (NRIS 2012) data provided by BHNF identified one historical occurrence of Cooper's Rocky Mountainsnail within the analysis area. This occurrence dates from 2008. If frigid ambersnails are known to co-occur with Cooper's Rocky Mountainsnails, this occurrence may also support frigid ambersnails.

3.2.1.1.4.1.4.8 Striate disc

The USFWS considered the striate disc as a Category 2 candidate species as recently as 1994, although that designation was discontinued when the USFWS revised the candidate classification system in 1996.

Striate disc was most often found in litter in rich mesic forest, generally on shaded, north-facing slope bases, often bordering or ranging slightly onto stream floodplains. They were locally abundant in comparatively small colonies spatially, most frequently in white-spruce communities but also aspen and riparian habitats, at the base of slopes where deciduous trees and shrubs were often common. Most sites had soils derived from weathered limestone, although four sites were on schist substrate. Foraging substrate consists of decayed deciduous leaves and herbaceous plants. Down woody material that helps maintain moist soil conditions and lessens sun exposure is an important habitat element. The striate disc was found to co-occur with Cooper's rocky mountainsnail, but more commonly with the mystery vertigo, callused vertigo, and cross vertigo. According to Frest and Johannes (2002), striate disc were found only in relatively undisturbed forested sites, with minor sun exposure and minor grazing and logging pressure, and most sites were protected by topography, down logs, or other physical features. Sites where the striate disc occurs appear restricted to the higher elevations of the limestone plateau of the west-central and north-central portions of the Black Hills.

According to FPMER, monitoring for SOLC snails was not funded in 2009. Forest Plan standard 3103 requires known SOLC snail colonies to be managed to retain favorable site conditions and to avoid/minimize the effects of land management activities to protect SOLC snails and their habitat. Subsequently, habitat is likely to be conserved for these species consistent with Objective 221 (USFS 2010).

Land snails, in general, are susceptible to habitat changes that increase sun exposure, disturb ground cover, reduce micro site humidity, or compact the soil. Additional risks include direct loss of habitat, barriers to dispersal (e.g., roads), predation, trampling by grazing ungulates, intense wildfire, application of herbicides or pesticides, and toxic leachates from mining activities. According to Frest and Johannes (2002), the striate disc may be negatively affected by road construction, livestock grazing, timber harvest, herbicides and pesticides, and high-intensity forest fires. As a result of the relatively immobile nature of land snails, they have limited ability to disperse and colonize adjacent habitats.

Natural Resource Information System (NRIS 2012) data provided by BHNF indicates rare snail occurrences at three locations within the analysis area. However, these areas are only identified as colonies of "vertigo" snails. Given that the striate disc is known to co-occur with vertigo snails, it is possible that the species occur in the analysis area at these three known snail occurrences. Suitable habitat is present in the analysis area.

3.2.1.1.4.1.5 Cliff/Cave Dependent Species

Several SOLC are associated and described with this habitat because it is likely to be the most limiting habitat component. Specifically many bat species depend on caves and mines for hibernating and/or roosting, and mountain goats rely on cliff habitat for safety and escape from predators. For each of these species additional habitats, such as foraging habitat, are equally critical. SOLC for which cliffs, caves, or abandoned mines are likely the most limiting habitat feature include, small-footed myotis, Long-eared myotis, long-legged myotis, and mountain goat.

3.2.1.1.4.1.5.1 Long-eared myotis

Long-eared myotis primarily inhabits coniferous forest and woodland, including juniper, ponderosa pine, and spruce-fir and is typically found near water and rock outcrops or cliffs (Manning and Jones 1989; WGFD 2010). Individuals typically forage over rivers, streams, and ponds within the forest-woodland environment. During summer, these bats roost in a wide variety of structures, including cavities in snags, under loose bark, stumps, buildings, rock crevices, caves, and abandoned mines while in the winter it hibernates primarily in caves (Manning and Jones 1989; WGFD 2010). The species typically feeds by gleaning prey from the surfaces of foliage, tree trunks, rocks, or ground, and may fly slowly around shrubs searching for emerging moths or non-flying prey (NatureServe 2012). Disturbance at roosting habitat, loss of roosting habitat, pesticides, and wind energy development are the main threats to the long-eared myotis (WGFD 2010). The global population of long-eared myotis is thought to be stable (Arroyo-Cabrales and Castaneda 2008a), but within South Dakota its population is classified as S1 (critically imperiled because of extreme rarity; SDGFP 2012).

According to FPMER, forest-wide monitoring suggests roost protection and snag availability are stable to increasing, therefore the Forest is conserving and enhancing habitat for the SOLC bats (USFS 2010c). Forest management areas are moving towards objectives in pine Structural Stage 5 but meet or exceed Forest Plan objectives for 4B and 4C. The BHNF is above large tree objectives for Management Area 5.1 (13%), but slightly below this objective in Management Area 5.4 (9%) (USFS 2010c).

Tigner and Stukel (2003) identify the entire BHNF as the range of the long-eared myotis; however records of capture are primarily from the northern portions near Sturgis, South Dakota and in Wyoming. No winter records occur for the long-eared myotis on the BHNF. However, given the difficult nature of locating winter hibernacula, it is possible that previously unidentified winter colonies occur. See **Tables 3-15, 3-16,** and **3-17** for comparison between effects of the Proposed Action and habitat that currently exists.

3.2.1.1.4.1.5.2 Long-legged myotis

Long-legged myotis is a medium-sized bat of western North America ranging from Alaska to Mexico and east to South Dakota. Long-legged myotis is among the more common species

in the Black Hills (Tigner and Stukel 2003). This species uses a variety of habitats in forested regions, and roosts in trees, rock crevices, fissures in stream banks, and buildings. Nursery colonies are most commonly found in trees (Arroyo-Cabrales and Castaneda 2008c). The species is migratory in some parts of its range, but is a year-round resident in the Black Hills, hibernating in caves and abandoned mines (Tigner and Stukel 2003). The species population is considered stable (Arroyo-Cabrales and Castaneda 2008c).

According to FPMER, forest-wide monitoring suggests roost protection and snag availability are stable to increasing, therefore the Forest is conserving and enhancing habitat for the SOLC bats (USFS 2010c). Forest management areas are moving towards objectives in pine Structural Stage 5 but meet or exceed Forest Plan objectives for 4B and 4C. The BHNF is above large tree objectives for Management Area 5.1 (13%), but slightly below this objective in Management Area 5.4 (9%) (USFS 2010c).

The long-legged myotis is one of the more common bat species on BHNF (Tigner and Stukel 2003), with the largest colony occurring in Jewel Cave. A second winter hibernacula of long-legged myotis is located approximately 15 kilometers north of Jewel Cave. Both known hibernacula are well south of the analysis area. However, given the difficult nature of locating winter hibernacula, it is possible that previously unidentified winter colonies occur. Suitable habitat for this bat can be found in the analysis area in terms of old mine entrances and limestone formations. See **Tables 3-15, 3-16,** and **3-17** for comparison between effects of the Proposed Action and habitat that currently exists.

3.2.1.1.4.1.5.3 Small-footed myotis

Small-footed myotis is the smallest bat in the Black Hills. This Great Plains species occurs from Alberta and Saskatchewan, Canada through eastern Colorado and Western Kansas, to north and central Mexico. This species inhabits a variety of habitats including rock outcrops on open grasslands, foothill canyons, and ponderosa pine woodlands. The species roosts in cliff crevices, under tree bark, in mines, caves, and buildings (Arroyo-Cabrales and Castaneda 2008d). Small-footed myotis is a widespread year-round resident of the Black Hills, hibernating in caves and mines (Tigner and Stukel 2003). The species population is considered stable (Arroyo-Cabrales and Castaneda 2008d).

According to FPMER, forest-wide monitoring suggests roost protection and snag availability are stable to increasing, therefore the Forest is conserving and enhancing habitat for the SOLC bats (USFS 2010c). Forest management areas are moving towards objectives in pine Structural Stage 5 but meet or exceed Forest Plan objectives for 4B and 4C. The BHNF is above large tree objectives for Management Area 5.1 (13%), but slightly below this objective in Management Area 5.4 (9%) (USFS 2010c).

Known winter hibernacula for the small-footed myotis in the BHNF include Jewel Cave and an abandoned mine near Mystic, South Dakota (Tigner and Stukel 2003). No maternity colonies have been identified on BHNF but the numerous rocky faces and cracks throughout the forest offer ample habitat. Mystic, South Dakota is located approximately five miles north

of the Proposed Action. While the known hibernacula do not occur within the analysis area, it is likely that individual small-footed myotis occur. Suitable habitat for this bat can be found in the analysis area including old mine entrances and limestone formations. See **Tables 3-15, 3-16,** and **3-17** for comparison between Proposed Action and habitat that currently exists.

3.2.1.1.4.1.5.4 Mountain Goat

Mountain goat is native to mountain ranges in northwestern North America, from Alaska south to Washington, Montana, and Idaho. There are exotic populations in several other western United States mountain ranges, including the Black Hills of South Dakota, where they were introduced in 1924 (Harmon 1944). Mountain goats typically occupy alpine and subalpine habitat, including steep grassy talus slopes, grassy ledges on cliffs, and alpine meadows. They utilize subalpine forests in winter, and use steep, rocky terrain for escape and giving birth (NatureServe 2012). The species population is stable overall (Festa-Bianchet 2008).

Current mountain goat populations are smaller than estimates by Richardson (1971). The SDGFP administers a hunting season on this population but the harvest season has been closed since 2006. The original herd of six transplanted animals grew to an estimated 300 to 400 animals by 1971, but a 2007 survey suggests a current population of only 60 goats. The cause of this decline is unknown. Some possibilities include high predator (mountain lion) numbers, genetics, and/or possible habitat loss (USFS 2010c). The BHNF continues to coordinate with the South Dakota Department of Game, Fish, and Parks to determine if more specific habitat management actions are needed to conserve/enhance habitat for this species.

Mountain goat distribution within the BHNF is largely limited to the granitic core of the forest, located outside of the analysis area (S. Haas,2012). Steep terrain in the analysis area could provide habitat for this species but would not be considered optimum habitat for this species.

3.2.1.1.5 Migratory Birds

Migratory birds are important components of biological diversity and are of great ecological and economic value. Nearly all native birds in the United States are protected under the MBTA (16 U.S.C. §703-711). The MBTA states that “Unless and except as permitted by regulations it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, [or] kill any migratory bird.” Unauthorized take of any of the protected bird species constitutes a violation of the MBTA.

The BGEPA (16 U.S.C. §668-668d) prohibits the take of any Bald or Golden Eagle. “Take” is defined as “Pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.” “Disturb” means “to agitate or bother a Bald or Golden Eagle to a degree that causes, or is likely to cause, based on the best scientific information available: 1) injury to an

eagle: 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior: or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Executive Order 13186 requires federal agencies to support the conservation intent of the migratory bird conventions (including the MBTA and BGEPA), address migratory bird conservation in agency plans, and evaluate the effects of actions and agency plans on migratory birds. Pursuant to Executive Order 13186, the USFWS entered into a Memorandum of Understanding with the USFS (USFS Agreement # 08-MU-1113-2400-264), which codified the responsibility and commitment of the USFS to protect migratory birds.

Migratory birds designated as priority species by Partners in Flight will not be analyzed further because: (1) specific species have another status designation that is already addressed in this document (e.g., MIS, SOLC, Sensitive); or (2) their habitat needs are addressed by USFS MIS species. **Table 3-11** provides a list of Partners in Flight Priority Bird Species for the Black Hills (SDGFP 2005) and their relationship to the Proposed Action.

TABLE 3-11 - PARTNERS IN FLIGHT PRIORITY BIRD SPECIES FOR BHNF

SPECIES	HABITAT	PROJECT DISPOSITION
Ruffed Grouse (*Bonasa umbellus*)	Aspen, open pine	MIS Discussion
Northern Goshawk (*Accipiter gentillis*)	Conifer, mixed forests	Region 2 Sensitive – BA/BE
Lewis's Woodpecker (*Melanerpes lewis*)	Dead trees in burned forest, stream bottoms	Region 2 Sensitive – BA/BE
Red-napped Sapsucker (*Sphyrapicus nuchalis*)	Aspen groves, mixed pine/aspen	MIS Discussion for Ruffed Grouse, white-tailed deer and Song Sparrow
American Three-toed Woodpecker (*Picoides dorsalis*)	Spruce Forest	Region 2- Sensitive – BA/BE
Black-backed Woodpecker (*Picoides arcticus*)	Recent burns, conifer forest	Region 2 Sensitive and MIS – BA/BE and MIS Discussion
Cordilleran Flycatcher (*Empidonax occidentalis*)	Mature woodland, foothills riparian areas	MIS Discussion for Ruffed Grouse and Song Sparrow
Veery (*Catharus fuscescens*)	Riparian, Aspen	MIS Discussion for Ruffed Grouse and Song Sparrow
Pinyon Jay (*Gymnorhinus cyanocephalus*)	Low elevation open pine forests	MIS Discussion for white-tailed deer
Clark's Nutcracker (*Nucifraga Columbiana*)	Conifer forests	MIS discussion for white-tailed deer
Pygmy Nuthatch (*Sitta pygmaea*)	Pine forests	SOLC discussion

TABLE 3-11 - PARTNERS IN FLIGHT PRIORITY BIRD SPECIES FOR BHNF		
SPECIES	**HABITAT**	**PROJECT DISPOSITION**
American Dipper (*Cinclus mexicanus*)	Mountain streams	SOLC discussion
Virginia's Warbler (*Oreothlypis virginiae*)	Pine-juniper-shrub. Found is specific areas in Custer and Fall Counties.	No habitat in analysis area
Black-and White Warbler (*Mniotilta varia*)	Low elevation oak woodlands	SOLC discussion
Western Tanager (*Piranga ludoviciana*)	Ponderosa pine forests	MIS discussion for Black-backed Woodpecker and white-tailed deer
Dark-eyed Junco (*Junco hyemalis*)	Coniferous and mixed forest	MIS discussion for white-tailed deer and Golden-crowned Kinglet
Cassin's finch (*Haemorhous cassinii*)	Woodlands and residential	MIS discussion for ruffed Black-backed Woodpecker and white-tailed deer
Lesser Goldfinch (*Carduelis psaltria*)	Woodlands, weedy fields only found in Fall River County, SD	No habitat in analysis area
Pine Siskin (*Carduelis pinus*)	Woodlands	MIS discussion for Ruffed Grouse, Golden-crowned Kinglet and white-tailed deer

3.2.1.1.6 Big Game

As indicated previously, this analysis for the South Dakota portion of the Project area tiers directly to the revised Forest Plan and the Phase II Forest Plan Amendment EIS (USFS 1996, 2005a) and the associated Biological Assessment/ Biological Evaluations (BA/BE) (Appendices H and C of the Forest Plan, respectively).

3.2.1.1.6.1 Elk

The Rocky Mountain elk (*Cercus elaphus nelsoni*) is a large North American cervid. This subspecies of elk was re-introduced to the Black Hills of South Dakota and Wyoming in the early 20th century. On the Forest, elk use a variety of vegetation types with a preference for forested riparian, forested stringers, and deciduous stands of birch or aspen. Dense stands of conifer and hardwoods provide thermal and hiding cover through-out the year. Open forested stands are used for foraging, where grasses, forbs, and/or shrubs are available. Based on the variety of preferred forested vegetation types, age-classes, and structural stages that elk may use throughout the year, a conservative estimate of 20,378 acres of potentially suitable elk habitat may exist in the South Dakota Analysis Area (0.5 mile on each side of ROW). The elk population in the Black Hills, including South Dakota and Wyoming, is estimated to be between 5,690 and 6,190; which is above the Wyoming and South Dakota game management agency objectives.

3.2.1.1.6.2 Mule Deer

In the Black Hills, mule deer (*Odocoileus hemionus*) represent an estimated 25 percent of the total deer population, with the white-tailed deer (BHNF MIS) accounting for 75 percent of the total deer population. These two deer species may often use similar habitats, however it is typical for mule deer to use habitats that are open (non-forested) and rugged. An estimated 1,913 acres of potentially suitable grassland habitat exists in the South Dakota Analysis Area.

3.2.1.2 WYOMING

The amount of each habitat that occurs in the Wyoming portion of the analysis area and the proposed ROW is provided in **Table 3-12**. The following sections summarize the existing conditions for each of these major habitat types and the associated sensitive species.

TABLE 3-12 - HABITAT TYPES INCLUDED WITHIN THE ANALYSIS AREA AND ROW

HABITAT TYPE	ANALYSIS AREA (ACRES)		ROW (ACRES)	
	TBNG	BLM	TBNG	BLM
Grassland	4,741	1,609	10	12
Shrubland	4,236	3,063	27	20
Conifer	23	627	1	8
Wetland/Riparian	10	33	0	0
Aquatic	4 stock ponds, 5 unnamed intermittent streams, 1 named intermittent stream	None	None	None

3.2.1.2.1 Federal Endangered Species Act Protected Species

The Federal ESA (7 United States Code [U.S.C.] §136; 16 U.S.C. §460 et seq.) is implemented by the USFWS, which is required by Section 7 that their actions (including permitting) are not likely to jeopardize the continued existence of a federally-listed endangered or threatened species or result in the destruction or modification of its habitat.

The most current list of Endangered, Threatened, Proposed, and Candidate Species and their designated and proposed critical habitat that occur in Campbell or Weston Counties, Wyoming includes Greater Sage-Grouse (*Centrocercus urophasianus*) (USFWS 2012a, b). Black-footed ferret (*Mustella nigripes*) was on previous versions of this list but has been since removed and are thus not considered in this EIS.

3.2.1.2.1.1 Greater Sage-Grouse

Currently, the Greater Sage-Grouse is a Candidate species for listing under the Federal Endangered Species Act (ESA) of 1973. Wyoming governors have signed various Executive Orders in recent years toward preserving Greater Sage-Grouse habitat and populations in

the state. These Executive Orders have established Core Areas, in which development is highly regulated and established various mitigation measures to reduce impacts to this species. In compliance with the various Greater Sage-Grouse Executive Orders, BHP completed a Greater Sage-Grouse Mitigation and Development Plan to reduce impacts to Greater Sage-Grouse where the Proposed Action passes through Greater Sage-Grouse Core Areas. On April 8, 2011, BHP received a letter of concurrence from the Wyoming Game and Fish Department (WGFD) and USFWS stating that "the project can move forward under the terms established in this Plan [Greater Sage-Grouse Mitigation and Development Plan], without anticipated population level impacts to Sage-Grouse."

The BLM Wyoming State Office and the Forest Service have initiated a planning effort to prepare nine Resource Management Plan (RMP) and Land and Resource Management Plan (LRMP) amendments to evaluate the adequacy of Greater Sage-Grouse conservation measures in the nine RMPs and LRMPs. This Nine-Plan Greater Sage-Grouse RMP Amendment planning area includes public land administered by the BLM, public land administered by the Forest Service, and Federal mineral estate included in the BLM Newcastle RMP and the TBNG LRMP. Along with the RMPs/LRMPs, an EIS will be developed as part of the planning process to understand the effects of land management actions on resources and resource uses within the nine planning units. The BLM and the Forest Service plan to incorporate consistent objectives and conservation measures into relevant RMPs and LRMPs by September 2014.

Greater Sage-Grouse are closely associated with sagebrush ecosystems of western North America. Leks are historical display grounds which are used annually where males gather to display for females during the spring mating season. Lek attendance varies throughout the species range, but typically begins as winter snow begins to melt. Mating in Wyoming typically peaks in early April, but peak male attendance typically occurs later in April or early May when attendance by yearling males begins to increase (Christiansen 2007); however, lek attendance may be delayed by a lingering snow pack. Leks are typically barren areas surrounded by mature sagebrush. Leks are rarely located on slopes greater than ten percent and typically have open, unobstructed sight lines which provide two major advantages to grouse: 1) it allows females on the periphery of the lek to view the displaying males; and 2) it allows displaying males to spot potential predators. While displaying on the lek, males also make a loud, deep call, called "booming," which can be heard from over a mile away during favorable conditions. Leks are typically attended in the early morning hours, but males may display well before dawn during a full moon if the sky is clear.

Nests are placed in thick vegetative cover usually dominated by mature sagebrush. Vegetatively diverse habitat may be an important aspect of nesting habitat to offer vertical and horizontal concealment (Connelly et al. 1991; Gregg et al. 1994). Density of herbaceous cover can be an important indicator of habitat quality for pre-nesting, nesting, and brood rearing hens.

As part of the ESA (Section 4(a)(1), the USFWS may determine a species to be endangered or threatened based on the basis of any of the following five factors: A) Present or

threatened destruction, modification, or curtailment of habitat or range; B) overutilization for commercial, recreational, scientific, or educational purposes; C) disease or predation; D) Inadequacy of existing regulatory mechanisms; or E) other natural or manmade factors affecting its continued existence.The USFWS identified Factors A and D as those that contributed to the decline of Greater Sage-Grouse populations.

The analysis area for Greater Sage Grouse is a four-mile boundary on either side of the proposed ROW and other features associated with the Proposed Action. The analysis area falls within the Powder River Basin of northeastern Wyoming and southwestern Montana, a region that has relatively active energy development. Greater Sage-Grouse populations are negatively impacted by energy development, typically oil, gas, and coal-bed methane extraction. Impact can result from direct habitat loss, direct human disturbance, noise disturbance, and habitat fragmentation by roads, power lines, pipelines, or other infrastructure associated with energy development.

Greater Sage-Grouse populations throughout northeast Wyoming and the analysis area have experienced a population decline. Over the past 12 years of coal-bed methane gas development in the Powder River Basin of eastern Wyoming, the Greater Sage-Grouse population has undergone a 79 percent decline (USFWS 2010).

GIS data provided by the WGFD that shows the location of all leks identified through the 2011 lek survey season was used to determine the number of leks in the analysis area.

Four occupied leks and five leks of undetermined status occur within the analysis area. Two of these leks occur on NFS lands, and both are classified as undetermined. BHP performed surveys for previously unidentified Greater Sage-Grouse leks in the spring of 2011 and 2012 and one previously unidentified lek was observed on private lands.

3.2.1.2.2 USFS Sensitive Species, BLM Sensitive Species, USFS Species of Local Concern

USFS and BLM sensitive species and WGFD (Species of Greatest Conservation Need) SGCN were grouped into one of five potential habitat classifications: grassland dependent, wetland/riparian/aquatic dependent, conifer forest dependent, shrubland dependent, and aquatic dependent. Species that may utilize more than one habitat type, such as the Peregrine Falcon, Northern Harrier, and Loggerhead Shrike, are addressed separately in the text below.

3.2.1.2.2.1 TBNG Forest Service Region 2 Sensitive Species

3.2.1.2.2.1.1 Applicable Laws, Regulations, Policies, and Forest Plan Direction

Section 2670 of the USFS Manual delegates designation of Sensitive species to each Regional Forester. Forest Sensitive species are defined as, “Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by a significant current or predicted downward trends in population numbers or

density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution." Section 2672.4 requires that all USFS planned, funded, executed, or permitted programs and activities are to be reviewed for possible effects on sensitive species.

Goals, standards, and guidelines outlined in the LRMP which are applicable to USFS Sensitive Species on a grassland-wide scale include the following:.

> Goal 1.b.: Provide ecological conditions to sustain viable populations of native and desired non-native species and to achieve objectives for Management Indicator Species (MIS).
>
> Objectives:
>
> 2. Within 15 years, demonstrate positive trends in population viability, habitat availability, habitat quality, population distribution throughout the species range within the planning area, and other factors affecting threatened, endangered, sensitive species and MIS.
>
> 3. Develop and implement conservation strategies for Forest Service sensitive species, as technical information becomes available.

Numerous other regulations, which are directed toward biological resources, are described in Chapter 1, Section F. Fish, Wildlife, and Rare Plants of the LRMP. USFS Sensitive Species or groups of species which are specifically addressed in Chapter 1, Section F for various management recommendations include migratory birds (1.F.1, 2, 3, 6, 8, and 9), bats (1.F.12 – 13), fish (1.B.1 – 15; 1.F.43 – 45), wintering and nesting raptors (1.F. 76 – 79), Mountain Plover (1.F.23 – 34), Burrowing Owl (1.F.64 – 65), and swift fox (1.F.70 – 71).

3.2.1.2.2.1.2 TBNG Sensitive Species Considered

For the purpose of this analysis, the LANDFIRE vegetation coverages described in **Table 3-13** were grouped into one of five potential habitat classifications based on visual analysis of aerial photography: grassland dependent, wetland/riparian/aquatic dependent, conifer forest dependent, shrubland dependent, and aquatic dependent. **Table 3-13** describes which vegetation coverages were included in each habitat classification, and the acres of potential impact in each classification. It was determined through analysis of aerial photography that the LANDFIRE vegetation coverages for agricultural, developed, and non-vegetated did not provide potential wildlife habitat and were excluded from the analysis.

TABLE 3-13 - HABITAT GROUPING, LANDFIRE VEGETATION COVERAGES, AND ACRES WITHIN ROW ON NFS LANDS				
Habitat Classification	**Acres on NFS in Wildlife Analysis Area**	**Acres on NFS in ROW**	**Temporary Overland Access on TBNG outside ROW (Acres)**	**Landfire Vegetation Coverages Included**
Grassland	4,741	10	0	Grassland
				Exotic herbaceous
				Sparsely vegetated
Shrubland	4,236	27	6	Shrubland
				Unknown (Blank)
Wetland/Riparian/Aquatic*	10*	0	0	Riparian*
Conifer	23	1	0	Conifer
* Wetland/Riparian/Aquatic habitats within the Wildlife analysis area were also derived from remotely sensed data on wetlands, streams, and field based wetland survey.				

Table 3-14 provides the listed USFS R2 Sensitive wildlife species considered in this analysis. A brief habitat description, documented occurrence and suitable habitat in the analysis area, and whether the species will be considered for further analysis is also included in **Table 3-14**. A species will not be carried forward for further analysis if the species has not been documented in or does not have suitable habitat present in the analysis area or if the species is unlikely to be impacted by the Proposed Action.

Table 3-14 is the local occurrence, habitat availability, and rationale for exclusion from analysis for USFS Region 2 Sensitive wildlife species that are known or suspected to occur within the vicinity of the T-O-RC project on NFS lands

TABLE 3-14 - USFS R2 SENSITIVE WILDLIFE SPECIES				
Species Name	**Habitat Requirements**	**Occurrence in Analysis Area[1]**	**Suitable Habitat in Wildlife Analysis Area**	**Rationale if Not Carried Forward for Analysis**
Mammals				
Townsend's Big-Eared Bat (*Corynorhinus townsendii*)	Dependent on caves and abandoned mines for roosting habitat. Forages over a variety of habitats including coniferous forests, juniper woodlands, deciduous forests, basins, and desert shrublands typically associated with water (WGFD 2010).	No	Yes	Evaluated

TABLE 3-14 - USFS R2 SENSITIVE WILDLIFE SPECIES

Species Name	Habitat Requirements	Occurrence in Analysis Area[1]	Suitable Habitat in Wildlife Analysis Area	Rationale if Not Carried Forward for Analysis
Hoary Bat (*Lasiurus cinereus*)	Deciduous and coniferous woodlands with dense canopy and open understory. Often found along forest edges foraging over water sources. Roosts in tree foliage (Willis and Bingham 2005; NatureServe 2012).	No	Yes	Evaluated
Fringed Myotis (*Myotis thysanodes*)	Coniferous forests, woodlands, grasslands, and shrublands, although it is probably most common in xeric woodlands, such as juniper, ponderosa pine, and Douglas-fir. Roosts in rock crevices, tree cavities, caves, abandoned mines, and buildings with winter hibernation roosts in caves (WGFD 2010).	No	Yes	Evaluated
Spotted Bat (*Euderma maculatum*)	Low deserts and basins and juniper woodlands but occurs primarily in association with canyons, prominent rock features, and permanent water sources. Roosts in cracks and crevices in high cliffs and canyons, it also occasionally roosts in buildings, caves, or abandoned mines (WGFD 2010).	No	Yes	Evaluated
Rocky Mountain Bighorn Sheep (*Ovis canadensis canadensis*)	Open, grassy areas associated with steep, cliff based escape cover as year round habitat (WGFD 2010).	No	No	Field visit confirmed no suitable habitat present.
Black-tailed Prairie Dog (*Cynomys ludovicianus*)	Low relief grasslands and sparse grassy shrublands dominated by blue grama, western wheatgrass and big sagebrush. Soils supporting burrows are fine to medium textured silty clay loam, sandy clay loam and loams.	Yes	Yes	Evaluated[2]
Swift Fox (*Vulpes velox*)	Shortgrass and mixed-grass prairies with gently rolling or level landscapes. In Wyoming, may utilize habitats that are considered atypical, such as sagebrush steppe with low-growing vegetation, relatively flat terrain, friable soils, and high den availability (WGFD 2010).	Yes	Yes	Evaluated
Birds				
Northern Goshawk (*Accipiter gentilis*)	Coniferous and mixed conifer/aspen forest habitat, and forages in a wide variety of forest ages, structural conditions, and successional stages. Nest sites are characterized by high canopy cover, high basal area, large tall trees, and fairly open understories typically on the lower third of slopes (WGFD 2010).	No	No	Field visit confirmed no suitable habitat present.

TABLE 3-14 - USFS R2 SENSITIVE WILDLIFE SPECIES

Species Name	Habitat Requirements	Occurrence in Analysis Area[1]	Suitable Habitat in Wildlife Analysis Area	Rationale if Not Carried Forward for Analysis
Grasshopper Sparrow (*Ammodramus savannarum*)	Shortgrass prairies, mixed grasslands, meadows, open sagebrush-grasslands, and agricultural areas. It requires herbaceous cover and conspicuous perches, and avoids areas containing more than 35% shrubs (WGFD 2010).	Yes	Yes	Evaluated
Sage Sparrow (*Amphispiza belli*)	Sagebrush specialist. Prairie and foothills shrubland habitat where sagebrush is present. Prefers shrublands with tall shrubs (1 to 2 meters [3 to 6 feet]) and low grass cover, where sagebrush is clumped in a patchy landscape (WGFD 2010).	No	Yes	Evaluated
Burrowing Owl (*Athene cunicularia*)	Open prairie, grassland, desert, and shrub-steppe habitats, and may also inhabit agricultural areas. It depends on mammals, particularly prairie dogs and ground squirrels that dig burrows, which it uses for nesting, roosting, and escape (WGFD 2010).	No	Yes	Evaluated
American Bittern (*Botaurus lentiginosus*)	Marshes with open water in the center, gradual slopes, a band of emergent vegetation around the periphery, and idle grassland in the adjacent uplands. Large wetlands, at least 3 hectares (7 acres [ac]), with tall, dense emergent vegetation such as cattails, bulrushes, and reeds (WGFD 2010).	No	No	Field visit confirmed no suitable habitat present.
Ferruginous Hawk (*Buteo regalis*)	Semiarid open country, primarily grasslands, basin-prairie shrublands, and badlands. It requires large tracts of relatively undisturbed rangeland and nests on rock outcrops, the ground, cutbacks, cliff ledges, or trees (WGFD 2010).	Yes	Yes	Evaluated
McCown's Longspur (*Calcarius mccownii*)	Shortgrass prairie and basin prairie shrubland habitats, and also inhabits plowed and stubble fields, grazed pastures, dry lakebeds, and other sparse, bare, dry ground. Prefers 45% to 80% grass cover and 15% to 25% bare ground (WGFD 2010).	Yes	Yes	Evaluated
Chestnut-collared longspur (*Calcarius ornatus*)	Shortgrass and open mixed-grass prairies. Avoids excessively shrubby areas, although it uses scattered shrubs and other low elevated perches for singing (WGFD 2010).	Yes	Yes	Evaluated
Greater Sage-Grouse (*Centrocercus urophasianus*)	Large, intact stands of mature sagebrush (*Artemisia* sp.) with well developed grass and forb understory and riparian meadows for nesting habitat.	Yes	Yes	Evaluated[3]

TABLE 3-14 - USFS R2 SENSITIVE WILDLIFE SPECIES				
Species Name	**Habitat Requirements**	**Occurrence in Analysis Area[1]**	**Suitable Habitat in Wildlife Analysis Area**	**Rationale if Not Carried Forward for Analysis**
Mountain Plover (*Charadrius montanus*)	Low, open habitats such as arid shortgrass and mixed-grass prairies with scattered clumps of cacti and forbs. Nest in large, flat grassland expanses with less than 5% slope; sparse, short vegetation (10 centimeters (cm) [4 inches (in)] or less); and bare ground. It is adapted to areas that have been disturbed by prairie dogs, heavy grazing, or fire (WGFD 2010).	Yes	Yes	Evaluated
Black Tern (*Chlidonias niger*)	Marshes and aquatic areas, and usually prefers marshes or marsh complexes greater than 20 hectares (50 ac). Nests in small, loose colonies, generally in areas of still water, with 25% to 75% of the surface covered by emergent vegetation, and well-interspersed with open water (WGFD 2010).	No	No	Field visit confirmed no suitable habitat present.
Northern Harrier (*Circus cyaneus*)	Nests on ground in open wetlands, including marshy meadows, wet, lightly grazed pastures, old fields, freshwater marshes, and tundra. May also utilize dry uplands, including upland prairies, mesic grasslands, drained marshlands, croplands, cold desert shrub-steppe, and riparian woodland (Sibley 2003; Smith et al. 2011).	Yes	Yes	Evaluated
Yellow-billed Cuckoo (*Coccyzus americanus*)	Riparian obligate species that prefers extensive areas of dense thickets and mature, deciduous, cottonwood gallery forests near water, and requires low, dense, shrubby vegetation for nest sites (WGFD 2010).	No	No	Field visit confirmed no suitable habitat present.
Olive-Sided Flycatcher (*Contopus cooperi*)	Primarily montane and northern coniferous forests, often associated with edges and opening associated with water, including wetlands, forest streams, and ponds (Altman and Sallabanks 2000).	No	No	Field visit confirmed no suitable habitat present.
American Peregrine Falcon (*Falco peregrinus anatum*)	Forages in a variety of open habitats from open woodlands and forests to shrub-steppe, grasslands, marshes, and riparian habitats. Nests on cliffs often located near water that are usually proximate to habitats with abundant prey (WGFD 2010).	No	Yes	Evaluated

TABLE 3-14 - USFS R2 SENSITIVE WILDLIFE SPECIES				
Species Name	**Habitat Requirements**	**Occurrence in Analysis Area[1]**	**Suitable Habitat in Wildlife Analysis Area**	**Rationale if Not Carried Forward for Analysis**
Bald Eagle (*Haliaeetus leucocephalus*)	Nests near large lakes and rivers in forested habitat where both adequate prey (fish, waterfowl and ungulate carcasses) are available and old, large-diameter cottonwood or conifer trees for nesting. Migrating and wintering eagles congregate near areas where concentrations of prey are available, such as carcasses of ungulate species, and spawning areas for kokanee, trout, and other fish (WGFD 2010).	Yes	Yes	Evaluated
Loggerhead Shrike (*Lanius ludovicianus*)	Open pastures and prairies with scattered bushes, hedgerows, and trees (Sibley 2003).	Yes	Yes	Evaluated
Lewis's Woodpecker (*Melanerpes lewis*)	Open or park-like ponderosa pine forests are major breeding habitat. Attracted to burned-out stands of Douglas-fir, mixed conifer, juniper, and riparian and oak woodlands, but is also found in deciduous forests, especially riparian cottonwoods (WGFD 2010).	No	Yes	Evaluated
Long-billed Curlew (*Numenius americanus*)	Grassland types ranging from moist meadow grasslands to agricultural areas to dry prairie uplands, usually near water. Prefers a complex of shortgrass prairies, agricultural fields, wet and dry meadows and prairies, and grazed mixed-grass and scrub communities. Nests on the ground in habitat that usually includes: grass less than 30 cm (12 in) high; bare ground; shade; abundant invertebrate prey; and a minimum of 40 hectares (100 ac) of suitable habitat (WGFD 2010).	No	Yes	Evaluated
Flammulated Owl (*Otus flammeolus*)	Semi-arid open oak and ponderosa pine forests with a mix of large old trees, thickets, and openings, and a high diversity of arthropod prey (McCallum 1994a).	No	No	Field visit confirmed no suitable habitat present.
Brewer's Sparrow (*Spizella breweri*)	Sagebrush specialist. Sagebrush shrublands with abundant, scattered shrubs and short grass. May also be found in mountain mahogany, rabbit brush, pinyon-juniper, or bunchgrass grasslands (WGFD 2010).	Yes	Yes	Evaluated

TABLE 3-14 - USFS R2 SENSITIVE WILDLIFE SPECIES				
Species Name	**Habitat Requirements**	**Occurrence in Analysis Area[1]**	**Suitable Habitat in Wildlife Analysis Area**	**Rationale if Not Carried Forward for Analysis**
Amphibians				
Northern Leopard Frog (*Lithobates pipiens*)	In or near permanent water in the plains, foothills, and montane zones comprised of swampy cattail marshes on the plains and beaver ponds in the foothills and montane zones (WGFD 2010).	Yes	Yes	Evaluated
Wood Frog (*Lithobates sylvaticus*)	Beaver ponds, slowly moving streams, small lakes, wet meadows, and willow thickets in the montane zones. Populations are usually found around 9,000 feet in elevation (WGFD 2010).	No	No	Field visit confirmed no suitable habitat present.
Reptiles				
None identified				
Fish				
Bluehead Sucker (*Catostomus discobolus*)	Mainstream and tributaries of large rivers. Large adults are associated with deep pools, undercut banks, moderate to fast current velocities, and rocky substrates (WGFD 2010).	NA[4]	Yes	Evaluated
Mountain Sucker (*Catostomus platyrhynchus*)	Cool, clear mountain streams from three to 12 meters in width. May also be found in larger rivers, lakes, and reservoirs (USFS 2005).	NA[4]	No	Field visit confirmed no suitable habitat present.
Lake Chub (*Couesius plumbeus*)	Typically found in lakes and streams with cool waters and clean gravel or cobble substrates (Isaak et al. 2003).	NA[4]	Yes	Evaluated
Plains Minnow (*Hybognathus placitus*)	Large, turbid prairie streams and rivers. Prefers slow water and side-pool habitat with sand or silt bottoms. Tolerant of high water temperatures and low oxygen make them able to inhabit intermittent pools (WGFD 2010).	NA[4]	Yes	Evaluated
Sturgeon Chub (*Hybopsis gelida*)	Free flowing turbid rivers. Rarely in tributary streams. Typically associated with hard substrates, shallow water, and high current velocity (WGFD 2010).	NA[4]	Yes	Evaluated
Finescale Dace (*Phoxinus neogaeus*)	Clear, slow moving or stagnant water with heavy aquatic vegetation and predominantly silt substrate. Mean water depths were generally greater than one foot deep and no large predatory fish (WGFD 2010).	NA[4]	Yes	Evaluated
Flathead Chub (*Platygobio gracilis*)	Main channels of sandy, turbid streams with small substrates, deep water, and woody debris (WGFD 2010).	NA[4]	Yes	Evaluated

TABLE 3-14 - USFS R2 SENSITIVE WILDLIFE SPECIES				
Species Name	**Habitat Requirements**	**Occurrence in Analysis Area[1]**	**Suitable Habitat in Wildlife Analysis Area**	**Rationale if Not Carried Forward for Analysis**
1. Occurrence in wildlife analysis area based on presence identified during 2012 field surveys on behalf of Proposed Action, WGFD Natural Heritage Program data, or personal communications with TBNG staff. 2. Please see MIS Section for full analysis of impacts to Black-tailed Prairie Dog. 3. Please see the associated T-O-RC Biological Assessment for a full evaluation of potential impacts to Greater Sage-Grouse. 4. Sensitive fish species may occur in permanent and intermittent water bodies in the Wildlife analysis area; however no species specific fish surveys took place.				

3.2.1.2.2.1.3 Grassland Dependent Species

USFS R2 Sensitive species that are characterized as Grassland Dependent species for the purpose of this analysis include swift fox, black-tailed prairie dog (BTPD), Grasshopper Sparrow, Burrowing Owl, Ferruginous Hawk, McCown's Longspur, Chestnut-collared Longspur, Mountain Plover, Northern Harrier, Loggerhead Shrike, Long-billed Curlew, Baird's Sparrow, and the American Peregrine Falcon. An additional species, for which grassland provides important habitat, but not necessarily the primary or most limiting habitat, is the fringed myotis. The natural history of this species is reviewed under the section titled Conifer Associated Wildlife Species. A full analysis of existing conditions and potential impacts to BTPD is included under the MIS (Section 4.0) below. Grassland habitat on TBNG land covers 4,741 acres of the analysis area.

3.2.1.2.2.1.3.1 Swift Fox

The swift fox is native to the shortgrass and mixed-grass prairies of the Great Plains in the central United States, although the species has demonstrated adaptability to other habitat types. Swift fox typically have a varied diet which can include insects, birds, plants, reptiles, and small mammals such as black-tailed prairie dog, rabbits, hares, and various rodents (Sovada et al. 2001; Dowd 2011). Conversion of native prairie to cropland and the continued loss of lands enrolled in the Conservation Reserve Program are the major reasons for swift fox population declines, while predation from coyotes and vehicle-related mortalities may also be contributing to declines (Dowd 2011).

Swift fox populations on TBNG were described in the *Thunder Basin National Grassland 2007 Monitoring Report Five Year Review* (USFS 2007a). At that time, spot-light surveys yielded an average detection of two swift fox per year from 2005 through 2007, with the majority of the occurrences coming in the Highlight Bill Geographic Area (USFS 2007a). Swift fox were identified by TBNG biologists in the analysis area during focused surveys in 2009 and 2010 (C. Painter,2012). However, species specific surveys to identify swift fox dens performed by TBNG personnel in the analysis area in September 2012 did not identify any individual swift fox or occupied swift fox dens.

3.2.1.2.2.1.3.2 Grasshopper Sparrow

The Grasshopper Sparrow inhabits shortgrass prairies, mixed grasslands, meadows, open sagebrush-grasslands, and agricultural areas. Grasslands with some herbaceous cover and conspicuous perches used for singing are also important habitat components; however, the species avoids areas containing more than 35 percent shrubs (WGFD 2010). Grasshopper Sparrows may select larger habitat patches so they can nest in interior habitat and avoid edge effects, where they tend to suffer higher rates of predation and parasitism (Johnson and Temple 1990; Slater 2004). They tend to avoid habitats where vegetation is less than ten centimeters in height and prefer grasslands with vegetation heights of approximately 30 centimeters and 50 percent grass cover (Slater 2004). The greatest threats to the Grasshopper Sparrow throughout its ranges are habitat loss caused by agriculture and urbanization, habitat fragmentation, and habitat degradation from grazing and non-natural fire regimes. In northeastern Wyoming, 60 percent of the region's shortgrass prairie has been converted to cropland (Nicholoff 2003). Improper grazing regimes can cause vegetation to become shorter than the height preferred by Grasshopper Sparrow, thus making the habitat less suitable (Bock et al. 1993).

WYNDD data identified numerous Grasshopper Sparrow occurrences throughout the wildlife analysis area, ranging from 1992 through 2002, and Breeding Bird Survey routes in close proximity to the analysis area have identified the species. Thirteen Grasshopper Sparrows were detected during BHP's migratory bird survey effort performed in support of the Proposed Action from June 1 to June 5, 2012.

3.2.1.2.2.1.3.3 Burrowing Owl

Burrowing Owl habitat is quite variable and ranges from relatively undisturbed mixed-grass prairie and rangelands to residential developments. Burrowing Owl habitat typically consists of open, dry, treeless areas on plains, prairies, and deserts. These areas are also occupied by burrowing mammals and other animals that provide burrows suitable for nesting (McDonald et al. 2004). Because Burrowing Owls spend most of their time on or in the ground and are extremely susceptible to predation, short vegetation structure is also a requirement (Zarn 1974; Green 1983), as it presumably allows for better detection of predators and visibility of prey (Green 1983). Given this requirement for short vegetation, Burrowing Owls are commonly found in association with cattle, prairie dogs, and other grazers that clip vegetation (Butts and Lewis 1982). A high density of available burrows for nesting is an important part of viable Burrowing Owl habitat. Because of this, Burrowing Owls are often highly associated with active prairie dog colonies (Butts and Lewis 1982; McDonald et al. 2004). Threats to Burrowing Owl populations are typically related to threats to prairie dogs which causes a loss of habitat. Loss of habitat to agricultural conversion, and reduction in prairie dog populations from sylvatic plague, poisoning, and other control efforts are the main threats to Burrowing Owls (McDonald et al. 2004).

Burrowing Owls are commonly observed on BTPD colonies throughout NFS lands (USFS 2007a). One active Burrowing Owl nest was observed in 2003 near the Teckla Substation. A

vacant or unoccupied BTPD colony is located directly south of Teckla Substation, however this colony did not contain any active burrows and all old burrows observed in 2012 were collapsed. No Burrowing Owls were detected during raptor nest surveys or migratory bird surveys performed in support of the Proposed Action. BHP did not specifically survey for Burrowing Owls or BTPD colonies in support of the Proposed Action. One active BTPD colony was observed on TBNG property approximately three miles north of Edwards Road and three miles south of Highway 450. The majority of this BTPD colony occurs on private lands to the north of the NFS lands; however, a small portion does occur on TBNG.

3.2.1.2.2.1.3.4 Ferruginous Hawk

Ferruginous Hawk habitat includes large tracts of relatively undisturbed, semiarid open country. While the species may use a variety of habitat types, grasslands, basin-prairie shrublands, and badlands are most commonly occupied (WGFD 2010). Nests may be placed on rock outcrops, the ground, badland ledges, cliff ledges, or trees, and occasionally on transmission line structures. The primary requirement for occupied Ferruginous Hawk territories is the presence of a substantial mammalian prey base, regardless of vegetation type. Mammalian prey can constitute as much as 95 percent of the biomass consumed by Ferruginous Hawks (Collins and Reynolds 2005). In general, sciurid (squirrels and related mammals) are more prominent in the diet of Ferruginous Hawks east of the Continental Divide while rabbits and hares are more prominent west of the Divide. This variation in dietary tendencies is based on prey availability respective to the Continental Divide (Bechard and Schmutz 1995). Habitat loss from conversion to agriculture, urban areas, and mineral development for coal-bed methane extraction, habitat degradation from over-grazing, and human disturbance during critical mating and breeding times are the primary causes for Ferruginous Hawk population declines.

Ferruginous Hawks are known to occur throughout the Wildlife analysis area. WYNDD data identified five Ferruginous Hawk occurrences throughout the analysis area, ranging from 1993 through 2008, and Breeding Bird Survey routes in close proximity to the analysis area have identified the species. Ferruginous Hawks were observed during all field survey efforts BHP performed in support of the Proposed Action. Three Ferruginous Hawk nests were observed in the analysis area on NFS or BLM managed parcels during raptor nest surveys in 2012 but the activity status of these nests was not confirmed.

3.2.1.2.2.1.3.5 McCown's Longspur

McCown's Longspur habitat includes open, dry, sparsely vegetated areas. It prefers shortgrass prairie and basin-prairie shrubland habitats, and also inhabits plowed and stubble fields, grazed pastures, dry lakebeds, and other sparse, bare, dry ground. It prefers 45 percent to 80 percent grass cover and 15 percent to 25 percent bare ground (WGFD 2010). McCown's Longspurs prefer to breed in heavily grazed areas, and they respond positively to livestock grazing (Bock et al. 1993; Sedgwick 2004a). These sites likely become snow-free earlier in the breeding season and are favored by a grasshopper species, *Aeropedellus clavatus*, which is a primary food item fed to young Longspurs. Loss of native shortgrass

prairie to agriculture and development on both breeding and wintering grounds is the greatest threat to McCown's Longspurs. Habitat loss from increasing oil and gas development, especially in Wyoming, and the associated negative impacts of disturbance and fragmentation also pose a threat to McCown's Longspurs (Sedgwick 2004a).

McCown's Longspurs is a known and common nesting species on NFS lands (Sedgwick 2004a). WYNDD data identified five occurrences of McCown's Longspur throughout the analysis area in 2004, and Breeding Bird Survey routes in close proximity to the analysis area have identified the species. Numerous McCown's Longspurs were observed during the migratory bird surveys performed by BHP in support of the Proposed Action. Points placed in NFS parcels located adjacent to the Proposed Action and State Highway 59 identified 19 McCown's Longspurs in these parcels. Only two other individuals were observed on other NFS parcels within one mile of the Proposed Action.

3.2.1.2.2.1.3.6 Chestnut-collared Longspur

Chestnut-collared Longspur habitat includes shortgrass and open mixed-grass prairies. It avoids excessively shrubby areas, although it uses scattered shrubs and other low elevated perches for singing (Sedgwick 2004b). Within arid habitats, it often prefers relatively more mesic areas; low, moist areas and wet-meadow zones around wetlands may provide suitable habitat (WGFD 2010). Compared to McCown's Longspur, the Chestnut-collared Longspur prefers areas with taller grass species such as needlegrasses (*Stipa spp*.) and wheatgrass (*Agropyron spp*.) (Baldwin and Creighton 1972). The diet of Chestnut-collared Longspurs consists primarily of grass seeds, insects, and spiders (Sedgwick 2004b). Loss of native mixed-grass and shortgrass prairies to agriculture and development on the breeding and wintering grounds is the greatest threat to this species. Habitat loss from increasing oil and gas development, especially in Wyoming, and the associated negative impacts of disturbance and fragmentation also pose a threat to Chestnut-collared Longspurs (Sedgwick 2004b).

Chestnut-collared Longspur is a known and common nesting species on NFS lands (Sedgwick 2004b). WYNDD data identified one Chestnut-collared Longspur occurrence from 1995 in the analysis area, and Breeding Bird Survey routes in close proximity to the analysis area have identified the species. Five individuals were observed during the migratory bird surveys performed by BHP in support of the Proposed Action.

3.2.1.2.2.1.3.7 Mountain Plover

Mountain Plover habitat includes low, open habitats such as arid shortgrass and mixed-grass prairies with scattered clumps of cacti and forbs. It prefers to nest in large, flat grassland expanses with less than five percent slope; sparse, short vegetation (10 centimeters [four inches] or less); and bare ground (WGFD 2010). It is adapted to areas that have been disturbed by prairie dogs, heavy grazing, or fire. Throughout their range, Mountain Plovers selectively nest on active prairie dog colonies, especially those of the BTPD (Dinsmore et al. 2005). The Mountain Plover was proposed for listing under the ESA

by the USFWS in 1999, but was withdrawn in 2003. Loss of nesting habitat and habitat alterations based on the loss of primary grazers, including black-tailed prairie dogs, are the primary threats to Mountain Plover. Several threats, particularly the loss of nesting habitat and threats to prairie dogs, are the focus of broader conservation efforts in the Great Plains that will benefit the plover and a host of other species (Dinsmore 2003). The impact of local landscape changes such as road construction, timber harvest, timber blow downs, and non-motorized recreational activities appear to have little or no negative impact on Mountain Plovers (Dinsmore 2003). Mountain Plovers are tolerant of human activities of short duration as exemplified by their willingness to nest on roads (Manning and White 2001; Dinsmore 2003) and near areas of human disturbance such as oil and gas development sites (Manning and White 2001; Plumb et al. 2005). Keinath and Ehle (2001) surveyed federal lands in the Powder River Basin for Mountain Plovers and noted that while there was a fair amount of potential Mountain Plover habitat, it was somewhat sparse and fragmented.

Specific Mountain Plover surveys are not included in the Thunder Basin National Grassland 2007 Monitoring Report Five Year Review (USFS 2007a), Thunder Basin National Grassland 2008 Monitoring and Evaluation Report (USFS 2008), or the Thunder Basin National Grassland 2009-2010 Monitoring and Evaluation Report (USFS 2011d). However, the Thunder Basin National Grassland 2007 Monitoring Report Five Year Review (USFS 2007a) reports that this species is detected on a regular basis, their population numbers tend to fluctuate with acres of occupied prairie dog habitat. Additionally, spatial information obtained from the WYNDD (WYNDD 2012) contains numerous observations of Mountain Plover with the analysis area, the most recent of these observations occurring in 2006. One active and one inactive prairie dog colony that may provide favorable nesting habitat for Mountain Plovers were observed in the analysis area. No Mountain Plovers were observed by BHP surveyors during any field surveys performed in support of the Proposed Action.

3.2.1.2.2.1.3.8 Northern Harrier

Northern Harrier habitat includes open wetlands, such as marshy meadows, wet, lightly grazed pastures, old fields, freshwater marshes, upland prairies and mesic grasslands, drained marshlands, croplands, cold desert shrub-steppe, and riparian woodland (Sibley 2003; Smith et al. 2011). Nesting may occur on the ground, in any of these habitats as nests are typically concealed by tall dense vegetation (Herkert et al. 1999; Slater and Rock 2005). Even when nests are placed in dry upland habitats, they are disproportionately positioned near wet areas such as stock ponds and streams (Simmons and Smith 1985; Slater and Rock 2005). Because Northern Harriers hunt by using low coursing flights to surprise prey, foraging typically occurs over areas of moderate to heavy vegetative cover, such as prairies, shrub-steppe uplands, marshes, and inactive fields not heavily grazed or harvested by farmers (Slater and Rock 2005). Habitat loss and habitat degradation are the primary causes of Northern Harrier population declines. Habitat loss of wetlands and prairies to agricultural and urban environments are the most important threats to the species. Northern Harriers are characterized as an area-sensitive species with large home ranges, and they

are usually associated with larger (more than 100 hectare) tracts of undisturbed habitat (Johnson and Igl 2001).

Northern Harriers are common residents of the analysis area. While the WYNDD data did not identify any Northern Harrier occurrences in the analysis area, Breeding Bird Survey routes in close proximity have identified the species in the past. Northern Harriers were commonly observed foraging during all field survey efforts BHP performed in support of the Proposed Action. No active Northern Harrier nests were detected during nesting raptor surveys.

3.2.1.2.2.1.3.9 Loggerhead Shrike

Loggerhead Shrike habitat includes open habitats such as deserts, sagebrush, grasslands, and pastures. The range of the Loggerhead Shrike covers a broad geographic area, but regardless of the geographic location, each occupied breeding territory includes some common habitat features: 1) nesting substrate (a tree or shrub); 2) elevated perches for hunting, pair maintenance, and territory advertisement (natural and artificial perches, such as power lines or fence posts, are used); 3) foraging areas (generally, open short grass areas with scattered shrubs or perches and some bare ground); 4) impaling sites (dense multi-stemmed and/or thorny shrubs, or barbed wire fences) (Pruitt 2000). Nests are typically placed in trees or thick shrubs within pastures and grasslands. Nesting success is generally higher for nests placed in isolated trees, relative to those in shelterbelts (windbreaks) or other linear formations, presumably as a result of decreased predation (Pruitt 2000; Wiggins 2005a). Loss of habitat caused by conversion to agriculture and overgrazing are the main threats to Loggerhead Shrike populations.

WYNDD data identified five occurrences of Loggerhead Shrike in the Wildlife analysis area, ranging from 1992 through 1996. Additionally, Breeding Bird Survey routes in close proximity to the analysis area have identified the species in the past. Loggerhead Shrikes were anecdotally observed in grassland, shrubland, and conifer habitats during raptor nest surveys and migratory bird surveys performed by BHP in support of the Proposed Action.

3.2.1.2.2.1.3.10 Long-billed Curlew

Long-billed Curlew habitat includes a variety of grassland types ranging from moist meadow grasslands to agricultural areas to dry prairie uplands, but is usually found near water. It prefers a complex of shortgrass prairies, agricultural fields, wet and dry meadows and prairies, and grazed mixed-grass and scrub communities (WGFD 2010). Curlews use taller, denser grass during brood rearing when shade and camouflage from predators are presumably more important for chicks (Redmond and Jenni 1986). Long-billed Curlews favor a wide range of habitats during migration, including dry short-grass prairie, wetlands associated with alkali lakes, playa lakes, wet coastal pasture, tidal mudflats, salt marsh, alfalfa fields, barley fields, fallow agriculture fields, and harvested rice fields (Sedgwick 2006). Loss of native mixed-grass and shortgrass prairie to agriculture and development on breeding and wintering grounds is the greatest threat to the Long-billed Curlew and the

associated negative impacts of disturbance and fragmentation from energy exploration also pose a threat to Long-billed Curlews (Sedgwick 2006).

Long-billed Curlew have been detected in low numbers on NFS parcels during surveys associated with Wyoming Partners in Flight in grassland habitats (USFS 2007a). Ten individual Long-billed Curlews were detected between 2002 and 2007 across NFS parcels (USFS 2007a); however, the WYNDD data did not include records of any Long-billed Curlew occurrences in the analysis area. No Long-billed Curlews were observed during field surveys of the Proposed Action. While there are no records of Long-billed Curlew in the analysis area, Breeding Bird Survey routes in close proximity have identified the species in the past.

3.2.1.2.2.1.3.11 American Peregrine Falcon

American Peregrine Falcon was listed as federally endangered under the Endangered Species Act (ESA) in 1970 in response to a substantial decline in populations. The species was removed from protection under the ESA in 1999 and remains one of the greatest success stories demonstrating the effectiveness of the ESA. The American Peregrine Falcon can inhabit a wide variety of habitats, including open woodlands and forests, shrub-steppe, grasslands, wetlands, and riparian habitat, so long as suitable cliff nesting habitat is present (Burns et al. 2005; WGFD 2010). Optimal cliff nesting habitat is 200 to 300 feet high and provides expansive views of the surrounding landscapes (White et al. 2002; Burns et al. 2005). These falcons typically hunt over open areas, such as grasslands, shrublands, and open wetlands, where they can maneuver to capture small to medium sized birds in flight. Disturbance of eyries and pesticides are the most prominent threats to American Peregrine Falcon populations range-wide. The *Thunder Basin National Grassland 2007 Monitoring Report Five Year Review* (USFS 2007a) states that TBNG personnel searched for American Peregrine Falcon eyries in potential cliff nesting habitat on NFS lands. No eyries were identified, although incidental American Peregrine Falcon sightings are occasionally recorded (USFS 2007a).

American Peregrine Falcon were not observed during any field surveys performed for the Proposed Action, nor were there any historical observations recorded in the WYNDD data in the analysis area. The wildlife analysis area does not support any cliff habitat which may provide nesting substrate for the American Peregrine Falcon. While there are no records of American Peregrine Falcon in the analysis area, Breeding Bird Survey routes in close proximity have identified the species in the past.

3.2.1.2.2.1.4 Conifer Forest Associated Wildlife Species

USFS R2 Sensitive wildlife species characterized as Conifer Forest Dependent in this analysis include hoary bat, fringed myotis, and Lewis's Woodpecker. Additional species for which conifer forests provide important habitat, but not necessarily the primary or most limiting habitat, include Townsend's big-eared bat, American Peregrine Falcon, and Bald Eagle; the natural histories of these species are reviewed under the section covering their

respective dominant habitat associations. Conifer habitat on NFS land covers 23 acres of the analysis area.

3.2.1.2.2.1.4.1 Fringed Myotis

Fringed myotis occupy a variety of habitats including mid-elevation desert, grass, and woodland habitats and are found at higher elevations in spruce-fir and in mixed timber (Schmidt 2003; Burns et al. 2005). Keinath (2004) has also described associated habitats to include, dry habitats where open areas (e.g., grasslands and deserts) are interspersed with mature forests, usually ponderosa pine, pinyon-juniper, or oak, creating complex mosaics with ample edges and abundant snags (Keinath 2004). Snags, caves, mines, and buildings may be used as roosts (Schmidt 2003). This species roosts in relatively permanent structures, such as caves, buildings, and rock crevices with high site fidelity for these roosts, and less fidelity for roosts in trees (Weller and Zabel 2001). This species feeds mainly on small moths high in the forest canopy or in thick vegetation near the ground (USFS 1996), particularly along stream courses (Schmidt 2003). Riparian areas and water sources are important habitat features, providing both prey species and drinkable water (Burns et al. 2005). Roost disturbance is the primary threat to populations of fringed myotis. Logging of mature forests, removal of snags in forests, mine closures, bridge alterations, and human cave exploration all contribute to disturbance of roosting myotis bats.

No USFS R2 Sensitive bat species were included in the WYNDD data for the analysis area. Fringed myotis were detected on NFS lands in 2005 and 2006, but not in 2007, 2008, or 2009 (USFS 2011d). Mist net surveys and acoustical bat surveys were performed in the wildlife analysis area by TBNG personnel in the summer of 2012. No USFS R2 Sensitive bat species were detected during these surveys.

3.2.1.2.2.1.4.2 Hoary Bat

Hoary bat occurrence is strongly associated with forested habitats, both deciduous and coniferous. It can be found in montane forests, cottonwood riparian forests, shelterbelts, tree rows, juniper woodlands, and suburban parks (Hester and Griener 2005). Hoary bats typically forage along edges associated with forested habitats. Roads, streams, lakes, or other edges in forest habitat may be used by foraging hoary bats (Christy and West 1993). Hoary bats roost primarily in the foliage of both deciduous and coniferous trees. Individuals typically roost at the edge of a clearing near the end of a branch. Roosts are well hidden from above but visible from below (Shump and Shump 1985; Willis and Brigham 2005). Degradation, fragmentation, and loss of roosting and foraging habitat, pesticides, and wind energy development are the main threats to the hoary bat (Hester and Griener 2005).

No USFS R2 Sensitive bat species were included in the WYNDD data for the wildlife analysis area. Hoary bats have been detected on NFS lands in 2006, 2007, 2008, and 2009 (USFS 2011d). Mist net surveys and acoustical bat surveys were performed in the analysis area by TBNG personnel in the summer of 2012. No sensitive bat species were detected during these surveys.

3.2.1.2.2.1.4.3 Lewis's Woodpecker

The Lewis's Woodpecker typically inhabits open canopy forests with brushy understory and an abundance of insect prey items (Tobalske 1997; Abele et al. 2004). Open conifer forests, particularly those that have recently burned or been infested with pine beetles, are the optimal habitat for this species (Burns et al. 2005). In southeast Wyoming, Lewis's Woodpeckers preferentially selected burned ponderosa pine forests, as reported by Linder and Anderson (1998). In this study, researchers reported that active nests occurred almost exclusively (98 percent) in burned stands, although only 41 percent and 21 percent of two study areas were burned. Closed canopy forests are typically avoided because the full canopy closure limits understory growth, thus reducing the preferred arthropod prey base. Unlike most North American woodpeckers, the Lewis's Woodpecker does not bore into trees to find prey. Instead, individuals typically glean aerial arthropods captured through short direct flights (Abele et al. 2004). Lewis's Woodpeckers prefer to nest in existing cavities or to excavate their own cavities in decayed and softened trees (Raphael and White 1984; Saab and Dudley 1998). Loss of breeding and wintering habitats in the form of burned pine forests, park-like ponderosa pine forests, riparian cottonwood stands, and oak-savannas through timber harvest or fire suppression are the main threats to Lewis's Woodpecker populations.

Lewis's Woodpeckers have occasionally, although uncommonly, been identified on NFS lands (USFS 2007a). The WYNDD data for the analysis area did not contain any records of Lewis's Woodpecker; however, Breeding Bird Survey routes in close proximity to the analysis area have observed Lewis's Woodpecker. Lewis's Woodpecker was not observed during any field surveys performed by BHP in support of the Proposed Action, despite the ponderosa pine habitat of the Rochelle Hills area providing optimal habitat for the species.

3.2.1.2.2.1.5 Wetland/Riparian/Aquatic Dependent Species

USFS R2 Sensitive wildlife species that are Wetland/Riparian/Aquatic Dependent include Townsend's big-eared bat, spotted bat, Bald Eagle, northern leopard frog, finescale dace, lake chub, plains minnow, sturgeon chub, and flathead chub. Additional species, for which wetlands, riparian, and aquatic areas provide important habitat, but not necessarily the primary or most limiting habitat, include hoary bat, long-eared myotis, Northern Harrier, American Peregrine Falcon, and Long-billed Curlew. The natural histories of these species are reviewed under the sections describing their primary habitat. Wetland/riparian habitat on NFS land covers ten acres of the wildlife analysis area. Perennial streams on NFS lands in the wildlife analysis area include: Bacon Creek, Big R W Creek, Buffalo Creek, Cottonwood Creek, Little Thunder Creek, Newel Prong, and West Bacon Creek.

3.2.1.2.2.1.5.1 Townsend's Big-eared Bat

Townsend's big-eared bat ranges from southern British Columbia, Canada through the western United States to Mexico, and east to central South Dakota, with isolated populations occurring as far east as Virginia. These bats forage over a variety of habitat,

including coniferous forests and woodlands, deciduous riparian woodland, semi-desert and montane shrublands, but are entirely dependent on caves and abandoned mines for roosting (Arroya-Cabrales and Castaneda 2008a, WGFD 2010). Individuals exhibit high roost fidelity. One of the largest hibernacula in the western United States is at Jewel Cave National Monument in the Black Hills, where 800 to 900 big-eared bats hibernate (Tigner and Stukel 2003). The Townsend's big-eared bat wing morphology permits slow maneuverable flight and the ability to hover and glean insects from vegetation. Because of this wing morphology, Townsend's big-eared bat forages primarily in and near vegetation. Typical foraging habitat includes forested and edge habitats, primarily riparian corridors or wetland edges (Fellers and Pierson 2002; Gruver and Keinath 2006).

No USFS R2 Sensitive bat species were included in the WYNDD data for the analysis area. As of 2009, the TBNG annual monitoring reports have not recorded any Townsend's big-eared bat occurrences on TBNG (USFS 2007a, 2008 and 2011b). However, after consultation with TBNG personnel, the Townsend's big-eared bat is included in this analysis. Townsend's big-eared bat was not detected in the analysis area in 2012 during surveys completed by TBNG.

3.2.1.2.2.1.5.2 Spotted Bat

Spotted bat occurs in many western states and provinces, but its distribution is quite patchy, likely the result of its dependence on large, isolated cliffs for roosting (Leonard and Fenton 1983; Luce and Keinath 2007). Foraging typically takes place near or over water, similar to other bat species, likely in response to an increase in insect prey abundance at these habitats (Waldien and Hayes 2001). Leonard and Fenton (1983) found that spotted bats preferred foraging in open areas associated with ponderosa pine forests in June, July, and August. They also documented use of old fields consisting of knapweed, with bunchgrass in moist depressions and ponderosa pine along the field margins. The main threats to the spotted bat are habitat alteration of wetlands and other foraging areas, over-utilization by collecting this species for scientific purposes, toxic chemicals and pesticide use, and disturbance or alteration at roost locations (Luce and Keinath 2007). Consultation with TBNG personnel identified that spotted bats on NFS lands typically forage over wet areas such as wetlands and intermittent streams.

Potential roosting habitat is extremely limited on NFS land and occurrence and habitat on NFS land is highly ephemeral. As of 2009, the TBNG annual monitoring reports have not recorded any spotted bat occurrences on NFS lands (USFS 2007a, 2008 and 2011b). No USFS R2 Sensitive bat species were included in the WYNDD data for the analysis area. However, after consultation with TBNG personnel, the spotted bat is included in this analysis. Spotted bat was not detected in the analysis area in 2012 during surveys completed by TBNG.

3.2.1.2.2.1.5.3 Bald Eagles

Bald Eagles typically nest near large lakes and rivers in forested habitat where both adequate prey (fish, waterfowl and ungulate carcasses) and old, large-diameter cottonwood or conifer trees for nesting are available. As high quality nesting habitat has become saturated along major river drainages and lakes, some pairs have been found nesting along smaller drainages, but these nest sites often have lower occupancy and productivity rates (WGFD 2010). Bald Eagle winter roosts are typically located in cottonwood or coniferous trees located along an established prey base, such as salmon rivers or large reservoirs (Buehler 2000).

BHP performed raptor winter roost surveys during the winter of 2012. One Bald Eagle winter roost was identified on NFS lands located approximately one mile to the west of the Proposed Action adjacent to a small dugout and WY Hwy 59. Individual Bald Eagles were also observed throughout the western portion of the analysis area while travelling between isolated NFS lands during raptor winter roost surveys and migratory bird surveys. No Bald Eagle nests were observed during the nesting raptor surveys or any other field-based surveys performed by BHP in support of the Proposed Action.

3.2.1.2.2.1.5.4 Northern Leopard Frogs

Northern leopard frogs occur in a wide variety of habitats and can occur at elevations of over 2,600 meters (8,500 feet) in Wyoming (WGFD 2010). They may be found in grasslands, brushlands, woodlands, and forests, further frequenting areas of permanent water such as wet meadows, bogs, ditches, slow streams, montane lakes, ponds, or reservoirs (Stebbins 2003; Elliott et al. 2009). However, preferred habitats for breeding in Wyoming tend to be cattail marshes in plains areas and beaver ponds in foothills and montane areas (WGFD 2010). When distributing into uplands, this species is most likely to be found in wet meadows, sometimes far from water (Stebbins 2003; McAllister 2005). Northern leopard frogs will forage among sedges, cattails, and tall grasses, primarily consuming invertebrates but also at times preying upon voles, small birds, snakes, or other amphibians (WGFD 2010). Habitat degradation and elimination, introduction of non-native game fish, and disease are the main threats to northern leopard frog populations.

No northern leopard frogs were observed in the analysis area during amphibian surveys performed by BHP in 2012 in support of the Proposed Action. However, the Wyoming NHP data identified one occurrence of the northern leopard frog in the analysis area in 2009.

3.2.1.2.2.1.5.5 Finescale dace

Finescale dace habitat includes slow or stagnant streams with abundant vegetation or other cover. They are intolerant of water temperatures greater than 77 degrees Fahrenheit (°F) and are frequently found in the absence of large predators (Isaak et al. 2003). In Wyoming, they were found at sites with clear, slow moving or stagnant water with heavy aquatic vegetation and predominantly silt substrate. Mean water depths were generally greater than

one foot and no large predatory fish were collected in association with finescale dace (WGFD 2010). Taxonomists have also noted that finescale dace often occur in cool, boggy, spring waters that are associated with complexes of beaver (*Castor canadensis*) dams or small lakes (USFS 2005). Risk factors to stream populations include increased watershed afforestation, land uses that decrease aquifer recharge, human uses and reduced beaver populations (Isaak et al. 2003). Hydrologic factors pose additional threats for this species because large floods or lengthy drought can threaten suitable habitat (USFS 2005). Potential habitat for finescale dace on NFS parcels within the wildlife analysis area is limited. Stock ponds and perennial streams within the analysis area could potentially provide habitat for the finescale dace based on turbidity, water levels, and substrates. No other suitable aquatic habitat, including beaver ponds, was observed during field-based surveys in 2012.

3.2.1.2.2.1.5.6 Flathead Chub

Flathead Chub habitat includes the main channels of sandy, turbid streams with small substrates, deep water, and woody debris (WGFD 2010). Streamlined bodies, large fins and sensory organs including barbels enable flathead chubs to efficiently feed in the swift currents of turbid rivers. Spawning occurs from July through September, coinciding with receding water levels, maximum temperatures, low turbidities, and stable sand substrates (WGFD 2010). The species may move into small tributary streams for spawning (NatureServe 2012). Flathead chub have been documented in water bodies occupying NFS and adjacent properties, including the Cheyenne River, Black Thunder Creek, Lance Creek, and the Little Powder River, of which none occur in the analysis area (S. Anderson, 2012).

3.2.1.2.2.1.5.7 Lake Chub

Lake Chub occupy a variety of habitat, including large and small standing and flowing waters. The species is most common in gravel bottom pools or in lakes along rocky lake margins. Spawning occurs in shallow stretches with gravelly substrates. It is found in lakes and streams that usually have cool waters and clean gravel or cobble substrates (Isaak et al. 2003). The lake chubs' diet consists primarily of mobile aquatic and terrestrial insects and zooplankton. Spawning occurs in the spring in shallow waters over cobble substrates, and eggs are given no parental care (Isaak et al. 2003). Lake populations may spawn within the lake or make a short migration into tributaries (Isaak et al. 2003). Lake chub have been documented in water bodies adjacent to NFS lands, but have not been documented on NFS lands to date (S. Anderson,2012).

3.2.1.2.2.1.5.8 Sturgeon Chub

Sturgeon chub occupy turbid, free flowing rivers with hard bottoms and high flow velocities. The species is predominantly found in main river systems and rarely occurs in smaller tributaries (WGFD 2010). River runs devoid of vegetation is typically preferred by this species (NatureServe 2012). Sturgeon chub have been documented in water bodies adjacent to NFS lands, but have not been documented on NFS lands to date (S. Anderson,

2012). The Wyoming State Wildlife Action Plan does not identify sturgeon chub as occurring farther east than western Campbell County (WGFD 2010).

3.2.1.2.2.1.5.9 Plains Minnow

Plains minnow occupy large, turbid prairie streams and rivers with slow water and side-pool habitat. They are typically found in streams with sand or silt bottoms and some current. The plains minnow is tolerant of high water temperature, high salinity and low oxygen, making them well adapted for survival in intermittent pools (WGFD 2010). Plains minnow have been documented in water bodies adjacent to NFS lands (S. Anderson, 2012). Barrineau *et al.* (2010) positively identified plains minnow in the Cheyenne River basin, however it is unknown if any of these observations occurred on NFS lands.

3.2.1.2.2.1.6 Shrubland Dependent Species

USFS R2 Sensitive wildlife species that are Shrubland Dependent and are addressed in this report include Sage Sparrow, Brewer's Sparrow, and Greater Sage-Grouse. Additional species, for which shrublands provide important habitat, but not necessarily the primary or most limiting habitat, include Townsend's big-eared bat, fringed myotis, swift fox, Burrowing Owl, Ferruginous Hawk, Northern Harrier, American Peregrine Falcon, and Loggerhead Shrike. Natural history descriptions for these species are reviewed under their respective dominant habitat associations. Shrubland habitat on NFS land covers 4,236 acres of the analysis area.

The Greater Sage-Grouse is also listed as a Candidate species under the ESA (USFWS, 2010). A full analysis of potential impact to Greater Sage-Grouse from the Proposed Action and Alternatives is provided in the Project BA. The BA is in the Project file.

3.2.1.2.2.1.6.1 Sage Sparrow

Sage Sparrow is considered a sagebrush obligate species that inhabits shrublands dominated by sagebrush, particularly big sagebrush (*Artemisia tridentata*), with a perennial bunch grass understory (Paige and Ritter 1999; Holmes and Johnson 2005a). Large patches of intact sagebrush with low disturbance and little habitat fragmentation are important attributes of Sage Sparrow habitat. Knick and Rotenberry (2002) found that the occurrence of Sage Sparrows increased with increasing area of sagebrush patches and decreasing fragmentation. Habitat components that have been positively associated with Sage Sparrow occurrence include higher sagebrush and shrub cover, and above average shrub height, while higher grass coverage is negatively associated with occupied habitat (Holmes and Johnson 2005a). Nests are located in shrubs, bunchgrasses, and occasionally on bare ground beneath shrubs (Martin and Carlson 1998). Foods taken during the breeding season include adult and larval insects, spiders, seeds, small fruits, and succulent vegetation that are mainly gleaned from the ground near or under the edges of shrubs, or from the lower stems or leaves of shrubs (Martin and Carlson 1998). Large-scale reduction in native sagebrush and shrubland habitats, fragmentation of these habitats, invasion of

non-native vegetation, prescribed fire, and oil and gas development are the main threats to Sage Sparrow populations range-wide.

Sage Sparrow numbers, as reported in the TBNG monitoring report 2002 to 2007, are as follows: 2002 – 86 individuals; 2003 – 107 individuals; 2004 – 110 individuals; 2005 – 128 individuals; 2006 – 232 individuals, 2007 – 127 individuals (USFS 2007a). Sage Sparrow numbers were not updated in the 2008 or 2009-2010 TBNG Monitoring reports. Sage Sparrows were not observed during any field surveys performed by BHP in support of the Proposed Action. Additionally the WYNDD data did not identify any Sage Sparrow occurrences in the analysis area, nor were any identified on Breeding Bird Survey routes in close proximity to the analysis area. However, these results may be a result of the difficulty in detecting Sage Sparrow, as the species is expected to occur in the analysis area.

3.2.1.2.2.1.6.2 Brewer's Sparrow

Brewer's Sparrow is a sagebrush obligate species that is often the most abundant songbird in sagebrush shrub steppe habitats (Holmes and Johnson 2005b). The density of singing male Brewer's Sparrow has been found to be largely correlated with large, unfragmented patches of sagebrush and other shrubland habitats (Knick and Rotenberry 2002). Knick and Rotenberry (2002) found that the occurrence of Brewer's Sparrows increased with increasing area of sagebrush patches and decreasing fragmentation. In eastern Wyoming, Brewer's Sparrows are commonly found in areas where sagebrush dominated landscapes begin to transition to those more dominated by short-grass prairies (Walker 2004). Nests are typically located in sagebrush or other shrubs in microhabitats with increased shrub densities when compared to the surrounding landscape (Rotenberry et al. 1999, Walker 2004). Threats to Brewer's Sparrow are similar to other shrubland dependent species and include large-scale reduction in native sagebrush and shrubland habitats, fragmentation of these habitats, invasion of non-native vegetation, prescribed fire, and oil and gas development.

WYNDD data contains numerous occurrences of Brewer's Sparrow within the analysis area, ranging from 1993 through 2004. The Brewer's Sparrow has also been identified on Breeding Bird Survey routes in close proximity to the analysis area. Brewer's Sparrows were widely identified by TBNG personnel leading up to the *Thunder Basin National Grassland 2007 Monitoring Report: Five Year Review* (USFS 2007a) and during migratory bird surveys performed by BHP in support of the Proposed Action. BHP personnel identified 140 Brewer's Sparrows during project-related migratory bird surveys. Individuals were observed on all but one surveyed NFS parcel.

3.2.1.2.2.2 BLM Sensitive Species

3.2.1.2.2.2.1 Applicable Laws, Regulations, Policies, and Management Plan Direction

The Proposed Action would pass through BLM lands managed by the Newcastle Field Office and would be managed by stipulations set forth in their Resource Management Plan.

According to the BLM Washington Office IM 09-039 Special Status Species Management (6840 Manual), BLM state directors are required to designate BLM Sensitive Species; species that occur on BLM-administered lands for which BLM has the capability to significantly affect the conservation status of the species through management. BLM 6840 Manual states "the protection provided by the policy for candidate species shall be used as the minimum level of protection for BLM sensitive species." A BLM Sensitive Species list for the state of Wyoming was first issued in 2001, and was revised in 2008.

BLM 6840 Manual 0.2-B. Planning stipulates that: When BLM engages in the planning process, it shall address Bureau sensitive species and their habitats in land use plans and associated NEPA documents.

The Newcastle Field Office Resource Management Plan was published in 2001, the same year as the first BLM Wyoming Sensitive Species list. The Resource Management Plan currently states "to the extent possible, provide habitat for threatened and endangered and special status plant and animal species on all public lands". As mentioned previously, the Newcastle RMP is one of the plans currently being amended as part of the Nine-Plan Greater Sage-Grouse RMP Amendment to provide consistent objectives and conservation measures for Greater Sage-Grouse into RMPs and LRMPs by September 2014.

On BLM lands in the analysis area the following acreages of habitat types are represented: 1,609 acres of Grassland; 3,063 acres of Shrubland; 627 acres of Conifer; 33 acres of Wetland/Riparian and no Aquatic habitat. Within the ROW there are 12 acres of Grassland, 20 acres of Shrubland, eight acres of conifer, and no Wetland/Riparian or Aquatic habitat.

3.2.1.2.2.2.2 Grassland Dependent Species

BLM Sensitive Species that are characterized as grassland dependent species include swift fox, Burrowing Owl, Ferruginous Hawk, Mountain Plover, Loggerhead Shrike, Long-billed Curlew, Baird's Sparrow, and the American Peregrine Falcon. Only the Baird's Sparrow is not covered in the USFS Region 2 Sensitive Species section above and existing conditions information for the Baird's Sparrow is described below.

3.2.1.2.2.2.2.1 Baird's Sparrow

Baird's Sparrow habitat includes native grasslands and lightly grazed pastures for both nesting and foraging (Wiggins 2006). Preferred breeding habitat is typically patchy grassland habitat with a mixture of forbs and grasses between 20 and 100 cm tall with little to no woody vegetation. The primary threats to Baird's Sparrow populations are overgrazing of native grassland habitat, loss of habitat to agricultural and urban uses, and alteration to the natural fire regime allowing woody vegetation to encroach upon potential nesting habitat (Wiggins 2006). Baird's Sparrow individuals were not observed during any field surveys in support of the Proposed Action.

3.2.1.2.2.2.3 Wetland/Riparian Dependent Species

The northern leopard frog is the only BLM Sensitive Species that is wetland/riparian dependent. It is also a USFS Region 2 Sensitive Species and is described in that section.

3.2.1.2.2.2.4 Aquatic Species

No BLM Sensitive Species that are aquatic dependent occur in the analysis area.

3.2.1.2.2.2.5 Conifer Forest Dependent Species

BLM Sensitive Species characterized as conifer forest dependent include fringed myotis and long-eared myotis. The TBNG USFS Region 2 Sensitive Species section provides a description of the fringed myotis. Existing conditions information for the long-eared myotis is provided below. Mist net surveys and acoustical bat surveys were performed in the analysis area by TBNG personnel in 2012 and no sensitive bat species were identified during these surveys.

3.2.1.2.2.2.5.1 Long-eared Myotis

The long-eared myotis primarily inhabits coniferous forest and woodland, including juniper, ponderosa pine, and spruce-fir and is typically found near water and rock outcrops or cliffs (Manning and Jones 1989; WGFD 2010). Individuals typically forage over rivers, streams, and ponds within the forest-woodland environment. During summer, these bats roost in a wide variety of structures, including cavities in snags, under loose bark, stumps, buildings, rock crevices, caves, and abandoned mines while in the winter it hibernates primarily in caves (Manning and Jones 1989; WGFD 2010). Disturbance at roosting habitat, loss of roosting habitat, pesticides, and wind energy development are the main threats to the long-eared myotis (WGFD 2010). Based on the limited availability of highly suitable habitat in the analysis area, this species is not likely to occur.

3.2.1.2.2.2.6 Shrubland Dependent Species

BLM Sensitive Species that are shrubland dependent include Sage Sparrow, Brewer's Sparrow, and Sage Thrasher. Existing conditions information for the Sage Sparrow and Brewer's Sparrow are described in the USFS Region 2 Sensitive Species section. Existing conditions for the Sage Thrasher is described below.

3.2.1.2.2.2.6.1 Sage Thrasher

The Sage Thrasher is considered a sagebrush obligate species which inhabits prairie and foothill sagebrush and shrublands with tall shrubs and low grass cover (WGFD 2010). Nests are commonly placed in stands of sagebrush or other shrub species which have a slightly higher density than the surrounding matrix (Busek et al. 2004). The primary threat to Sage

Thrasher populations is habitat loss, modification, and fragmentation caused by invasion of nonnative plant species, agricultural practices, fire, urban and natural resource development, and increased recreational activity (Busek et al. 2004). Sage Thrashers were observed during migratory bird surveys performed in the analysis area.

3.2.1.2.2.2.6.2 Greater Sage-Grouse

The Greater Sage-Grouse is described under the Federal Endangered Species Act Protected Species of this section. Specific to the BLM are established habitat conservation measures related to seasonal timing stipulations, avoidance buffers, and disturbance density for all projects on BLM lands inside and outside of Core Areas. On February 15, 2012 the Wyoming BLM issued Instruction Memorandum (IM) No. WY-2012-019 (IM No. WY-2012-019) to provide guidance to Wyoming BLM Field Offices on Greater Sage-grouse habitat management for proposed activities. IM No. WY-2012-019 states that the identified Greater Sage-grouse Preliminary Priority Habitat on BLM property are consistent with areas mapped as Greater Sage-grouse Core Areas and Connectivity Areas mapped by E.O. 2011-5. BLM management direction contained in IM No. WY-2012-019 is largely based on the presence or absence of mapped Core Areas. IM No. WY-2012-019 also established habitat conservation measures related to seasonal timing stipulations, avoidance buffers, and disturbance density for all projects on BLM lands inside and outside of Core Areas. Also, as mentioned previously, the Newcastle RMP is one of the plans currently being amended as part of the Nine-Plan Greater Sage-Grouse RMP Amendment to provide consistent objectives and conservation measures for Greater Sage-Grouse into RMPs and LRMPs by September 2014.

3.2.1.2.2.3 TBNG Management Indicator Species

Management Indicator Species (MIS) are wildlife species whose habitat is most likely to be affected by USFS management practices, thereby serving as indicators for other wildlife species groups and habitat quality. They provide a measure of assessing the success of vegetation and land management practices. Each individual National Forest designates specific MIS in their LRMP. The TBNG LRMP directs that habitat is provided for identified MIS and those native indigenous species that use special or unique habitats. The LRMP includes six geographical designations within the TBNG: Highlight Bill, Broken Hills, Cellar Rosecrans, Fairview Clareton, Upton Osage, and Spring Creek. The LRMP identifies three MIS to be used in Geographic Areas across TBNG: BTPD, Greater Sage-Grouse, and Plains Sharp-Tailed Grouse (*Tympanuchus phasianellus*). The BTPD and Greater Sage-Grouse were selected for analysis based on their occurrence in the Wyoming wildlife analysis area. The Plains Sharp-tailed Grouse was not selected for analysis because it is not designated as an MIS in geographic areas that may be impacted by the Proposed Action. Geographic Areas potentially impacted by the Proposed Action include Highlight Bill, Broken Hills, Cellar Rosecrans, and Fairview Clareton.

The analysis area is one mile on each side of the Proposed Action for all species except the Greater Sage-Grouse which is analyzed at four miles on each side of the Proposed Action.

3.2.1.2.2.3.1 Black-tailed Prairie Dog

3.2.1.2.2.3.1.1 Black-tailed Prairie Dog Regulations

Grassland Wide Goal 1.b and associated Objectives provides wildlife goals for all designated MIS on TBNG by directing the TBNG to demonstrate positive trends in population viability, habitat availability, habitat quality, population distribution throughout the species range across TBNG, and other factors affecting threatened, endangered, sensitive species and MIS. Additionally, each MIS has goals, standards, and guidelines specific to that species and Geographic Area. Those additional regulations are addressed for each species below.

Goals, standards, and guidelines identified in the TBNG LRMP which apply specifically to the BTPD that may affect the Proposed Action are detailed in Chapter 1 Section F of the LRMP:

> 69. To reduce risks and habitat loss for prairie dogs and other wildlife species closely associated with prairie dog colonies, align new roads outside prairie dog colonies. If it's necessary to place a new road in a prairie dog colony, minimize the amount of road within the colony to the extent that soil, drainage, topographical and other physical factors will allow. **Guideline**

Chapter 2 of the LRMP outlines objectives, standards, and guidelines which are applicable to the BTPD as an MIS at the geographic level. The standards and guidelines described for each Geographic Area emphasize TBNG cooperation with adjacent land owners to protect BTPD on NFS lands and overall acreages of low-level grasslands to provide suitable habitat for BTPD. These standards and guidelines do not provide specific restrictions or guidance to proposed projects on TBNG lands at the Geographic Area level.

On November 12, 2009 the TBNG issued the Record of Decision for the Thunder Basin National Grassland Prairie Dog Management Strategy and LRMP Amendment #3 (USFS 2009a). The TBNG lands impacted by the updated prairie dog management strategy are located approximately six miles south of the Proposed Action.

3.2.1.2.2.3.1.2 Species Ecology

The BTPD is taxonomically related to ground squirrels. The BTPD constructs burrows in low relief grasslands and sparse grassy shrublands. This species typically lives in large colonies organized around family units called coteries, further organized into wards and extensive towns. The extent of towns is ultimately governed by soil, vegetation, and topography. BTPD densities can vary widely within towns primarily driven by recruitment, forage, predation and disease. The BTPD breeding system is polygynous organized around harems. Litters range from three to five pups. Breeding age is attained at two years with females entering estrous once each year.

Past population declines of the BTPD related to the loss of habitat across its range have been caused by conversion of prairie grassland to cropland, urbanization, habitat modification (invasion of woody species into grassland and savanna), and habitat fragmentation (BLM 2005; USFWS 2000). The USFWS (2000) 12-month finding rated habitat loss as a moderate threat to the BTPD. However, in the 2002 reassessment (USFWS 2002), it was concluded that the present or threatened destruction of habitat from agricultural conversion and other factors was no longer a threat.

Sylvatic (bubonic) plague has been identified as a major cause of BTPD declines in recent years. Sylvatic plague is an exotic disease that can kill more than 99 percent of prairie dogs in a colony. The plague bacterium, *Yersinia pestis,* is transmitted animal-to-animal by infected fleas or contact with infected blood or tissue. The significance of plague in range-wide prairie dog mortality is unclear, though experts agree that where plague occurs it is extremely important in population dynamics. Plague may be introduced into a colony by other species or by dispersing prairie dogs, which bring plague-infected fleas into a colony. Prairie dogs with plague in their bloodstream are very unlikely to introduce plague because the infected animals die quickly (NatureServe 2012).

3.2.1.2.2.3.1.3 Habitat/Population Status and Trend

BTPD populations are not measured by an estimate of individuals on TBNG. Instead, populations are estimated by the acres of occupied BTPD colonies on TBNG. All BTPD .colonies on TBNG are mapped annually. In 2010, approximately 5,200 acres of NFS land was occupied by BTPD colonies and 3,489 of those acres occurred in Management Area 3.63, which has been selected as a potential area for future black-footed ferret reintroduction (USFS 2011d). Management Area 3.63 is well south of the Proposed Action and was purposely avoided during early route planning efforts. The 5,200 acres occupied by BTPD colonies in 2010 was the largest coverage since the population crashed to 3,243 acres in 2007, following an outbreak of sylvatic plague on NFS lands. Recent survey data indicate this positive population trend has continued in 2011 and 2012. Active BTPD colonies occupied 9,857 acres in 2011 and increased to 16,638 acres in 2012.

BHP did not specifically survey for BTPD colonies in support of the Proposed Action. However, biologists performing field work for other biological resources noted any BTPD colonies on NFS lands within the wildlife analysis area. Two BTPD colonies, one active and one inactive, were identified anecdotally in this manner. The inactive colony was identified directly south of Teckla substation. This inactive colony appeared to have been uninhabited for a number of years. Mounds where burrows were once located were identified, but no open burrows were observed. Mounds had been revegetated since the colony became inactive.

The active BTPD colony that was identified on NFS land is located approximately three miles north of Edwards Road and three miles south of WY Route 450. The majority of this BTPD colony occurs on private lands north of the TBNG boundary; however, a small portion

occurs on TBNG. No part of the identified active BTPD colony occurs within the ROW of the Proposed Action.

3.2.1.2.2.3.2 Greater-Sage Grouse

The Project BA in the Project file (and summarized in **Appendix E**) provides a description of the existing conditions and an analysis of impacts on the Greater Sage-Grouse. The following sections address the population and habitat conditions and trends of the Greater Sage-Grouse in the wildlife analysis area as a MIS.

3.2.1.2.2.3.2.1 Greater Sage-Grouse TBNG Regulations

Goals, standards, and guidelines which apply to Greater Sage-Grouse and may affect the Proposed Action, but are not explicitly directed at transmission lines, include Chapter 1 Section F of the LRMP in 1.F.46, 48, 49, and 51. These TBNG Standards and Guidelines are provided in **Appendix D**. As mentioned previously, the TBNG LRMP is one of the plans currently being amended as part of the Nine-Plan Greater Sage-Grouse RMP Amendment to provide consistent objectives and conservation measures for Greater Sage-Grouse into RMPs and LRMPs by September 2014.

MIS are wildlife species whose habitat is most likely to be affected by management practices, thereby serving as indicators for other wildlife species groups and habitat quality. They provide a measure for assessing the success of vegetation and land management practices. The LRMP directs that habitat is provided for identified MIS and those native indigenous species that use special or unique habitats. The LRMP identifies six Geographic Areas: Highlight Bill, Broken Hills, Cellar Rosecrans, Fairview Clareton, Upton Osage, and Spring Creek. Greater Sage-Grouse have been designated as MIS for all six geographic areas. Goals, standards, and guidelines which are applicable to MIS on a grassland-wide scale and may affect the Proposed Action include Grassland Wide Goal 1.b Objectives 1 – 8.

Goals, standards, and guidelines which are applicable to Greater Sage-Grouse as an MIS at the geographic level and may affect the Proposed Action are described in Chapter 2 of the TBNG LRMP. Objectives for Greater Sage-Grouse at the Geographic Area level include:

- Provide diverse and quality sagebrush habitat across the Geographic Area at levels that, in combination with habitat on adjoining lands, helps support stable to increasing populations of Sage-grouse and other wildlife with similar habitat needs. (Objective)
- Establish and maintain quality nesting habitat for Sage-grouse and associated wildlife by meeting vegetation objectives for high structure sagebrush understories within ten years. (Objective)
- Reduce the impacts of extended droughts on Sage-grouse populations and their recovery after droughts by managing land uses in Sage-grouse habitat in a manner

that does not significantly magnify the adverse effects of drought on grouse nesting, brooding and foraging habitats. **(**Objective)

Note that the three objectives listed above apply to each of the six Geographic Areas where the Greater Sage-Grouse is listed as an MIS.

Standards and Guidelines for Greater Sage-Grouse at the Geographic Area level are typically similar for each Geographic Area and include Guidelines on acres of habitat and habitat structure, and forage maintenance; and Standards on maintenance of populations during drought conditions.

Currently, the TBNG is amending the LRMP to address needed changes to the management and conservation of Greater Sage-Grouse habitats to support the population management objectives for the state of Wyoming. During a conference call with TBNG, it was determined that the LRMP amendments that could affect the Proposed Action would include additional restrictions on TBNG lands occurring within state-designated Core Areas. Because BHP has a Greater Sage-Grouse Mitigation and Development Plan in place, which protects Greater Sage-Grouse in Core Areas and that has been agreed upon by BHP, WGFD, and USFWS, preliminary informal consultation with TBNG personnel has indicated that these LRMP amendments will not affect the Proposed Action (T. Byer and G. Proctor, 2011).

3.2.1.2.2.3.2.3 Greater Sage-Grouse Habitat/Population Trend and Viability

Greater Sage-Grouse population trends throughout northeast Wyoming, the Powder River Basin, the TBNG, and the analysis area have experienced consistent population declines in the last decade. Since 2007, the three leks monitored and one lek complex monitored in association with the Proposed Action have displayed an average population trend of -7.4, indicating an overall decline in Greater Sage-Grouse populations in the analysis area. The Cellars Lek Complex alone has declined from a high of 82 displaying male Greater Sage-Grouse in 2007 to 14 displaying male Greater Sage-Grouse in 2012. While none of the leks or lek complexes monitored in association with WGFD occurs on NFS administered lands, these trends reflect the overall Greater Sage-Grouse population trends of the region.

The mean number of displaying male Greater Sage-Grouse from 1996 to 2011 across all known leks on TBNG is 8.3 males. The negative population trend is also seen on a grassland wide scale. The mean number of displaying male Greater Sage-Grouse in 2011 was 3.9 (USFS 2011d).

The current decline in Greater Sage-Grouse populations in northeastern Wyoming can also be seen in the population trend for TBNG. The minimum population estimate for Greater Sage-Grouse on TBNG peaked at over 3,000 birds in 2001, and had a second slightly lower peak of over 2,500 birds in 2008. However, the overall population trend on TBNG is declining. In 2012, the estimated population of Greater Sage-Grouse on TBNG was slightly over 500 birds (USFS 2012).

Populations of Greater Sage-Grouse on TBNG are also monitored at the Geographic Area level. The mean male lek attendance in 2011 for leks within the Broken Hills, Cellar Rosecrans, and Fairview Clareton Geographic Areas was 9.5, 4.0, and 2.9, respectively. Each of these averages is below the 10-year average for the respective Geographic Area (Broken Hills – 14.5; Cellar Rosecrans – 13.9; Fairview Clareton – 11.1). The Highlight Bill Geographic Area has undergone intensive mineral development over the last ten or more years. There are no sage grouse leks currently active within The Highlight Bill Geographic Area.

Potential reasons for Greater Sage-Grouse declines on NFS lands are similar to those throughout the range of the species, and northeast Wyoming. Fire return intervals have been reduced due to shifting land uses and fire management practices. Subsequently, invasion of sagebrush habitat by annual grasses due to fire or other disturbances frequently result in the conversion of disturbed sagebrush landscapes into habitat unsuitable for Greater Sage-Grouse (Johnson et al. 2010). The increased presence of cheatgrass in a sagebrush community creates a cascading feedback loop toward cheatgrass dominance through increased fire intervals.

Increased exposure to human activity and anthropogenic disturbances, including highways, oil and gas exploration, and vertical structures has likely also played a role in Greater Sage-grouse population declines on NFS lands and across the west. Traffic associated with local roads and energy exploration fragment Greater Sage-Grouse habitat and present anthropogenic disturbances which may negatively impact populations (Johnson et al. 2010). Vertical structures existing on NFS lands (such as communication towers, transmission and distribution lines, and wind turbines) may also negatively influence Greater Sage-Grouse populations. NFS lands within the analysis area are intermixed with other parcels owned and managed by the state of Wyoming, BLM, and private land holders. Because of this landscape matrix of various land managers, activities undertaken by one entity impacts Greater Sage-Grouse populations on other adjacent properties. In 2002, the BLM in Wyoming proposed development of 39,367 coal-bed methane wells and 3,200 conventional oil and gas wells in the Powder River Basin in addition to the existing 12,024 coal-bed methane wells currently drilled or permitted. Oil and gas development could decrease Greater Sage-Grouse populations which also occupy TBNG.

3.2.1.2.2.4 TBNG Species of Local Concern

USFS Species of Local Concern are those species that are documented or suspected to be at risk at a local scale within the Region, but do not meet the criteria for regional Sensitive Species designation. The TBNG currently utilizes the WGFD's SGCN list to identify Species of Local Concern. WGFD SGCN that could be impacted by implementation of the Proposed Action include Townsend's big-eared bat, Northern Goshawk, Burrowing Owl, Ferruginous Hawk, Mountain Plover, Bald Eagle, bluehead sucker, and sturgeon chub. All TBNG Species of Local Concern that could be impacted by the Proposed Action are analyzed in either the USFS Region 2 Sensitive Species or BLM Sensitive Species sections above.

3.2.1.2.3 Migratory Birds

In consultation with TBNG and BLM, surveys were conducted for migratory birds on NFS lands and raptors on BLM and NFS lands, within one mile of the Proposed Action. Eighty-three migratory bird species were detected during April and June surveys within or adjacent to the survey area. Species were also recorded during survey work for other species. The sections below present the results from the 2012 surveys.

3.2.1.2.3.1 Breeding Bird Surveys

A total of 64 bird species were identified within the analysis area during breeding bird transect surveys conducted in 2012. The four most abundant species were Western Meadowlark (26%), Lark Bunting (14%), Brewer's Sparrow (13%), and Vesper Sparrow (8%). A total of 13 special status species were detected during the breeding bird surveys, including the following USFS or BLM sensitive species: Ferruginous Hawk, Northern Harrier, Brewer's Sparrow, and McCown's and Chestnut-collared longspur. Species of local concern included Golden Eagle, Short-eared Owl, Upland Sandpiper, Red-headed Woodpecker, Loggerhead Shrike, Sage Thrasher, Grasshopper Sparrow, and Lark Bunting. An additional four species with special status were observed incidentally: Greater Sage-Grouse (ESA Candidate; TBNG MIS), Plains Sharp-tailed Grouse (TBNG MIS), Swainson's Hawk (SOLC), and an unidentified falcon (Peregrine or Prairie Falcon; S or SOLC).

3.2.1.2.3.2 Raptor Nest Inventory

Raptor nest surveys were conducted from the ground for an area up to two miles from the Proposed Action. Survey biologists found a total of 32 stick nests, including 25 raptor nests, six black-billed magpie nests, and one Canada goose nest. The majority of the raptor nests were in live cottonwood trees (72%), with fewer found on the ground (12%), in ponderosa pine (8%), or on man-made structures (8%). Of the 25 raptor nests, 17 were on NFS land, one on BLM, one on state land, and six on private properties. Eleven of the 25 raptor nests were confirmed active in 2012, including five nests on NFS land and one nest on state property. The other five active nests were detected within the survey area but were located on private property adjacent to the analysis area.

The following raptor species were observed during project-specific surveys: Turkey Vulture, Golden Eagle, Ferruginous Hawk, Swainson's Hawk, Red-tailed Hawk, unidentified falcon, Northern Harrier, Cooper's Hawk, American Kestrel, Great-horned Owl, and Short-eared Owl. Three species were only observed incidentally, including Swainson's Hawk, unidentified falcon, and Cooper's Hawk. Of these observed species, the Ferruginous Hawk and Northern Harrier are listed as sensitive species, and the Golden Eagle, Short-eared Owl, and Swainson's Hawk are species of local concern as described by the USFS. A total of five special status species raptor nests were found on NFS lands of which three were active in 2012. Two of these nests were occupied by Golden Eagles and the third by a Ferruginous Hawk.

3.2.1.2.4 Big Game

3.2.1.2.4.1 Elk

Historically the elk was a common grazer on the Northern Great Plains prior to European settlement. As elk populations expand and disperse, small free-ranging elk herds are re-establishing on the grasslands of the TBNG and BLM planning area. Elk use a variety of habitats including open ranges, forested areas, and agricultural areas. The elk population on TBNG lands is estimated to be 400.

3.2.1.2.4.2 Mule Deer

The mule deer is native to the TBNG. Mule deer use a variety of habitats on the TBNG including grasslands, badlands, shrublands, and woodlands. Of particular importance to the mule deer are wooded draws, riparian habitats, brushy arroyos, and juniper woodlands. Populations in Wyoming and other western states have shown a general decreasing trend (MDWG 2013). Mule deer populations in Wyoming have been generally declining in number since the 1990s. This decline has been attributed to decreasing habitat availability and/or quality in mule deer habitats throughout the state (MDWG 2013). There is an estimated 14,342 acres of potentially suitable mule deer habitat on TBNG and BLM lands within the Wyoming Analysis Area.

3.2.1.2.4.3 Pronghorn

The pronghorn is native to North America, including much of Wyoming. This species inhabits open rangelands where sagebrush and forbs comprise much of the diet. There is an estimated 13,649 acres of potentially suitable grassland and shrubland habitats in the Wyoming Analysis Area.

3.2.2 Environmental Consequences

3.2.2.1 ALTERNATIVE 1 – NO ACTION

3.2.2.1.1 South Dakota

Under the No Action Alternative, NFS land would continue to be managed under the current management direction provided in the BHNF LRMP, as amended. Implementation of Alternative 1 would not introduce any infrastructure to the analysis area, or require any operation and maintenance activities so would result in no impacts to wildlife. The landscape would continue in its present state, subject to ecosystem processes (i.e., succession, forest maturation, and natural disturbance cycles such as fire and insect outbreaks) and other land uses, including timber harvest. Succession and tree growth would likely continue within the 47 miles of currently unused ROW leading eventually to reforestation.

3.2.2.1.2 Wyoming

Under the No Action Alternative, NFS and BLM lands would continue to be managed under the current management direction provided in the TBNG LRMP and the BLM IM No. WY-2010-012. There would be no effect on federally-listed species and no impact on TBNG sensitive species, management indicator species, BLM sensitive species, and WGFD species of greatest conservation concern.

3.2.2.2 ALTERNATIVE 2 – PROPOSED ACTION

Implementation of the Proposed Action could result in various potential impacts to wildlife. The following sections describe the types of wildlife impacts that could occur both in South Dakota and Wyoming.

Direct injury or mortality**:** Construction, operation, and maintenance activities have the potential to cause direct injury and mortality to wildlife species. Individuals could be harmed through collision with moving vehicles or equipment, or by crushing as the result of vehicles and equipment driving over individuals unable to avoid activity. Individuals at greatest risk of being crushed by vehicles and equipment include nest occupants (eggs, nestlings, fledglings, and attending adults) and individuals of species that are incapable of avoiding areas of activity either based on their ecology (live in burrows or spend time subterranean), body size (small mammals, insects, reptiles/amphibians), or form of locomotion (insects and reptiles/amphibians). Potential injury or mortalities would not be expected to result in changes to population condition or status of any wildlife sensitive species. Implementation of species specific mitigation measures would reduce the potential for harm to species by avoiding habitats that are known to support special status wildlife species.

Collision with transmission lines or associated guy-wires associated could cause direct injury or mortality to species that fly, including bats, birds, and the northern flying squirrel. High mortality rates usually occur in specific localized situations where certain factors create high risk potential, for example where large numbers of birds regularly cross the transmission line between foraging and nesting sites. Species that typically experience the highest power line collision fatalities are those with “poor” flight ability (high wing loading, low wing aspect), particularly those with fast flight and poor maneuverability, such as waterfowl, rails, shorebirds, and upland game birds (Bevanger 1998; Janns 2000). The placement of the transmission line relative to surrounding vegetation can also influence collision risk. Lines that are at or below the canopy height of adjacent trees rarely present a problem because tree-dwelling birds are usually maneuverable enough to avoid the lines, and other species will typically be flying above the canopy (APLIC 2012).

While the risk of collision for other wildlife species would increase with the implementation of the Proposed Action, the likelihood of this risk resulting in injuries or mortalities sufficient to lead to changes in local population condition or status is not expected for any special status wildlife species.

Disturbance**:** Implementation of the Proposed Action, including increased human presence and activity, could disturb individuals by causing them to alter or change behaviors and could displace individuals from otherwise suitable habitats. Disturbance effects have the potential to affect several special status wildlife species, particularly nesting raptors, lekking Greater Sage-Grouse, roosting bats and big game species. In each case, the Proposed Action includes timing limitations and habitat avoidance measures that would greatly diminish the potential for project-related activities to cause detectable impacts to these species. For other special status wildlife groups and species, disturbance impacts are typically ameliorated by individuals relocating to other suitable and unaffected habitats. Disturbance effects would be most likely during construction when human presence and activity would be the greatest. The potential for and the intensity of disturbance effects would be lower during operation and maintenance activities.

Vegetation clearing in support of the Proposed Action is proposed to take place outside of the migratory bird nesting season (April 15 – July 31). By performing clearing activities outside of the nesting season, the Proposed Action would greatly reduce disturbance impacts to nesting sensitive bird species. However, if vegetation clearing is necessary during the nesting season, preconstruction migratory bird nest surveys would be conducted to identify active nests in proposed disturbance areas. Identified nests would be avoided while active. Clearing vegetation outside of the migratory bird nesting season, or completion of nest surveys and application of nest buffers, would reduce disturbance impacts to nesting bird species and would ensure the Proposed Action remains in compliance with the Migratory Bird Treaty Act.

Habitat Loss**:** Implementation of the Proposed Action could result in the permanent and temporary alteration and removal of habitats that support special status wildlife species. Permanent habitat loss resulting from implementation of the Proposed Action can be divided into two categories: 1) areas that would be permanently cleared of all vegetation, such as under structures and permanently improved access roads; and 2) areas where vegetation may be modified, but the land would remain in a vegetated state, such as temporary work areas and access routes. There are two commonly occurring examples of modified vegetation. The first is overland travel whereby vegetation is driven over but not cropped. Soil is compacted, but no surface soil is removed. The other example of modified vegetation is deforestation under spanned areas of the ROW-herbaceous vegetation would remain and habitat loss would not necessarily occur for species that inhabit unforested areas. Additional temporary disturbance would include temporary new access roads, construction yards/staging areas, decking yards, pulling/tensioning sites, and the work area around structures that would occur within the ROW and outside of the ROW. Habitat loss in these temporarily disturbed areas would be expected to return to pre-construction conditions, though in some cases, such as forested areas, full recovery to pre-disturbance habitat conditions could take many years. Refer to **Tables 3-15**, **3-16**, and **3-17** for summaries of regarding estimates of habitat loss.

Noxious weeds**:** Noxious weeds may be spread by ground-disturbing activities, and if noxious weeds become established, degradation of wildlife habitat may result. Noxious

weeds may out-compete native plant species and alter the species composition of the vegetation community. Carnivorous and insectivorous species could be affected by alterations to native plant communities if major structural changes to their habitat occurred or if prey species populations were significantly impacted. The establishment of new noxious weeds in the Project Area could also result in detrimental changes to wildlife behavior. Noxious weed populations can fill the interstitial spaces that are typically bare between natural plant communities. By filling these spaces, populations of noxious weeds could carry/sustain wildfires that would otherwise self-extinguish for lack of fuels. The Proposed Action includes measures and an associated weed management plan that are expected to be effective at addressing the potential for spreading and establishing noxious weeds in the Proposed Project area. Noxious weed populations are known to currently exist in the Project Area. Implementation of the Proposed Action is not expected to change the species composition, distribution, or occurrence of noxious weeds in the Project Area.

Avian Predators**:** Transmission line structures can provide perching and nesting opportunities for some corvid and raptor species, leading to a potential increase in predation rates on prey species or nesting birds. This impact would be greatest in open areas where the transmission line may be the only suitable nesting or perching substrate in the area. With the application of appropriate perching and nesting diverters, the availability of these potential perching and nesting sites would be greatly reduced, if not eliminated. This is discussed under the mitigation for each species where applicable. The potential for increased predation rates on special status wildlife species would be minimal and unlikely to affect population health or status of these species.

3.2.2.2.1 South Dakota

3.2.2.2.1.1 Direct/Indirect Effects

3.2.2.2.1.1.1 Federal Endangered Species Act Protected Species

Discussions with BHNF biologists have indicated that none of these species are known to occur within the BHNF. Therefore, the Proposed Action will have "**no effect**" on species or their habitat protected under the ESA on BHNF.

3.2.2.2.1.1.2 BHNF Management Indicator Species

3.2.2.2.1.1.2.1 Black-backed Woodpecker

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of the Proposed Action may temporarily disturb Black-backed Woodpeckers. The presence of construction personnel, the use of construction equipment, and noise generated from construction may disturb nesting and foraging Black-backed Woodpeckers that occur near the proposed construction areas. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the

duration of construction. Black-backed Woodpeckers in the analysis area would be able to continue normal behaviors once construction is completed. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb Black-backed Woodpeckers.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

The Proposed Action could result in a permanent loss of habitat for Black-backed Woodpeckers. Habitat within the analysis area includes mature ponderosa pine stands, and stands damaged by insect activity (primarily pine beetle) and fires. Construction of the proposed ROW would result in the permanent loss of 11 acres of forest stands with ten or more live trees greater than five inches in diameter per acre showing signs of insect damage, 27 acres of stands classified as 4C (mature trees cover > 70%), and 89 acres of forest stands in which old burns reduced the stands timber productivity. The construction of project-related access roads would destroy another two acres of potentially suitable Black-backed Woodpecker. Construction areas and timber decking areas would not be placed in potential Black-backed Woodpecker habitat. The existing 47 mile long unoccupied ROW, which currently supports younger trees, does not include suitable Black-backed Woodpecker habitat. Implementation of the Proposed Action would result in the loss of an estimated 127 acres of potentially suitable Black-backed Woodpecker habitat. See **Tables 3-16** and **3-17** for a comparison of forest stand types impacted by the Proposed Action and what is currently available.

Direct mortality from construction, operations, and maintenance equipment

The Proposed Action could result in direct mortality to Black-backed Woodpecker. Direct mortality may occur through birds colliding with vehicles and during removal of potentially occupied habitats. Implementation of mitigation measures, provided in **Appendix B**, would reduce or eliminate potential short-term impacts to individuals during the breeding season as a result of the Proposed Action; therefore the effects to the Black-backed Woodpecker are negligible.

Collision with transmission lines or associated guy-wires

The Proposed Action would result in an increase in collision risk between Black-backed Woodpeckers and infrastructure associated with the Proposed Action. Black-backed Woodpeckers may be susceptible to collision during low light levels or inclement weather; however, because Black-backed Woodpeckers occupy habitat with numerous obstructions (i.e., branches) and do not have the high wing loading and low aspect values which make a species more prone to collision, the risk of a Black-backed Woodpecker colliding with the Proposed Action is minimal.

TABLE 3-15 - BHNF HABITAT TYPES IMPACTED BY ROW	
HABITAT TYPE	**ACRES WITHIN IMPACT AREA[1,2,3]**
Developed: Developed, Urban, Strip Mines, Gravel Pit, Reservoirs and Impoundments	3
Hardwoods: Aspen, Birch, Bur Oak, Other	46
Grassland: Grassland, Bluegrass, Exotic Herbaceous, Oatgrass	118
Montane Grasslands	2
Ponderosa Pine	965
Riparian Hardwoods	2
Shrublands	0
White Spruce	20
Total	1,156

Sources: Predominantly based on USFS 2009a, but also incorporates LANDFIRE dataset (USGS 2010) within 0.5-mile buffer where there were data gaps. Other exceptions include: 1) Montane Grassland (Owens 2012, pers. comm.) that is located in the Grassland vegetation type (BHNF Existing Vegetation) is identified as Montane Grassland. Bluegrass, Ponderosa Pine, and White Spruce vegetation types from BHNF Existing Vegetation were retained with those vegetation types; 2) Hardwoods were mapped based on June and August 2012 fieldwork. Impact area is calculated based on Project data current as of August 29, 2012. Forested vegetation types calculated in this table are overestimated because the proposed ROW follows an existing 50-foot wide ROW. Total acres in this table are presented as 22,389 acres due to rounding to whole numbers.

[1]Construction areas and decking areas were selected to be in previously disturbed, unforested locations. No additional tree clearing is anticipated in construction areas or decking areas. [2]Roads are buffered by 50 feet on either side so that adjacent habitats are adequately addressed for assessing habitat suitability for special status plants. The Grand Total of the impact area is 722 acres if roads are not buffered. [3]Specific locations of structure work areas, wire-pulling, tensioning, and splicing sites, and structure bases are not currently available, so were estimated for analysis purposes.

TABLE 3-16 - FOREST STAND CLASSIFICATIONS (PONDEROSA PINE, WHITE SPRUCE, AND ASPEN) INCORPORATED WITHIN AND THE PROPOSED ROW	
FOREST STAND	**ACRES WITHIN PROPOSED ROW**
3A – Sapling/pole cover <40%	42
3B – Sapling/pole cover 40% - 70%	17
3C – Sapling/pole cover >70%	6
4A – Mature tree cover <40%	195
4B – Mature tree cover 40% - 70%	148
4C – Mature tree cover >70%	29
Total	437

Source: USFS 2009a

TABLE 3-17 - LAND AREA (ACRES) OF VEGETATION TYPES ON BHNF LANDS THAT WOULD BE DISTURBED BY THE PROPOSED PROJECT AND ALTERNATIVE 3 WITH ROUTE MODIFICATIONS

DISTURBANCE TYPE	ASPEN/ BIRCH	GRASSLAND/ BLUEGRASS	BUR OAK	MONTANE GRASSLAND	PONDEROSA PINE	RIPARIAN HARDWOOD	STRIP MINES, GRAVEL PIT	WHITE SPRUCE	GRAND TOTAL
Construction Area[1]	0	0	0	0	20	0	0	0	20
Decking Areas[1]	1	7	0	0	18	0	3	0	28
Existing Roads - May Need Improved[2]	33	66	<1	1	368	0	<1	11	478
New Spur Roads[2]	1	7	0	1	85	1	0	0	95
Overland Travel[2]	0	5	0	0	40	0	0	<1	45
Total Project Disturbance Outside Row	**34**	**84**	**<1**	**1**	**531**	**1**	**3**	**12**	**667**
New Spur Roads Inside ROW[2]	<1	<1	0	0	6	<1	0	0	6
Overland Travel Inside ROW	<1	2	0	0	22	0	0	1	24
Decking Areas Inside ROW[1]	<1	1	0	0	4	0	0	0	5
Existing Roads - May Need Improved Inside ROW[2]	<1	<1	0	0	5	0	0	<1	6
ROW - Other	10	30	0	<1	397	1	0	8	447
Estimated land area of structure work areas[3]	1	4	0	0	52	<1	0	1	58
Estimated land area of wire-pulling, tensioning, and splicing sites[3]	<1	1	0	0	8	0	0	<1	9
Estimated land area of structure bases[3]	0	0	0	0	<1	0	0	0	<1
Total Project Disturbance Inside ROW	**11**	**34**	**0**	**<1**	**434**	**1**	**0**	**9**	**489**
Grand Total[2]	**45**	**118**	**<1**	**2**	**965**	**2**	**3**	**20**	**1,156**

Sources: All vegetation data is based on the BHNF Existing Vegetation (USFS 2009a), with the following exceptions: 1) Montane Grassland (Owens 2012, pers. comm.) that is located in the Grassland vegetation type (BHNF Existing Vegetation) is identified as Montane Grassland. Bluegrass, Ponderosa Pine, and White Spruce vegetation types from BHNF Existing Vegetation were retained with those vegetation types. 2) Riparian Hardwood and Bur Oak vegetation types were mapped based on June and August 2012 fieldwork. Disturbance Types are calculated based on Project data current as of August 29, 2012. Non-hardwood riparian and wetland vegetation is represented in Table A1 using number of features instead of area. Forested vegetation types calculated in this table are overestimated because the proposed ROW follows an existing 50-foot wide ROW.

[1]Construction areas and decking areas were selected to be in previously disturbed, unforested locations. No additional tree clearing is anticipated in construction areas or decking areas. [2]Roads are buffered by 50 feet on either side so that adjacent habitats are adequately addressed for assessing habitat suitability for special status plants. The Grand Total of all Project disturbances is 722 acres if roads are not buffered. [3]Specific locations of structure work areas, wire-pulling, tensioning, and splicing sites, and structure bases are not currently available, so were estimated for analysis purposes. These numbers are included within the land area of ROW – Other, so should not be added to Total Project Disturbance inside ROW or other table rows.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to Black-backed Woodpecker habitat. The increased fire risk associated with noxious weeds could increase the risk of wildfire, which would create additional Black-backed Woodpecker habitat short-term. Loss of forest habitat due to wildfire would have long-term negative effects. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to the Black-backed Woodpecker relating to noxious weeds would be greatly reduced.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for the Black-backed Woodpecker. Implementation of other project mitigation measures, provided in **Appendix B**, would reduce or eliminate impacts to the Black-backed Woodpecker.

Compliance with Applicable Regulations

By following existing ROW to the greatest extent possible, the Proposed Action would reduce habitat loss to Black-backed Woodpecker and retain the maximum amount of habitat possible. This would ensure that the Proposed Action complies with Goal 2, Objective 238b, Standard 3.7-2101, and Standard 5.4-3201.

Closing most access roads to public access would ensure the Proposed Action complies with Standard 8.2-2104.

Conclusions

Impacts to Black-backed Woodpecker from the Proposed Action may include loss of habitat, disturbance from construction related activities, direct mortality, and increased noxious weeds. Black-backed Woodpecker population trends are irruptive based on the amount of suitable fire and pine beetle damaged stands. While construction of the Proposed Action may impact individual Black-backed Woodpeckers, the Proposed Action would not likely impact population trends observed on the BHNF. The effects from these impacts would present a negligible effect on the Forest-wide population and habitat trend for the Black-backed Woodpecker.

3.2.2.2.1.1.2.2 Brown Creeper

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of the Proposed Action may temporarily disturb Brown Creepers. The presence of construction personnel, use of construction equipment, and noise generated from construction may disturb nesting and foraging Brown Creepers that occur in habitats immediately adjacent to construction areas. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction. Brown Creepers in the analysis area would likely return to normal behaviors once

construction is completed. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb Brown Creepers.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

The Proposed Action would result in a permanent loss of habitat for Brown Creepers. Habitat within the analysis area includes mature ponderosa pine stands, and stands damaged by insect activity (primarily pine beetle) and fires used for foraging. Implementation of the Proposed Action, and construction of the associated ROW, would result in the loss of 29 acres late-successional forest stands classified as 4C (mature trees cover > 70%). Of these 29 acres, three acres had a tree size classification of "very large", the preferred habitat of the Brown Creeper, an additional 18 acres were classified as "large". Access roads associated with the Proposed Action would result in the loss of two acres of potential Brown Creeper habitat. Construction areas and timber decking areas would not be placed in potential Brown Creeper habitat. The existing 47 mile long unoccupied ROW supports young trees which are not suitable habitat for Brown Creepers. Implementation of the Proposed Action would damage or remove 29 acres of potentially suitable Brown Creeper habitat in the analysis area. See **Tables 3-16** and **3-17** for a comparison of forest stand types impacted by the ROW and what is currently available.

Direct mortality from construction, operations, and maintenance equipment

The Proposed Action may result in direct mortality to Brown Creepers. Direct mortality may be caused by vehicle-bird collisions, and could through the removal of trees with cavities occupied by nesting individuals. Implementation of the project mitigation measures would reduce or eliminate potential short-term impacts to individuals during the breeding season as a result of the Proposed Action, therefore the effects to the Brown Creeper are negligible.

Collision with transmission lines or associated guy-wires

The Proposed Action would result in an increase in collision risk between Brown Creepers and infrastructure associated with the Proposed Action. Brown Creepers may be susceptible to collision during low light levels or inclement weather; however, because Brown Creepers occupy habitat with numerous obstructions (i.e., branches) and do not have the high wing loading and low aspect values which make a species more prone to collision, the risk of a Brown Creeper colliding with the Proposed Action is minimal.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds may create a permanent impact to Brown Creeper habitat. The increased fire risk associated with noxious weeds could increase the risk of wildfire, which would create additional snags that may provide Brown Creeper habitat, but also remove existing mature stands used by Brown Creeper. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the

forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to Brown Creeper relating to noxious weeds would be greatly reduced.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for the Brown Creeper. Implementation of project mitigation measures would reduce or eliminate impacts to the Brown Creeper.

Compliance with Applicable Regulations

By following existing ROW to the greatest extent possible, the Proposed Action would reduce habitat loss to Brown Creeper and retain the maximum amount of habitat possible. This would ensure that the Proposed Action complies with Goal 2, Objective 238a, Standard 3.7-2101, and Standard 5.4-3201.

Closing most access roads to public access would reduce impacts from recreational motorists ensure the Proposed Action complies with Standard 8.2-2104.

Conclusions

Impacts to Brown Creeper resulting from implementation of the Proposed Action may include loss of habitat, disturbance from construction related activities, direct mortality, and increased noxious weeds. Brown Creeper population trends have been positive in white spruce and late-successional pine habitat in recent years (USFS 2010). While construction of the Proposed Action may impact individual Brown Creepers, the Proposed Action would not likely impact population trends observed on the BHNF. The effects from these impacts would present a negligible effect on the Forest-wide population and habitat trend for the Brown Creeper.

3.2.2.2.1.1.2.3 Golden-crowned Kinglet

Direct Effects

Disturbance from construction, operations and maintenance activities

The Proposed Action may temporarily disturb Golden-crowned Kinglets. The presence of construction personnel, the use of construction equipment, and noise generated from construction could potentially disturb nesting and foraging Golden-crowned Kinglet occurring in habitats immediately adjacent to the proposed construction sites. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction. Golden-crowned Kinglet behavior and habitat use in the analysis area would be expected to return to normal patterns once construction is completed. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb Golden-crowned Kinglet. Golden-crowned Kinglet habitat is limited to spruce stands in the analysis area. Based on the relatively limited occurrence of the preferred spruce habitat in the analysis area, impacts to individuals would also be relatively limited.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

The Proposed Action would result in a permanent loss of habitat for Golden crowned kinglets. Suitable habitat within the analysis area includes stands of white spruce, mature ponderosa

pine stands, and wetland and riparian areas with some spruce component. Implementation of the Proposed Action and construction of the associated ROW would result in the loss of eight acres of mature white spruce habitat, and 27 acres of late-successional ponderosa pine forests. Access roads associated with the Proposed Action would result in the loss of two acres of white spruce and two acres of mature ponderosa pine which could provide Golden-crowned Kinglet habitat. Construction areas and timber decking areas would not be placed in Golden-crowned Kinglet habitat. The existing 47 mile long unoccupied ROW contains young trees which do not serve as habitat for Golden-crowned Kinglet. Implementation of the Proposed Action would result in 39 acres of disturbance or removal of potentially suitable Golden-crowned Kinglet habitat in the analysis area. See **Tables 3-16** and **3-17** for a comparison of forest stand types impacted by the Proposed Action and what is currently available.

Direct mortality from construction, operations, and maintenance equipment

The Proposed Action has the potential to result in direct injury or mortality to Golden-crowned Kinglets. Direct mortality would likely be caused by collisions with vehicles, and may be caused by the removal of trees with occupied nests. Implementation of project mitigation measures would reduce or eliminate potential short-term impacts to individuals during the breeding season as a result of the Proposed Action; therefore the effects to the Golden-crowned Kinglet are negligible.

Collision with transmission lines or associated guy-wires

Implementation of the Proposed Action would result in an increase in the collision risk between Golden-crowned Kinglets and infrastructure associated with the Proposed Action. Golden-crowned Kinglets may be susceptible to collision during low light levels or inclement weather. However, this species is highly maneuverable in flight, so the risk of a Golden-crowned Kinglet colliding with the Proposed Action is minimal.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to Golden-crowned Kinglet habitat. The increased fire risk associated with noxious weeds could increase the risk of wildfire, which would reduce stands of spruce and mature ponderosa pines used as habitat by the Golden-crowned Kinglet. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to Golden-crowned Kinglet would be minimized.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for the Golden-crowned Kinglet. Implementation of project mitigation measures would reduce or eliminate impacts to the Golden-crowned Kinglet.

Compliance with Applicable Regulations

By following existing ROW to the greatest extent possible, the Proposed Action would reduce habitat loss to Golden-crowned Kinglet and retain the maximum amount of habitat possible. This would ensure that the Proposed Action complies with Goal 2, Objective 238c, Standard 3.7-2101, and Standard 5.4-3201.

Closing most access roads to public access would reduce impacts from recreational motorists ensure the Proposed Action complies with Standard 8.2-2104.

Conclusions

Impacts to Golden-crowned Kinglets from implementation of the Proposed Action may include loss of habitat, disturbance from construction related activities, direct mortality and increased noxious weeds. While construction of the Proposed Action may impact individual Golden-crowned Kinglets, the Proposed Action would not likely impact population trends observed on the BHNF. The effects from these impacts would present a negligible effect on the Forest-wide population and habitat trend for the Golden-crowned Kinglet.

3.2.2.2.1.1.2.4 Grasshopper Sparrow

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of the Proposed Action has the potential to temporarily disturb Grasshopper Sparrows. The presence of construction personnel, the use of construction equipment, and noise generated from construction could potentially disturb nesting and foraging Grasshopper Sparrows within the analysis area. Given the open nature of grassland habitat occupied by the Grasshopper Sparrow, impacts from construction related disturbance may occur at longer distances than forest dwelling species. Disturbance from construction activity would be localized to the area of active construction and limited to the duration of construction. Grasshopper Sparrow habitat use and behaviors would likely return to normal patterns once construction is completed. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb Grasshopper Sparrows.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Implementation of the Proposed Action would result in a permanent loss of habitat for Grasshopper Sparrows. Habitat within the analysis area includes open grasslands with various species compositions. The proposed ROW would occupy 33 acres of potential Grasshopper Sparrow habitat. Grassland habitats would not be cleared of vegetation within the ROW and would continue to provide suitable Grasshopper Sparrow habitat post-construction. Approximately seven structures would be placed on grassland habitat on the BHNF. Temporary disturbance associated with construction areas for these seven structures would be approximately two acres. Permanent habitat loss from these seven structures would be negligible. Access roads associated with the Proposed Action would result in the permanent loss of 13 acres of potential Grasshopper Sparrow habitat. Temporary overland access and timber decking areas would temporarily impact nine acres of potential Grasshopper Sparrow

habitat. See **Tables 3-16** and **3-17** for a comparison of habitat types impacted by the Proposed Action and what is currently available.

Direct mortality from construction, operations, and maintenance equipment

Implementation of the Proposed Action has the potential to result in direct injury or mortality to Grasshopper Sparrows. Direct mortality may be caused by collisions with vehicles associated with the project. Grading and removal of grassland habitats for access roads and construction areas associated with the Proposed Action could potentially kill nesting Grasshopper Sparrows and non-nesting Grasshopper Sparrows. Implementation of project mitigation measures would reduce or eliminate potential short-term impacts to individuals during the breeding season as a result of the Proposed Action, therefore the effects to the Grasshopper Sparrow are negligible.

Collision with transmission lines or associated guy-wires

Implementation of the Proposed Action would result in an increase in collision risk between Grasshopper Sparrows and infrastructure associated with the Proposed Action. Grasshopper Sparrows may be susceptible to collision during low light levels or inclement weather; however, because Grasshopper Sparrows are agile fliers which do not have the high wing loading and low aspect values. The risk of a Grasshopper Sparrows colliding with the Proposed Action is minimal.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to Grasshopper Sparrow habitat. Noxious weeds can overtake native grassland communities, reduce prey abundance and create monocultures too dense to provide suitable Grasshopper Sparrow habitat. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to Grasshopper Sparrow relating to noxious weeds would be minimized.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action may result in increased predation rates for the Grasshopper Sparrow as a result of perching and nesting raptors and corvids. This may result in an increase in localized predation and scavenger rates. Increased predation effects may be permanent but localized to perching structures throughout the life of the transmission line. However, increased predation rates would not likely have a long-term negative effect on this species or their use of suitable habitat.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for the Grasshopper Sparrow. Implementation of project mitigation measures would minimize or eliminate impacts to the Grasshopper Sparrow.

Compliance with Applicable Regulations

By following existing ROW to the greatest extent possible, the Proposed Action would reduce habitat loss to Grasshopper Sparrows and retain the maximum amount of habitat possible. This would ensure that the Proposed Action complies with Goal 2, Objective 238a, Standard 3.7-2101, and Standard 5.4-3201.

Closing most access roads to public access would reduce impacts from recreational motorists ensure the Proposed Action complies with Standard 8.2-2104.

Conclusions

Impacts to Grasshopper Sparrows from implementation of the Proposed Action may include loss of habitat, disturbance from construction related activities, direct mortality, and increased noxious weeds. Grasshopper Sparrow populations have exhibited steady or positive population trends in recent years (USFS 2009c). While construction of the Proposed Action may impact individual Grasshopper Sparrows, the Proposed Action would not likely impact population trends observed on the BHNF. The effects from these impacts would present a negligible effect on the Forest-wide population and habitat trend for the Grasshopper Sparrow.

3.2.2.2.1.1.2.5 Ruffed Grouse

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of the Proposed Action has the potential to temporarily disturb Ruffed Grouse. The presence of construction personnel, the use of construction equipment, and noise generated from construction could potentially disturb nesting, breeding, and foraging Ruffed Grouse within the analysis area. However, the density of the forest and rugged landscape would likely reduce impacts to much less than the one-half mile considered for the analysis area. Male Ruffed Grouse perform a breeding display called “drumming” in which they attempt to attract females from a distance. Noise created by construction equipment working in or adjacent to Ruffed Grouse habitat may drown out the noises of drumming male Ruffed Grouse. This type of disturbance, if occurred during the mating season and with sufficient intensity and duration, has the potential to change local productivity rates. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction. Ruffed Grouse behaviors and habitat use would likely return to normal patterns once construction is completed. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb Ruffed Grouse.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Implementation of the Proposed Action would result in a permanent loss of Ruffed Grouse habitat. Habitat within the analysis area includes aspen of various stages. Construction of the proposed ROW would permanently remove ten acres of potential Ruffed Grouse habitat. However, in areas where the ROW is cleared through aspen stands, young aspen could recolonize the ROW and provide Ruffed Grouse habitat until operations and maintenance activities require the stands to be cut. Access roads associated with the Proposed Action would

result in the permanent loss of six acres of potential Ruffed Grouse habitat outside of the ROW. Construction areas, pulling/tensioning/splicing sites, and timber decking areas would temporarily impact less than one acre of potential Ruffed Grouse habitat. The existing 47 mile long unoccupied ROW contains young trees and brushy habitat which may serve as habitat for Ruffed Grouse. The removal of young and mature stands of pines for the ROW may lead to an increase in Ruffed Grouse habitat when the ROW begins to revegetate.

Direct mortality from construction, operations, and maintenance equipment

Implementation of the Proposed Action could result in direct injury or mortality to Ruffed Grouse. Direct mortality may result from vehicle collisions and construction occurring in occupied habitats. Grading and removal of aspen habitats for ROW, access roads, and construction areas associated with the Proposed Action could potentially kill nesting Ruffed Grouse and non-nesting Ruffed Grouse that are unable to avoid construction equipment. Implementation of project mitigation measures would reduce or eliminate potential short-term impacts to individuals during the breeding season as a result of the Proposed Action, therefore the effects to the Ruffed Grouse are negligible.

Collision with transmission lines or associated guy-wires

Implementation of the Proposed Action would result in an increase in collision risk between Ruffed Grouse and infrastructure associated with the Proposed Action. Ruffed Grouse may be susceptible to collision during low light levels or inclement weather and based on their relatively high wing loading and aspect values. However, unlike the plains grouse species (i.e., Plains Sharp-tailed Grouse and Greater Sage-Grouse), Ruffed Grouse inhabit areas of more complex vertical structure and likely are adept at avoiding new obstacles, such as transmission lines and guy-wires.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to Ruffed Grouse habitat. Native plant communities could be altered, having a negative effect on the Ruffed Grouse. The increased fire risk associated with noxious weeds could result in wildfire. Depending on the severity of the fire, aspen suckering could be stimulated, increasing preferred Ruffed Grouse habitat until burned areas are recolonized by young pine stands. Creation of a Noxious and Invasive Weed Management Plan would limit the establishment and spread of noxious weeds as part of the Proposed Action.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action may provide additional perches for predatory raptors which may prey on Ruffed Grouse. Ruffed Grouse are a known prey item of several raptor species, including Northern Goshawk (*Accipiter gentilis*), Cooper's Hawk (*Accipiter cooperii*), Red-tailed Hawk (*Buteo jamaicensis*), and Great-horned Owl (*Bubo virginianus*). Such predators may use support structures, as those included in the Proposed Action, as hunting perches, which could lead to increased predation on Ruffed Grouse. However, the increase in available

perching habitat may be negligible in Ruffed Grouse habitat given the abundance of natural perches in the forest.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for the Ruffed Grouse. Implementation of project mitigation measures would reduce or eliminate impacts to Ruffed Grouse.

Compliance with Applicable Regulations

By following existing ROW to the greatest extent possible, the Proposed Action would reduce habitat loss to Ruffed Grouse and retain the maximum amount of habitat possible. This would ensure that the Proposed Action complies with Goal 2, Objective 238a, Standard 3.7-2101, and Standard 5.4-3201.

Closing most access roads to public access would reduce impacts from recreational motorists ensure the Proposed Action complies with Standard 8.2-2104.

Conclusions

Impacts to Ruffed Grouse from the Proposed Action may include loss of habitat, disturbance from construction related activities, direct mortality, increased noxious weeds, and increased predation. While construction of the Proposed Action may impact individual Ruffed Grouse, the Proposed Action would not likely impact population trends observed on the BHNF. The effects from these impacts would present a negligible effect on the Forest-wide population and habitat trend for the Ruffed Grouse.

3.2.2.2.1.1.2.6 Song Sparrow and Beaver

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of the Proposed Action has the potential to temporarily disturb beavers and Song Sparrows. The presence of construction personnel, the use of construction equipment, and noise generated from construction could potentially disturb nesting and foraging Song Sparrows and beavers which occupy riparian areas within the analysis area, especially occupied habitats proximal to proposed construction areas. However, given the small amount of potential riparian habitat in the analysis area and the small amount of habitat that may be crossed by the ROW or access roads associated with the Proposed Action, the likelihood of disturbing Song Sparrows and/or beavers is low. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction. Beavers and Song Sparrow habitat use and behaviors would return to normal patterns once construction is completed. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb beavers or Song Sparrows.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

The ROW of the Proposed Action would affect beaver and Song Sparrow habitat. Willows, aspen, spruce trees or other vegetation tall enough to interfere with the completed transmission

line would be removed; however, removal of riparian and wetland vegetation would be avoided to the greatest extent possible. The proposed ROW would cross permanent streams on BHNF in two places: once at Slate Creek, and once at South Fork Castle Creek. The proposed ROW would also cross Slate Creek again and Rapid Creek downstream of Pactola Reservoir; however, these crossing would occur on private lands. Access paths for construction, operation and maintenance of the Proposed Action would cross wetlands and riparian areas at pre-existing crossing locations, such as existing bridges and culverts, to the greatest extent possible. Field surveys completed by BHP identified approximately one acre of riparian habitat which would be permanently removed in support of new access roads located outside of the ROW. BMPs to be described in the Proposed Action SWPPP would limit the amount of sediment moving into wetlands and riparian areas, potentially degrading beaver and Song Sparrow habitat. BMPs that shall be applied may include, but are not limited to, silt fence, straw wattles, sediment bags, and straw bales. Any new access road water crossings will be constructed according to Standard 1203 to allow fish and other aquatic species to pass. See **Tables 3-15** and **3-17** for a comparison of habitat types within the analysis area and what may be impacted by the Proposed Action.

Direct mortality from construction, operations, and maintenance equipment

Implementation of the Proposed Action has the potential to result in direct injury or mortality to Song Sparrows. Direct injury or mortality to Song Sparrows may occur from collisions with moving vehicles. Because a majority of wetland and riparian vegetation would be spanned and avoided by the Proposed Action, the likelihood that nesting Song Sparrows would be killed by construction equipment is low. It is unlikely that implementation of the Proposed Action would directly injure or kill beaver, because a minimal amount of suitable aquatic beaver habitats would be affected.

Collision with transmission lines or associated guy-wires

Implementation of the Proposed Action would result in an increase in collision risk between Song Sparrows and infrastructure associated with the Proposed Action. Song Sparrows may be susceptible to collision during low light levels or inclement weather; however, because Song Sparrows are agile fliers which do not have the high wing loading and low aspect values which make a species more prone to collision, the risk of Song Sparrows colliding with the Proposed Action is minimal.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to beaver and Song Sparrow habitat. Noxious weeds can overtake native riparian vegetation creating monocultures that are too dense to provide suitable beaver and Song Sparrow habitat. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to beaver and Song Sparrow relating to noxious weeds would be minimized.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for the Song Sparrow or beaver. Implementation of project mitigation measures would reduce or eliminate impacts to the Song Sparrow and beaver.

Compliance with Applicable Regulations

By following existing ROW to the greatest extent possible, the Proposed Action would reduce habitat loss to Song Sparrow and beaver and retain the maximum amount of habitat possible. This would ensure that the Proposed Action complies with Goal 2, Objective 238a, Standards 1301, 1303 and 1306, Standard 3.7-2101, and Standard 5.4-3201.

Closing most access roads to public access would reduce impacts from recreational motorists ensure the Proposed Action complies with Standard 8.2-2104.

Conclusions

Impacts to beavers and Song Sparrows from implementation of the Proposed Action may include habitat degradation, disturbance from construction related activities, direct mortality, and increased noxious weeds. Song Sparrow populations have declined slightly since monitoring was started in 2001 but not enough data has been collected to provide meaningful trend (USFS 2010). Beaver abundance and distribution are monitored through food cache surveys, but not enough data has been collected to date to determine a trend. While construction of the Proposed Action may impact individual beavers and Song Sparrows, the Proposed Action would have a negligible effect on the Forest-wide population or habitat trend for these species and is consistent with Objective 238a.

3.2.2.2.1.1.2.7 White-tailed Deer

Direct Effects

Disturbance from construction, operation, and maintenance activities

Implementation of the Proposed Action would temporarily disturb white-tailed deer. The presence of construction personnel, the use of construction equipment, and noise generated from construction has the potential to disturb white-tailed deer within the analysis area. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction. White-tailed deer habitat use and behaviors would be expected to return to normal patterns once construction is completed. Even if white-tailed deer are disturbed from habitats surrounding active construction areas, the abundance and suitability of other habitat throughout the analysis area would support displaced individuals. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb white-tailed deer.

Construction activities may disturb white-tailed deer utilizing big game winter range habitats within the analysis area. Disturbances would be temporary and limited to the immediate area surrounding construction activities. Once construction has been completed in an area, disturbances would stop and white-tailed deer would likely return to the completed ROW. The prevalence of potential white-tailed deer habitat within the analysis area when compared to the relatively small amount of habitat to be altered by the Proposed Action (**Tables 3-17** and **3-18**)

would reduce potential disturbance impacts to white-tailed deer by allowing individuals to inhabit adjacent areas.

White-tailed deer occupying designated winter range in Management Area 5.4 may be disturbed by construction activities if these activities take place from December 15 through May 15. Typically, these areas are located in foothill positions or on old wildfire sites where reduced snow depths and often better-than-average forage conditions provide the habitat sought by deer and elk during the winter. Disturbance to white-tailed deer during the winter months would present a greater impact that other times of the year due to the depleted energy reserves of wintering animals and the reduced available forage. Given the severity of typical winters in the Black Hills, the extent of winter construction activities is not known at this time. If the construction activities were to occur within designated big game winter ranges, the project would contact BHNF personnel to identify any timing restrictions.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Implementation of the Proposed Action and construction of the associated ROW would likely reduce the structural stages of forested stands that would provide cover for white-tailed deer during construction and maintenance activities (**Table 3-18**).

TABLE 3-18 - WHITE-TAILED DEER HABITAT IMPACTS WITHIN ROW

HABITAT TYPE	ACRES WITHIN ROW
Grasslands	33 acres
Aspen	10 acres
3A forest stands	39 acres*
4A forest stands	182 acres*
*Stands would not likely be allowed to return to current height in ROW once project is complete. Stands would revert to an earlier seral stage within the ROW.	

New or improved access roads would result in the permanent loss of 106 acres of potential white-tailed deer habitat. Construction areas, pulling/tensioning/splicing sites, and timber decking areas would temporarily impact 46 acres of potential white-tailed deer habitat outside of the ROW. Proposed ROW would occupy 284 acres within Management Area 5.4 designated as big game winter range; however, the presence of the transmission line would not exclude big game from occupying this area. Shrubs, grasses, and other low-growing vegetation would be allowed to reclaim the ROW once construction has completed and would provide additional foraging habitat for white-tailed deer, while intact screening habitat would be left in place at the edge of the ROW.

The results of some research indicate that white-tailed deer, and other ungulate species, may avoid suitable habitats that are associated with linear surface disturbances. This avoidance of otherwise suitable habitats could be considered an additional aspect of habitat loss, besides the direct disturbance, permanent and temporary, that can be associated with the proposed project.

Direct mortality from construction, operations, and maintenance equipment

Implementation of the Proposed Action has the potential to result in direct injury or mortality to white-tailed deer. Direct injury or mortality may be caused by vehicle collisions. Collision and mortality of white-tailed deer from larger construction equipment is unlikely.

Indirect Effects

Noxious weed spread.

The potential for the establishment and spread of noxious weeds could create a permanent impact to white-tailed deer habitat. The increased fire risk associated with noxious weeds could increase the risk of wildfire, which may create new white-tailed deer habitat if burned areas are reclaimed by native vegetation. However, noxious weeds could negatively affect white-tailed deer by replacing native species with monocultures that do not provide suitable forage. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to white-tailed deer relating to noxious weeds would be minimized.

Species Specific Mitigation Measures

Implementation of project mitigation measures would reduce or eliminate impacts to white-tailed deer. The following species specific mitigation measures would also be employed to reduce potential impact of the Proposed Action on white-tailed deer.

In MA 5.4, consider limiting the amount of disturbance from construction and maintenance activities during the winter periods (December 15 through May 15). BHNF personnel will be contacted prior to any winter construction in MA 5.4 regarding the implementation of seasonal restriction. Maintain current seasonal closures, limiting use of access routes by the public during the winter months following the current BHNF Motorized Vehicle Use Map

Compliance with Applicable Regulations

By following existing ROW to the greatest extent possible, the Proposed Action would reduce habitat loss to white-tailed deer and retain the maximum amount of habitat possible. This would ensure that the Proposed Action complies with Goal 2, Objective 238a, Standard 3.7-2101 Standard 5.4-3201, and Standard 5.4-9101.

Closing most access roads to public access would reduce impacts from recreational motorists ensure the Proposed Action complies with Standard 8.2-2104 and Objective 5.4-207.

Conclusions

Impacts to white-tailed deer from the Proposed Action may include disturbance, habitat loss, direct mortality, and habitat degradation from noxious weeds. White-tailed deer populations on BHNF have increased dramatically since 2000 (USFS 2010). While construction of the Proposed Action may impact individual white-tailed deer, the Proposed Action would not likely impact population trends observed on the BHNF. The effects from these impacts would present a negligible effect on the Forest-wide population and habitat trend for the white-tailed deer.

3.2.2.2.1.1.2.8 Mountain Sucker

Direct Effects

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Aquatic species associated with clear water may experience temporary habitat degradation beyond the boundaries of the ROW resulting from siltation, if road-improvement and other ground-breaking activities cause erosion and siltation of streams, lakes, and ponds during the construction phase. Mountain suckers may occur in three named streams within the analysis area which would be crossed by the Proposed Action. All mountain sucker habitat would be spanned by the Proposed Action and all access routes would utilize existing crossings of aquatic habitat, regardless of whether mountain suckers occur or not. The ROW would cross permanent streams in two places: once at Slate Creek, and once at South Fork Castle Creek. The ROW would also cross Rapid Creek; however this crossing would occur on privately held properties. All creeks would be spanned by the Proposed Action and no in-water work would occur. See **Tables 3-15** and **3-17** for a comparison of habitat types impacted by the Proposed Action and what is currently available.

Access to the Proposed Action would utilize existing crossing locations, such as existing culverts and bridges, to cross all water bodies (permanent or intermittent) to the greatest extent possible. Any new water crossings would be constructed to meet Standard 1203 to allow continued fish passage and not create a barrier to fish movement. BMPs to be described in the Proposed Action's SWPPP would limit the amount of sediment moving into aquatic habitats, potentially degrading mountain sucker habitat. BMPs employed may include, but are not limited to, silt fence, straw wattles, sediment bags, and straw bales. Because the Proposed Action would avoid all potential mountain sucker habitat, utilize BMPs to protect aquatic areas, and implement a Noxious Weed Reclamation and Revegetation Plan, the Proposed Action will present a negligible effect on the Forest-wide population and habitat trend for mountain sucker.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to aquatic habitat. The Proposed Action may result in the introduction of aquatic invasive plants which may degrade mountain sucker habitat. All construction equipment would avoid aquatic habitats and a noxious and invasive weed and aquatic nuisance management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to aquatic habitats would be minimized.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action may result in increased predation rates for the Mountain Sucker as a result of perching predators. Increased predation effects may be localized to perching structures throughout the life of the transmission line. However, transmission line

structures, for the most part would avoid aquatic habitat, therefore the effects to these species is likely to be low.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for the mountain sucker. Project mitigation measures would reduce or eliminate impacts to the mountain sucker.

Compliance with Applicable Regulations

By following existing ROW to the greatest extent possible, the Proposed Action would reduce habitat loss to Mountain Sucker and retain the maximum amount of habitat possible. This would ensure that the Proposed Action complies with Goal 2, Objective 238d, Standards 1301, 1303 and 1306, Standard 3.7-2101, and Standard 5.4-3201.

Closing most access roads to public access would reduce impacts from recreational motorists ensure the Proposed Action complies with Standard 8.2-2104.

All new water crossings used by new or improved access routes would be constructed so as to allow aquatic species to pass through unimpeded. This would ensure the Proposed Action complies with Standard 1203.

Conclusions

Impacts to mountain sucker from implementation of the Proposed Action may include disturbance, habitat loss through degradation of water quality, and habitat degradation from noxious weeds. However, because the Proposed Action would avoid all streams and associated riparian areas and employ various BMPs to reduce siltation of water bodies, the Proposed Action will present a negligible effect on the Forest-wide population and habitat trend for mountain sucker. The Proposed Action is also consistent with Objective 238d given the implementation of BMPs.

3.2.2.2.1.1.3 BHNF USFS Region 2 Sensitive Species

3.2.2.2.1.1.3.1 Grassland/Meadow Dependent Species

Direct and indirect effects to the BTPD, Grasshopper Sparrow, Burrowing Owl, Northern Harrier, Loggerhead Shrike and the regal fritillary are described in further detail below.

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of the Proposed Action has the potential to temporarily disturb grassland/meadow dependent bird species. The presence of construction personnel, the use of construction equipment, and noise generated from construction could potentially disturb their nesting and foraging within the analysis area. BTPD burrows may be temporarily abandoned as the result of disturbance by construction activities. Given the open nature of grassland habitat occupied by these species impacts from construction related disturbance may occur at longer distances than forest dwelling species. Disturbance from construction activity would be localized to the area of active construction and limited to the duration of construction. Grassland/Meadow dependent bird and mammal species' habitat use and behaviors would likely return to normal

patterns once construction is completed. Helicopter based surveys for operation and maintenance monitoring of the line would have negligible effect on these species. The regal fritillary would not be affected by disturbance related impacts.

Habitat loss from vegetation clearing for ROW, access roads, and other Project-related features

At temporarily disturbed sites on grasslands, soil is compacted, but limited surface soil is removed except for road access needs. Additional temporary disturbance would include temporary new access roads, construction yards/staging areas, decking yards, pulling/tensioning sites, and the work area around structures. Even though vegetation may be damaged, this creates vertical mulch upon the surface soil and leaves the seed bank in place. Crushed vegetation provides opportunities for more effective re-vegetation because affected plants typically re-sprout after temporary use is stopped. The other prominent example of modified vegetation is deforestation under spanned areas of the ROW—herbaceous vegetation will remain and habitat loss would not necessarily occur for species that inhabit unforested areas. Habitat loss in these temporarily disturbed areas would be allowed to return to pre-construction habitat types, though in some cases, full recovery to pre-disturbance habitat conditions may take many years.

Implementation of the Proposed Action would result in a permanent loss of habitat for Region 2 Sensitive grassland/meadow dependent species. Habitat within the analysis area includes open grasslands with various species compositions. The proposed ROW would occupy 33 acres of potential habitat grassland/meadow dependent species. Grassland habitats would not be cleared of vegetation within the ROW and would continue to provide suitable habitat post-construction. Soil is compacted, but no surface soil is removed except for road clearing. Even though vegetation may be damaged, this creates vertical mulch upon the surface soil and leaves the seed bank in place. Crushed vegetation provides opportunities for more effective re-vegetation because affected plants typically re-sprout after temporary use is stopped. Approximately seven structures would be placed on grassland habitat on the BHNF. Temporary disturbance associated with construction areas for these seven structures would be approximately two acres. Permanent habitat loss from these seven structures would be negligible. Construction of access roads associated with the Proposed Action would result in the permanent loss of 13 acres of potential grassland/meadow habitat. Temporary overland access and timber decking areas would temporarily impact nine acres of potential habitat; grasslands temporarily disturbed within the ROW that would remain intact post-construction would occupy 33 acres for a total temporary disturbance of 42 acres. See **Tables 3-6** and **3-17** for comparisons of habitat types impacted by the Proposed Action and what is currently available.

Direct mortality from construction, operations, and maintenance equipment

Implementation of the Proposed Action has the potential to result in direct injury or mortality to grassland/meadow dependent species. Direct mortality may be caused by collisions with vehicles associated with the Project. Grading and removal of grassland habitats for access roads and construction areas associated with the Proposed Action could potentially kill BTPD, nesting bird species and regal fritillary larvae. Implementation of project mitigation measures,

provided in **Appendix B**, would reduce or eliminate potential short-term impacts to individuals especially during the breeding season as a result of the Proposed Action; therefore the effects on Region 2 Sensitive grassland/meadow dependent species would be negligible.

Collision with transmission lines or associated guy-wires (9)

Implementation of the Proposed Action would result in an increase in collision risk between grassland/meadow dependent bird species and infrastructure associated with the Proposed Action. Birds may be susceptible to collision during low light levels or inclement weather; however, because these birds are agile fliers, the risk of these grassland/meadow dependent birds colliding with the Proposed Action is minimal. There is no documentation regarding the regal fritillary associated with transmission lines or associated guy-wires. The regal fritillary is not expected to be at risk for injury or death as the result of collision with transmission lines or guy-wires.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to grassland/meadow habitat. Noxious weeds can overtake native grassland communities, reduce prey abundance and create monocultures too dense to provide suitable nesting and foraging habitat. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action.

The establishment of nonnative or invasive vegetation would limit the potential nesting habitat for smaller grassland birds that nest in stands of native grasses. Such species include Loggerhead Shrike and Grasshopper Sparrow. Establishment of nonnative or invasive vegetation presents lower habitat suitability than native grasses by offering less optimal forage, cover, and nesting habitat. Impacts to Northern Harrier and Burrowing Owl from nonnative and invasive vegetation would include a reduction in suitable nesting habitat and a drop in available prey base. This would make grasslands comprised of predominantly nonnative or invasive vegetation less suitable than native grasses. The establishment and spread of noxious weeds would reduce potential BTPD habitat as noxious weeds are generally not considered suitable habitat (Roe and Roe 2003). Regal fritillary would likely experience less suitable habitat if noxious weeds should become established.

Flashovers on transmission lines caused by avian nesting material, prey, or streamers touching two energized conductors at once can ignite wildfires that may create a greater impact in nonnative vegetation that in native grasses. The periodic removal of nesting material and proper spacing of conductors can reduce the risk of flashovers occurring, thus lowering the risk of fire spreading through invasive weeds. Creation of a Noxious and Invasive Weed Management Plan would reduce the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious and Invasive Weed Management Plan are implemented, along with periodic removal of nesting material and proper conductor spacing to avoid flashovers potential impacts from noxious weeds would be reduced.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action may result in increased predation rates for grassland/meadow dependent birds and BTPD as a result of perching and nesting raptors and corvids on the seven structures placed in grassland habitats. Increased predation effects may be permanent but localized to perching structures throughout the life of the transmission line. However, increased predation rates would not likely have a long-term negative effect on these species or their use of suitable habitat.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for Region 2 grassland/meadow habitat dependent species. Implementation of project mitigation measures, **Appendix B**, would reduce or eliminate impacts such noxious weed spread and mortality during the breeding season.

Compliance with Applicable Regulations

Completion of this analysis and associated BA/BE would ensure the Proposed Action complies with the BHNF LRMP Goal 2, Objective 221. The Proposed Action will comply with Standards and Guidelines of the BHNF LRMP when all mitigation measures are applied.

The Proposed Action does not anticipate any insecticide applications. As such, the Proposed Action would comply with Standard 3120.

Grassland Associated Species Cumulative Effects

Increased fire suppression efforts in past decades had reduced an important disturbance component in the Black Hills which created open grasslands. Effective fire suppression efforts have allowed open grassland patches to be recolonized by conifer forests throughout BHNF. However, prescribed burning, grassland restoration projects, and recent intense wildfires have acted to re-establish grassland habitats. Future grassland restorations efforts are expected on BHNF, but natural succession and fire suppression will continue. The Proposed Action could potentially act as a fire break to slow wildfires, thus reducing their capability to create new grassland habitat.

Development of grasslands for subdivision, houses and ranches, roads, and the associated introduction of non-native species have resulted in smaller, more fragmented patches of grassland habitat throughout BHNF. This has resulted in a reduction of available grassland patches of adequate size and plant composition to support sensitive grassland species. Removal of vegetation through mowing, wildfire, and prescribed burning during the critical phases of these species have likely caused mortality and reduced reproductive success, especially if these activities did not provide a mosaic of various grassland successional stages. Use of herbicides on both private and forest have decreased vegetation species diversity in native, forb-rich grasslands (e.g., montane grasslands). This likely affected the abundance of prey host/nectar plants. Pesticide use on private forest could reduce prey availability. The Proposed Action would temporarily remove grassland habitat, potentially adding to cumulative pressures felt from these impacts.

Overall, despite the possible death, injury, and displacement of some animals, the cumulative impacts associated with the Proposed Action are not expected to significantly reduce the size or viability of BTPD, Grasshopper Sparrow, Burrowing Owl, Northern Harrier, Loggerhead Shrike, and regal fritillary populations within the analysis area.

Grassland Species Determination and Rationale

Under the No Action Alternative, implementation would have "*no impact*" on grassland-dependent R2 sensitive wildlife species. This determination is based on the lack of new disturbance or project-related effects on the habitats and sensitive species occurring in the analysis area.

Under the Proposed Action, implementation "*may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing*" of grassland-dependent R2 sensitive wildlife species. This determination is based on the relatively limited (spatially and temporally) potential for direct impacts on these species, and for the use and effectiveness of mitigation measures to avoid, reduce, or mitigate potential direct and indirect effects on these species.

3.2.2.2.1.1.3.2 Wetland/Riparian/Aquatic Dependent Species

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of the Proposed Action has the potential to temporarily disturb Bald Eagle, Black Hills red-bellied snake and Northern leopard frog. The presence of construction personnel, the use of construction equipment, and noise generated from construction could potentially disturb nesting, roosting and foraging Bald Eagles. Identified Bald Eagle nests and winter roosts would be seasonally avoided based on dates and distances provided by the BHNF LRMP (Appendix D). Bald Eagle nests would be permanently avoided by at least 660 feet as recommended by the National Bald Eagle Management Guidelines (USFWS 2007c). Black Hills red-bellied snake and Northern leopard frog may temporarily flee occupied habitats proximal to proposed construction areas. However, given the small amount of potential riparian habitat in the analysis area and the small amount of habitat that may be crossed by the ROW or access roads associated with the Proposed Action, the likelihood of disturbing the Black Hills red-bellied snake and Northern leopard frog are low. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb Black Hills red-bellied snake and Northern leopard frog. However, helicopter surveys may disturb Bald Eagles if completed during critical periods in high use areas (e.g., winter communal roosts, nests). Mitigation measures, described in **Appendix B**, would be implemented to reduce or eliminate impacts to these species. Lake chub and mountain sucker are not expected to experience disturbance related impacts.

Habitat loss from vegetation clearing for ROW, access roads, and other Project-related features

Construction of the proposed ROW could impact habitats that are suitable for the Bald Eagle, Black Hills red-bellied snake, and northern leopard frog, mountain sucker, and lake chub. Willows, aspen, spruce trees or other vegetation tall enough to interfere with the completed transmission line would be removed; however, removal of riparian and wetland vegetation would be avoided to the greatest extent possible. Aquatic species associated with clear water may experience temporary habitat degradation beyond the boundaries of the ROW resulting from siltation, if road-improvement and other ground-breaking activities cause erosion and siltation of streams, lakes, and ponds during the construction phase. Mountain suckers may occur in three named streams within the analysis area that would be crossed by the Proposed Action. Lake chub are not known to occur within close proximity of the proposed ROW. New and improved access roads and overland access paths for construction, operation and maintenance of the Proposed Action would cross wetlands, riparian areas, and aquatic habitat at pre-existing crossing locations, such as existing bridges and culverts, to the greatest extent possible.

Field surveys completed by BHP did not identify any riparian habitat that would be impacted in support of new access roads located outside of the ROW. All creeks would be spanned by the Proposed Action and no in-water work would occur. BMPs to be described in the Proposed Action SWPPP would limit the amount of sediment moving into wetlands and riparian areas, potentially degrading wetland/riparian dependent species. BMPs that shall be applied may include, but are not limited to, silt fence, straw wattles, sediment bags, and straw bales. Any new access road water crossings will be constructed according to Standard 1203 to allow fish and other aquatic species to pass. In addition, Mitigation measures, described in **Appendix B**, would be implemented to reduce or eliminate impacts to these species. See Tables 3-7 and 3-17 for a comparison of habitat types within the analysis area and what would be impacted by the Proposed Action.

Direct mortality from construction, operations, and maintenance equipment

Implementation of the Proposed Action has the potential to result in direct injury or mortality to Bald Eagle, Black Hills red-bellied snake and Northern leopard frog. Direct injury or mortality to Bald Eagles may occur from collisions with moving vehicles. Injury or mortality to Black Hills red-bellied snake and Northern leopard frogs may occur as a result of crushing by vehicles, soil compaction of hibernation sites, especially if access routes bisect migration routes from wintering areas and breeding habitat. Wetland and riparian habitat would be avoided by the Proposed Action to the greatest extent practicable. No disturbance to wetland and riparian habitat is anticipated at this time; however, this may change as more specific structure spotting is developed. The likelihood that long-term effects on the status of these species based on the potential for isolated occurrences of injury or mortality to individuals would be low. However, mortality rates for the Black Hills red-bellied snake and northern leopard frogs may be higher in areas where increased vehicle traffic as a result of construction, operations and maintenance equipment occurs during migration periods. Direct mortality from construction related equipment would not occur for lake chub and mountain sucker. At no point would construction related equipment enter aquatic habitat, thus eliminating the potential for direct mortality. Mitigation

measures, described in **Appendix B**, would be implemented to reduce or eliminate impacts to these species.

Collision with transmission lines or associated guy-wires

Implementation of the Proposed Action would result in an increase in collision risk between Bald Eagles and infrastructure associated with the Proposed Action. Bald Eagles may be susceptible to collision during low light levels or inclement weather; however, the risk of Bald Eagles colliding with the transmission line structures is minimal. The Black Hills red-bellied snake, Northern leopard frog, mountain sucker, and lake chub would not be susceptible to collision with project-related infrastructure.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to wetland/riparian/aquatic habitat. The Proposed Action may result in the introduction of aquatic invasive species (plants and animals) which may degrade Region 2 Sensitive aquatic species habitat. Noxious weeds can overtake native riparian vegetation creating monocultures that are too dense to provide suitable habitat for the Black Hills red-bellied snake and Northern leopard frog, especially if prey species or water tables are reduced. Use of herbicide to control noxious weed spread could impact reproduction rates for the Black Hills red-bellied snake and Northern leopard frog. Bald Eagles may be indirectly impacted by noxious weed spread if their prey habitat is affected. However, the likelihood that Bald Eagles would be affected by the spread of noxious weeds would be low. All construction equipment would avoid aquatic habitats and a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. Creation of a Noxious Weed Reclamation and Revegetation Plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to Bald Eagle, Black Hills red-bellied snake, Northern leopard frog, mountain sucker, and lake chub from the spread of noxious weeds would be minimized.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action may result in increased predation rates for the Black Hills red-bellied snake, northern leopard frog, lake chub, and mountain sucker as a result of perching predators. Increased predation effects may be localized to perching structures throughout the life of the transmission line. However, transmission line structures, for the most part would avoid wetland/riparian habitat, therefore the effects to these species is likely to be low. The Bald Eagle would not be affected by this potential impact.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for Black Hills red-bellied snake and Northern leopard frog. Mitigation measures, included in **Appendix B**, would reduce or eliminate impacts to these wetland/riparian dependent species. Species specific mitigation measures

applicable to the Bald Eagle include seasonal and permanent nest buffers. Refer to **Appendix B** for these buffers.

Compliance with Applicable Regulations

Completion of this analysis and associated BA/BE would ensure the Proposed Action complies with the BHNF LRMP Goal 2, Objective 221. The Proposed Action will comply with Standards and Guidelines of the BHNF LRMP when all mitigation measures are applied.

The Proposed Action does not anticipate any insecticide applications. As such, the Proposed Action would comply with Standard 3120.

Wetland/Riparian/Aquatic Cumulative Effects

Historic livestock overgrazing, the loss of beaver, road construction, timber harvest activities, recreation use, mining activities, and land development and the resulting degradation of the majority of stream channels and lowering of water tables in the range allotments have affected the function and potential for many riparian areas to support riparian shrub and hardwood communities. The loss of hydrologic function has reduced riparian species such as green ash, cottonwood, aspen, birch and willow species to isolated patches and fragmented habitat. Drought conditions over the past decade have exacerbated the poor condition of most riparian areas. Browsing by ungulates and conifer encroachment has also led to the suppression of hardwood regeneration and development.

Sedimentation of streams and wetland habitat from grounds exposed by construction activities, existing roads, off-road vehicle use, and wildfires have resulted in increased sediment loads and increased water temperatures. These changes may influence the forest-wide distribution of mountain sucker, lake chub, Black Hills red-bellied snake, and northern leopard frog. Future prescribed burns are not expected to create these kinds of impacts on wetland and aquatic habitat.

The Proposed Action will avoid or span all wetland, riparian, and aquatic habitat which may occur in potential impact areas. All wetland, riparian, and aquatic habitat will be protected by BMPs to be described in the SWPPP. Because the Proposed Action will avoid and protect all wetland, riparian, and aquatic habitat, the Proposed Action will not add to the cumulative impacts from fragmentation, alteration, degradation, and conversion of habitat for mountain sucker, lake chub, Black Hills red-bellied snake, and northern leopard frog within the analysis area.

The Proposed Action may produce a cumulative disturbance impact on Bald Eagles if other disturbances are present around construction activities. Any Bald Eagle nests or winter roosts would be avoided by the prescribed avoidance buffers. This would limit the potential of the Proposed Action to increase the cumulative disturbance impact to Bald Eagles.

Overall, despite the possible death, injury, and displacement of some animals, the cumulative impacts associated with the Proposed Action are not expected to significantly reduce the size or viability of Bald Eagle, Black Hills red-bellied snake, northern leopard frog, mountain sucker, and lake chub populations within the analysis area.

Wetland/Riparian/Aquatic Determination and Rationale

Under the No Action Alternative, implementation would have "*no impact*" on wetland/riparian/meadow-dependent R2 sensitive wildlife species. This determination is based on the lack of new disturbance or project-related effects on the habitats and sensitive species occurring in the analysis area.

Under the Proposed Action, implementation "*may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing*" of wetland/riparian/meadow-dependent R2 sensitive wildlife species. This determination is based on the relatively limited (spatially and temporally) potential for direct impacts on these species, and for the use and effectiveness of mitigation measures to avoid, reduce, or mitigate potential direct and indirect effects on these species.

3.2.2.2.1.1.3.3 Conifer Forest Dependent Species

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of the Proposed Action may temporarily disturb hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, and Flammulated Owl. Cooper's rocky mountainsnail would not likely be impacted by disturbance. The presence of construction personnel, the use of construction equipment, and noise generated from construction may disturb nesting and foraging conifer dependent bird species that occur near the proposed construction areas. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction. The hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, and Flammulated Owl in the analysis area would be able to continue normal behaviors once construction is completed. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb conifer forest dependent Sensitive species.

Areas with known Goshawk activity within the last three years would be monitored during the breeding season prior to construction activity. If active nests are located, mitigation measures would be applied to avoid disturbing nesting birds (**Appendix B**).

Vegetation clearing in support of the Proposed Action would take place outside of the migratory bird nesting season (April 15 – July 31). By performing clearing activities outside of the nesting season, the Proposed Action would greatly reduce disturbance impacts to nesting sensitive bird species. If vegetation clearing is planned in the nesting season, preconstruction migratory bird nest surveys would preclude the clearing and appropriate nest buffers, to be determined through discussions with USFWS, would be applied. Clearing vegetation outside of the migratory bird nesting season, or completion of nest surveys and application of nest buffers, would reduce disturbance impacts to nesting bird species and would ensure the Proposed Action remains in compliance with the Migratory Bird Treaty Act.

Mammal species that are known to roost in trees would also be vulnerable to disturbance effects. During the maternity season in late-spring/early-summer; hoary bats roost exclusively in

tree foliage. Disturbance to maternity rearing areas may disrupt rearing of young and may cause displacement from traditional rearing areas. American marten have the tendency to avoid human activity and may be temporarily displaced from the area immediately surrounding human activities. The Proposed Action would avoid riparian areas that are documented to be used by American marten as travel corridors. Therefore, disturbance to this species would be minimal and short-term. For all conifer dependent species, once disturbance activity is complete, potentially displaced individuals would be able to reoccupy the area.

Habitat loss from vegetation clearing for ROW, access roads, and other Project-related features

Habitat within the analysis area includes mature ponderosa pine stands, white spruce stands and stands damaged by insect activity (primarily pine beetle) and fires. The Proposed Action could result in a permanent loss of habitat for hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, Flammulated Owl and Cooper's rocky mountainsnail. Species that depend on mature conifer trees as a critical habitat component would experience the most habitat loss, partly because forested habitat makes up the majority of the ROW, and partly because tree-clearing would result in total and permanent conversion of conifer dominated habitats. Habitat loss for tree-dependent species would be reduced because the Proposed Action would follow an existing, unoccupied ROW for 47 miles, however this reduction in lost habitat cannot be quantified at this time. Although tree-dependent species would experience the largest amount of habitat loss, the acreages lost would be small relative to the total amount of available forested habitat within the analysis area (**Tables 3-6, 3-7**, and **3-16**).

Northern Goshawks hunt in a variety of open or closed forest types, but for nesting they depend on mature, closed canopy forest with large trees. BHNF forest-wide Standard 3108 calls for identifying and protecting 180 acres of suitable nesting habitat within one-half mile of historically active nests. Implementation of this standard would reduce impacts to nesting Northern Goshawks within one-half mile of the Proposed Action.

Implementation of the Proposed Action would result in the loss of 545 acres of ponderosa pine forest and ten acres of white spruce forest. Construction of the proposed ROW would result in the permanent loss of conifer forest habitat preferred by FS Sensitive species, including 11 acres of forest stands with ten or more live trees greater than five inches in diameter per acre showing signs of insect damage, 27 acres of stands classified as 4C (mature trees cover > 70%), and 89 acres of forest stands in which old burns reduced the stands timber productivity. The construction of Project-related access roads would destroy another two acres of potentially suitable conifer forest habitat. Construction areas and timber decking areas would not be placed in potential hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, Flammulated Owl and Cooper's rocky mountainsnail habitat. While the Proposed Action may disturb 545 acres of ponderosa pine and ten acres of white spruce, not all of these acres would provide optimal habitat for hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, Flammulated Owl and Cooper's rocky mountainsnail. Implementation of the Proposed Action would result in the loss of an estimated 129 acres of optimal hoary bat, American marten, Northern Goshawk, Lewis's

Woodpecker, Black-backed Woodpecker, Flammulated Owl and Cooper's rocky mountainsnail habitat. The existing 47 mile long unoccupied ROW, which currently supports younger trees, does not include suitable hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, Flammulated Owl and Cooper's rocky mountainsnail habitat.

Land snails in general are susceptible to habitat changes that increase sun exposure, disturb vegetation cover, reduce micro-site humidity, compact soil, or remove litter or coarse woody debris (Anderson 2005). Snails may be less likely or unable to cross a corridor where these habitat changes have occurred, such as portions of the ROW if vegetation below ROW would provide protection from desiccation. For some snail species paved and unpaved roads have been shown to limit dispersal. It is likely that the ROW and associated roads under the Proposed Action would influence snail dispersal if snails are present in the area. The ROW does not cross any currently known snail colonies. Loss of vegetative cover under the ROW due to disturbance and construction would temporary; therefore, effects of ROW clearing to snails would be low.

Direct mortality from construction, operations, and maintenance equipment

The Proposed Action could result in direct mortality to the hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, Flammulated Owl and Cooper's rocky mountainsnail habitat, through collision or destruction of occupied cavities. Species may experience injury or mortality during tree removal, and vehicle travel associated with construction, operations, and maintenance of the Proposed Action. The Cooper's rocky mountainsnail could be crushed by machinery or by dislodged rocks in construction areas. Bats colliding with vehicles could occur, but unlikely since bat species are typically nocturnal and work activities would likely be less during the night time. American marten would likely flee from construction activities but would cross roads when traffic volume increases. Birds could potentially collide with vehicles, but their ability to maneuver inflight decreases the potential for collisions. While collisions with vehicles may occur to these species from temporary increases in traffic volume, the risk and likelihood is low. Implementation of mitigation measures identified in **Appendix B** would reduce or eliminate potential short-term impacts to individuals during the breeding season as a result of the Proposed Action, therefore the potential for injury or mortality to the hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, Flammulated Owl and Cooper's rocky mountainsnail habitat are negligible.

Collision with transmission lines or associated guy-wires

Implementation of the Proposed Action would likely increase the risk of avian and bat collisions with the transmission line wires or associated guy-wires, which may result in injury or mortality. Collision risk varies among avian species and depends on physiology and flight behavior, as well as weather and location of the transmission line in relation to bird use areas (Savereno et al. 1996; Bevanger 1998). In general, avian collision with power lines (distribution and transmission) is typically greatest where the lines cross migratory paths, bisect feeding and nesting or roosting sites, or occur adjacent to major avian use areas, none of which occurs in conifer habitat in the analysis area. The Proposed Action would result in an increase in collision risk between infrastructure associated with the Proposed Action for the hoary bat, Northern

Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, and Flammulated Owl. The hoary bat and birds may be susceptible to collision during low light levels or inclement weather; however, because hoary bat, Northern Goshawk, Lewis's Woodpecker, Black-backer occupy habitat with numerous obstructions (i.e., branches) and do not have the high wingloading and low aspect values that make a species more prone to collision, the risk of the hoary bat and birds colliding with the Proposed Action is minimal. There would be no effects to American marten or Cooper's rocky mountain snail as a result of collision with the transmission line or guy-wires.

Indirect Effects

Noxious weed spread

The establishment and spread of noxious weeds or non-native species can result in degradation of wildlife habitat (Levine et al. 2003). Non-native plant invasions have the potential to permanently impact wildlife habitat quality by out-competing native plants, altering the natural fire regime, and changing ecosystem processes (e.g., nitrogen cycling). Some non-native plants, such as cheatgrass, create a more continuous fuel bed than native bunchgrasses, resulting in an increased risk of wildfire (Paysen et al. 2000). Construction of access roads and the movement of construction equipment and vehicles along these access roads or the occurrence of overland travel may increase the potential for the establishment and spread of noxious weeds.

The potential for the establishment and spread of noxious weeds could create a permanent impact to the hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, Flammulated Owl and Cooper's rocky mountainsnail habitat. The increased fire risk associated with noxious weeds could increase the risk of wildfire, which would create additional Black-backed Woodpecker and Lewis' Woodpecker habitat short-term. Loss of forest habitat caused by wildfire would have long-term negative effects, especially for American marten, Northern Goshawk, Flammulated Owl and Cooper's rocky mountainsnail because these species rely on later seral stages of ponderosa pine and/or spruce. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to the hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, Flammulated Owl and Cooper's rocky mountainsnail from the spread of noxious weeds would be greatly reduced.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action may result in increased predation rates for the hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, Flammulated Owl and Cooper's rocky mountainsnail as a result of perching and nesting raptors and corvids; however, these impacts would be minimal given the amount of existing perches available in a forest environment. Increased predation effects, even if they are minimal, may be permanent but localized to perching structures throughout the life of the transmission line.

However, increased predation rates would not likely have a long-term negative effect on these species or their use of suitable habitat.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for the Region 2 Sensitive Species that are dependent on conifer forest habitat. Mitigation measures, included in **Appendix B**, would reduce or eliminate impacts to the hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, Flammulated Owl and Cooper's rocky mountainsnail.

Compliance with Applicable Regulations

Completion of this analysis and associated BA/BE would ensure the Proposed Action complies with the BHNF LRMP Goal 2, Objective 221. The Proposed Action will comply with Standards and Guidelines of the BHNF LRMP when all mitigation measures are applied.

The Proposed Action does not anticipate any insecticide applications. As such, the Proposed Action would comply with Standard 3120.

Conifer Associated Species Cumulative Effects

The dominant tree species within the analysis area, ponderosa pine, is currently undergoing substantial mortality based on the mountain pine beetle outbreak. As a result, untreated portions of the analysis area would revert to an earlier seral pine stands. Since most mountain pine beetle killed trees fall within 5-10 years, habitat created for cavity dependent species would decline. While this will have a short-term positive effect on species dependent on insect outbreaks and fire such as the Black-backed Woodpecker and Lewis' Woodpecker by improving habitat suitability, the mountain pine beetle outbreak will have a negative impact on conifer forest dependent Region 2 Sensitive species long-term, especially species associated with mature pine forest, such as the Northern Goshawk, Flammulated Owl, northern flying squirrel, and Cooper's rocky mountainsnail. As a result of the mountain pine beetle outbreak, fire hazards (residual fuel loading) would increase, especially in untreated areas. There is a greater potential of wildfire caused by the transmission line once in use (arcing, downed lines) which increases the potential for long-term habitat loss for forest dependent species until burned areas recover to existing conditions.

Timber harvest activities completed in the past throughout the analysis area have opened the existing canopy and removed large diameter trees which may provide suitable habitat to conifer habitat dependent species. Additionally, fuels treatment and stand thinning activities have reduced multi-stage forest components suitable for nesting Northern Goshawk. Snag reduction efforts have reduced potential nesting habitat for Black-backed Woodpecker, Lewis's Woodpecker, and Flammulated Owl; however, current management goals provide for a suitable amount of snags for nesting populations. High levels of canopy closure from past forestry practices and fire suppression have resulted in a higher level of canopy closure, which may in turn reduce the potential prey base for Northern Goshawk and Flammulated Owl, as well as Black-backed Woodpecker and Lewis's Woodpecker when these species glean insect prey off the boles of trees.

Summer of 2012 was an especially intense year for wildfire in the BHNF. The Proposed Action would result in a small loss of wildlife habitat when compared to that of wildfires which have been bolstered by the standing dead timber left from the mountain pine beetle. The cleared ROW of the Proposed Action could act as a fire break to reduce the loss of habitat in the event of a wildfire.

Project-related traffic and construction activity may result in the injury or mortality to conifer dependent species but these numbers would be small in comparison to total species populations. Cumulative effects of direct mortality from other actions would be limited to projects being completed at the same time as the Proposed Action. Such projects may include the timber harvest and subdivision development. Direct mortality from construction related equipment may crush Cooper's rocky mountainsnail, however avoidance of all known snail colonies would limit this impact. Performing all clearing activities outside of the migratory bird nesting season would limit the possibility of direct mortality to nesting birds.

Treatments to reduce or eliminate noxious weeds and invasive species would continue on BHNF and private property within the area. Treatments may include pesticides, biological control agents for example. The Proposed Action would implement a Noxious Weed Reclamation and Revegetation Plan to limit the potential to spread noxious weeds. Rehabilitation of disturbed sites using native, weed-free seed would lessen the potential for noxious weeds to establish that could potentially replace important wildlife habitat. Implementation of project mitigation measures would reduce the potential for spread of aquatic nuisance species.

Overall, despite the possible death, injury, and displacement of some animals, the cumulative impacts associated with the Proposed Action are not expected to significantly reduce the size or viability of hoary bat, American marten, Northern Goshawk, Lewis's Woodpecker, Black-backed Woodpecker, Flammulated Owl and Cooper's rocky mountainsnail populations within the analysis area.

Conifer Forest Species Determination and Rationale

Under the No Action Alternative, implementation would have "*no impact*" on coniferous forest-dependent R2 sensitive wildlife species. This determination is based on the lack of new disturbance or project-related effects on the habitats and sensitive species occurring in the analysis area.

Under the Proposed Action, implementation "*may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing*" of coniferous forest-dependent R2 sensitive wildlife species. This determination is based on the potential for direct impacts on these species, and the use and effectiveness of mitigation measures to avoid, reduce, or mitigate potential direct and indirect effects on these species.

3.2.2.2.1.1.3.4 Cliff/Cave Dependent Species

Direct Effects

Disturbance from construction, operations, and maintenance activities

Construction related activities associated with the Proposed Action, such as the presence of construction personnel, presence and use of construction equipment, and noise impacts related to construction activities, may temporarily disturb Townsend's big-eared bat, fringed myotis, Rocky Mountain bighorn sheep and American Peregrine Falcon. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction.

Wild sheep have habituated to human activity where the activity is predictable temporally and spatially. However, human disturbance on and near winter ranges and lambing sites may be detrimental. Very little is known on the effects of helicopter use on bighorn sheep. Some studies suggest that animals may respond differently to a human caused noise stimulus associated with perceived predation risk (Frid and Dill 2002, Stankowich 2008). Bighorn sheep appear to be more sensitive to human caused disturbance when security is threatened. Factors that influence movement and avoidance may include predictability, frequency and magnitude, timing, and location of the disturbance (Knight and Cole 1995). A sudden, fast approaching stimuli coming from above such as low flying aircraft may elicit a different response compared to a slow moving stimuli such as a hiker walking up a hill.

Disturbance that occurs during critical periods (maternity and hibernation periods) for bats could cause bats to abandon roost sites during these critical periods that could result in death and/or reduced reproductive rates. Disturbance of American Peregrine Falcon nests could cause the same results as those for bats. However, once construction is complete, individuals would be able to reoccupy the area of construction. All of these Region 2 cliff/cave dependent sensitive species in the analysis area would be able to continue normal behaviors once construction is completed. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to the Townsend's big-eared bat or fringed myotis. However, helicopter based surveys have the potential to disrupt Rocky Mountain bighorn sheep and American Peregrine Falcon if the surveys are done during critical periods such as nesting, lambing or during winter when energy reserves are low. Implementation of project mitigation measures would reduce or eliminate the potential for disturbance of cliff/cave dependent sensitive species during critical periods.

Habitat loss from vegetation clearing for ROW, access roads, and other Project-related features

Implementation of mitigation measures described in **Appendix B** will ensure that no cliff or cave type habitat, which is likely to be these species most limiting habitat component, will be removed as part of the Proposed Action. However, vegetation clearing and construction of the transmission line could cause a loss of potential foraging habitat for cliff/cave dependent habitat. See **Tables 3-6** and **3-17** for comparison of habitat types impacted by the Proposed Action and what is currently available which could be used by cliff/cave dependent species as foraging areas. Implementation of appropriate mitigation measures are expected to nearly eliminate the

potential for project-related activities to directly alter or remove cliff/cave habitats occupied by R2 sensitive wildlife species.

Rocky Mountain bighorn sheep could experience long-term beneficial impacts from vegetation clearing under the Proposed Action. Forage would increase by reducing forested structural stage within the ROW. Clearing of vegetation would also increase the ability to see predators, reducing predation rates in those areas. However, additional access to areas that were not previously accessed could provide predators' easy access to foraging areas, increase human caused disturbance, which would eventually decrease the use of some areas by bighorn sheep.

Implementation of project mitigation measures, identified in **Appendix B**, would reduce or eliminate potential short-term impacts to individuals especially during critical periods as a result of the Proposed Action; therefore the effects to Region 2 Sensitive cliff/cave dependent species would be negligible.

Direct mortality from construction, operations, and maintenance equipment

Construction, operation and maintenance activities have the potential to cause direct injury and mortality to cliff/cave dependent Region 2 Sensitive species. The highest risk of injury or mortality would occur during construction phase of the Proposed Action.

Bat species could be crushed by machinery or by dislodged rocks in the unlikely event construction activities occur at or near previously undocumented roost sites. While collisions with vehicles may occur to these species from temporary increases in traffic volume, the risk and likelihood is low. Bats colliding with vehicles could occur, but unlikely since bat species are typically nocturnal and work activities would likely be less during the night time. Bighorn sheep would likely flee from construction activities, which could cause loss of footing on steep cliffs. Collision with vehicles could occur if bighorn sheep are using road side areas for foraging and obtaining salt. American Peregrine Falcons are unlikely to collide with project-related vehicles and equipment. For cliff/cave dependent Region 2 Sensitive species, mortality caused by Project activities is expected to be rare event , and therefore not expect to affect species persistence Forest-wide.

Collision with transmission lines or associated guy-wires

Collision with transmission lines or associated guy-wires may cause direct mortality to bats and the American Peregrine Falcon. For birds, high mortality rates usually occur in specific localized situations where certain localized situations may create high risk potential, for example where lines are placed near seasonal migration routes and/or between foraging and nesting areas. The placement of the line relative to surrounding vegetation can also influence collision risk. Lines that are at or below the canopy height of adjacent trees rarely present a problem because tree-dwelling birds are usually maneuverable enough to avoid the lines, and other species will typically be flying above the canopy (APLIC 2012). Based on excellent flight maneuverability of the Townsend's big-eared bat, Fringed myotis and American Peregrine Falcon, the probability of mortality cause by collision with transmission lines or associated guy-wires are low.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to Region 2 Cliff/Cave dependent Sensitive Species habitat. The establishment and spread of noxious weeds or non-native species can result in degradation of wildlife habitat (Levine et al. 2003). Non-native plant invasions have the potential to permanently impact wildlife habitat quality by out-competing native plants, altering the natural fire regime, and changing ecosystem processes (e.g., nitrogen cycling). Noxious weeds can overtake native plant communities, changing suitable habitat for prey species or reduce water tables that are important for parts of their life cycle. Use of herbicide to control noxious weed spread could impact prey abundance for bats. Loss of palatable forage species due to invasive species could reduce nutritional value of forage for bighorn sheep. Loss of suitable forage could negatively affect reproduction and survival rates for bighorn sheep or cause a shift in use areas. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to Townsend's big-eared bat, fringed myotis, Rocky Mountain bighorn sheep and American Peregrine Falcon from impacts of noxious weed spread would be minimized.

Increased predation based on an increase in perching and nesting opportunities for raptors

Cliff/cave-dependent sensitive wildlife species are not expected to experience increased predation rates from raptors or corvids potentially perching or nesting on the proposed structures.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for the Region 2 Sensitive Species that are dependent on cliff/cave habitat. Project mitigation measures, described in **Appendix B**, would reduce or eliminate impacts to the Townsends big-eared bat, fringed myotis, Rocky Mountain bighorn sheep and American Peregrine Falcon.

Compliance with Applicable Regulations

Completion of this analysis and associated BA/BE would ensure the Proposed Action complies with the BHNF LRMP Goal 2, Objective 221. The Proposed Action will comply with Standards and Guidelines of the BHNF LRMP when all mitigation measures are applied.

The Proposed Action does not anticipate any insecticide applications. As such, the Proposed Action would comply with Standard 3120.

Cliff/Cave Species Cumulative Effects

Due to these species preference for steep, rocky terrain, very little vegetative treatments have occurred in their preferred habitat. However, areas that can be accessed by traditional harvest activities are likely to improve forage habitat adjacent to steep terrain for Townsend's big-eared bat, fringed myotis, Rocky Mountain bighorn sheep, and American Peregrine Falcon. Increased recreation use in critical use areas for Rocky Mountain bighorn sheep (i.e., lamb rearing areas) especially OHV use could be a factor in bighorn recruitment numbers. Mortality can occur while

trying to escape human presence, especially when lambs are very young and easily disturbed. Several factors associated with recreation use include displacement to less suitable habitat, noise, disruption of traditional movement corridors, loss of suitable areas for shelter/cover, and increased chances of domestic sheep/goat interactions (Beecham et al. 2007). Closures of caves with known Townsend's big-eared bat and fringed myotis hibernacula and cliffs with known American Peregrine Falcon aires have helped reduce disturbance to these species during critical life history periods. The Proposed Action would avoid all known bat hibernacula, American Peregrine Falcon aeries, and Rocky Mountain bighorn sheep sensitive areas as described in Appendix B and would not contribute to cumulative disturbance related impacts.

Timber harvest activities completed in the past throughout the analysis area have opened the existing canopy and removed large diameter trees which may provide suitable foraging habitat to Townsend's big-eared bat and fringed myotis. High levels of canopy closure from past forestry practices and fire suppression have resulted in a higher level of canopy closure, which may in turn reduce the potential prey base for Townsend's big-eared bat and fringed myotis. Additionally, fire suppression efforts have allowed pine stands to encroach on high slope areas which may serve as foraging grounds for Rocky Mountain bighorn sheep. The Proposed Action would open pine habitats and may create increased foraging opportunities for Townsend's big-eared bat, fringed myotis, and Rocky Mountain bighorn sheep.

Mine and cave closures across the BHNF in an effort to protect bat species and identification of seasonal habitats for Rocky Mountain bighorn sheep have reduced the amount of suitable habitat for these species. The Proposed Action would not result in the closure of caves or mines, or the removal of steep and cliff type terrain. Therefore, the Proposed Action would not contribute to cumulative impacts of habitat loss.

Overall, despite the possible death, injury, and displacement of some animals, the cumulative impacts associated with the Proposed Action are not expected to significantly reduce the size or viability of Townsend's big-eared bat, fringed myotis, Rocky Mountain bighorn sheep, and American Peregrine Falcon populations within the analysis area.

Cliff/Cave Species Determination and Rationale

Under the No Action Alternative, implementation would have "*no impact*" on cliff/cave-dependent R2 sensitive wildlife species. This determination is based on the lack of new disturbance or project-related effects on the habitats and sensitive species occurring in the analysis area.

Under the Proposed Action, implementation "*may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing*" of cliff/cave-dependent R2 sensitive wildlife species. This determination is based on the relatively limited (spatially and temporally) potential for direct impacts on these species, and for the use and effectiveness of mitigation measures to avoid, reduce, or mitigate potential direct and indirect effects on these species.

3.2.2.2.1.1.3.5 BHNF Region 2 Sensitive Species Specific Mitigation Measures

Mitigation measures, described in **Appendix B**, would be implemented to reduce or eliminate impacts to BHNF Region 2 Sensitive Species. The following mitigation measures will also be employed to reduce potential impact of the Proposed Action on Region 2 Sensitive Species:

Initiate re-vegetation as soon as possible, not to exceed six months after termination of ground-disturbing activities. Revegetate all disturbed soils with native species in seed/plant mixtures that are noxious weed free. On areas needing immediate establishment of vegetation, non-native, non-aggressive annuals (e.g., wheat, oats, rye) or sterile species may be used while native perennials are becoming established, or when native species are not available. Other aggressive non-native perennials (e.g., smooth brome, timothy) will not be used. Seed will be tested for noxious weeds. If mulches are used, they are to be noxious-weed free. Weed free alfalfa seed may be used only when native legume seed is not available and only when there is extensive disturbance associated with road construction or mine reclamation where top soil is no longer available.

Locate vehicle service and fuel areas, chemical storage and use areas, and portable fire pumps and fuels outside of the Water Influence Zone (WIZ) buffers, preferably on gentle terrain. All operation plans should include spill prevention and spill containment protocol.

At a minimum, a 100 foot WIZ buffer should be applied to protect streams courses, ponds, wetlands, springs, fens and other water bodies from disturbance associated with transmission line construction and maintenance activities that could impair stream function, increase sedimentation and affect riparian/aquatic species habitat. No vegetative treatment within the WIZ is recommended to maintain multi-layered riparian vegetation structure, ensure lake/stream shading, and to maintain important wildlife habitat features. Consider larger buffer widths along perennial and intermittent streams (e.g., South Fork Castle Creek, Slate Creek and Rapid Creek).

Construction and maintenance activities in Rocky Mountain bighorn sheep lambing areas should be restricted from April 1 through June 15. Activities may also include road work, noxious weed treatment and on the ground personnel (e.g., layout, saw crews). Coordinate with the SDGFP to determine acceptable management activities, length of timing restriction and the size of area to be avoided.

Helicopter flight paths should avoid known high use areas of bighorn sheep unless sheep become accustomed to activity. Timing restrictions may be required to reduce the negative effects of bighorn sheep movement. Coordinate with the SDGFP to determine the length of timing restriction and the size of area to be avoided.

Noxious weed control methods that may negatively impact sensitive plants and snails would be avoided. Treat individual plants rather than broadcast application in areas where special status species occur. Control invasive weeds at snail occurrences, but use herbicides when snails are not on the surface. Monitor weed treatments used at special status plant occurrences and retreat as needed during the season.

As part of the Noxious Weed and Rehabilitation Plan, incorporate measures that would reduce the introduction and/or translocation aquatic nuisance species identified in the BHNF Aquatic Nuisance Action Plan (USFS 2009). Measures should be taken to reduce the pathways of spread of these species. Mitigation measures should include designated water sources, decontamination of equipment (prior to construction and during construction) and staging area locations in relation to water sources.

Vegetation clearing would take place outside of the migratory bird nesting season (April 15 – July 31). If vegetation clearing is planned in the nesting season, preconstruction migratory bird nest surveys would preclude the clearing and appropriate nest buffers, to be determined through discussions with USFWS, would be applied.

Prior to construction, active raptor nests would be identified within the analysis area. Nests would be avoided while active. Timing and disturbance buffers would be maintained around identified nests of raptor SOLC and sensitive species using USFWS-recommended spatial and temporal buffers for construction-related activities (USFWS 2012). The distance may be reduced where forest characteristics or topography reduce the line-of-site distance from the nest, based on site-specific analysis. Similarly, timing and disturbance buffers would be maintained around Bald Eagle winter roost areas, in season (**Table 3-19**).

Permanently avoid known Bald Eagle nests by 660 feet if structures will be visible from existing nest, and 330 feet if structures will not be visible from existing nest, per the USFWS National Bald Eagle Management Guidelines (USFWS 2007c).

The following additional protective measures will apply relative to the Northern Goshawk: Identify nest areas around historically active nests. No structures, access roads, or overland travel access paths will be placed through BTPD colonies. Perch discouragers will be placed on structures when adjacent to BTPD colonies.

A USFS Sensitive Species located after contract or permit issuance will be appropriately managed by active coordination between permittee, contractor or purchaser, USFS line officer, project administrator, and biologist and/or botanist. Solutions need to be based on the circumstances of each new discovery and must consider the species need, contractual obligations and costs, and mitigation measures available at the time of discovery.

Where caves or abandoned mines serve as nurseries or hibernacula for bats, vegetative changes within 500 feet of the opening will be avoided unless topography or other features protect the openings from disturbance.

TABLE 3-19 - DISTURBANCE BUFFERS AND TIMING RESTRICTIONS ON RAPTOR NESTS IN SOUTH DAKOTA				
SPECIES	**NEST**		**WINTER ROOST**	
	DISTANCE (MILES)	**DATES**	**DISTANCE (MILES)**	**DATES**
Bald Eagle[1]	0.5	2/1 – 9/1	1.0	11/1 -4/1
Northern Goshawk[1]	0.5	4/1 – 8/15		
Cooper's Hawk[2]	0.25	4/1 – 8/31		
Sharp-shinned Hawk[2]	0.25	4/15 – 8/31		
Peregrine Falcon[2]	1	3/15 – 8/31		
Broad-winged Hawk[2]	0.25	4/15 – 8/15		
Northern Harrier[2]	0.25	4/15 – 8/31		
Flammulated Owl[2]	0.25	4/1 – 9/30		
Northern Saw-whet Owl[2]	0.125	4/1 – 8/31		
Burrowing Owl[2]	0.25	4/15 – 8/31		
[1]Source: USFS 2005 [2]Source: USFWS 2012 *Dates may vary depending on the species				

Design of all access road crossings of permanent or intermittent water bodies to allow aquatic species, including USFS Sensitive fish species, to pass through unimpeded

Avoid placing slash piles in meadows and grasslands. If unavoidable, slash piles and log deck areas should be placed on the edges of these meadows and grasslands.

New roads and temporary roads should avoid being placed within meadows or grasslands. If topography is constraining, roads/trails should be placed as far as possible from meadow edge and avoid bisecting meadow/grassland.

The Proposed Action will comply with current recommended raptor and bat protection guidelines (APLIC/USFWS) to reduce the potential for raptor collision and electrocution.

Compliance with Applicable Regulations

Completion of this analysis and associated BA/BE would ensure the Proposed Action complies with Goal 2 Objective 221. The Proposed Action will comply with the following Standards and Guidelines of the BHNF LRMP when all mitigation measures are applied.

Design of all access road crossings of permanent or intermittent water bodies to allow aquatic species, including USFS Sensitive fish species, to pass through unimpeded will ensure the Proposed Action complies with Standard 1203.

Application of Bald Eagle nest and winter roost avoidance buffers would limit potential disturbance impacts to Bald Eagles and would ensure the Proposed Action complies with Standard 3101 and the BGEPA.

Avoidance of known USFS Sensitive bat maternity colonies, including caves and mines, and clearing vegetation outside of the migratory bird nesting season will ensure the Proposed Action complies with Standard 3102 and Standard 3207.

Avoidance of known USFS Sensitive snail colonies during route selection and application of all measures described in the Noxious Weed Reclamation and Revegetation Plan will ensure the Proposed Action complies with Standard 3103.

Spanning of all wetland habitat by the Proposed Action and access road avoidance of wetland habitat to the greatest extent possible will ensure the Proposed Action complies with Standard 3104.

Implementation of a SWPPP, spanning and avoidance of riparian areas and wetlands, use of access road crossings that would allow continued fish passage, and implementation of the Noxious Weed Reclamation and Revegetation Plan will ensure the Proposed Action complies with Standard 3106.

Species specific mitigation measures aimed to protect nesting Northern Goshawks, including retaining at least 180 of suitable nesting habitat around active nests, avoidance of construction activities within one-half mile of active Northern Goshawk nests from April 1 through August 15, and route selection to avoid known Northern Goshawk historic and current nesting areas identified during 2012 field surveys, would ensure the Proposed Action complies with Standard 3108 and Standard 3111.

Continued communication between the Proposed Action and BHNF personnel will ensure the Proposed Action complies with Standard 3115, should unanticipated impacts to USFS Sensitive Species occur.

No known Black Hills red-bellied snake hibernacula occur within the area. As such, the Proposed Action would comply with Standard 3116. Should a previously unidentified hibernacula be identified, the Proposed Action would communicate with the appropriate BHNF personnel to reduce potential impacts to Black Hills red-bellied snake and continue to comply with Standard 3116.

The Proposed Action does not cross any known BTPD colonies. As such, the Proposed Action would comply with Standard 3121.

Implementation of raptor nest buffers described in **Table 3-19** will ensure the Proposed Action complies with Standard 3204.

The Proposed Action would avoid vegetation changes within 500 feet of known bat nurseries or hibernacula to ensure the Proposed Action complies with Standard 3207.

The Proposed Action would not locate new access roads or logging decks or slash piles in meadows and within riparian area buffer zones/water influence zones to ensure that the Proposed Action complies with Guidelines 4111 and 9204.

The Proposed Action would comply with current raptor protection guidelines (APLIC/USFWS) to reduce the potential for raptor collision and electrocution to ensure that the Proposed Action complies with Standards 8308 and 8309.

3.2.2.2.1.1.3.6 Conclusions

Impacts to USFS Sensitive Species may include permanent and temporary impacts from direct loss of habitat, disturbance from construction related activities, direct mortality from construction equipment, collision with transmission lines, habitat alteration based on invasive species, noxious weed spread, and increased predation based on increased perching opportunities for corvids and raptors. Mitigation measures such as seasonal avoidance of raptor nests, minimization of vegetation clearing during the bird breeding season, avoidance of wetland/riparian and aquatic habitats, use of BMPs for soil protection, reducing impact to meadows and re-vegetation of disturbed areas, and a Noxious Weed Reclamation and Revegetation Plan would reduce impacts to USFS Sensitive Species. While construction of the Proposed Action may impact individual animals, implementation of the Proposed Action would not likely have measurable long term impacts on population trends of USFS Sensitive Species within the analysis area. **Table 3-20** provides an individual impact determination for all USFS Sensitive Species which may occur within the analysis area.

TABLE 3-20 - BHNF USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS

SPECIES	ALTERNATIVE	EFFECTS SUMMARY	DETERMINATION
Mammals			
Townsend's Big-Eared Bat (*Corynorhinus townsendii*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Would cause loss of potential roosting and foraging habitat. Avoidance of vegetation clearing within migratory bird nesting season and avoidance of known maternity colonies and hibernacula within caves or mines by 500 feet would reduce impacts.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action, with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Hoary Bat (*Lasiurus cinerus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Would cause loss of potential roosting and foraging habitat. Avoidance of vegetation clearing within migratory bird nesting season and avoidance of known maternity colonies and hibernacula within caves or mines by 500 feet would reduce impacts.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2

TABLE 3-20 - BHNF USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Fringed Myotis (*Myotis thysanodes*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Would cause loss of potential roosting and foraging habitat. Avoidance of vegetation clearing within migratory bird nesting season and avoidance of known maternity colonies and hibernacula within caves or mines by 500 feet would reduce impacts.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Black-Tailed Prairie Dog (*Cynomys ludoviscianus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	No known BTPD colonies in analysis area. Any previously unidentified BTPD colonies would be avoided by all Project-related infrastructures.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
American Marten (*Martes americana*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Would cause loss of potential habitat. ROW and access roads would not present barrier to dispersal. Completed Proposed Action would remove small portion of suitable habitat when compared to habitat available in analysis area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2

TABLE 3-20 - BHNF USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Rocky Mountain Bighorn Sheep (*Ovis canadensis canadensis*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Individuals may be disturbed on mapped lambing and wintering range. Construction related disturbances would be temporary and individuals would recolonize ROW upon completion of Proposed Action. Proposed Action would remove small portion of suitable habitat when compared to habitat available in analysis area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Swift Fox (*Vulpes velox*)	Alternative 1 – No Action Alternative	No potential habitat in analysis area.	No Impact
	Alternative 2 – Proposed Action	No potential habitat in analysis area.	No Impact
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	No Impact
Birds			
Northern Goshawk (*Accipiter gentillis*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Would cause loss of potential nesting and foraging habitat. Implementation of nest avoidance buffers, and adherence to nest habitat acres described in BHNF LRMP would reduce impacts.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Less impacts than Alternative 2	Similar to Alternative 2
Grasshopper Sparrow (*Ammodramus savannarum*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Would cause loss of potential nesting and foraging habitat. Proposed Action would remove small portion of suitable habitat when compared to habitat available in analysis area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2

TABLE 3-20 - BHNF USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Burrowing Owl (*Athene cunicularia*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	May impact nesting and foraging habitat. Applicable seasonal buffers around nests would be applied. Proposed Action would remove small portion of suitable habitat when compared to habitat available in analysis area. No known BTPD colonies (favored nesting habitat) occur in analysis area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Ferruginous Hawk (*Buteo regalis*)	Alternative 1 – No Action Alternative	No potential habitat in analysis area.	No Impact
	Alternative 2 – Proposed Action	No potential habitat in analysis area.	No Impact
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	No Impact
Mountain Plover (*Charadrius montanus*)	Alternative 1 – No Action Alternative	No potential habitat in analysis area.	No Impact
	Alternative 2 – Proposed Action	No potential habitat in analysis area.	No Impact
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	No Impact
Northern Harrier (*Circus cyaneus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	May impact nesting and foraging habitat. Applicable seasonal buffers around nests would be applied. Proposed Action would remove small portion of suitable habitat when compared to habitat available in analysis area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Yellow-billed Cuckoo (*Coccyzus americanus*)	Alternative 1 – No Action Alternative	No potential habitat in analysis area.	No Impact
	Alternative 2 – Proposed Action	No potential habitat in analysis area.	No Impact
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	No Impact

TABLE 3-20 - BHNF USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
American Peregrine Falcon (*Falco peregrinus anatum*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	May impact nesting, roosting, and foraging habitat. Cliff areas would be spanned and applicable seasonal buffers to nests would reduce impacts. Proposed Action would remove small portion of suitable foraging habitat when compared to habitat available in analysis area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Bald Eagle (*Haliaeetus leucocephalus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	May impact nesting and roosting habitat. Applicable seasonal avoidance buffers around nests and known winter roosts would reduce impacts.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Loggerhead Shrike (*Lanius ludoviscianus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Would cause loss of potential nesting and foraging habitat. Restrict vegetation removal within migratory bird nesting season April 15 – July 31. Proposed Action would remove small portion of suitable habitat when compared to habitat available in analysis area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Lewis's Woodpecker (*Melanerpes lewis*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Would cause loss of potential nesting and foraging habitat. Restrict vegetation removal within migratory bird nesting season April 15 – July 31. Proposed Action would remove small portion of suitable habitat when compared to habitat available in analysis area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2

TABLE 3-20 - BHNF USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Long-billed Curlew (*Numenius americanus*)	Alternative 1 – No Action Alternative	No potential habitat in analysis area.	No Impact
	Alternative 2 – Proposed Action	No potential habitat in analysis area.	No Impact
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	No Impact
Black-backed Woodpecker (*Picoides arcticus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Would cause loss of potential nesting and foraging habitat. Restrict vegetation removal within migratory bird nesting season April 15 – July 31. Proposed Action would remove small portion of suitable habitat when compared to habitat available in analysis area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Flammulated Owl (*Otus flammeolus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Would cause loss of potential nesting and foraging habitat. Restrict vegetation removal within migratory bird nesting season April 15 – July 31. Proposed Action would remove small portion of suitable habitat when compared to habitat available in analysis area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Amphibians			
Northern Leopard Frog (*Lithobates pipiens*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	ROW would span all permanent and intermittent streams. Wetland habitat would be avoided by construction personnel. Application of a SWPPP would eliminate sedimentation of local waterways.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2

TABLE 3-20 - BHNF USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Reptiles			
Black Hills Redbelly Snake (*Storeria occipitomaculata pahasapae*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	No known Black Hills red-bellied snake hibernacula in analysis area. Presence of ROW or access road would not present barrier to Black Hills red-bellied snake dispersal. Wetland and riparian habitat would be avoided by construction personnel and spanned by Proposed Action.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Fishes			
Mountain Sucker (*Catostomus platyrhynchus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	ROW would span all permanent and intermittent streams. Adherence to Standard 1203 would ensure that all access road crossings of intermittent streams would continue to allow aquatic life to pass through. Application of a SWPPP would eliminate sedimentation of local waterways.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Lake Chub (*Couesius plumbeus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	ROW would span all permanent and intermittent streams. Adherence to Standard 1203 would ensure that all access road crossings of intermittent streams would continue to allow aquatic life to pass through. Application of a SWPPP would eliminate sedimentation of local waterways.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Finescale Dace (*Phoxinus neogaeus*)	Alternative 1 – No Action Alternative	No known populations of finescale dace in analysis area.	No Impact
	Alternative 2 – Proposed Action	No known populations of finescale dace in analysis area.	No Impact
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	No Impact

TABLE 3-20 - BHNF USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Molluscs			
Cooper's Rocky Mountain Snail (*Oreohelix strigosa cooperi*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	May result in loss of habitat. All known snail colonies would be avoided. Proposed Action would remove small portion of suitable habitat when compared to habitat available in analysis area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2
Insects			
Regal Fritillary (*Speyeria idalia*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the BHNF LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	May result in loss of habitat. No known populations of regal fritillary in analysis area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3b to 3g)	Similar to Alternative 2	Similar to Alternative 2

3.2.2.2.1.1.4 BHNF Species of Local Concern

3.2.2.2.1.1.4.1 Grassland/Meadow Dependent Species

There are no SOLC grassland/meadow dependent species expected to occur in the analysis area. Implementation of the proposed alternative would not impact these species.

3.2.2.2.1.1.4.2 Wetland/Riparian Dependent Species

Direct Effects

Disturbance from construction, operations, and maintenance activities

The Atlantis fritillary, tawny crescent, callused vertigo and mystery vertigo would not be disturbed. Implementation of the Proposed Action has the potential to temporarily disturb the meadow jumping mouse Black-and-white Warbler, Atlantis fritillary, and tawny crescent. The presence of construction personnel, the use of construction equipment, and noise generated from construction could potentially disturb nesting, roosting and foraging Black-and-white Warbler. The meadow jumping mouse may temporarily flee occupied habitats proximal to proposed construction areas. However, given the small amount of potential riparian habitat in the analysis area and the small amount of habitat that may be crossed by the ROW or access roads associated with the Proposed Action, the likelihood of disturbing the Black-and-white

Warbler and meadow jumping mouse are low. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb any of the SOLC species dependent on wetland/riparian habitats. Mitigation measures, described in **Appendix B**, would be implemented to reduce or eliminate impacts to these species.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

The ROW of the Proposed Action would impact habitat that may support the meadow jumping mouse, Black-and-white Warbler, Atlantis fritillary, tawny crescent, callused vertigo, and mystery vertigo. Willows, aspen, spruce trees or other vegetation tall enough to interfere with the completed transmission line would be removed; however, removal of riparian and wetland vegetation would be avoided to the greatest extent possible. The proposed ROW would cross permanent streams in two places: once at Slate Creek, and once at South Fork Castle Creek. The proposed ROW would also cross Slate Creek a second time and Rapid Creek downstream of Pactola Reservoir; however, these crossing would occur on private lands. Access paths for construction, operation and maintenance of the Proposed Action would cross wetlands and riparian areas at pre-existing crossing locations, such as existing bridges and culverts, to the greatest extent possible. Field surveys completed by BHP identified approximately acre of riparian habitat which would be permanently removed in support of new access roads located outside of the ROW. BMPs to be described in the Proposed Action SWPPP would limit the amount of sediment moving into wetlands and riparian areas, potentially degrading wetland/riparian dependent species. BMPs that shall be applied may include, but are not limited to, silt fence, straw wattles, sediment bags, and straw bales. Any new access road water crossings will be constructed according to Standard 1203 to allow fish and other aquatic species to pass.

Land snails in general are susceptible to habitat changes that increase sun exposure, disturb vegetation cover, reduce micro-site humidity, compact soil, or remove litter or coarse woody debris (Anderson 2005). Snails may be less likely or unable to cross a corridor where these habitat changes have occurred, such as portions of the ROW if vegetation below ROW would provide protection from desiccation. For some snail species paved and unpaved roads have been shown to limit dispersal (Baur and Baur 1990; Meadows 2002). It is likely that the ROW and associated roads under the Proposed Action would influence snail dispersal if snails are present in the area. The ROW does not cross any currently known snail colonies. Loss of vegetative cover under the ROW due to disturbance and construction would temporary. Therefore, effects of ROW clearing to snails would be low.

In addition, mitigation measures, included in **Appendix B**, would be implemented to reduce or eliminate impacts to these species. See **Tables 3-15** and **3-17** for a comparison of habitat types impacted by the proposed action and what is currently available.

Direct mortality from construction, operations, and maintenance equipment

Implementation of the Proposed Action has the potential to result in direct injury or mortality to the meadow jumping mouse, Black-and-white Warbler, Atlantis fritillary, tawny crescent, callused vertigo, and mystery vertigo. Direct injury or mortality to these species may occur from collisions with moving vehicles. Injury or mortality to meadow jumping mouse, Black-and-white Warbler, Atlantis fritillary, tawny crescent, callused vertigo, and mystery vertigo may occur as a result of crushing/trampling nests on the ground, fledglings during the Black-and-white Warbler nesting season. Butterfly larvae could be lost as a result of trampling/crushing of host plants. Meadow jumping mouse nests could be lost due to crushing, trampling and soil compaction of hibernation sites. Snails could be crushed/trampled during activities. A majority of wetland and riparian habitat would be avoided by the Proposed Action. The likelihood that long-term effects to these species would occur as a result of construction would be low. Mitigation measures, described in **Appendix B**, would be implemented to reduce or eliminate impacts to these species.

Collision with transmission lines or associated guy-wires

The meadow jumping mouse, callused vertigo, and mystery vertigo would not be at risk for colliding with transmission lines or guy-wires. Implementation of the Proposed Action would result in an increase in collision risk between Black-and-white Warbler, Atlantis fritillary, and tawny crescent and infrastructure associated with the Proposed Action. Black-and-white Warbler may be susceptible to collision during low light levels or inclement weather; however, the risk of colliding with the Transmission line structures is minimal due to their ability to maneuver inflight. The SOLC butterflies, could collide with lines but in general fly near the ground and not at the height of the transmission lines.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to wetland/riparian habitat. Noxious weeds can overtake native riparian vegetation creating monocultures that are too dense to provide suitable habitat for the meadow jumping mouse, Black-and-white Warbler, Atlantis fritillary, tawny crescent, callused vertigo, and mystery vertigo especially if prey species, plant host or nectar species or water tables are reduced. Use of herbicide to control noxious weed spread could impact nectar/host plant species abundance for SOLC butterflies. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to meadow jumping mouse, Black-and-white Warbler, Atlantis fritillary, tawny crescent, callused vertigo, and mystery vertigo relating to noxious weeds would be minimized.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action may result in increased predation rates for the meadow jumping mouse, Black-and-white Warbler, Atlantis fritillary, tawny crescent, callused vertigo, and mystery vertigo as a result of perching predators. Increased predation effects may be localized to perching structures throughout the life of the transmission line. However, transmission line structures, for the most part would avoid wetland/riparian habitat, therefore the effects to these species is likely to be low.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for meadow jumping mouse, Black-and-white Warbler, Atlantis fritillary, tawny crescent, callused vertigo, and mystery vertigo. Mitigation measures, described in **Appendix B**, would reduce or eliminate impacts to these wetland/riparian dependent species.

Conclusions

Impacts to USFS wetland/riparian dependent Sensitive Species may include permanent and temporary impacts from direct loss of habitat, disturbance from construction related activities, direct mortality from construction equipment, habitat alteration based on noxious weed spread, and increased predation based on increased perching opportunities for corvids and raptors. Mitigation measures such as minimization of vegetation clearing during the bird breeding season, avoidance of wetland/riparian and aquatic habitats, use of BMPs for soil protection and re-vegetation of disturbed areas, and a Noxious Weed Reclamation and Revegetation Plan would reduce impacts to USFS wetland/riparian dependent Sensitive Species. While construction of the Proposed Action may impact individual animals, implementation of the Proposed Action would not notably decrease the amount of these species habitat at the Forest-wide scale. Forest Plan direction would maintain riparian diversity, condition, and trend, therefore Objective 213 would be met. It appears that all alternatives would be consistent with Objective 221; therefore, these species are likely to persist.

3.2.2.2.1.1.4.3 Aquatic Dependent Species

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of the Proposed Action has the potential to temporarily disturb the American Dipper. The presence of construction personnel, the use of construction equipment, and noise generated from construction could potentially disturb nesting, roosting and foraging dippers. However, given the small amount of potential riparian habitat in the analysis area and the small amount of habitat that may be crossed by the ROW or access roads associated with the Proposed Action, the likelihood of disturbing American Dippers are low. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb SOLC species dependent on riparian/aquatic habitats. Mitigation measures, described in **Appendix B**, would be implemented to reduce or eliminate impacts to the American Dipper.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Aquatic species associated with clear water may experience temporary habitat degradation beyond the boundaries of the ROW resulting from siltation, if road-improvement and other ground-breaking activities cause erosion and siltation of streams, lakes, and ponds during the construction phase. American Dippers may occur in three named streams within the analysis area which would be crossed by the Proposed Action. All aquatic habitats would be spanned by the Proposed Action. Access to the Proposed Action would utilize existing crossing locations, such as existing culverts and bridges, to cross all water bodies (permanent or intermittent) to the greatest extent possible. All creeks would be spanned by the Proposed Action and no in-water work would occur. BMPs to be described in the Proposed Action's SWPPP would limit the amount of sediment moving into aquatic habitats, potentially degrading stream habitat. BMPs employed may include, but are not limited to, silt fence, straw wattles, sediment bags, and straw bales. In addition, mitigation measures, described in **Appendix B**, would be implemented to reduce or eliminate impacts to this species. See **Tables 3-15** and **3-17** for a comparison of habitat types impacted by the proposed action and what is currently available.

Because the Proposed Action would avoid potential American Dipper habitat to the greatest extent possible, utilize BMPs to protect aquatic areas, and implement a Noxious Weed Reclamation and Revegetation Plan, the Proposed Action will present a negligible effect on the Forest-wide population and habitat trend for American Dipper.

Direct mortality from construction, operations, and maintenance equipment

Implementation of the Proposed Action has the potential to result in direct injury or mortality to the American Dipper. Direct injury or mortality to this species may occur from collisions with moving vehicles. Injury or mortality to American Dipper may occur as a result of dislodging nests from stream crossing structures, crushing/trampling ground nests and crushing fledglings during the nesting season. A majority of riparian/aquatic habitat would be avoided by the Proposed Action. The likelihood that long-term effects to the American Dipper would occur as a result of construction activities would be low. Mitigation measures, described in **Appendix B**, would be implemented to reduce or eliminate impacts to the dipper.

Collision with transmission lines or associated guy-wires

Implementation of the Proposed Action could result in an increase in collision risk of the American Dipper and infrastructure associated with the Proposed Action. American Dippers may be susceptible to collision during low light levels or inclement weather; however, the risk of colliding with the transmission line structures is extremely low due to their ability to maneuver inflight and that American Dippers typically fly low to the ground along stream corridors, thus avoiding transmission line structures.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to aquatic habitat. The Proposed Action may result in the introduction of aquatic invasive

species (plants and animals) which may degrade SOLC aquatic dependent species habitat. All construction equipment would avoid aquatic habitats and a noxious and invasive weed management plan would limit the establishment and spread of invasive species as part of the Proposed Action. Creation of a Noxious and Invasive Weed Management Plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to aquatic habitats relating to noxious weeds would be minimized.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action may result in increased predation rates for the American Dipper as a result of perching predators. Increased predation effects may be localized to perching structures throughout the life of the transmission line. However, transmission line structures, for the most part would avoid aquatic habitat, therefore the effects to the dipper is likely to be low.

No species specific mitigation measures were designated for the mountain sucker and lake chub. Mitigation measures, described in **Appendix B**, would reduce or eliminate impacts to the SOLC species that depend on aquatic habitat.

Conclusions

Impacts to USFS aquatic dependent SOLC may include permanent and temporary impacts from direct loss of habitat, disturbance from construction related activities, direct mortality from construction equipment, habitat alteration based on noxious weed spread, and increased predation based on increased perching opportunities for corvids and raptors. Mitigation measures such as minimization of vegetation clearing during the bird breeding season, avoidance of wetland/riparian and aquatic habitats, use of BMPs for soil protection and re-vegetation of disturbed areas, and a Noxious Weed Reclamation and Revegetation Plan would reduce impacts to the American Dipper. While construction of the Proposed Action may impact individual animals, implementation of the Proposed Action would not notably decrease the amount of these species habitat at the Forest-wide scale. Forest Plan direction would maintain riparian diversity, condition, and trend, therefore Objective 103 would be met. It appears that all alternatives would be consistent with Objective 221; therefore, American Dipper are likely to persist.

3.2.2.2.1.1.4.4 Conifer Forest Dependent Species

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of the Proposed Action may temporarily disturb Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, and Pygmy Nuthatch. There would be no effect on the frigid ambersnail and striate disc. The presence of construction personnel, the use of construction equipment, and noise generated from construction may disturb nesting and foraging conifer dependent bird species that occur near

the proposed construction areas. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction. The Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, and Pygmy Nuthatch in the area would be able to continue normal behaviors once construction is completed. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb conifer forest dependent SOLC species.

Areas with known raptor nesting activity within the last three years would be monitored during the breeding season prior to construction activity. If active nests are located, mitigation measures would be applied to avoid disturbing nesting birds.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Habitat within the analysis area includes mature ponderosa pine stands, white spruce stands and stands damaged by insect activity (primarily pine beetle) and fires. The Proposed Action could result in a permanent loss of habitat for the Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, Pygmy Nuthatch, frigid ambersnail, and striate disc. Species that depend on mature conifer trees as a critical habitat component would experience the most habitat loss, partly because forested habitat makes up the majority of the ROW, and partly because tree-clearing would result in total and permanent conversion of conifer dominated habitats. Habitat loss for tree-dependent species would be reduced because the Proposed Action would follow an existing, unoccupied ROW for 47 miles, however this reduction in lost habitat cannot be quantified at this time. Although tree-dependent species would experience the largest amount of habitat loss, the acreages lost would be small relative to the total amount of available forested habitat within the analysis area (**Table 3-6**).

Broad-winged Hawk, Cooper's Hawk, Sharp-shinned Hawk, Northern Saw-whet Owl and Pygmy Nuthatch hunt in a variety of open or closed forest types, but for nesting they depend on mature, closed canopy forest with large trees. BHNF forest-wide Standard 3204 calls for identifying and protecting suitable nesting habitat for raptors. Implementation of mitigation measures would reduce the effects on nesting and foraging habitat loss to SOLC conifer dependent birds.

Construction of the proposed ROW would result in the permanent loss of 11 acres of forest stands with ten or more live trees greater than five inches in diameter per acre showing signs of insect damage, 27 acres of stands classified as 4C (mature trees cover > 70%), and 89 acres of forest stands in which old burns reduced the stands timber productivity. The construction of project-related access roads would destroy another two acres of potentially suitable conifer forest habitat. Construction areas and timber decking areas would not be placed in potential Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, Pygmy Nuthatch, frigid ambersnail and striate disc habitat. The existing unoccupied ROW, which currently supports younger trees, does not include suitable Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, Pygmy Nuthatch, frigid ambersnail and striate disc habitat. Implementation of the Proposed Action would result in the loss of an estimated 129 acres of potentially suitable Broad-

winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, Pygmy Nuthatch, frigid ambersnail and striate disc habitat.

Land snails in general are susceptible to habitat changes that increase sun exposure, disturb vegetation cover, reduce micro-site humidity, compact soil, or remove litter or coarse woody debris (Anderson 2005). Snails may be less likely or unable to cross a corridor where these habitat changes have occurred, such as portions of the ROW if vegetation below ROW would provide protection from desiccation. For some snail species paved and unpaved roads have been shown to limit dispersal (Baur and Baur 1990; Meadows 2002). It is likely that the ROW and associated roads under the Proposed Action would influence snail dispersal if snails are present in the area. The ROW does not cross any currently known snail colonies. Loss of vegetative cover under the ROW due to disturbance and construction would temporary. Therefore, effects of ROW clearing to snails would be low. See **Tables 3-15** through **3-17** for a comparison of forest stand types impacted by the Proposed Action and what is currently available.

Direct mortality from construction, operations, and maintenance equipment

The Proposed Action could result in direct mortality to the Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, Pygmy Nuthatch, frigid ambersnail and striate disc. The frigid ambersnail and striate disc could be crushed by machinery or by dislodged rocks in construction areas. Direct mortality may occur through colliding with vehicles and during removal of potentially occupied habitats. Birds could potentially collide with vehicles, but their ability to maneuver inflight decreases the potential for collisions. While collisions with vehicles may occur to these species from temporary increases in traffic volume, the risk and likelihood is low. Implementation of mitigation measures, described in Appendix B, would reduce or eliminate potential short-term impacts to individuals during the breeding season as a result of the Proposed Action, therefore the effects to the Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, Pygmy Nuthatch, frigid ambersnail and striate disc species are negligible.

Collision with transmission lines or associated guy-wires

The Proposed Action would result in an increase in collision risk between infrastructure associated with the Proposed Action for the Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, and Pygmy Nuthatch. The Northern flying squirrel and birds may be susceptible to collision during low light levels or inclement weather; however, because the Northern Goshawk, Lewis's Woodpecker, Black-backer occupy habitat with numerous obstructions (i.e., branches) and do not have the high wingloading and low aspect values which make a species more prone to collision, the risk of birds colliding with the Proposed Action is minimal. Northern flying squirrel could collide with transmission lines or transmission line infrastructure, especially where the line location is close to surrounding taller vegetation. However, only a few individuals would be affected therefore, impact to this species persistence is low. There would be no effects to the frigid ambersnail and striate disc relating to collision with transmission lines or guy-wires.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to the Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, Pygmy Nuthatch, frigid ambersnail and striate disc. The increased fire risk associated with noxious weeds could increase the risk of wildfire, which would create additional Black-backed Woodpecker and Lewis' Woodpecker habitat short-term which are common prey species to forest hawks. Loss of forest habitat due to wildfire would have long-term negative effects, especially for the entire conifer depended SOLC species, since most of these species rely on later seral stages of ponderosa pine and/or spruce. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to the Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, Pygmy Nuthatch, frigid ambersnail and striate disc relating to noxious weeds would be greatly reduced.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action may result in increased predation rates for Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, Pygmy Nuthatch, frigid ambersnail and striate disc as a result of perching and nesting raptors and corvids. This may result in an increase in localized predation rates. Increased predation effects may be permanent but localized to perching structures throughout the life of the transmission line. However, increased predation rates would not likely have a long-term negative effect on these species or their use of suitable habitat.

Species Specific Mitigation Measures

No species specific mitigation measures were designated for BHNF SOLC Species that are dependent on conifer forest habitat. Mitigation measures, described in **Appendix B**, would reduce or eliminate impacts to the Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, Pygmy Nuthatch, frigid ambersnail and striate disc.

Conclusions

Impacts to USFS conifer dependent SOLC Species may include permanent and temporary impacts from direct loss of habitat, disturbance from construction related activities, direct mortality from construction equipment, electrocution and collision with transmission lines, habitat alteration based on noxious weed spread, and increased predation based on increased perching opportunities for corvids and raptors. Mitigation measures such as avoidance of raptor nests, minimization of vegetation clearing, especially during the bird breeding season, applying recommended APLIC guidelines to prevent electrocution and collision with transmission lines/structures, use of BMPs for soil protection and re-vegetation of disturbed areas, and a Noxious Weed Reclamation and Revegetation Plan would reduce impacts to these species. While construction of the Proposed Action may impact individual animals, implementation of the

Proposed Action would not notably decrease the amount of these species habitat at the Forest-wide scale. Forest Plan direction would maintain conifer forest diversity, condition, and trend, therefore Objectives 3.7-201, 5.1- 204 and 5.4-206 would be met. It appears that all alternatives would be consistent with Objective 221; therefore, the Broad-winged Hawk, Northern flying squirrel, Sharp-shinned Hawk, Cooper's Hawk, Northern Saw-whet Owl, Pygmy Nuthatch, frigid ambersnail and striate disc are likely to persist.

3.2.2.2.1.1.4.5 Cliff/Cave Dependent Species

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of the Proposed Action may temporarily disturb small-footed myotis, long-eared myotis, long-legged myotis, and mountain goat. The presence of construction personnel, the use of construction equipment, and noise generated from construction may disturb roosting, nesting and foraging cliff/cave species that occur near the proposed construction areas. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction.

Disturbance that occurs during critical periods (maternity and hibernation periods) for bats could cause bats to abandon roost sites during these critical periods that could result in death and/or reduced reproductive rates. Disturbance to Mountain Goats could cause mountain goats to relocate to other areas temporarily.

However, once construction is complete, individuals would be able to reoccupy the area of construction. All of these SOLC cliff/cave dependent species in the analysis area would be able to continue normal behaviors once construction is completed. Helicopter based surveys for operation and maintenance monitoring of the line are unlikely to disturb SOLC bats. However, helicopter based surveys have the potential to disrupt mountain goats if the surveys are done during critical periods such as kidding or during winter when energy reserves are low. Mitigation measures, described in **Appendix B**, would reduce or eliminate the potential for disturbance of cliff/cave dependent SOLC species during critical periods.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Vegetation clearing and construction of the transmission line could cause a loss of habitat for cliff/cave dependent species. See **Tables 3-15** thru **3-17** for comparison of habitats types impacted by the Proposed Action and what is currently available. For cliff/cave dependent SOLC species, the loss of habitat would be dependent upon whether the project activities would permanently affect important habitat features such as traditional bat roosting areas or critical mountain goat use areas. For these species, implementation of project mitigation measures would reduce and/or eliminate the potential for important habitat (caves/cliff features) to be impacted, if known locations would be avoided.

Mountain goats would likely benefit most long-term from vegetation clearing under the Proposed Action. Forage would increase by reducing forested structural stage within the ROW. Clearing of vegetation would also increase the ability to see predators, reducing predation rates in those

areas. However, additional access to areas that were not previously accessed could provide predators' easy access to foraging areas, increase human caused disturbance, which would eventually decrease the use of some areas by mountain goats.

Implementation of project mitigation measures, described in **Appendix B**, would reduce or eliminate potential short-term impacts on individuals especially during critical periods as a result of the Proposed Action; therefore the effects on SOLC species dependent on cliff/cave habitat would be negligible.

Direct mortality from construction, operations, and maintenance equipment

Construction, operation and maintenance activities have the potential to cause direct injury and mortality to cliff/cave dependent SOLC species. The highest risk of injury or mortality would occur during construction phase of the Proposed Action.

Bat species could be crushed by machinery or by dislodged rocks if roosting in construction areas. While collisions with vehicles may occur to these species from temporary increases in traffic volume, the risk and likelihood is low. Bats colliding with vehicles could occur, but unlikely since bat species are typically nocturnal and work activities would likely be less during the night time. Mountain goats would likely flee from construction activities, which could cause loss of footing on steep cliffs. Collision with vehicles could occur if mountain goats are using road side areas for foraging and obtaining salt. For cliff/cave dependent SOLC species, mortality caused by project activities would likely affect individuals, therefore would not affect species persistence forest-wide.

Collision with transmission lines or associated guy-wires

Collision with transmission lines or associated guy-wires may cause direct mortality to bats. The placement of the line relative to surrounding vegetation can also influence collision risk. Based on excellent flight maneuverability of the SOLC bats, the probability of mortality cause by collision with transmission lines or associated guy-wires are low. However, individuals could collide with transmission lines/guy-wires during low visibility conditions such as fog. The mountain goat would not be at risk of colliding with transmission lines or guy-wires.

Indirect Effects

Noxious weed spread

The potential for the establishment and spread of noxious weeds could create a permanent impact to SOLC Species dependent on cliff/cave habitat. Noxious weeds can overtake native plant communities, changing suitable habitat for prey species or reduce water tables that are important for parts of their life cycle. Use of herbicide to control noxious weed spread could impact prey abundance for bats. Loss of palatable forage species due to invasive species could reduce nutritional value of forage for mountain goats. Loss of suitable forage could negatively affect reproduction and survival rates for mountain goats or cause a shift in use areas. Creation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to SOLC bats and mountain goat relating to noxious weeds would be minimized.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action may result in increased predation rates for SOLC bats as a result of perching predators. Increased predation effects may be localized to perching structures throughout the life of the transmission line. However, the effects to cliff/cave dependent SOLC species are likely to be low. Mountain goats would not experience increased predation from avian predators.

Species Specific Mitigation Measures

No species specific mitigation measures were designated SOLC Species that are dependent on cliff/cave habitat. Project mitigation measures, described in **Appendix B**, would reduce or eliminate impacts on the small-footed myotis, long-eared myotis, long-legged myotis, and mountain goat and their habitats.

Conclusions

Impacts to USFS cliff/cave dependent SOLC Species may include permanent and temporary impacts from direct loss of habitat, disturbance from construction related activities, direct mortality from construction equipment, collision with transmission lines, habitat alteration based on noxious weed spread, and increased predation based on increased perching opportunities for corvids and raptors. Mitigation measures such as avoidance of mines and caves, minimization of vegetation clearing, especially during the breeding season, applying recommended APLIC guidelines to prevent electrocution and collision with transmission lines/structures, use of BMPs for soil protection and re-vegetation of disturbed areas, and a Noxious Weed Reclamation and Revegetation Plan would reduce impacts to theses USFS SOLC Species. While construction of the Proposed Action may impact individual animals, implementation of the Proposed Action would not notably decrease the amount of these species habitat at the Forest-wide scale. Forest Plan direction would maintain conifer forest diversity, condition, and trend, therefore Objective 218 would be met. It appears that all alternatives would be consistent with Objective 221; therefore, the small-footed myotis, long-eared myotis, long-legged myotis, and mountain goat are likely to persist.

3.2.2.2.1.1.4.6 BHNF SOLC Specific Mitigation Measures

Mitigation measures, described in **Appendix B**, would be implemented to reduce or eliminate impacts on BHNF SOLC. Species-specific mitigation measures would also be applied to BHNF SOLC, where applicable.

3.2.2.2.1.1.4.7 Compliance with Applicable Regulations

The Proposed Action will comply with the following Standards and Guidelines of the BHNF LRMP when all mitigation measures are applied. Adherence to all mitigation measure, completion of the route selection process, and the use of existing ROW would ensure that all SOLC populations potentially impacted by the Proposed Action will be likely to persist and will not trend toward listing under the USFS Region 2 Sensitive Species list. This will ensure the Proposed Action complies with Objective 221.

Avoidance of known SOLC bat maternity colonies, including caves and mines, and clearing vegetation outside of the migratory bird nesting season will ensure the Proposed Action complies with Standard 3102 and Standard 3207.

Avoidance of known SOLC snail colonies during route selection and application of all measures described in the Noxious Weed Reclamation and Revegetation Plan will ensure the Proposed Action complies with Standard 3103.

Spanning of all wetland habitats by the Proposed Action and access road avoidance of wetland habitat to the greatest extent possible will ensure the Proposed Action complies with Standard 3104.

Implementation of a SWPPP, spanning and avoidance of riparian areas and wetlands, use of access road crossings that would allow continued fish passage, and implementation of the Noxious Weed Reclamation and Revegetation Plan will ensure the Proposed Action complies with Standard 3106.

Implementation of raptor nest buffers described in **Table 3-19** will ensure the Proposed Action complies with Standard 3204.

The proposed action would not locate new access roads or logging decks or slash piles in meadows and within riparian area buffer zones/water influence zones to ensure that the Proposed Action complies with Guidelines 4111 and 9204.

The Proposed Action would comply with current raptor protection guidelines (APLIC/USFWS) to reduce the potential for raptor collision and electrocution to ensure that the Proposed Action complies with Standards 8308 and 8309.

3.2.2.2.1.1.4.8 BHNF SOLC Species Conclusions

Impacts to SOLC may include permanent and temporary impacts from direct loss of habitat, disturbance from construction related activities, direct mortality from construction equipment, collision with transmission lines, habitat alteration based on noxious weed spread, and increased predation based on increased perching opportunities for corvids and raptors. SOLC which occupy conifer forest habitat described above would likely persist across the BHNF. SOLC which occupy cliff/cave habitat described above would likely persist across the BHNF. SOLC which occupy wetland and riparian habitat described above would likely persist across the BHNF. SOLC which occupy aquatic habitat described above would likely persist across the BHNF. Mitigation measures such as seasonal avoidance of raptor nests, minimization of vegetation clearing during the bird breeding season, avoidance of wetland/riparian and aquatic habitats, use of BMPs for soil protection and re-vegetation of disturbed areas, and a Noxious Weed Reclamation and Revegetation Plan would reduce impacts to all wildlife. Completion of the Proposed Action would not cause any SOLC described here to trend toward inclusion on the USFS Region 2 Sensitive Species list. While construction of the Proposed Action may impact individual animals, implementation of the Proposed Action would not likely have measurable long term impacts on population trends of SOLC within the analysis area. The Proposed Action

would not notably decrease the amount of these species habitat at the Forest-wide scale. The Proposed Action would have various beneficial and adverse effects on SOLC habitat short-term and long-term. It appears that all alternatives would be consistent with Objective 221, therefore these species are likely to persist.

3.2.2.2.1.1.5 Migratory Birds

Effects to migratory bird species as a group would be similar to the effects described for migratory bird species with special status designations.

3.2.2.2.1.1.6 Big Game

3.2.2.2.1.1.6.1 Elk

Implementation of the Proposed Action may cause various direct and indirect effects on elk, including direct injury or mortality, disturbance or displacement, and alteration or loss of suitable habitats. The use of construction equipment and temporary increases in vehicle traffic in occupied elk habitats could increase the likelihood and occurrence of vehicle-elk collisions. Construction and human activity in proposed project areas may temporarily cause elk to avoid otherwise suitable habitats. Establishment and use of project-related access routes could displace elk up to 0.5 miles from established roads (Perry and Overly 1977). Implementation of the Proposed Action has the potential to alter or remove an estimated 1,152 acres of potentially suitable elk habitat. These potential effects are expected to be temporary, as in risks associated with injury or mortality and displacement; or minor as in the case for habitat alteration and loss.

3.2.2.2.1.1.6.2 Mule Deer

Implementation of the Proposed Action may cause various direct and indirect effects on mule deer including direct injury or mortality, disturbance or displacement, and alteration or loss of suitable habitats. Temporary increases in construction activity and vehicle use in the proposed Project Area could lead to short-term increase in the frequency and number of vehicle-mule deer collisions. Human activity in occupied habitats may disturb individual mule deer behavior or displace deer from otherwise suitable habitats. As indicated in the Black Hills LRMP and a USDA Forest Service Technical Memorandum (*A Framework for Revising Deer and Elk Strategic Management Direction on the BHNF; Oct 17, 2003)*, there is little research available regarding mule deer ecology in the Black Hills. Implementation of the Proposed Action could alter or remove a conservatively estimated 1,129 acres of potentially suitable mule deer habitat. While mule deer have been assumed to avoid roads in the same manner as elk, little empirical evidence is available to document this tendency (Wisdom et al 2005). Mule deer may be displaced up to 0.5 miles from established and used access routes. Such displacement, and the associated avoidance of otherwise suitable habitats is not expected to detrimentally affect mule deer because of their association with a variety of habitats and the availability of other suitable habitats within the analysis area and Forest. These potential effects are expected to be temporary in nature and lack sufficient magnitude or distribution to have a measurable shift in population numbers, health, or survivability on the Forest.

3.2.2.2.1.2 Cumulative Effects Analysis

The Forest Plan Monitoring Implementation Guide (USFS 2009a) provides guidance to implementing the monitoring and evaluation requirements to the Forest Plan. Forest-wide monitoring results can be found in the BHNF Monitoring and Evaluation Reports (USFS 2009b, 2010c). Projects such as the T-O-RC Project, contribute to forest-wide cumulative effects on the landscape scale.

Cumulative effects from the Proposed Action were analyzed under the same impacts described above. Cumulative effects may present direct impacts from disturbance, loss of habitat, direct mortality, and collision risks; indirect impacts may include from noxious weeds, and increased predation. **Appendix C** provides a list of projects analyzed for cumulative effects to wildlife species in South Dakota.

Disturbance from the Proposed Action may have an additive effect on wildlife when other projects are ongoing during at the same location and same time frame. All projects and activities listed in **Appendix C** have the potential to disturb wildlife. However, disturbance is typically a localized effect. Disturbance from the Proposed Action and other activities would have to occur in relatively close proximity to one another to impact wildlife. In instances where disturbance from the Proposed Action and other activities do occur in close proximity, the abundance of suitable habitat surrounding the Proposed Action should provide ample escape habitat to lessen the degree of disturbance. A majority of disturbance would occur during the construction phase of the Proposed Action. This disturbance would be relatively short in duration and would occur on isolated areas along the proposed line during construction and maintenance activities.

Loss of habitat from the Proposed Action would have an additive effect on wildlife. Long-term, loss of late seral conifer habitat would occur for the life of the transmission line due to maintenance of ROW for powerline operation and safety. Projects listed in **Appendix C** have the potential to eliminate or reduce wildlife habitat. In addition, the dominant tree species within the analysis area, ponderosa pine, is currently undergoing substantial mortality based on the mountain pine beetle outbreak. As a result, untreated portions of the analysis area would revert to an earlier seral pine stands. Since most mountain pine beetle killed trees fall within 5-10 years, habitat created for cavity dependent species would decline. While this will have a short-term positive effect on species dependent on insect outbreaks and fire such as the Black-backed Woodpecker and Lewis' Woodpecker by improving habitat suitability, the mountain pine beetle outbreak will have a negative impact on conifer forest dependent MIS, SOLC and Region 2 Sensitive species long-term, especially species associated with mature pine forest, such as the Northern Goshawk, Flammulated Owl, northern flying squirrel, and Cooper's Rocky Mountainsnail. As a result of the mountain pine beetle outbreak, fire hazards (residual fuel loading) would increase, especially in untreated areas. There is a greater potential of wildfire caused by the transmission line once in use (arcing, downed lines) which increases the potential for long-term habitat loss for forest dependent species until burned areas recover to existing conditions.

The Proposed Action would result in a small loss of wildlife habitat when compared to that of timber harvest operations and unchecked wildfires. The cleared ROW of the Proposed Action could act as a fire break to reduce the loss of habitat in the event of a wildfire.

Direct mortality from the Proposed Action would have negligible cumulative effects on wildlife species. Project-related traffic and construction activity may result in the injury or mortality to wildlife but these numbers would be small in comparison to total species populations. Cumulative effects of direct mortality from other actions listed in **Appendix C** would be limited to projects being completed at the same time as the Proposed Action. Such projects may include the timber harvest and subdivision development. Direct mortality from construction related equipment may crush migratory bird nests or fossorial species. Performing all clearing activities outside of the migratory bird nesting season would limit the possibility of direct mortality to nesting birds. The number of fossorial species which may be killed by construction equipment associated with the Proposed Action would be minimal. The Proposed Action would contribute small numbers of direct mortality when combined other projects considered in this section.

Collision risk with the Proposed Action would have additive effects on wildlife species, but effects would be minimal. A new transmission line would add to other distribution and transmission lines which currently occur on BHNF with potential collision risk. Avian collision risk is highest where a power line passes between important habitat used by various bird species, such as between roosting areas or nesting areas and foraging areas, or along major lines of migration such as ridgelines or river corridors. The Proposed Action does not pass between important habitat used by various species or areas known to serve as migration corridors. Drainages, especially perennial and intermittent stream courses along with ridgelines throughout the BHNF may act as migration pathways to some extent. The Proposed Action would pass through the BHNF predominantly in areas of ponderosa pine or spruce forests but would span across several streams. The presence of the pine and spruce trees would act to limit the likelihood of collision with a transmission line by causing migrating birds to fly at higher altitudes, thus passing over the Proposed Action.

The Proposed Action along with all projects and actions listed in **Appendix C** above have the potential to spread noxious weeds and invasive species. The Proposed Action would implement a Noxious Weed Reclamation and Revegetation Plan to limit the potential to spread noxious weeds. Rehabilitation of disturbed sites using native, weed-free seed would lessen the potential for noxious weeds to establish that could potentially replace important wildlife habitat. Implementation of the mitigation measures, as described in **Appendix B**, would reduce the potential for spread of aquatic nuisance species.

Increased predation from predatory raptors as would have additive cumulative impacts on various wildlife. The new transmission structure would increase the potential for predatory species to hunt in addition to other available man-made perches currently on the landscape such as other transmission lines, fences and distribution lines. H-frame structures provided by the Proposed Action would create multiple perches and nesting substrate for predatory raptors and ravens; however, this increase in perch and nesting opportunity would be negligible when the amount of natural perching and nesting substrate on the BHNF is considered. In addition,

mitigation measures detailing the installation of raptor safe configurations could also reduce the potential for roosting by predatory raptors.

3.2.2.2.2 Wyoming

Potential direct and indirect effects have been identified as direct injury or mortality; disturbance; habitat loss; noxious weeds; and avian predators. A general discussion for each of these impacts is provided at the beginning of the South Dakota environmental consequences section.

Table 3-21 summarizes the acres of disturbance by vegetation type on federal lands in Wyoming. **Table 3-22** provides acres of disturbance by vegetation type and disturbance type for federal lands in Wyoming.

TABLE 3-21 - VEGETATION TYPES ON FEDERAL LANDS IN WYOMING THAT WOULD BE DISTURBED (ACRES)[1]

VEGETATION TYPE	ACRES OF NEW DISTURBANCE	PERCENT OF PROPOSED ACTION AREA
Grassland	7	11
Sagebrush/grassland	47	76
Sagebrush/grassland with Ponderosa Pine	3	5
Ponderosa Pine	4	6
Other[2]	1	2
TOTAL	62	100

Source: All vegetation data for the proposed ROW on TBNG is based on fieldwork conducted in June 2012. Vegetation data for other areas in TBNG and on BLM lands is based on evaluation of aerial imagery, LANDFIRE, adjacent parcels on BHNF (BHNF 2009), and adjacent parcels in the proposed ROW on TBNG.
[1]Disturbance to private land would be determined in the future.
[2]Other category includes non-vegetated areas such as barren and developed land.

TABLE 3-22 - LAND AREA (ACRES) OF VEGETATION TYPES ON TBNG AND BLM LANDS THAT WOULD BE DISTURBED BY THE PROPOSED PROJECT AND ALL ROUTE ALTERNATIVES

Disturbance TYPE	AGENCY	BARREN	BIG SAGEBRUSH/ BLUE GRAMA	BIG SAGEBRUSH/ BLUE GRAMA W/ PONDEROSA PINE	LITTLE SAGE-BRUSH/ SEEDED GRASSLAND	GRASSLAND UNKNOWN TYPE	SEEDED GRASSLAND	PONDEROSA PINE	DEVELOPED	GRAND TOTAL
Overland Access Inside ROW[1]	Total	<1	4	<1	<1	<1	3	<1	<1	8
	BLM	<1	2	0	0	<1	2	<1	<1	4
	TBNG	0	2	<1	<1	0	1	0	<1	4
ROW - Other	Total	1	33	1	5	1	17	7	2	68
	BLM	1	18	<1	0	1	9	7	1	37
	TBNG	0	16	1	5	0	8	0	11	31
Estimated land area of structure work areas[2]	Total	<1	5	<1	1	<1	3	1	<1	11
	BLM	<1	2	<1	0	<1	1	1	<1	4
	TBNG	0	3	<1	1	0	2	0	<1	6

TABLE 3-22 - LAND AREA (ACRES) OF VEGETATION TYPES ON TBNG AND BLM LANDS THAT WOULD BE DISTURBED BY THE PROPOSED PROJECT AND ALL ROUTE ALTERNATIVES

Disturbance TYPE	AGENCY	BARREN	BIG SAGEBRUSH/ BLUE GRAMA	BIG SAGEBRUSH/ BLUE GRAMA W/ PONDEROSA PINE	LITTLE SAGE-BRUSH/ SEEDED GRASSLAND	GRASSLAND UNKNOWN TYPE	SEEDED GRASSLAND	PONDEROSA PINE	DEVELOPED	GRAND TOTAL
Estimated land area of wire-pulling, tensioning, and splicing sites[2]	Total	<1	1	<1	<1	<1	<1	<1	<1	2
	BLM	<1	<1	<1	0	<1	<1<1	<1	<1	1
	TBNG	0	1	<1	<1	0	<1	0	<1	1
Estimated land area of structure bases[2]	Total	0	<1	0	0	00	<1	0	0	<1
	BLM	0	0	0	0	0	0	0	0	<1
	TBNG	0	<1	0	0	0	0	0	0	<1
Total Project Disturbance Inside ROW	**Total**	**1**	**37**	**2**	**5**	**1**	**20**	**8**	**2**	**76**
	BLM	**1**	**20**	**<1**	**0**	**1**	**11**	**8**	**11**	**41**
	TBNG	**0**	**18**	**1**	**5**	**0**	**10**	**0**	**1**	**35**
Total Project Disturbance Outside ROW - Overland Access[1]	**Total**	**<1**	**44**	**2**	**3**	**<1**	**6**	**4**	**1**	**61**
	BLM	**<1**	**3**	**0**	**0**	**<1**	**3**	**4**	**1**	**11**
	TBNG	**0**	**41**	**2**	**3**	**0**	**4**	**0**	**<1**	**50**
TOTAL PROJECT DISTURBANCE	**Total**	**1**	**81**	**4**	**9**	**1**	**27**	**12**	**3**	**138**
	BLM	**1**	**23**	**<1**	**0**	**1**	**13**	**12**	**2**	**52**
	TBNG	**0**	**58**	**4**	**9**	**0**	**13**	**0**	**1**	**86**

3.2.2.2.2.1 Direct and Indirect Effects

3.2.2.2.2.1.1 Federal Endangered Species Act Protected Species

3.2.2.2.2.1.1.1 Greater Sage-Grouse

Disturbance from construction, operation, and maintenance activities

Construction related activities associated with the Proposed Action, such as the presence of construction personnel, presence and use of construction equipment, and noise impacts related to construction activities, have the potential to disturb individual Greater Sage-Grouse within and adjacent to construction areas. Various landscape features such as vegetation, topography, and the amount of existing anthropogenic disturbances adjacent to the Proposed Action also affect the degree to which Greater Sage-Grouse are impacted by construction related activities. The amount of anthropogenic disturbance throughout the Project Area is typically low; however, disturbances such as oil and gas wells, roads and highways, distribution lines, and active coal mines are present. Implementation of timing stipulations, described in **Appendix B**, would reduce potential disturbance lekking and nesting Greater Sage-Grouse by restricting construction activities within two miles of known active leks between March 1 and June 30. These dates were selected as an additional conservative measure and differ from those

provided by the USFS, WGFD and USFWS. Chapter 1, Section F of the TBNG LRMP designates restricted dates between March 1 and June 15. However, while working with the WGFD and USFWS during preparation of the Greater Sage-Grouse Mitigation and Development Plan, restrictive dates between March 15 through June 30 were identified. In an effort to reduce disturbance to the greatest extent possible, the Proposed Action would avoid construction activities within two miles of active leks between the earliest and latest dates suggested.

While this measure may reduce disturbances to lekking and nesting Greater Sage-Grouse, construction related activities at other times of the year may disturb wintering and foraging Greater Sage-Grouse. No Greater Sage-Grouse winter concentration areas occur within the Project Area (M. Fry, 2010), therefore no winter construction seasonal restrictions would be applied during implementation of the Proposed Action. Disturbance from construction of the Proposed Action would be localized to the area of active construction and limited to the duration of construction. Greater Sage-Grouse would be able to continue normal behaviors once construction is completed. Even if Greater Sage-Grouse are displaced from habitats surrounding active construction areas, the availability and suitability of other unaffected habitat throughout the Project Area would provide suitable habitat away from construction areas. Helicopter based surveys for operation and maintenance monitoring of the line may disturb lekking Greater Sage-Grouse if the survey helicopter approaches active leks too closely. Helicopter surveys for operations and maintenance in Greater Sage-Grouse habitat would not occur from March 1 through June 30.

Disturbance of Greater Sage-Grouse from construction, operation and maintenance activities may occur as a result of implementation of the Proposed Action. However, with the implementation of mitigation measures, such as no construction activities occurring within two miles of known and active leks between March 1 and June 30, the impacts associated with disturbance of Greater Sage-Grouse would be reduced.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Clearing and grading access roads, work areas, and other project related features such as construction staging areas would result in the permanent and temporary loss of potential Greater Sage-Grouse habitat. No ground disturbing activities would occur in known leks. No ground disturbing activities would take place within two miles of known leks from March 1 through June 30.

Overall, the ROW of the Proposed Action would incorporate a total of 1,210 acres of potential Greater Sage-Grouse habitat; 671 acres of grassland habitat and 539 acres of shrubland habitat. **Table 3-23** presents a breakdown of this habitat based on type of habitat and ownership. Note that the majority of the ROW on shrubland and grassland habitat would not be impacted by the Proposed Action. Grassland and shrubland acreage calculations on TBNG and BLM, presented in **Table 3-23**, are based on field surveys completed by botanical surveyors in the field. Grassland and shrubland habitats on state (Wyoming), and privately held properties were not surveyed in the field and acreages presented in **Table 3-23** are based on LANDFIRE

coverages (USGS 2006) and were derived through GIS analysis and have not had a ground-based legal survey completed at this time. The design used for GIS analysis followed section lines, which caused some portions of the 100 foot wide ROW to fall on NFS and BLM properties. In these instances, the 100 foot wide ROW would either fall entirely on BLM or entirely on NFS once the Proposed Action completes a ground-based legal survey. Acres of grassland and shrubland for each jurisdiction presented below may change slightly once the ground-based legal survey is completed.

TABLE 3-23 - APPROXIMATE ACRES OF GRASSLAND AND SHRUBLAND HABITAT WITHIN ROW

	TBNG	BLM	State (WY)	Private	Total
Grassland	10	12	52	597	671
Shrubland	27	20	31	461	539
Total	37	32	83	1,058	1210

Acres based on a GIS exercise. No ground-based legal survey has been completed at this time. Acres displayed in this table may change pending final design and legal survey.

Grass and shrub vegetation within the proposed ROW would not be removed during construction activities and would remain in place throughout the life of the Proposed Action. Construction, operation and maintenance access paths to the Proposed Action would utilize overland travel to the ROW and within the ROW to the greatest extent possible. Habitat loss associated with the practice of overland travel during construction would be temporary, because no improvements (soil removal, grading, or other disturbing activities) would be applied and in-situ soils and associated vegetation would likely regrow and revegetate the disturbed areas than if soil was removed, graded, or gravel added. Nine acres of NFS and BLM lands that support Greater Sage-Grouse habitat would be temporarily impacted by overland travel. No new access roads would be constructed on NFS or BLM lands. Overland travel will be used to the greatest extent possible on privately held lands, however instances such as steep slopes may require the creation of a permanent access road. Such locations are not known at this time. Overland access or access roads on privately held lands that occur in potential Greater Sage-Grouse habitat would encompass 85 acres. Overland access or permanent access roads on lands held by the state of Wyoming that would occur in potential Greater Sage-Grouse habitat would encompass eight acres. The extent that permanent access roads would be used is unknown at this time and would not be developed until structure spotting is complete. The Proposed Action would occur on private lands that may support Greater Sage-Grouse habitat for approximately 86 miles. Approximately 500 structures would be located in Greater Sage-Grouse habitat on private lands.

Structures would be placed approximately every 800 to 900 feet. This would result in the permanent loss of Greater Sage-Grouse habitat at pole locations. Approximately 20 structures would occur on NFS lands in grassland or shrubland habitat, and 12 structures would occur on BLM lands in grassland or shrubland habitat. Approximately 500 structures would occur on private lands, which is predominantly grassland and shrubland habitat in Wyoming. Each structure would be accompanied by a structure work area of 100 feet by 100 feet. Structure work areas on BLM and NFS lands would create approximately 350,000 square feet, or

approximately eight acres, of temporary disturbance to grassland and shrubland habitats. While vegetation in Greater Sage-Grouse habitat would not be removed throughout the length of the ROW, Greater Sage-Grouse may still avoid the ROW and surrounding areas, thus resulting in an indirect loss of potential habitat. This impact is further addressed under indirect impacts below. Potential Greater Sage-Grouse habitat would only be removed at pole locations and not throughout the entire ROW, and no new permanent roads would be created as part of the Proposed Action.

The Greater Sage-Grouse Core Areas were designed throughout Wyoming with the aim of protecting the greatest amount of occupied Greater Sage-Grouse habitat possible. Using known locations of occupied leks throughout the state, the Core Areas protect over 83 percent of the known Greater Sage-Grouse populations in Wyoming while occupying only 25 percent of its land area. While areas outside of designated Core Area do support Greater Sage-Grouse habitat, it stands to reason that areas most populated with Greater Sage-Grouse would provide the most suitable habitat in Wyoming. By avoiding Core Areas to the greatest extent possible, the Proposed Action route will greatly reduce the amount of highly suitable Greater Sage-Grouse habitat that could be impacted.

Direct mortality from construction, operations, and maintenance equipment

Implementation of the Proposed Action could result in the direct mortality of Greater Sage-Grouse through collision with construction related equipment, primarily collisions with vehicles traveling to and from construction areas. This would present a temporary, direct impact. Research has shown that most nests are placed within three miles of the lek where the female was bred (WGFD 2003). By restricting construction activities between March 1 and June 30 within two miles of active leks, the Proposed Action would greatly reduce the likelihood that Greater Sage-Grouse nests are crushed by construction equipment in work areas and that adult birds are struck by moving equipment and vehicles. Direct mortality of Greater Sage-Grouse from collisions with vehicles traveling to and from construction areas could increase in areas of active construction. Based on the low likelihood of birds colliding with moving vehicles and the isolated nature of concentrated activity, this potential impact is not expected to result in an important shift in Greater Sage-Grouse mortality or changes to local populations. .

Collision with transmission lines or associated guy-wires

Implementation of the Proposed Action could result in the increased risk of collision between Greater Sage-Grouse and transmission lines. This would present a permanent direct impact. In general, avian collision with power lines (distribution and transmission) is typically greatest where the lines cross migratory paths, bisect feeding and nesting or roosting sites, or occur adjacent to major avian use areas (Savereno et al. 1996). While Greater Sage-Grouse are a predominantly ground dwelling species, they may be at risk of collision when a power line is placed in one of these key areas. The highest collision risks occur where grouse typically fly between foraging and loafing habitat bisected by power lines (SAIC 2001).

Sage-grouse have high wingloading values and low aspect values. This means that the birds have small wings in proportion to their relatively heavy bodies. This causes the birds to be less

maneuverable during flight and restricts swift reactions to unexpected obstacles (Bevanger 1998). High wingloading and low aspect values are typically associated with birds that are poor fliers, and exhibit short, low bursts of flight, such as Greater Sage-Grouse, Greater Prairie Chicken (Tympanuchus cupido), and Lesser Prairie Chicken (Tympanuchus pallidicinctus). These species may be more prone to collision with power lines when they are unexpectedly flushed from cover.

Documentation of direct mortality of Sage-grouse resulting from collisions with transmission lines has been limited. Two adult hens and one adult male were found beneath a telephone line five miles north of Beaver, Utah (Schroeder et al. 1999). The cause of death was later determined to be collision with the telephone line where it bisected sagebrush flats and an alfalfa field. Beck et al. (2006) monitored survival of 26 radio-collared juvenile Sage-grouse in the Medicine Lodge area of Clark County and 32 juvenile Sage-grouse in the Table Butte area of Clark and Jefferson Counties, Idaho in 1997 and 1998. While all mortality of the Medicine Lodge population was attributed to raptor predation, two instances of mortality (33 percent) in the Table Butte population were attributed to collisions with power lines. This study did not differentiate between transmission lines and distribution lines, so it is impossible to determine if a transmission line caused these deaths. The ten year study on the Falcon – Gondor 345 kV Transmission Line did not identify collision as the source of mortality for any of the 376 radio tracked Greater Sage-Grouse (Nonne et al. 2013).

As agreed upon in the Greater Sage-Grouse Mitigation and Development Plan, bird flight diverters would be placed on the overhead shield wire where the Proposed Action passes through Greater Sage-Grouse core area. The use of guy-wires would be limited to the extent possible; however, guy-wires may be required to support transmission structures where the Proposed Action changes direction. No guy-wires would be used in Greater Sage-Grouse core area in an effort to limit the possibility of collision. Mitigation measures such as the use of bird flight diverters, the limited use of guy-wires, and the limited documented occurrences of Greater Sage-Grouse collision with transmission lines would reduce potential impacts.

Noxious Weeds

Implementation of the Proposed Action could result in the establishment and spread of noxious weeds in Greater Sage-Grouse habitat. This would present a permanent indirect impact if noxious weeds could not be controlled after colonization. Noxious weeds negatively impact Greater Sage-Grouse primarily by reducing or eliminating native vegetation that the species requires for food and cover, resulting in habitat loss and fragmentation. Nonnative, invasive vegetation, including annual grasses and other noxious weeds continue to expand their range across Greater Sage-Grouse habitat, facilitated by ground disturbances such as wildfire, grazing, roads, and infrastructure. Throughout the range of the Greater Sage-Grouse, noxious weeds are most problematic in the Intermountain West and Great Basin. Invasive grasses increase fire return intervals or fire intensity, further reducing potential Greater Sage-Grouse habitat.

Fire has always been present across the sage-shrub landscape; however, the recent spread of invasive plant species has altered the fire frequency and intensity across some portions of the

range of the Greater Sage-Grouse. Fire can quickly remove large expanses of Greater Sage-Grouse habitat in a single event. Small, controlled fires in some nesting and early brood rearing habitat may increase the suitability of that habitat by increasing the amount of perennial grasses and forbs that provide suitable forage. Independent of the response of perennial grasses and forbs to fire, the most important and widespread sagebrush species for Greater Sage-Grouse (i.e., big sagebrush) are killed by fire and require decades to recover. After a fire and prior to recovery, these burned sites are of limited to no use to Greater Sage-Grouse (Fischer et al. 1997; Connelly et al. 2000; Nelle et al. 2000). Stands of sagebrush suitable for Greater Sage-Grouse habitat typically take years to recover following a fire. Many times invasive annual grasses, specifically *Bromus tectorum* and *Taeniatherum caput-medusae*, colonize burned patches of sagebrush, creating large monocultures that do not support Greater Sage-Grouse populations (Connelly et al. 2000). The loss of habitat caused by fire and the functional barrier burned habitat can pose to movement and dispersal compounds the influence this factor can have on Greater Sage-Grouse populations and population dynamics.

Flashovers on transmission lines caused by avian nesting material, prey, or streamers touching two energized conductors at once can ignite wildfires. The periodic removal of nesting material and proper spacing of conductors can reduce the risk of flashovers. Creation of a noxious and invasive weed management plan, as part of the Proposed Action, would reduce the likelihood of spreading noxious weeds. Stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, along with periodic removal of nesting material and proper conductor spacing to avoid flashovers would reduce potential impacts.

Landscape fragmentation by ROW and permanent access roads

The Proposed Action's ROW and access roads may fragment intact wildlife habitat, which may decrease habitat connectivity and inhibit movement for Greater Sage-Grouse (Knick et al. 2010). Fragmentation from the presence of the completed transmission line and permanent access roads would present a permanent indirect impact, while fragmentation from temporary access roads and overland travel paths would create a temporary indirect impact. Grassland and shrubland habitats within the ROW would only be modified in temporary construction areas at each pole location, and at pulling and tensioning sites. Loss of connectivity caused by habitat fragmentation may inhibit daily movements of Greater Sage-Grouse within their home-ranges as well as migration movements. Fragmentation may also inhibit dispersal ability, leading to greater isolation among habitat patches. Transmission lines within the Greater Sage-Grouse distribution may cause habitat fragmentation without providing a true physical barrier by causing birds to avoid certain areas of habitat for all life phases. However, information to support this possible avoidance theory is inconclusive, as Blomberg et al (2007) and Nonne et al. (2013) described above and the next three studies described below illustrate. Neither Blomberg et al. (2007) or Nonne et al. (2013) identified the presence of a 345 kV transmission line as a negative factor in various Greater Sage-Grouse population dynamics.

Habitat selection was modeled for three Sage-grouse populations in Beaverhead County, Montana based on a radio telemetry study involving 45 male Sage-grouse during the summers of 2001 through 2005. One of the parameters used in the model was distance to the nearest power line. The study did not differentiate between distribution lines or transmission lines;

however, the distance to the power line variable was not found to be associated with Sage-grouse habitat selection, suggesting that the presence of power lines did not impact habitat selection by male Greater Sage-Grouse (Wisinski 2007).

Johnson et al. (2010) explored the relation between trends of Greater Sage-Grouse lek counts from 1997 through 2007, and a variety of natural and anthropogenic habitat features which may fragment landscapes. For instance, lek trends were positively associated with sagebrush cover within five and 18 kilometers (three and 11 miles). This study made no distinction between distribution lines and transmission lines. The study found no general pattern associated with lek trends and length of power lines within five kilometers or 18 kilometers (three or 11 miles), indicating that power lines had no impact, positive or negative, on trends in lek attendance.

Based on unpublished pellet count data collected along transects perpendicular to transmission lines, the Science Applications International Corporation (SAIC 2001) found that Greater Sage-Grouse infrequently used areas close to transmission lines in the Hells Canyon region of southwestern Idaho. The presence of transmission lines may have caused a functional fragmentation of habitat causing Greater Sage-Grouse to abandon otherwise suitable habitat or disrupt movement patterns among seasonal habitats (SAIC 2001).

As the above studies and the Contemporary Knowledge and Research Needs Regarding the Potential Effects of Tall Structures on Sage-grouse (*Centrocercus urophasianus* and *C. minimus*) described earlier show, impacts of fragmentation from transmission lines to Greater Sage-Grouse are still uncertain. The route determined for the Proposed Action was intentionally designed to intersect the least amount of Greater Sage-Grouse core area, which would be expected to present the most optimal habitat for the species. The small amount of Greater Sage-Grouse core area intersected, and the limited number of leks present in the Project Area, indicate that the proposed ROW does not pass through the most suitable Greater Sage-Grouse habitat in the Powder River Basin. By purposely avoiding the most suitable Greater Sage-Grouse habitat, the habitat fragmentation impacts associated with implementation of the Proposed Action have been reduced to the greatest extent possible.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action does have the potential to cause an increase in predation on Greater Sage-Grouse, by increasing potential perches for predatory raptors and corvids. This would present a permanent indirect impact. Numerous researchers have documented Golden Eagle predation on Sage-grouse (Ellis 1985; Gibson and Bachman 1992; Schroeder et al. 1999). Ellis (1985) observed lekking Greater Sage-Grouse flushing and ceasing lek activities in the presence of a Golden Eagle perched two kilometers (one miles) away. Ellis (1985) also found that Golden Eagle predation on Greater Sage-Grouse on leks increased from 26 to 73 percent of the total predation after completion of a transmission line within 200 meters (656.7 feet).

The use of power lines support structures perches and nesting substrate for Sage-grouse predators is well documented. Steenhof et al. (1993) noted that within one year of construction of a 373-mile transmission line in southern Idaho and Oregon, raptors and ravens began nesting

on support structures. Within ten years of construction, 133 pairs of raptors and ravens were nesting along the line. The increased abundance of perches and nesting substrate can potentially have negative impacts on local Sage-grouse populations. Sage-grouse nest success has been shown to be inversely related to the density of common ravens, which may increase in the presence of a transmission line (Schroeder et al. 1999). However, an increase in common raven density does not necessarily result in a decrease in Sage-grouse populations. Blomberg and Sedinger (2008) noted that common ravens observed at Sage-grouse leks near a new transmission line in Nevada increased from 14 to 75 during the first four years post construction. Despite the increase in raven occurrences at leks, lek attendance by Sage-grouse did not decrease.

The ten year monitoring study completed on the Falcon – Gondor 345 kV Transmission Line in north-central Nevada also monitored mortality of the radio-tracked Greater Sage-Grouse. Researchers identified 87 mortality events and determined that predation was the greatest cause of mortality. However, mortality by mammalian and avian predators was roughly equal (Nonne et al. 2013) indicating that predatory raptors and corvids did not glean an additional hunting advantage from the transmission line.

As agreed upon in the Greater Sage-Grouse Mitigation and Development Plan, tubular steel monopole structures with davit arms would be utilized where the Proposed Action crosses Greater Sage-Grouse Core Area. The use of tubular steel monopole structures with davit arms would reduce the available perching and nesting substrate available to raptors and corvids as compared to H-frame structures used elsewhere along the Proposed Action. Additionally, blade-style perch discouragers would be placed on the davit arms to further reduce the raptor and corvid use of structures. Corvid nests are routinely removed throughout the BHP service area as part of operation and maintenance activities to reduce the risk of fire and outages of transmission lines. While these mitigation measures would act to reduce the impacts of nesting and foraging raptors and corvids within the Greater Sage-Grouse Core Areas, they would only be implemented where the Proposed Action occurs within Greater Sage-Grouse Core Areas. However, as stated above in the analysis of fragmentation impacts, the Proposed Action purposely avoided the most suitable Greater Sage-Grouse habitat. By purposely avoiding the most suitable Greater Sage-Grouse habitat, utilizing tubular steel structures with davit arms and perch discouragers within Greater Sage-Grouse Core Area, and removing corvid nests as part of operation and maintenance activities, the impacts of the Proposed Action from increased predation have been reduced to the greatest extent possible.

Greater Sage-Grouse Cumulative Effects

Cumulative effects are defined in the USFWS Section 7 Handbook as “effects of future state or private activities, not involving federal activities that are reasonably certain to occur within the actin area of the federal action subject to consultation.”

Cumulative short- and long-term disturbances to the species considered in this analysis arise from multiple sources. Those include direct and indirect impacts of mining within the analysis area (with an anticipated life of at least 20 years), extraction of conventional oil and gas and coal bed methane (CBNG) reserves, road and rail line development or relocation, grazing

(livestock and wildlife), drought, occupied residences, hunting and trapping, and other forms of dispersed recreation. Those activities have occurred in the analysis area in the past and most are expected to continue at similar levels. Both mining and oil and gas development activities have requirements for reclamation of disturbed areas as resources are depleted. As new areas of disturbance related to these two activities are added, mined-out areas are restored and reclaimed and oil and gas well sites are reclaimed when depleted wells are abandoned.

Cumulative impacts to sagebrush habitats and Greater Sage-Grouse would largely result from the fragmentation, alteration, degradation, and conversion of sagebrush stands from the continuation and expansion of mining activities, in combination with the other activities discussed above. Mine-related impacts in sagebrush habitats would be mitigated as required, although would not likely be able to fully mitigate the on-going loss or alteration of sagebrush habitat within the area as sage stands may not become fully reestablished until two to three decades after seeding. Implementation of the Proposed Action would contribute a relatively small amount of disturbance to habitats that may support the Greater Sage-Grouse. Implementation of the Proposed Action would not contribute substantially to the cumulative effects of previously described past and future projects, because the Proposed Action would not impact known leks and would affect a relatively small proportion of Greater Sage-Grouse Core Areas. Habitat loss from conversion of suitable sagebrush habitat to infrastructure was one of the primary drivers the USFWS listed the Greater Sage-Grouse as a Candidate for the ESA. Continued habitat loss from energy development, including mining and oil and gas exploration, remains one of the largest threats to Greater Sage-Grouse. The Proposed Action routes through the least amount of Greater Sage-Grouse Core Areas to reduce impacts to Greater Sage-Grouse.

The Proposed Action would not present a physical barrier to Greater Sage-Grouse. Lands that may be specifically managed for Greater Sage-Grouse habitat include those on NFS and BLM lands. However, NFS and BLM lands are highly separated from one another in the vicinity of the Proposed Action, thus limiting the respective agencies' ability to manage large parcels of intact habitat. Adjacent parcels are typically privately held and subject to the management decisions of the private landowner. Existing fragmentation on the landscape includes projects that have been in place for long periods of time, such as natural gas wells, railroad lines, roads, and other power lines. When the total amount of existing fragmentation on the landscape from completed projects is considered, the additional impacts of fragmentation from the Proposed Action would be minimal.

Other adverse impacts would potentially include loss of nests or individuals and the potential displacement of individuals from seasonal or year-round habitats. This species may experience increased rates of predation caused by the creation of favorable habitats or travel corridors for mammalian predators, resulting from fragmentation of sagebrush habitats. Some individuals could be killed or injured by vehicles or shooting. Nests may be destroyed or otherwise compromised by activities (i.e., construction, off-road driving, livestock grazing) conducted during the breeding season. Any displaced individuals would have to compete for available adjacent territories, and if adjacent habitats are at carrying capacity, intraspecific competition may result in nutritional stress, decrease in fecundity, or mortality to affected individuals.

Cumulative effects of ongoing activities may have already resulted in the loss or displacement of Greater Sage-Grouse from the area.

Overall, despite the possible death, injury, and displacement of some animals, and after implementation of mitigation measures, the cumulative impacts associated with implementation of the Proposed Action are not expected to reduce the size or viability of Greater Sage-Grouse populations within the Project Area.

Effects Determination

Mitigation measures such as seasonal avoidance of leks, modified structures with perch discouragers, bird flight diverters, a noxious and invasive weed management plan would collectively reduce impacts to Greater Sage-Grouse to levels that are not likely to be measurable or determinable at the population level. Additionally, BHP and USFS have agreed upon compensatory mitigation to reduce potential impacts to Greater Sage-Grouse at off-site locations. Through discussions with USFS, BHP has agreed to complete compensatory mitigation for direct and indirect impacts to approximately 1,920 acres of Greater Sage-Grouse habitat. This acreage was based on a one-mile buffer extending into NFS administered lands located in Township 44 North, Range 69 West, Sections 4, 5, and 6. These lands are directly adjacent to, but not within, state-designated Greater Sage-Grouse Core Area. Funds from compensatory mitigation will go towards ongoing habitat enhancement efforts for Greater Sage-Grouse, such as cheatgrass eradication programs and conifer encroachment reduction. The specific locations for these off-site mitigation efforts have not yet been determined but will be within the known range of Greater Sage-Grouse on NFS lands. The compensatory mitigation, when considered with routing to avoid Greater Sage-Grouse habitat on NFS lands and additional mitigation measures described in **Appendix B**, would ensure that the Proposed Action does not affect the overall viability of the species on NFS lands.

Impacts to Greater Sage-Grouse as the result of implementation of the Proposed Action could include loss of habitat, disturbance from construction related activities, injury or mortality, increased risk of avian-powerline collision, increased potential for spread and establishment of noxious weeds, habitat fragmentation, and increased predation. While construction of the Proposed Action may impact individual Greater Sage-Grouse, the Proposed Action would not likely impact population trends observed throughout the Powder River Basin or the Project Area. The Proposed Action has reduced potential impacts to Greater Sage-Grouse through general mitigation measures, Greater Sage-Grouse species specific mitigation measures, and routing through the least amount of Core Area and incorporating a low number of leks within four miles. However, because the Proposed Action would occur in occupied Greater Sage-Grouse habitat outside of the Core Area, and because of the currently declining trends of Greater Sage-Grouse populations on NFS lands and across northeastern Wyoming, implementation of the Proposed Action would "*likely jeopardize the continued existence of Greater Sage-Grouse as a Candidate Species*" if mitigation efforts are not applied. However, mitigation efforts described above and in **Appendix B** would reduce impacts of the Proposed Action to the point that implementation would not contribute to a net loss in habitat for Sage Grouse, or contribute to the direct, indirect, or cumulative impacts.

3.2.2.2.2.1.2 TBNG Forest Service Sensitive Species

3.2.2.2.2.1.2.1 Grassland Dependent Species

Direct Effects

Disturbance from construction, operation, and maintenance activities

Construction related activities associated with implementation of the Proposed Action, such as the presence of construction personnel, presence and use of construction equipment, and noise impacts related to construction activities, may result in the disturbance to swift fox, Grasshopper Sparrow, Burrowing Owl, Ferruginous Hawk, McCown's Longspur, Chestnut-collared Longspur, Mountain Plover, Northern Harrier, Loggerhead Shrike, Long-billed Curlew, Baird's Sparrow, and the American Peregrine Falcon within and adjacent to construction areas. Disturbances occurring during critical periods, that are prolonged, and/or that occur with great intensity can result in reduced productivity, increased energy expenditure, or displacement of individuals (Bennett 1991); however, the magnitude of impact is often specific to the species and the type of disturbance. Disturbances to wildlife include temporary impacts to habitat use in areas adjacent to active construction activities and potential permanent impacts to habitat use based on the presence of the transmission line after construction has concluded.

Vegetation clearing activities on NFS lands will be conducted outside of the migratory bird nesting season (April 15 – July 15). Seasonal avoidance buffers outlined in the TBNG LRMP and by the USFWS (USFWS 2012) would be applied to identified raptor nests to reduce disturbance related impacts to nesting raptors. Scheduling vegetation clearing activities outside of the migratory bird nesting season would reduce disturbance impacts to Grasshopper Sparrow, McCown's Longspur, Chestnut-collared Longspur, Mountain Plover, Loggerhead Shrike, Long-billed Curlew, and Baird's Sparrow. Application of seasonal avoidance buffers to identified raptor nests during construction activities would reduce disturbance related impacts to Burrowing Owl, Ferruginous Hawk, Northern Harrier, and American Peregrine Falcon. Potential disturbance impacts to Mountain Plover would be reduced through the use of avoidance buffers, as described in the TBNG LRMP. Any known Mountain Plover nests or nesting areas would be avoided by a quarter mile from March 15 to July 31.

Construction activities may disturb swift fox during the breeding and whelping seasons, if occupied dens are established near construction areas. However, construction activities are less likely to disturb foraging fox, as foraging typically occurs at night. Disturbance to breeding and whelping swift fox from construction related activities may result in den abandonment or reduced reproductive success by continually causing adults to leave dens and young. Potential disturbance impacts to swift fox will be reduced through the use of avoidance buffers described in the TBNG LRMP. Any known swift fox dens will be avoided by a quarter of a mile avoidance buffer from March 1 through August 31. Potential long-term impacts associated with operations and maintenance activities would not disturb swift fox to the degree that reproductive success would be jeopardized. Implementing avoidance buffers around known swift fox dens from March 1 through August 31 would reduce potential disturbance impacts to swift fox dens.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Permanent habitat loss of grassland habitat for swift fox, Grasshopper Sparrow, Burrowing Owl, Ferruginous Hawk, McCown's Longspur, Chestnut-collared Longspur, Mountain Plover, Northern Harrier, Loggerhead Shrike, Long-billed Curlew, Baird's Sparrow, and the American Peregrine Falcon would only occur at structure locations. After completion, each structure would occupy approximately seven square feet of habitat. Grassland habitat would remain largely undisturbed within the ROW, with the exception of where structure work areas and overland travel routes occur within the ROW. The ROW within NFS lands would occupy approximately ten acres of grassland habitat. These ten acres of ROW would include approximately five structures. Temporary impacts from structure work areas associated with these five structures would occupy approximately 50,000 square feet, or one acre, of grassland habitat. Pulling and tensioning sites would be placed within the ROW and on private properties and would not be located on NFS lands.

No habitat would be permanently lost from the establishment and use of access roads because no new access roads would be constructed on NFS or BLM lands. Access to all structure locations would be achieved through overland travel. The use of overland travel access routes would result in a temporary loss of approximately two acres of grassland habitat within these travel corridors. After construction activities have been completed and overland travel access routes are no longer required, habitats in these areas would be appropriately managed based on stipulations described in the Noxious Weed Reclamation and Revegetation Plan developed for the Proposed Action. Overland travel may be required to access structures in need of repair. However, these instances are expected to be rare and will not create additional impacts. When impacts from overland access and structure work areas are combined, temporary impacts from the Proposed Action would impact approximately three total acres of grassland habitat.

One active BTPD colony, which would provide optimal habitat for Mountain Plover and Burrowing Owl, was located within the analysis area. No structures or overland access paths would be placed within active BTPD colonies. As such, implementation of the Proposed Action would not result in the removal of optimal nesting habitat for the Mountain Plover or Burrowing Owl. Additionally, no active swift fox dens were located within the analysis area during 2012 surveys. Implementation of the Proposed Action would not result in the removal of occupied swift fox dens.

Grassland habitats would not require maintenance throughout the life of the Proposed Action. Other habitat types, such as conifer forests, often require vegetation within the ROW to be trimmed periodically to limit interference with a transmission line. Vegetation within grassland habitat would not require such maintenance and current vegetation would remain in place.

Direct mortality from construction, operation, and maintenance equipment

Construction, operation and maintenance of the Proposed Action may result in injury or mortality to swift fox, Grasshopper Sparrow, Burrowing Owl, Ferruginous Hawk, McCown's Longspur, Chestnut-collared Longspur, Mountain Plover, Northern Harrier, Loggerhead Shrike, Long-billed Curlew, Baird's Sparrow, and the American Peregrine Falcon through collision or entrapment.

Wildlife species with limited mobility may experience injury or mortality during vegetation management, clearing, and grading operations associated with construction, operations, and maintenance of the Proposed Action. Collisions with vehicles related to construction, operations and maintenance may result in injury or mortality, particularly since the volume and frequency of localized vehicle traffic would increase as part of implementation of the Proposed Action in the vicinity of active construction activities.

Burrowing Owl and swift fox may experience mortality if occupied burrows are collapsed or if egress is prevented. No active Burrowing Owl nests or swift fox dens were identified during raptor nest surveys or swift fox den surveys conducted in support of the Proposed Action in 2012. No structures, structure work areas, or overland access routes would occur in occupied BTPD colonies. Avoidance of occupied BTPD colonies and application of den avoidance buffers described above would reduce the likelihood that a Burrowing Owl or swift fox is trapped in a collapsed burrow.

Avoidance of vegetation removal during the migratory bird nesting season would reduce the likelihood that a nesting bird or its fledglings would be directly killed during the construction phase. Construction equipment utilizing overland travel routes and structure work areas that would not necessarily require the removal of vegetation may directly kill nesting birds or their fledglings in grassland habitat if such actions take place during the nesting season. The potential for direct mortality would be minimized by reducing these types of construction areas. Such areas would occupy approximately three total acres of grassland habitat.

All USFS R2 Sensitive species that occupy grassland habitat may be killed by construction personnel travelling to and from construction areas or by operations and maintenance personnel checking and repairing lines (i.e., road kill). Implementation of the Proposed Action would increase vehicle traffic volume on existing roads locally in the vicinity of active construction areas. However, because the increases would be localized and typically short in duration, the increased risk of direct mortality in the form of vehicle-wildlife collisions would be minimal and uncommon.

Collision with transmission lines or associated guy-wires

Collision with transmission lines or associated guy-wires may cause direct injury or mortality to USFS R2 Sensitive avian species in grassland habitats. Higher mortality rates usually occur in specific localized situations where certain factors create high risk potential. Such situations may include where large numbers of birds regularly cross the line between foraging and roosting or nesting sites. None of the grassland habitats crossed by the Proposed Action would constitute such areas that would concentrate bird movements.

Species that typically experience the highest power line collision fatalities are those with “poor” flight ability created by high wing loading and low wing aspect (Bevanger 1998; Janss 2000). Long-billed Curlew would likely fall into this category. Grasshopper Sparrow, McCown’s Longspur, Chestnut-collared Longspur, Mountain Plover, Loggerhead Shrike, and Baird’s Sparrow are all small birds which are not typically prone to collision with transmission lines. Burrowing Owl, Ferruginous Hawk, Northern Harrier, and American Peregrine Falcon are typically not prone to collision with transmission lines and may occasionally use support

structures as hunting perches. However, extreme weather events, such as fog or high winds, may increase the likelihood of a collision with the Proposed Action for all species.

Indirect Effects

Noxious weed spread

The establishment and spread of noxious weeds or non-native species can result in degradation of wildlife habitat (Levine et al. 2003). Non-native plant invasions have the potential to permanently impact wildlife habitat quality by out-competing native plants, altering the natural fire regime, and changing ecosystem processes (e.g., nitrogen cycling). Nonnative, invasive vegetation, including annual grasses and other noxious weeds continue to expand their range across Wyoming and other western states, facilitated by ground disturbances such as wildfire, grazing, roads, and infrastructure. Invasive grasses increase fire return intervals or fire intensity, further reducing potential sensitive species habitat. Many times invasive annual grasses, specifically *Bromus tectorum* and *Taeniatherum asperum*, colonize burned patches of sagebrush, creating large monocultures which do not support suitable habitat for shrubland dependent species and present lower quality habitat for grassland dependent species compared with native grasses.

The establishment of nonnative or invasive vegetation could limit the potential nesting habitat for smaller grassland birds that nest in stands of native grasses. Such species include Long-billed Curlew, Grasshopper Sparrow, McCown's Longspur, Chestnut-collared Longspur, Mountain Plover, Loggerhead Shrike, and Baird's Sparrow. Establishment of nonnative or invasive vegetation presents lower habitat suitability than native grasses by offering less optimal forage, cover, and nesting habitat. Impacts to swift fox, Burrowing Owl, Ferruginous Hawk, Northern Harrier, and American Peregrine Falcon from nonnative and invasive vegetation could include a drop in available prey base. This would make grasslands comprised of predominantly nonnative or invasive vegetation less suitable than native grasses.

Flashovers on transmission lines caused by avian nesting material, prey, or streamers touching two energized conductors at once can ignite wildfires which may create a greater impact in nonnative vegetation than in native grasses. The periodic removal of nesting material and proper spacing of conductors can reduce the risk of flashovers occurring, thus lowering the risk of fire spreading through invasive weeds. Creation of a noxious and invasive weed management plan would reduce the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious and Invasive Weed Management Plan are implemented, along with periodic removal of nesting material and proper conductor spacing to avoid flashovers, potential impacts from noxious weeds would be reduced.

Landscape fragmentation by ROW and permanent access roads

Implementation of the Proposed Action and the establishment of an occupied ROW may result in the permanent fragmentation effects for species relying on grassland habitats. No new permanent roads would be constructed on NFS lands and would not add to the potential impacts of habitat fragmentation once overland access paths are reclaimed. Fragmentation may also be caused by the presence of the Proposed Action, even if grassland habitat is not directly removed. Grassland and habitats within the ROW would only be modified in temporary

construction areas at each pole location and overland access paths. While the installation of the Proposed Action may provide a linear contrast within the grassland habitat, such a feature seems unlikely to cause effects attributable to more traditional habitat fragmentation on any of these grassland species. The entire ROW would not be cleared of grassland habitat, the presence of the transmission line may fragment habitat if USFS R2 Sensitive species discussed in this section avoids the Proposed Action despite the presence of suitable habitat within the ROW. Predatory raptors, including Ferruginous Hawk, Northern Harrier, American Peregrine Falcon, and Burrowing Owl have been known to utilize transmission support structures as hunting perches. This would indicate that the presence of the Proposed Action would not present an impact from fragmentation for these species. Knick and Rotenberry (2002) indicated small passerines in open habitat are highly sensitive to fragmentation at spatial scales larger than the species typical home range. Even if Grasshopper Sparrow, McCown's Longspur, Chestnut-collared Longspur, Mountain Plover, Loggerhead Shrike, and Baird's Sparrow avoid the Proposed Action, the narrow width of the ROW would not be larger than the typical home range. Thus impacts to the species from fragmentation would be reduced.

Implementation of the Proposed Action would not result in the removal of grassland habitat along the length of the ROW. While habitat fragmentation is commonly cited as a cause of grassland species declines (Saunders et al. 1991; Vander Hagen 2007; Knick and Rotenberry 2002), the fragmentation referenced is typically the removal of habitat through fire or conversion to agriculture. Grassland habitats within the ROW on NFS lands would continue to persist in their current state and would still provide large patches of intact habitat. Fragmentation of large, intact parcels of habitat can provide travel corridors to mammalian predators, such as coyote and red fox, into larger patches of intact grassland and shrubland habitat. However, this would not occur with the Proposed Action because vegetation removal within the ROW in grassland habitat would not be required. The ROW would not create an edge impact that may be utilized by mammalian predatory edge species, such as coyotes and red fox. Therefore, increased predation by mammalian predators on sensitive species inhabiting large blocks of intact grassland or shrubland habitat is not expected. Potential impacts for increased predation from avian predators are addressed below.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action could impact Mountain Plover, Long-billed Curlew, and swift fox utilizing grassland habitats by creating increased raptor perching and nesting opportunities, resulting in increased predation in those habitats. Mountain Plover and Long-billed Curlew would be at greater risk of predation from raptors utilizing support structures for the Proposed Action. This risk would be reduced for Mountain Plover because raptor perch discouragers would be placed on structures adjacent to BTPD colonies, a favored habitat of Mountain Plovers. Swift fox, particularly young and small individuals, may experience increased predation by larger predatory raptors such as Golden Eagle and possibly Ferruginous Hawk. The presence of native habitat within and adjacent to the ROW would help to reduce predation on Mountain Plover, Long-billed Curlew, and swift fox by allowing native vegetation to provide cover.

Small passerines that inhabit grasslands, such as Grasshopper Sparrow, McCown's Longspur, Chestnut-collared Longspur, Loggerhead Shrike, and Baird's Sparrow, would not likely experience increased predation rates because hawks (Buteos) and eagles, the raptor species most likely to benefit from the increased perching and nesting opportunities, do not typically hunt small bird species. Burrowing Owl, Ferruginous Hawk, Northern Harrier, and American Peregrine Falcon would not experience a negative impact from the increase in raptor perches and nesting opportunities.

3.2.2.2.2.1.2.2 Wetland/Riparian/Aquatic Dependent Species

Direct Effects

Disturbance from construction, operation, and maintenance activities

Construction related activities associated with the Proposed Action, such as the presence of construction personnel, presence and use of construction equipment, and noise impacts related to construction activities, may result in the disturbance of Townsend's big-eared bat, spotted bat, Bald Eagle, northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow within and adjacent to construction areas. Increased disturbance can result in reduced productivity, increased energy expenditure, or displacement of individuals (Bennett 1991); however, the magnitude of impact is often specific to the species and the type of disturbance. Disturbances to wildlife include temporary impacts to habitat use in areas adjacent to active construction activities and potential permanent impacts to habitat use based on the presence of the transmission line after construction has concluded.

Disturbance to Bald Eagles occupying nests or winter roosts would be minimized through the application of avoidance buffers identified in the TBNG LRMP and USFWS Bald Eagle Management Guidelines. The TBNG LRMP describes a seasonal avoidance buffer of one mile to be placed on Bald Eagle winter roosts from November 1 through March 31. For any active Bald Eagle nest identified during the construction phase, a one-mile disturbance free buffer would be applied to the nest from February 1 through July 31.

Bat species that are known to roost in trees would also be susceptible to disturbance caused during construction periods. The Townsend's big-eared bat and spotted bat roost in a variety of locations including under tree bark and in tree cavities. While these species may utilize trees as temporary roosts, the more sensitive maternity and hibernating roosts are typically located on cliffs or in caves or mines. No potential maternity or hibernating colony habitat occurs within the wildlife analysis area. The migratory bird nesting seasonal timing limitation on construction activities, may also afford some benefits to roosting Townsend's big-eared bats and spotted bats, particularly those that may occupy suitable arboreal habitats. Individual bats roosting in arboreal habitats outside of the migratory bird nesting season would be disturbed if occupied roost trees are removed. Additionally, noise related to construction activities may disturb bats roosting in trees in close proximity to construction activities. It should be noted that no riparian habitat would be removed within the ROW and no overland access routes would be routed through wetland, riparian, or aquatic habitat. Any trees removed which may house roosting Townsend's big-eared bat or spotted bat would be located outside of wetlands or riparian areas.

All wetland and aquatic habitats within the ROW would be avoided by the Proposed Action via spanning. No overland access routes would occur in wetland habitats and existing crossings would be used at all perennial streams. Therefore, disturbance to northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow would be minimal. Helicopter surveys performed as part of operations and maintenance activities would not cause important disturbance related impacts to northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow. Habitat avoidance measures would eliminate impacts to wetland and aquatic habitats.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Potential habitat for Townsend's big-eared bat, spotted bat, Bald Eagle, northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow would not be impacted by the Proposed Action. Such habitats would be spanned by conductors and no transmission support structures would be placed in wetlands, riparian areas, or aquatic habitat. At no point would construction related equipment enter wetland or aquatic habitat. Additional storm water best-management-practices, to be outlined in the forthcoming Stormwater Pollution Prevention Plan (SWPPP), would capture sediments and storm water runoff from the construction site before it enters wetland or aquatic habitat. This would eliminate potential habitat loss through habitat degradation to northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow inhabiting wetland and aquatic habitat.

Under the Bald and Golden Eagle Protection Act, no activity may remove a Bald Eagle nest without a proper take permit. The Proposed Action would not result in the loss of any known Bald Eagle nests. Additionally, the one observed Bald Eagle winter roost tree is located over one mile from the Proposed Action and would not be removed.

Avoidance of all wetland, riparian, and aquatic habitat would not result in the loss of foraging habitat for Townsend's big-eared bat or spotted bat. While no riparian or wetland vegetation would be removed as part of the Proposed Action, trees adjacent to such habitats may be removed. This would result in a small permanent loss of potential roosting habitat for Townsend's big-eared bat and spotted bat.

Direct mortality from construction, operation, and maintenance equipment

The threat of direct mortality from construction, operations, and maintenance equipment to Townsend's big-eared bat, spotted bat, Bald Eagle, northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow would be minimal because no construction or operations and maintenance equipment would enter wetland, riparian, or aquatic habitat at any point. Direct mortality to sensitive fish species would be avoided by ensuring that no overland travel routes pass through aquatic habitat. Construction equipment would pass over permanent and intermittent water bodies at previously existing crossing locations. Northern leopard frog, and to a lesser extent Townsend's big-eared bat, spotted bat, and Bald Eagle, would be at risk for collision with construction or operations and maintenance related equipment travelling to and from the Proposed Action when existing roads pass through wetland, riparian, or aquatic habitats. Northern leopard frogs would be at greater risk based on their small size and slow

moving nature. Implementation of the Proposed Action would increase vehicle traffic volume on existing roads locally in the vicinity of active construction areas. However, because the increases would be localized and typically short in duration, the increased risk of direct mortality in the form of vehicle-wildlife collisions would be low.

Collision with transmission lines or associated guy-wires

Collision with transmission lines or associated guy-wires may cause direct injury or mortality to the Bald Eagle, Townsend's big-eared bat, or spotted bat. Higher mortality rates usually occur in specific localized situations where certain factors create high risk potential. Because these species typically forage over wetland, riparian, or aquatic habitats, the Proposed Action would result in a higher risk of collision when conductors span such habitats. However, none of these species are typically associated with or prone to colliding with transmission lines. Bats are typically very agile fliers and are able to easily avoid transmission lines and guy-wires. Extreme weather events, such as fog or high winds, may increase the likelihood of Bald Eagles colliding with the Proposed Action. If avian or bat collision with the Proposed Action is identified as a problem, the Proposed Action would mark the problem area of the line in accordance with APLIC guidelines (APLIC 2012).

Indirect Effects

Noxious weed spread

The establishment and spread of noxious weeds or non-native species can result in degradation of habitat used by Townsend's big-eared bat, spotted bat, Bald Eagle, northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow (Levine et al. 2003). Non-native aquatic plant invasions have the potential to permanently impact wildlife habitat quality by out-competing native plants and changing ecosystem processes (e.g., nitrogen cycling). Establishment of non-native plants can create monocultures of one species that would not support suitable habitat for USFS R2 Sensitive species reliant on wetland, riparian, or aquatic habitats. Establishment of non-native vegetation may also reduce the available habitat suitable for prey species of Townsend's big-eared bat, spotted bat, and northern leopard frog. The potential for establishment of noxious weeds or non-native wetland, aquatic, or riparian species would be greatly reduced by ensuring that all construction and operations and maintenance equipment avoids such habitats and utilizes existing crossing locations for access over permanent and intermittent streams.

Landscape fragmentation by ROW

No overland access routes would pass through wetland, riparian, or aquatic habitats utilized by Townsend's big-eared bat, spotted bat, Bald Eagle, northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow and would not present any fragmentation to these habitats. The Proposed Action ROW would not require the removal of wetland, riparian, or aquatic habitats on NFS lands; all such habitats would be spanned by conductors. All permanent and intermittent water bodies would be crossed by construction equipment at existing crossing locations. This would eliminate the need for new culverts, bridges, or low-water crossings which may fragment habitat utilized by sensitive fish species such as lake chub, plains minnow, sturgeon chub, and flathead chub. Therefore, impacts from landscape

fragmentation on Townsend's big-eared bat, spotted bat, Bald Eagle, northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow are not anticipated.

Increased predation based on an increase in perching and nesting opportunities for raptors

The Proposed Action has the potential to cause an increase in predation rates on northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow as the result of predatory bird species utilizing the transmission support structures as hunting perches. Such predatory species may include various raptors or piscavorous species such as Belted Kingfisher (*Ceryle alcyon*). This would present a permanent impact. Predatory raptors are known to utilize transmission structures for hunting perches in landscapes otherwise devoid of perches (Steenhoff et al. 1993; Blomberg and Sedinger 2008; Howe 2012). While no structures would be placed directly in wetland, riparian, or aquatic habitats, structures would likely be placed adjacent to such habitats where the Proposed Action would span them. Increased predation may not present substantial effects on northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow based on the limited distribution of wetland, riparian, and aquatic habitats in the wildlife analysis area. Additionally, the majority of raptor species occurring in the wildlife analysis area include large Buteo species such as Red-tailed Hawk and Ferruginous Hawk, species which do not typically forage on fish or small amphibians. Water bodies which may be spanned by the Proposed Action are not large enough to attract raptors, such as Bald Eagle and Osprey (*Pandion haliaetus*) which would typically prey upon fish and amphibians. Additionally, such habitats would not be altered by the Proposed Action, thus allowing species occupying these habitats to find refuge in the existing vegetation. The presence of additional perches adjacent to wetland, riparian, and aquatic habitats may inhibit the ability of northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow to expand their current ranges if individuals fall to predation. The presence of the Proposed Action adjacent to wetland, riparian, and aquatic habitats would increase the availability of perches to predatory raptors. However, effects from this impact would be minimal because existing escape vegetation would be left in place, and the majority of avian predators in the wildlife analysis area do not typically forage on fish or amphibians.

3.2.2.2.2.1.2.3 Conifer Forest Dependent Species

Direct Effects

Disturbance from construction, operation, and maintenance activities

Construction related activities associated with the Proposed Action, such as the presence of construction personnel, presence and use of construction equipment, and noise impacts related to construction activities, may result in the disturbance of fringed myotis, hoary bat, and Lewis's Woodpecker within and adjacent to construction areas. Increased disturbance can result in reduced productivity, increased energy expenditure, or displacement of individuals (Bennett 1991); however, the magnitude of impact is often specific to the species and the type of disturbance. Disturbances to wildlife include temporary impacts to habitat use in areas adjacent to active construction activities and potential permanent impacts to habitat use based on the presence of the transmission line after construction has concluded.

Vegetation clearing activities on NFS lands will be conducted outside of the migratory bird nesting season (April 15 – July 15). Seasonal avoidance buffers outlined in the TBNG LRMP and by the USFWS (USFWS 2012) would be applied to identified raptor nests to reduce disturbance related impacts to nesting raptors. Scheduling vegetation clearing activities outside of the migratory bird nesting season and applying seasonal avoidance buffers to raptor nests during construction activities would aid in reducing impacts to nesting bird species, including Lewis's Woodpecker in conifer forest habitat.

Bat species that are known to roost in trees would also be susceptible to disturbance caused during construction periods. The fringed myotis and hoary bat roost in a variety of locations including under tree bark and in tree cavities. While these species may utilize trees as temporary roosts, the more sensitive maternity and hibernating roosts are typically located on cliffs or in caves or mines. No potential maternity or hibernating colony habitat for fringed myotis and hoary bat occurs within the wildlife analysis area. The migratory bird nesting seasonal timing limitation on construction activities, may also afford some benefits to fringed myotis and hoary bats roosting suitable arboreal habitats. Individual bats roosting in arboreal habitats outside of the migratory bird nesting season would be disturbed if occupied roost trees are removed. Additionally, noise related to construction activities may disturb bats roosting in trees in close proximity to construction activities. Other potential roosting habitat within the analysis area is limited to anthropogenic features such as buildings and bridges. Individual fringed myotis and hoary bats roosting in anthropogenic features would likely be acclimated to human activity, reducing the potential disturbance related impacts. The absence of optimal maternity colony habitat, hibernating colony habitat, and restrictions on vegetation removal would minimize impacts to bat species.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Permanent habitat loss of conifer habitat for Lewis's Woodpecker, fringed myotis, and hoary bat would occur within the ROW of the Proposed Action. Mature conifer trees would be removed within the ROW because they would potentially contact or fall on the completed transmission line, increasing the risk of an outage or wildfire. Overland access paths to structure locations would occur within the ROW and would not result in any new habitat loss in conifer forests. Approximately one acre of conifer forest habitat located on NFS lands will be permanently removed under implementation of the Proposed Action. Lewis's Woodpecker, fringed myotis, and hoary bat would experience a permanent habitat loss of one acre. Conifer forest habitat on NFS lands that would be removed is located primarily in the Rochelle Hills area. While species that depend on conifer forest habitat would experience a permanent loss of habitat, the amount removed is relatively small compared to the amount of available undisturbed habitat and would not have a measurable impact on population status or survivorship.

Direct mortality from construction, operation, and maintenance equipment

Construction, operation, and maintenance of the Proposed Action may result in injury or mortality to Lewis's Woodpecker, fringed myotis, and hoary bat through collision or destruction of occupied cavities. Species may experience injury or mortality during tree removal, and vehicle travel operations associated with construction, operations, and maintenance of the

Proposed Action. Lewis's Woodpecker, hoary bat, or fringed myotis occupying tree cavities in areas being cleared may experience mortality if occupied trees are felled prior to the individual escaping. All vegetation removal on NFS lands would occur outside of the migratory bird nesting season. This would reduce the likelihood that a nesting Lewis's Woodpecker or its fledglings would be directly killed during tree removal. No maternity roost habitat exists within areas which would be directly impacted by construction activities. Therefore, the likelihood that the Proposed Action would result in direct mortality to hoary bats or fringed myotis occupying maternity roosts or their young is low.

Collisions with vehicles related to construction, operations and maintenance may result in injury or mortality, particularly since the volume and frequency of localized vehicle traffic would increase as part of implementation of the Proposed Action in the vicinity of active construction activities. However, the likelihood of a vehicle strike to Lewis's Woodpecker, hoary bat, or fringed myotis is likely to be low because no existing roads occur in the limited amount of conifer habitat in the wildlife analysis area.

Collision with transmission lines or associated guy-wires

Implementation of the Proposed Action would increase the risk of avian and bat collisions with the transmission line wires or associated guy-wires that may result in injury or mortality. Collision risk varies among avian species and depends on physiology and flight behavior, as well as weather and location of the transmission line in relation to bird use areas (Savereno et al. 1996; Bevanger 1998). In general, avian collision with power lines (distribution and transmission) is typically greatest where the lines cross migratory paths, bisect feeding and nesting or roosting sites, or occur adjacent to major avian use areas, none of which occurs in conifer habitat in the wildlife analysis area. The placement of a transmission line relative to surrounding vegetation can also influence collision risk. Lines that are at or below the canopy height of adjacent trees rarely present a problem because tree-dwelling birds and bats, such as Lewis's Woodpecker, hoary bat, and fringed myotis, are usually maneuverable enough to avoid the lines, while other species will typically be flying above the canopy (APLIC 2012).

Lewis's Woodpecker, hoary bat, and fringed myotis are not typically associated with or prone to colliding with transmission lines. However, extreme weather events, such as fog or high winds, may increase the likelihood of these species colliding with the Proposed Action.

Indirect Effects

Noxious weed spread

The establishment and spread of noxious weeds or non-native species can result in degradation of wildlife habitat (Levine et al. 2003). Non-native plant invasions have the potential to permanently impact wildlife habitat quality by out-competing native plants, altering the natural fire regime, and changing ecosystem processes (e.g., nitrogen cycling). Some non-native plants, such as cheatgrass, create a more continuous fuel bed than native bunchgrasses, resulting in an increased risk of wildfire (Paysen et al. 2000). Construction of access roads and the movement of construction equipment and vehicles along these access roads or the occurrence of overland travel may increase the potential for the establishment and spread of noxious weeds.

Because the Proposed Action would permanently remove conifer habitat that could be occupied by Lewis's Woodpecker, hoary bat, and fringed myotis, the threat from noxious weeds or non-native species precluding the establishment of suitable coniferous habitat is nonexistent. However, the establishment of noxious weeds or non-native plants may reduce the amount of suitable habitat for prey species that develop in the grass or shrub layer along the forest floor, thus reducing the available prey base. Additionally, an increase in wildfire occurrence caused by the establishment of non-native plants could remove conifer forest habitat occupied by Lewis's Woodpecker, hoary bat, and fringed myotis. Flashovers on transmission lines caused by avian nesting material, prey, or streamers touching two energized conductors at once can ignite wildfires. The periodic removal of nesting material and proper spacing of conductors can reduce the risk of flashovers occurring, thus lowering the risk of fire spreading through invasive weeds. Creation of a Noxious Weed Reclamation and Revegetation Plan would reduce the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, along with periodic removal of nesting material and proper conductor spacing to avoid flashovers, potential impacts from noxious weeds would be reduced.

Landscape fragmentation by ROW

The Proposed Action's ROW and overland access paths may fragment intact conifer habitat, which may decrease habitat connectivity and inhibit movement of Lewis's Woodpecker, hoary bat, and fringed myotis (Knight et al. 2000). Fragmentation of habitat may be caused by the removal of one habitat type and replacing it with another. This may include removal of forest habitat within the ROW and replacing it with grassland or shrubland habitat or earlier successional forest habitat. It is highly unlikely that the Proposed Action alone will create a permanent barrier to migration or dispersal of Lewis's Woodpecker, hoary bat, or fringed myotis based on the narrow width of the ROW and the short-term nature of the increase in traffic on access roads.

Implementation of the Proposed Action and construction of the proposed ROW on NFS lands would result in the fragmentation of conifer forest habitat where trees would be removed within the ROW. Construction of the proposed ROW is not likely to have important ecological effects on Lewis's Woodpecker, hoary bat, or fringed myotis associated with habitat fragmentation based on the linear and relatively narrow aspects of the ROW. However, effects associated with creating new and abrupt habitat edges are a related and likely source of impacts. For newly created ROWs occurring in forested habitats, such as those in the Rochelle Hills of the TBNG, the margins of the forested habitat often experience changes in wildlife species composition, habitat and plant species composition, and microclimate. These characteristics of forested edge habitats vary in their significance and their positive or negative impacts depending which target species (plant or animal) is considered. These potential effects would likely be minimal on the Lewis's Woodpecker, hoary bat, or fringed myotis. Lewis's Woodpecker commonly occupies open, savannah-like habitats that could accommodate the Proposed ROW. Hoary bats typically forage along forest edges, which would include the edge of the Proposed ROW.

The ROW associated with the Proposed Action may provide access to formerly interior habitats to nest parasite species, such as the brown-headed cowbird, which would otherwise not have

access to the forest interior. Brown-headed cowbirds may parasitize the nests of Lewis's Woodpecker; however, their preferred prey species are nests of sparrows, vireos, and warblers (Lowther 1993).

Increased predation based on an increase in perching and nesting opportunities for raptors.

Because conifer habitats present an abundance of available perching and nesting opportunities for raptors, Lewis's Woodpecker, hoary bat, and fringed myotis are not anticipated to be impacted by the potential increase in predation from raptors utilizing transmission structures.

3.2.2.2.2.1.2.4 Shrubland Dependent Species

Direct Effects

Disturbance from construction, operations, and maintenance activities

Construction related activities associated with the Proposed Action, such as the presence of construction personnel, presence and use of construction equipment, and noise impacts related to construction activities, may result in the disturbance of Sage Sparrow and Brewer's Sparrow within and adjacent to construction areas. Increased disturbance can result in reduced productivity, increased energy expenditure, or displacement of individuals (Bennett 1991); however, the magnitude of impact is often specific to the species and the type of disturbance. Disturbances to wildlife include temporary impacts to habitat use in areas adjacent to active construction activities and potential permanent impacts to habitat use based on the presence of the transmission line after construction has concluded.

Numerous Brewer's Sparrows were identified during migratory bird surveys completed in support of the Proposed Action in 2012. Many of these were identified by their song. The presence of numerous singing males would indicate that active nesting territories are present within the wildlife analysis area and some may be impacted by the Proposed Action. Construction activities may disturb nesting Brewer's Sparrows within and adjacent to construction areas. Vegetation clearing activities on TBNG lands will be conducted outside of the migratory bird nesting season (April 15 – July 15). Scheduling vegetation clearing activities outside of the migratory bird nesting season would reduce disturbance impacts to Sage Sparrow and Brewer's Sparrow.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Permanent habitat loss of shrubland habitat for Sage Sparrow and Brewer's Sparrow would only occur at structure locations. After completion, each structure would occupy approximately seven square feet of habitat. Shrubland habitat would remain largely undisturbed within the ROW, with the exception of where structure work areas and overland travel routes occur within the ROW. The ROW within NFS lands would occupy approximately 27 acres of shrubland habitat. These 27 acres of ROW would be occupied by approximately 15 structures. Temporary impacts from structure work areas associated with these 15 structures would occupy approximately 150,000 square feet, or three acres, of shrubland habitat. Pulling and tensioning sites would be placed within the ROW and on private properties and would not be located on NFS lands.

No habitat would be permanently lost from the establishment and use of access roads because no new access roads would be constructed on BLM or NFS lands. Access to all structure locations would be achieved through overland travel. The use of overland travel access routes would result in a temporary loss of approximately three acres of shrubland habitat within the ROW and six acres of shrubland habitat outside of the ROW. After construction activities have been completed and overland travel access routes are no longer required, habitats in these areas would be appropriately managed based on stipulations described in the Noxious Weed Reclamation and Revegetation Plan developed for the Proposed Action. Overland travel may be required to access structure in need of repair. However, these instances are expected to be rare and will not create additional impacts. When impacts from overland access and structure work areas are combined, temporary impacts from the Proposed Action would impact approximately 12 total acres of shrubland habitat.

Shrubland habitats would not require maintenance throughout the life of the Proposed Action. Other habitat types, such as conifer forests, often require vegetation within the ROW to be trimmed periodically to limit interference with a transmission line. Vegetation within shrubland habitat would not require such maintenance and current vegetation would remain in place.

Direct mortality from construction, operation, and maintenance equipment

Construction, operation, and maintenance of the Proposed Action could result in injury or mortality to Brewer's Sparrow and Sage Sparrow through collision with construction or operations and maintenance equipment. Collisions with vehicles related to construction, operations and maintenance may result in injury or mortality, particularly since the volume and frequency of localized vehicle traffic would increase as part of implementation of the Proposed Action in the vicinity of active construction activities.

Avoidance of vegetation removal activities during the migratory bird nesting season would reduce the likelihood that a nesting Sage Sparrow or Brewer's Sparrow or their fledglings would be directly killed during the construction phase. Construction equipment utilizing overland travel routes and structure work areas that would not necessarily require the removal of vegetation may directly kill nesting birds or their fledglings in grassland habitat if such actions take place during the nesting season. The potential for direct mortality would be minimized by reducing these types of construction areas. Such areas would occupy approximately 12 total acres of shrubland habitat.

Collision with transmission lines or associated guy-wires

Collision with transmission lines or associated guy-wires may cause direct injury or mortality to Sage Sparrow and Brewer's Sparrow. Higher mortality rates usually occur in specific localized situations where certain factors create high risk potential. Such situations may include where large numbers of birds regularly cross the line between foraging and roosting or nesting sites. None of the shrubland habitats crossed by the Proposed Action would constitute such areas that would concentrate bird movements. Sage Sparrow and Brewer's Sparrow are not typically prone to collision with transmission lines because of their small size, high maneuverability, and tendency to fly at level lower than conductors. However, extreme weather events, such as fog or

high winds, may increase the likelihood of a collision with the Proposed Action for all avian species.

Indirect Effects

Noxious weed spread

The establishment and spread of noxious weeds or non-native species can result in degradation of wildlife habitat (Levine et al. 2003). Non-native plant invasions have the potential to permanently impact wildlife habitat quality by out-competing native plants, altering the natural fire regime, and changing ecosystem processes (e.g., nitrogen cycling). Nonnative, invasive vegetation, including annual grasses and other noxious weeds continue to expand their range across Wyoming and other western states, facilitated by ground disturbances such as wildfire, grazing, roads, and infrastructure. Invasive grasses increase fire return intervals or fire intensity, further reducing potential shrubland habitat. Many times invasive annual grasses, specifically *Bromus tectorum* and *Taeniatherum asperum*, colonize burned patches of sagebrush, creating large monocultures which do not support suitable habitat for shrubland dependent species.

The establishment of nonnative or invasive vegetation as an understory to shrubland habitat would increase wildfire intensity and would limit the potential nesting habitat for Sage Sparrow and Brewer's Sparrow. Establishment of a nonnative or invasive understory presents lower habitat suitability than native grasses in the understory by offering less optimal forage, cover, and nesting habitat.

Flashovers on transmission lines caused by avian nesting material, prey, or streamers touching two energized conductors at once can ignite wildfires which may create a greater impact in nonnative vegetation that in native shrubland. The periodic removal of nesting material and proper spacing of conductors can reduce the risk of flashovers occurring, thus lowering the risk of fire spreading through invasive weeds. Creation of a noxious and invasive weed management plan would reduce the establishment and spread of noxious weeds as part of the Proposed Action. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, along with periodic removal of nesting material and proper conductor spacing to avoid flashovers potential impacts from noxious weeds would be reduced.

Landscape fragmentation by ROW and permanent access roads

Implementation of the Proposed Action and the establishment of an occupied ROW may result in the permanent fragmentation effects for Sage Sparrow and Brewer's Sparrow. No new permanent roads would be constructed on TBNG or BLM lands and thus would not add to the potential impacts of habitat fragmentation once overland access paths are reclaimed. Fragmentation may also be caused by the presence of the Proposed Action, even if shrubland habitat is not directly removed. Shrubland habitats within the ROW would only be modified in temporary construction areas at each pole location and overland access paths. While the entire ROW would not be cleared of shrubland habitat, the presence of the transmission line may fragment habitat if Sage Sparrow and Brewer's Sparrow avoid the Proposed Action despite the presence of suitable habitat within the ROW. Knick and Rotenberry (2002) indicated small passerines in open habitat are highly sensitive to fragmentation at spatial scales larger than the species typical home range. Even if Sage Sparrow and Brewer's Sparrow avoid the Proposed

Action, the narrow width of the ROW would not be larger than the typical home range. Thus impacts to the species from fragmentation would be reduced.

Sage Sparrow and Brewer's Sparrow typically prefer large, intact patches of habitat. The Proposed Action would not result in the removal of shrubland habitat along the length of the ROW. While habitat fragmentation is commonly cited as a cause of shrubland species declines (Saunders et al. 1991; Vander Hagen 2007; Knick and Rotenberry 2002), the fragmentation referenced is typically the removal of habitat through fire or conversion to agriculture. Shrubland habitats within the ROW on NFS lands would continue to persist in their current state and would still provide large patches of intact habitat. Fragmentation of large, intact parcels of habitat can provide travel corridors to mammalian predators, such as coyote and red fox, into larger patches of intact grassland and shrubland habitat. However, this would not occur with the Proposed Action because vegetation removal within the ROW in grassland habitat would not be required. The ROW would not create an edge impact that may be utilized by predatory edge species, such as coyotes and red fox. Therefore, increased predation on Brewer's Sparrow and Sage Sparrow inhabiting large blocks of intact shrubland habitat is not expected.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action could result in increased raptor perching and nesting opportunities, resulting in increased predation in those habitats. However, small passerines that inhabit shrublands, such as Sage Sparrow and Brewer's Sparrow, would not likely experience a dramatic increase in predation rates because hawks (Buteos) and eagles, the raptor species most likely to benefit from the increased perching and nesting opportunities, do not typically hunt small bird species. Impacts from increased predation by raptors utilizing transmission structures are expected to be minimal.

3.2.2.2.2.1.2.5 TBNG Sensitive Species Determinations

For a description of the rationale and determinations for all TBNG sensitive species, refer to **Appendix E**, which includes a summary of the TBNG BA and BE. **Table 3-24**, presents the effects determinations for TBNG sensitive species.

The effects determination for all TBNG sensitive species that were analyzed, except fishes, is "may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing". The effects determination for sensitive fish species that were analyzed is "No impact".

TABLE 3-24 - TBNG USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Mammals			
Townsend's Big-Eared Bat (*Corynorhinus townsendii*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Avoidance of vegetation clearing within migratory bird nesting season would protect any maternity colonies located in vegetation. No known roosting colonies in Wildlife Analysis Area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Hoary Bat (*Lasiurus cinerus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Avoidance of vegetation clearing within migratory bird nesting season would protect any maternity colonies located in vegetation. No known roosting colonies in Wildlife Analysis Area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Fringed Myotis (*Myotis thysanodes*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Avoidance of vegetation clearing within migratory bird nesting season would protect any maternity colonies located in vegetation. No known roosting colonies in Wildlife Analysis Area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Spotted Bat (*Euderma maculatum)*	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Avoidance of vegetation clearing within migratory bird nesting season would protect any maternity colonies located in vegetation. No known roosting colonies in Wildlife Analysis Area.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2

TABLE 3-24 - TBNG USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Black-Tailed Prairie Dog (*Cynomys ludoviscianus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Only one occupied BTPD colony in Wildlife Analysis Area. No structures or overland access roads will be placed in any occupied BTPD colony	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Swift Fox (*Vulpes velox*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Seasonal avoidance buffer would avoid dens by 0.25 miles March 1 – August 31. Completed ROW would not remove native vegetation under conductors, thus continuing to provide suitable foraging habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	No Impact
Birds			
Grasshopper Sparrow (*Ammodramus savannarum*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Restrict vegetation removal within migratory bird nesting season April 15 – July 31. Completed ROW would not remove native vegetation under conductors, thus continuing to provide suitable habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Sage Sparrow (*Amphispiza belli*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Restrict vegetation removal within migratory bird nesting season April 15 – July 31. Completed ROW would not remove native vegetation under conductors, thus continuing to provide suitable habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2

TABLE 3-24 - TBNG USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Burrowing Owl (*Athene cunicularia*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Only one occupied BTPD colony in Wildlife Analysis Area. No structures or overland access roads will be placed in any occupied BTPD colony. Seasonal raptor nest buffers described in TBNG LRMP will be adhered to.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Ferruginous Hawk (*Buteo regalis*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Seasonal raptor nest and winter roost buffers described in TBNG LRMP will be adhered to. Completed ROW would not remove native vegetation under conductors, thus continuing to provide suitable habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	No Impact
McCown's Longspur (*Calcarius mccownii*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Restrict vegetation removal within migratory bird nesting season April 15 – July 31. Completed ROW would not remove native vegetation under conductors, thus continuing to provide suitable habitat	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Chestnut-collared Longspur (*Calcarius ornatus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Restrict vegetation removal within migratory bird nesting season April 15 – July 31. Completed ROW would not remove native vegetation under conductors, thus continuing to provide suitable habitat	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2

TABLE 3-24 - TBNG USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Greater Sage-grouse (*Centrocercus urophasianus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Off-site mitigation agreed upon by TBNG and BHP, and implementation of the Greater Sage-grouse Mitigation and Development Plan would reduce impacts on populations to a low level and would not jeopardize populations within Core Areas. No occupied leks occur within the TBNG Planning Area. Construction would occur in potential habitat. Construction activities would not occur within two miles of an active lek March 15 – June 30.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Mountain Plover (*Charadrius montanus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Construction activities would avoid potential Mountain Plover nesting habitat by 0.25 mile from March 15 – July 31. Only one occupied BTPD colony occurs in Wildlife Analysis Area which would provide potential nesting habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	No Impact
Northern Harrier (*Circus cyaneus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Seasonal raptor nest and winter roost buffers described in TBNG LRMP will be adhered to. Completed ROW would not remove native vegetation under conductors, thus continuing to provide suitable habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2

TABLE 3-24 - TBNG USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
American Peregrine Falcon (*Falco peregrinus anatum*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Seasonal raptor nest and winter roost buffers described in TBNG LRMP will be adhered to. Completed ROW would not remove native vegetation under conductors, thus continuing to provide suitable habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Bald Eagle (*Haliaeetus leucocephalus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Seasonal raptor nest and winter roost buffers described in TBNG LRMP will be adhered to. Completed ROW would not remove native vegetation under conductors, thus continuing to provide suitable habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Loggerhead Shrike (*Lanius ludoviscianus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Restrict vegetation removal within migratory bird nesting season April 15 – July 31. Completed ROW would not remove native vegetation under conductors, thus continuing to provide suitable habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Lewis's Woodpecker (*Melanerpes lewis*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Restrict vegetation removal within migratory bird nesting season April 15 – July 31. Completed ROW would remove small portion of suitable habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2

TABLE 3-24 - TBNG USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Long-billed Curlew (*Numenius americanus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Restrict vegetation removal within migratory bird nesting season April 15 – July 31. Project would avoid all wet habitat favored by Long-billed Curlew. Completed ROW would not remove native vegetation under conductors, thus continuing to provide suitable habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	No Impact
Brewer's Sparrow (*Spizella breweri*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	Restrict vegetation removal within migratory bird nesting season April 15 – July 31. Completed ROW would not remove native vegetation under conductors, thus continuing to provide suitable habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Amphibians			
Northern Leopard Frog (*Lithobates pipiens*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	All wetland/riparian and aquatic habitat would be spanned if identified within the ROW. No overland access routes or construction equipment would enter wetland/riparian or aquatic habitat. Access routes crossings of all permanent and intermittent water bodies would occur at existing crossing locations. Best-management-practices in a SWPPP would prevent sedimentation of potential habitat.	May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2

TABLE 3-24 - TBNG USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Fishes			
Lake Chub (*Couesius plumbeus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	All wetland/riparian and aquatic habitat would be spanned if identified within the ROW. No overland access routes or construction equipment would enter wetland/riparian or aquatic habitat. Access routes crossings of all permanent and intermittent water bodies would occur at existing crossing locations. Best-management-practices in a SWPPP would prevent sedimentation of potential habitat.	No Impact
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Plains Minnow (*Hybognathus placitus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	All wetland/riparian and aquatic habitat would be spanned if identified within the ROW. No overland access routes or construction equipment would enter wetland/riparian or aquatic habitat. Access routes crossings of all permanent and intermittent water bodies would occur at existing crossing locations. Best-management-practices in a SWPPP would prevent sedimentation of potential habitat.	No Impact
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Stugeon Chub (*Hybopsis gelida*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	All wetland/riparian and aquatic habitat would be spanned if identified within the ROW. No overland access routes or construction equipment would enter wetland/riparian or aquatic habitat. Access routes crossings of all permanent and intermittent water bodies would occur at existing crossing locations. Best-management-practices in a SWPPP would prevent sedimentation of potential habitat.	No Impact
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2

TABLE 3-24 - TBNG USFS SENSITIVE SPECIES EFFECTS DETERMINATIONS			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Finescale Dace (*Phoxinus neogaeus*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	All wetland/riparian and aquatic habitat would be spanned if identified within the ROW. No overland access routes or construction equipment would enter wetland/riparian or aquatic habitat. Access routes crossings of all permanent and intermittent water bodies would occur at existing crossing locations. Best-management-practices in a SWPPP would prevent sedimentation of potential habitat.	No Impact
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2
Flathead Chub (*Playgobio gracilis*)	Alternative 1 – No Action Alternative	NFS lands would continue to be managed under the current management direction provided in the TBNG LRMP as amended. No new infrastructure would be introduced to the analysis area.	No Impact
	Alternative 2 – Proposed Action	All wetland/riparian and aquatic habitat would be spanned if identified within the ROW. No overland access routes or construction equipment would enter wetland/riparian or aquatic habitat. Access routes crossings of all permanent and intermittent water bodies would occur at existing crossing locations. Best-management-practices in a SWPPP would prevent sedimentation of potential habitat.	No Impact
	Alternative 3 – Proposed Action with Route Modifications (3a)	Similar to Alternative 2	Similar to Alternative 2

3.2.2.2.2.1.3 TBNG Management Indicator Species

3.2.2.2.2.1.3.1 Black-tailed Prairie Dog

Under the Proposed Action, effects to BTPDs may include direct effects, including disturbance, loss of habitat, and direct mortality, and indirect effects, including noxious weed spread, habitat fragmentation, and increased predation. Direct, indirect, and cumulative effects to the BTPD are described below.

Disturbance from construction, operation, and maintenance activities

Construction related activities associated with the Proposed Action, such as the presence of construction personnel, presence and use of construction equipment, and noise impacts related to construction activities, may result in the disturbance of BTPD within and adjacent to construction areas. Existing anthropogenic disturbances in close proximity to this colony include a natural gas pipeline pumping station and an existing distribution line that crosses the colony on private lands. These existing anthropogenic disturbances are not under active construction

and would only disturb the active BTPD colony during and maintenance activities. Transmission lines typically require little on-the-ground maintenance once construction is completed. Operations and maintenance activities will be limited across the entire length of the Proposed Action and will be consistent with BHP's Operations and Maintenance Procedures for its entire infrastructure. Surveys will be performed once a year, typically in early June, using helicopter-based aerial surveys to inspect the integrity of the conductors, insulators, and support structures. After completion of construction, maintenance ground crews will only be required to access the Proposed Action when there is a failure to the line. As such, disturbance associated with operation and maintenance of the proposed line is expected to be inconsequential to the BTPD.

Factors that may reduce potential disturbance related impacts to BTPD include the species' ability to withstand human presence, the short duration construction personnel would be working at each structure location, and the limited amount of operations and maintenance activities associated with the Proposed Action.

Habitat loss from vegetation clearing for ROW, access roads, and other project-related features

Overland access routes and structure work areas would create a temporary loss of potential, but currently unoccupied BTPD habitat. ROW on NFS lands would be 100 feet wide with structures placed approximately every 800 to 900 feet. This would result in the permanent loss of wildlife habitat at pole locations; however, potential BTPD grassland habitat within the ROW for the Proposed Action would not be graded or removed. Grassland habitat within the ROW may be temporarily impacted but would not be permanently removed.

Implementation of the Proposed Action would not result in habitat loss within the one known active BTPD colony in the wildlife analysis area. Implementation of the Proposed Action would result in the temporary loss of approximately three acres of potentially suitable, but currently unoccupied, BTPD grassland habitat, approximately two acres from overland travel and one acre from temporary construction areas at pole locations. Use of overland travel routes would not constitute a permanent loss in habitats because these routes would not be improved, by definition, and appropriate measures would be used to reclaim and facilitate natural restoration after construction is complete. Permanent loss of grassland habitat associated with the five transmission poles placed in potential BTPD habitat would be negligible. It is believed that the construction of the proposed ROW and associated transmission line would not deter or limit future BTPD use of associated grassland habitats, and thereby does not constitute a permanent loss of the ten acres of potentially suitable grassland habitats within the ROW on NFS lands.

Direct mortality from construction, operation, and maintenance equipment

Direct mortality from construction, operation, and maintenance activities due to crushing or entombment underground, or collision with construction or operations and maintenance equipment would be unlikely. No structures or overland travel routes would be placed in existing BTPD colonies. Therefore, the potential for BTPDs to be trapped in collapsed burrows or crushed by the use of vehicle or equipment traffic would be minimized. Collisions with vehicles related to construction, operations and maintenance may result in injury or mortality, particularly

since the volume and frequency of localized vehicle traffic would increase as part of implementation of the Proposed Action in the vicinity of active construction activities. Dispersing BTPDs may be struck by vehicles related to construction, operation and maintenance activities; however, the limited distribution of BTPDs within the analysis area would reduce such impacts.

Noxious Weeds

The establishment and spread of noxious weeds or non-native species can result in degradation of wildlife habitat (Levine et al. 2003). Non-native plant invasions have the potential to permanently impact wildlife habitat quality by out-competing native plants, altering the natural fire regime, and changing ecosystem processes (e.g., nitrogen cycling). Some non-native plants, such as cheatgrass, create a more continuous fuel bed than native bunchgrasses, resulting in an increased risk of wildfire (Paysen et al. 2000). Construction of access roads and the movement of construction equipment and vehicles along these access roads or the occurrence of overland travel may increase the potential for the establishment and spread of noxious weeds. Noxious weeds are generally not considered suitable for prairie dog habitat (Roe and Roe 2003). Creation of and adherence to a Noxious Weed Reclamation and Revegetation Plan would limit the establishment and spread of noxious weeds as part of the Proposed Action. Stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan will reduce potential impacts to BTPD from the spread of noxious weeds.

Landscape fragmentation by ROW and permanent access roads

The Proposed Action's ROW and access roads may fragment intact wildlife habitat, which for some species may decrease habitat connectivity and inhibit movement (Knight et al. 2000). BTPD habitats within the ROW would only be modified in temporary construction areas at each pole location, at pulling and tensioning sites, and at overland access paths. While the entire ROW would not be cleared of grassland habitat, the presence of the transmission line may fragment habitat if BTPD avoids the Proposed Action despite the presence of suitable habitat within the ROW. Loss of connectivity through habitat fragmentation may inhibit daily movements of BTPD within their home-ranges. Fragmentation may also inhibit dispersal ability, leading to greater isolation among habitat patches.

The wildlife analysis area currently contains 4,741 acres of grassland habitat that may present potentially suitable habitat for the BTPD. It is unknown if implementation of the Proposed Action could present a dispersal barrier to BTPDs moving from one existing colony to another or establishing new colonies. No published studies were identified pertaining to this topic. The ROW and associated construction areas would not permanently remove any habitat available to BTPDs. BTPDs are known to occur near anthropogenic disturbances, demonstrated by the presence of a distribution line through the observed colony. Initial routing of the Proposed Action purposely avoided Management Area 3.63, and thus avoided the majority of BTPD occurrences on NFS lands. Avoiding Management Area 3.63 would limit the fragmentation experience by BTPDs on NFS lands.

Increased predation based on an increase in perching and nesting opportunities for raptors

Implementation of the Proposed Action has the potential to increase predation on BTPDs by predatory raptors utilizing the transmission support structures as hunting perches. This would present a permanent impact. Predatory raptors are known to utilize transmission structures for hunting perches in landscapes otherwise devoid of perches (Steenhoff et al. 1993; Blomberg and Sedinger 2008; Howe 2012). Based on the limited occurrence of BTPD colonies in the wildlife analysis area, one known active colony, and the existence of a distribution line crossing this colony, combined with the presence of a nearby active Golden Eagle nest, it is unlikely that the implementation of the Proposed Action would have measurable impacts on the one known active BTPD colony.

Habitat/Population Trend and Viability

Recent population trends in the TBNG were discussed above in Section 4.3.2 and illustrated in Figure 3. In summary, the 10-year BTPD population trend within the NFS lands suggests a relatively steady trend in occupied acres, as seen with the sharp increase in 2012.

Impacts associated with the Proposed Action could diminish the survival and reproductive success of individual BTPD which occupy the sole active colony in the wildlife analysis area. As it appears that very few individuals regularly inhabit the entire wildlife analysis area, this Proposed Action is expected to only marginally contribute to a reduction of BTPD numbers in proximity of the wildlife analysis area or the TBNG as a whole. Therefore contributions to any loss of population viability or individual BTPD within these areas are negligible.

The presence of one active BTPD colony and one inactive colony indicate that BTPD are present within the wildlife analysis area, but not in great numbers. Other potential grassland habitats within the wildlife analysis area are currently unoccupied. Those areas could potentially house additional BTPD colonies if such areas are colonized. Survey data throughout the TBNG indicate that BTPD populations are highly cyclical but have remained largely constant over the past ten years. Increased efforts to boost BTPD populations as described in the *Record of Decision for the Thunder Basin National Grassland Prairie Dog Management Strategy and LRMP Amendment #3* (USFS 2009a) have resulted in a sharp increase in BTPD populations in recent years. Since 2009, prescribed burning to increase potential BTPD habitat has been completed on approximately 8,700 acres of grassland; additionally, 899 BTPD individuals were translocated to unoccupied habitat which was mowed and dusted for plague prior to translocation.

Guidelines described for the Cellar Rosecrans and Broken Hills Geographic Areas encourage working with landowners in areas specifically managed for BTPD. Objectives described in Chapter 2 indicate that these areas are located in the central portion of each Geographic Area, well south of the wildlife analysis area and will not be impacted by the Proposed Action. Additionally, NFS lands impacted by the updated prairie dog management strategy are located approximately six miles to the south of the wildlife analysis area and will not be impacted by the Proposed Action.

In summary, because of substantial blocks of suitable habitat located throughout TBNG and in areas specifically managed for BTPD south of the Proposed Action, BTPD populations are viable and remain well distributed across the Grassland. The Proposed Action would have little to no impact on Grassland-wide populations and available habitat for BTPD.

Compliance with Plan Direction

Implementation of the Proposed Action would comply with the following Standards and Guidelines of the TBNG LRMP, when all mitigation measures are applied. See **Appendix B** for a complete list of mitigation measures to be implemented by the Proposed Action.

By restricting all project related infrastructure and overland access paths to outside of occupied BTPD colonies, the Proposed Action would meet the requirements of the TBNG LRMP Guideline 1.F.69. Implementation of the Proposed Action would also limit construction activities within a quarter mile of occupied BTPD colonies to reduce potential impacts to nesting Mountain Plovers per TBNG Guideline 1.F.29. While this Guideline is specifically directed to protect nesting Mountain Plover, adherence to the seasonal avoidance buffer would also reduce potential impacts to BTPD.

Specific Guidelines are applied to MIS for each Geographic Area on TBNG. Geographic Areas crossed by the Proposed Action include Highlight Bill, Broken Hills, Cellar Rosecrans, and Fairview Clareton Geographic Areas. Specific Guidelines directed at managing BTPD populations are not specified on the Fairview Clareton and Highlight Bill Geographic Areas. Broken Hills and Cellar Rosecrans each have similar Guidelines toward the BTPD. One such Guideline directs the TBNG to work with private landowners adjacent to managed BTPD populations to enhance long-term management opportunities for expanding prairie dog populations. The second Guideline for these Geographic Areas direct TBNG managers to provide for a range of suitable BTPD habitat in the form of low structure grasslands as follows:

- Broken Hills: 23,616 to 31,488 acres of low structure grasslands
- Cellar Rosecrans: 36,324 to 42,378 acres of low structure grasslands

The NFS lands impacted by the updated prairie dog management strategy are located approximately six miles to the south of the wildlife analysis area and will not be impacted by the Proposed Action. Because the Proposed Action will not remove low structure grasslands from within the ROW, the Proposed Action will meet the requirements of TBNG Guidelines directed at BTPD management within the Broken Hills and Cellar Rosecrans Geographic Areas.

Conclusions

Implementation of the Proposed Action would avoid the one known occupied BTPD colony in the wildlife analysis area and thereby avoid direct impacts to individual BTPDs and this colony. Implementation would alter or remove some unoccupied habitats that may be suitable for this species. Indirect effects that could arise from increased avian predation and changes in the fire regime caused by the establishment and spread of noxious weeds would be relatively low and further reduced by implementing effective mitigation measures.

Based on the avoidance of the one known occupied BTPD colony, implementation of the Proposed Action would be unlikely to affect the current population trends of BTPD on TBNG. The construction and operation of the proposed transmission line would not result in measurable or detectable changes in habitat suitability or availability for expanded or new BTPD colonies and thus will not impact BTPD habitat condition and trends.

Implementation of the Proposed Action and the avoidance of activities in the one known occupied BTPD colony would result in little to no effects on individual BTPD. Additionally, habitat within the ROW of the Proposed Action would still allow BTPD to colonize the ROW post-construction. Population trends of BTPD across TBNG will not be impacted by the Proposed Action and BTPD populations will remain viable after the Proposed Action is implemented.

3.2.2.2.2.1.3.2 Greater Sage-Grouse

Refer to the Federal Endangered Species Act Species Section for a detailed analysis of potential effects on the Greater Sage-Grouse. The following analysis and conclusions pertain to the Greater Sage-Grouse as a TBNG MIS.

The loss of available Greater Sage-Grouse habitat from the Proposed Action on NFS lands would include 27 acres of shrubland habitat and ten acres of grassland habitat. TBNG is currently participating in habitat reclamation projects that would increase Greater Sage-Grouse habitat across the entire Grassland. Such projects include removal of conifer trees which have encroached upon otherwise suitable Greater Sage-Grouse habitat, and the eradication of cheatgrass from sagebrush stands.

In an effort to reduce impacts to Greater Sage-Grouse populations and their habitat, BHP and TBNG have agreed upon compensatory mitigation to reduce potential impacts to Greater Sage-Grouse at off-site locations. Through discussions with TBNG, BHP has agreed to complete compensatory mitigation for direct and indirect impacts to approximately 1,920 acres of Greater Sage-Grouse habitat. This acreage was based on a one mile buffer extending into TBNG managed properties located in Township 44 North, Range 69 West, Sections 4, 5, and 6. These lands are directly adjacent to, but not within, state-designated Greater Sage-Grouse Core Area. Funds from compensatory mitigation will go towards ongoing habitat enhancement efforts for Greater Sage-Grouse, such as cheatgrass eradication programs and conifer encroachment reduction. The specific locations for these off-site mitigation efforts have not yet been determined but will be within the known range of Greater Sage-Grouse on NFS lands. The compensatory mitigation, when considered with routing to avoid Greater Sage-Grouse habitat on NFS lands and additional mitigation measures described in **Appendix B**, would ensure that the Proposed Action does not affect the overall viability of the species on NFS lands.

The Proposed Action has taken numerous steps to ensure that implementation will have the lowest impact possible on Greater Sage-Grouse populations and their habitat. These steps include general mitigation measures, Greater Sage-Grouse species specific mitigation measures, and routing through areas with a low number of leks within four miles.

Compliance with Plan Direction

Implementation of the Proposed Action would comply with the following Standards and Guidelines of the TBNG LRMP, when all mitigation measures are applied. See **Appendix B** for a complete list of mitigation measures to be implemented by the Proposed Action.

Application of mitigation measures described in **Appendix B**, including seasonal avoidance of leks, no structures within a quarter of a mile of leks, and application of perch discouragers at specified locations will meet the TBNG Standards and Guidelines 1.F.46, 48, 49, and 51.

Specific Guidelines are applied to MIS for each Geographic Area on the TBNG. Geographic Areas crossed by the Proposed Action include Highlight Bill, Broken Hills, Cellar Rosecrans, and Fairview Clareton Geographic Areas. Specific Guidelines directed at managing Greater Sage-Grouse populations in the Highlight Bill, Fairview Clareton, Broken Hills, and Cellar Rosecrans each have similar Guidelines toward the Greater Sage-Grouse. One such Guideline directs the TBNG to establish and maintain quality foraging habitat for Greater Sage-Grouse and associated species by enhancing and/or maintaining productive sagebrush stands with a diversity of forb species. Another common Standard directs the TBNG to carefully consider the impacts of their selected action so that the impact of prolonged drought is not exacerbated. Additionally, Guidelines for each Geographic Area directs TBNG managers to provide for a range of suitable Greater Sage-Grouse habitat in the form of high structure sagebrush understory as follows:

- Broken Hills: 55,104 to 62,976 acres
- Cellar Rosecrans: 42,378 to 48,432 acres
- Fairview Clareton: 27,639 to 32,245 acres
- Highlight Bill: 25,195 to 30,234 acres

Implementation of the Proposed Action would conform with all Standards and Guidelines directed for Greater Sage-Grouse as a MIS at the Geographic level by not enhancing the impacts of prolonged drought, not substantially reducing forage, and not substantially reduce available high-structure sagebrush understory. Additionally, the implementation of compensatory mitigation measures described above and in **Appendix B** would help increase potential forage and acres of available Greater Sage-Grouse habitat.

Conclusions

Analysis of Greater Sage-Grouse habitat that could be impacted by the Proposed Action is provided in the Project BA, and the evaluations are reflective of the known conditions in the area and are appropriate for the species represented. Analysis of impacts from the Proposed Action on Greater Sage-Grouse population and habitat trend and viability are provided in the Biological Evaluation. The effects determination for the Greater Sage-Grouse, as an MIS, is "*May impact individuals, but is not likely to cause a trend in federal listing or loss of viability in the planning area".* This determination is based on the addition of onsite and offsite mitigation listed above and in **Appendix B**. By participating in offsite compensatory mitigation, as well as onsite mitigation such as avoidance of habitat, negative impacts of the Proposed Action should be offset by the positive impacts from the mitigation. Mitigation measures will be completed in

addition to applying all standards and guidelines in the LRMP that will further protect Greater Sage-Grouse. Therefore this project should not contribute to a net loss in habitat or populations viability for Greater Sage-Grouse, or contribute to the direct, indirect, or cumulative impacts.

3.2.2.2.2.1.4 BLM Sensitive Species

3.2.2.2.2.1.4.1 Grassland Dependent Species

Implementation of the Proposed Action could alter or remove an estimated 16 acres of grassland habitat on BLM lands. BLM grassland dependent sensitive species could experience similar potential effects from implementation of the Proposed Action as BHNF grassland dependent sensitive species.

3.2.2.2.2.1.4.2 Wetland/Riparian Species

No impacts to wetland/riparian habitats on BLM lands would result from implantation of the Proposed Action. BLM wetland/riparian dependent sensitive species could experience similar potential effects from implementation of the Proposed Action as BHNF wetland/riparian dependent sensitive species.

3.2.2.2.2.1.4.3 Aquatic Species

Implementation of the Proposed Action would have no impacts on BLM sensitive aquatic species, as none are known to occur in the Wyoming analysis area.

3.2.2.2.2.1.4.4 Conifer Forest Dependent Species

Implementation of the Proposed Action could alter or remove an estimated nine acres of conifer forest habitat on BLM lands. BLM conifer forest dependent sensitive species could experience similar potential effects from implementation of the Proposed Action as BHNF conifer forest dependent sensitive species.

3.2.2.2.2.1.4.5 Shrubland Dependent Species

Implementation of the Proposed Action could alter or remove an estimated 20 acres of shrubland habitat on BLM lands. BLM shrubland dependent sensitive species could experience similar potential effects from implementation of the Proposed Action as TBNG shrubland dependent sensitive species.

Implementation of the Proposed Action could impact BLM Sensitive Species individuals, but would not be likely to affect population trends or status of these species in the Wyoming analysis area.

3.2.2.2.2.1.5 WGFD Species of Greatest Conservation Concern

All WGFD species that could be impacted through implementation of the Proposed Action, are also Forest Service Region 2 Sensitive Species or BLM Sensitive Species.

3.2.2.2.2.1.6 Migratory Birds

Implementation of the Proposed Action could affect migratory bird species in Wyoming, similar to those described for migratory bird species that may occur in South Dakota.

3.2.2.2.2.1.7 Big Game

3.2.2.2.2.1.7.1 Elk

Implementation of the Proposed Action may cause various direct and indirect effects on elk, including direct injury or mortality, disturbance or displacement, and alteration or loss of suitable habitats. The use of construction equipment and temporary increases in vehicle traffic in occupied elk habitats could increase the likelihood and occurrence of vehicle-elk collisions. Construction and human activity in proposed project areas may temporarily cause elk to avoid otherwise suitable habitats. Establishment and use of project-related access routes could displace elk up to 0.5 miles from established roads (Perry and Overly 1977) Implementation of the Proposed Action has the potential to alter or remove an estimated 135 acres of potentially suitable elk habitat. These potential effects are expected to be temporary, as in risks associated with injury or mortality and displacement; or minor as in the case for habitat alteration and loss.

3.2.2.2.2.1.7.2 Mule Deer

Implementation of the Proposed Action may cause various direct and indirect effects on mule deer including direct injury or mortality, disturbance or displacement, and alteration or loss of suitable habitats. Temporary increases in construction activity and vehicle use in the proposed Project Area could lead to short-term increase in the frequency and number of vehicle-mule deer collisions. Human activity in occupied habitats may disturb individual mule deer behavior or displace deer from otherwise suitable habitats. Implementation of the Proposed Action could alter or remove a conservatively estimated 135 acres of potentially suitable mule deer habitat. While mule deer have been assumed to avoid roads in the same manner as elk, little empirical evidence is available to document this tendency (Wisdom et al 2005). Mule deer may be displaced up to 0.5 miles from established and used access routes. Such displacement, and the associated avoidance of otherwise suitable habitats is not expected to detrimentally affect mule deer because of their association with a variety of habitats and the availability of other suitable habitats within the analysis area and Forest. These potential effects are expected to be temporary in nature and lack sufficient magnitude or distribution to have a measurable shift on population numbers, health, or survivability.

3.2.2.2.2.1.7.3 Pronghorn

As described for other big game species, implementation of the Proposed Action may cause direct and indirect effects on pronghorn including direct injury or mortality, disturbance or displacement, and alteration or loss of suitable habitats. Pronghorn may be injured or killed as the result of vehicle-pronghorn collisions associated with construction and vehicle activity in the proposed Project Area. Human activity and presence in occupied pronghorn habitats may temporarily displace pronghorn from otherwise suitable habitats. This potential disturbance and/or displacement is not expected to have detrimental or measurable effects on the local pronghorn population based on the temporary and relatively isolated nature of project activities and the availability of other suitable and unaffected habitats in the Wyoming Analysis Area and region. Implementation of the proposed project may physically alter or remove an estimated 135 acres of potentially suitable pronghorn habitats in the Wyoming Analysis Area. These potential effects on the pronghorn are expected to be temporary, limited in duration and intensity and expected to be ameliorated over the course of time and through the availability of otherwise unaffected and available habitats.

3.2.2.2.2.2 Cumulative Effects Analysis

Cumulative effects may present direct impacts from disturbance, loss of habitat, direct mortality, and collision risks; indirect impacts may include from noxious weeds, fragmentation, and increased predation. **Appendix C** provides a summary of projects analyzed for cumulative effects to wildlife species in Wyoming.

3.2.2.2.2.2.1 TBNG Forest Service Sensitive Species

3.2.2.2.2.2.1 Grassland Dependent Species

Cumulative short- and long-term disturbances to swift fox, Grasshopper Sparrow, Burrowing Owl, Ferruginous Hawk, McCown's Longspur, Chestnut-collared Longspur, Mountain Plover, Northern Harrier, Loggerhead Shrike, Long-billed Curlew, Baird's Sparrow, and the American Peregrine Falcon arise from multiple sources. Those occur on federal and non-federal lands and include direct and indirect impacts of mining (with an anticipated life of at least 20 years), extraction of conventional oil and gas and CBNG reserves, road and rail line development or relocation, grazing (livestock and wildlife), drought, occupied residences, hunting and trapping, and other forms of dispersed recreation. Those activities have occurred in the analysis area in the past and most are expected to continue at similar levels. Both mining and oil and gas development activities have requirements for reclamation of disturbed areas as resources are depleted. As new areas of disturbance related to these two activities are added, mined-out areas are restored and reclaimed and oil and gas well sites are reclaimed when depleted wells are abandoned.

Cumulative impacts to grassland habitats will largely result from the fragmentation, alteration, degradation, and conversion of grasslands from the continuation and expansion of mining activities, in combination with the other activities discussed above. Mine-related impacts in grassland habitats would be mitigated as required to reduce the loss of potential grasslands.

Implementation of the Proposed Action would contribute a relatively small and unimportant fraction of disturbance to grassland habitats within the wildlife analysis area. Implementation of the Proposed Action would mitigate the cumulative effects of previously described past and future projects by implementing avoidance mitigation measures such as raptor nest buffers, swift fox den buffers, avoidance of BTPD colonies, avoidance of vegetation removal during the migratory bird nesting season, and implementation of stipulations outlined in the Noxious Weed Reclamation and Revegetation Plan.

The Proposed Action would not present a physical barrier to grassland dependent species. NFS lands are highly separated from one another in the wildlife analysis area, thus limiting the USFS's ability to manage large parcels of intact grassland habitat. Adjacent parcels are typically privately held and subject to the management decisions of the private landowner. Existing fragmentation in the analysis area includes projects that have been in place for long periods of time, such as natural gas wells, railroad lines, roads, and other power lines. When the total amount of existing fragmentation in the wildlife analysis area from completed projects is considered, the additional impacts of fragmentation from the Proposed Action and future projects would be minimal.

Other adverse impacts would potentially include loss of nests and dens or individuals of grassland dependent species. The potential displacement of individuals from seasonal or year-round habitats may also occur as a result of the Proposed Action. Displaced individuals may experience increased rates of predation due to the creation of favorable habitats or travel corridors for mammalian predators, due to the existing fragmentation of grassland habitats. Implementation of mitigation measures including nest avoidance buffers, swift fox den avoidance buffers, and restriction of vegetation removal within the migratory bird nesting season would reduce these impacts during sensitive time periods for grassland dependent species. Individuals displaced from occupied habitat could be killed or injured by vehicles or shooting. Nests or dens may be destroyed or otherwise compromised by activities not related to the Proposed Action (i.e., construction, off-road driving, livestock grazing) conducted during the breeding season. Any displaced individuals would have to compete for available adjacent territories, and if adjacent habitats are at carrying capacity, intraspecific competition may result in nutritional stress, decrease in fecundity, or mortality to affected individuals. Cumulative effects of ongoing activities may have already resulted in the loss or displacement of grassland dependent species from the area.

Overall, despite the possible death, injury, and displacement of some animals, the cumulative impacts associated with the Proposed Action are not expected to significantly reduce the size or viability of swift fox, Grasshopper Sparrow, Burrowing Owl, Ferruginous Hawk, McCown's Longspur, Chestnut-collared Longspur, Mountain Plover, Northern Harrier, Loggerhead Shrike, Long-billed Curlew, Baird's Sparrow, and the American Peregrine Falcon populations within the analysis area.

3.2.2.2.2.2.2 Conifer Forest Dependent Species

Cumulative short- and long-term disturbances to Lewis's Woodpecker, fringed myotis, and hoary bat arise from multiple sources. Those occur on federal and non-federal lands and include direct and indirect impacts of extraction of conventional oil and gas and CBNG reserves, grazing (livestock and wildlife), drought, occupied residences, hunting and trapping, and other forms of dispersed recreation. Those activities have occurred in the analysis area in the past and most are expected to continue at similar levels. Impacts from mining, and road or rail improvement are not anticipated within conifer habitat within the analysis area, as these potential impacts currently occur in conifer habitat within the analysis area. No oil and gas wells currently occur within conifer habitat in the analysis area; however, wells do occur adjacent to conifer habitats and may encroach within these habitats in the future.

Cumulative impacts to conifer habitats will largely result from the fragmentation, alteration, degradation, and conversion of conversion from the activities discussed above. Implementation of the Proposed Action would introduce disturbance to conifer habitat within the Rochelle Hills which is currently non-existent. Current disturbance in the Rochelle Hills is primarily related to grazing and hunting. Implementation of the Proposed Action would mitigate the cumulative effects by implementing avoidance mitigation measures such as raptor nest buffers, swift fox den buffers, avoidance of vegetation removal during the migratory bird nesting season, and implementation of stipulations outlined in the Noxious Weed Reclamation and Revegetation Plan.

The Proposed Action would not present a physical barrier to conifer dependent species. Existing fragmentation in conifer forests in the analysis area is minimal. However, fragmentation from the Proposed Action impacts to Lewis's Woodpecker and hoary bat may not present a large impact. Lewis's Woodpecker typically prefers open stands of conifer forest, while hoary bat prefers to forage along forest edges. Cumulative impacts of fragmentation from the Proposed Action and future projects would be minimal when the habitat needs and foraging nature of conifer dependent USFS R2 Sensitive species is considered.

Other adverse impacts could potentially include loss of nests and maternity roosts or individuals of conifer dependent species. The potential displacement of individuals from seasonal or year-round habitats may also occur as a result of the Proposed Action. Displaced individuals may experience increased rates of predation due to the creation of favorable habitats or travel corridors for mammalian predators. Implementation of mitigation measures including restriction of vegetation removal within the migratory bird nesting season would reduce these impacts during sensitive time periods for Lewis's Woodpecker, hoary bat, and fringed myotis. Individuals could be killed or injured by vehicles. Any displaced individuals would have to compete for available adjacent territories, and if adjacent habitats are at carrying capacity, intraspecific competition may result in nutritional stress, decrease in fecundity, or mortality to affected individuals. Cumulative effects of ongoing activities may have already resulted in the loss or displacement of conifer dependent species from the area.

Overall, despite the possible death, injury, and displacement of some animals, the cumulative impacts associated with the Proposed Action are not expected to significantly reduce the size or

viability of Lewis's Woodpecker, hoary bat, or fringed myotis populations within the analysis area.

3.2.2.2.2.2.3 Wetland/Riparian/Aquatic Dependent Species

Cumulative short- and long-term disturbances to Townsend's big-eared bat, spotted bat, Bald Eagle, northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow arise from multiple sources. Those occur on federal and non-federal lands and include direct and indirect impacts of mining (with an anticipated life of at least 20 years), extraction of conventional oil and gas and CBNG reserves, road and rail line development or relocation, grazing (livestock and wildlife), drought, occupied residences, hunting and trapping, and other forms of dispersed recreation. Those activities have occurred in the wildlife analysis area in the past and most are expected to continue at similar levels.

The Proposed Action will avoid or span all wetland, riparian, and aquatic habitat that may occur in potential impact areas. All wetland, riparian, and aquatic habitat will be protected by BMPs, to be described in the SWPPP. Because the Proposed Action will avoid and protect all wetland, riparian, and aquatic habitat, the Proposed Action will not add to the cumulative impacts from fragmentation, alteration, degradation, and conversion of habitat for Townsend's big-eared bat, spotted bat, Bald Eagle, northern leopard frog, finescale dace, lake chub, sturgeon chub, and plains minnow within the wildlife analysis area.

The Proposed Action could produce a cumulative disturbance impact on Bald Eagles if other disturbances are present around construction activities. Any Bald Eagle nests or winter roosts would be avoided by the prescribed avoidance buffers. This would limit the potential of the Proposed Action to increase the cumulative disturbance impact to Bald Eagles.

3.2.2.2.2.2.4 Shrubland Dependent Species

Cumulative short- and long-term disturbances to Brewer's Sparrow and Sage Sparrow arise from multiple sources. Those occur on federal and non-federal lands and include direct and indirect impacts of mining of shrubland habitat within the analysis area (with an anticipated life of at least 20 years), extraction of conventional oil and gas and CBNG reserves, road and rail line development or relocation, grazing (livestock and wildlife), drought, occupied residences, hunting and trapping, and other forms of dispersed recreation. Those activities have occurred in the analysis area in the past and most are expected to continue at similar levels. Both mining and oil and gas development activities have requirements for reclamation of disturbed areas as resources are depleted. As new areas of disturbance related to these two activities are added, mined-out areas are restored and reclaimed and oil and gas well sites are reclaimed when depleted wells are abandoned.

Cumulative impacts to sagebrush habitats and the species which inhabit them will largely result from the fragmentation, alteration, degradation, and conversion of sagebrush stands from the continuation and expansion of mining activities, in combination with the other activities discussed above. Mine-related impacts in sagebrush habitats would be mitigated as required, although would not likely be able to fully mitigate the on-going loss or alteration of sagebrush

habitat within the area as sage stands may not become fully reestablished until two to three decades after seeding. Implementation of the Proposed Action would contribute a relatively small fraction of disturbance to the general habitat requirements of Brewer's Sparrow and Sage Sparrow. Implementation of the Proposed Action would not contribute to the cumulative effects of previously described past and future projects, because the Proposed Action would affect a relatively small amount of shrubland habitat within the analysis area. Continued habitat loss from energy development, including mining and oil and gas exploration, remains one of the largest threats to native sagebrush shrubland habitats.

The Proposed Action would not present a physical barrier to Brewer's Sparrow and Sage Sparrow. NFS lands are highly separated from one another in the vicinity of the Proposed Action, thus limiting the respective agencies' ability to manage large parcels of intact habitat. Adjacent parcels are typically privately held and subject to the management decisions of the private landowner. Existing fragmentation on the landscape includes projects that have been in place for long periods of time, such as natural gas wells, railroad lines, roads, and other power lines. When the total amount of existing fragmentation of shrubland habitats from completed projects is considered, the additional impacts of fragmentation from the Proposed Action would be minimal.

Other adverse impacts would potentially include loss of nests or individuals and the potential displacement of individuals from seasonal or year-round habitats. These species may experience increased rates of predation due to the creation of favorable habitats or travel corridors for mammalian predators, resulting from fragmentation of sagebrush habitats. Some individuals could be killed or injured by vehicles. Nests may be destroyed or otherwise compromised by activities (i.e., construction, off-road driving, livestock grazing) conducted during the breeding season. Any displaced individuals would have to compete for available adjacent territories, and if adjacent habitats are at carrying capacity, intraspecific competition may result in nutritional stress, decrease in fecundity, or mortality to affected individuals. Cumulative disturbance impacts resulting from the Proposed Action would be mitigated by avoiding all vegetation clearing during the migratory bird nesting season.

Overall, despite the possible death, injury, and displacement of some animals, the cumulative impacts associated with the Proposed Action are not expected to significantly reduce the size or viability of Sage Sparrow or Brewer's Sparrow populations within the analysis area.

3.2.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

Alternative 3 would have similar effects as the Proposed Action, with some differences as described below.

3.2.2.3.1 South Dakota

3.2.2.3.1.1 Direct/Indirect Effects

Alternative 3 with the route modifications identified in South Dakota would result in impacts that are similar in type and magnitude to those described for the Proposed Action on the BHNF

Region 2 sensitive species, BHNF MIS, BHNF SOLC, and migratory birds. Impacts to the Northern Goshawk would be less for Alternative 3 than those of the Proposed Action.

3.2.2.3.2 Wyoming

3.2.2.3.2.1 Direct/Indirect Effects

Route modification 3a (Fiddler) was designed to avoid disturbance-related impacts to two Greater Sage-Grouse leks (Upton Fairview and Jessee leks) and to grouse that use these leks and the surrounding habitats. Route modification 3a is a proposed one-mile deviation north of the Proposed Action. Therefore, implementation of this Alternative 3 would increase the distance between construction, operation and maintenance activities and these two occupied leks, thus reducing the potential for disturbance and potential impacts on the Greater Sage-Grouse.

3.3 FIRE AND FUELS

3.3.1 Existing Conditions

3.3.1.1 SOUTH DAKOTA

3.3.1.1.1 Fire History

Historically, fire played a major role in shaping the composition and structure of the plant communities and ecological processes in South Dakota (USFS 2006). Human management activities such as fire exclusion, fire suppression, and resource management have influenced vegetation composition and structure (USFS 2005). As a result, current conditions in the Black Hills have deviated from historical conditions through more homogenous forest structures, higher tree densities, and lower average tree sizes (Hunter et al. 2007).

USFS fire history data indicates that 12 fires have occurred within five miles of the analysis area since 1911. Fire history data for the analysis area is presented in **Table 3-25**.

The 2000 fire season was one of the worst fire seasons in history for the nation and occurred during a period of prolonged drought conditions (USFS 2005). The National Fire Plan (NFP) was developed in August 2000 with the intent of actively responding to severe wildland fires while ensuring sufficient firefighting capacity for the future.

TABLE 3-25 - SOUTH DAKOTA FIRE HISTORY DATA FOR THE PROPOSED PROJECT (1911 – 2011)		
FIRE NAME	**YEAR**	**FIRE SIZE (Acres)**
Jasper	2000	83,510
Horse Creek	1991	2,673
Westberry Trails	1988	4,788
Schmitz Ranch	1985	150
Matt	1940	497
McVey	1939	20,758
Johnson	1936	700
Bloody Gulch	1934	564
Blanchard	1931	807
Spring Creek	1926	284
RR	1911	218
East Boundary	1911	228

3.3.1.1.2 Vegetation

The most dominant vegetation type in the Black Hills is ponderosa pine (*Pinus ponderosa*), occurring at elevations from 3,700 to 6,700 feet, on all soil types, and on all aspects. As a result of fire disturbance and insect outbreaks, ponderosa pine is considered to be the climax species over much of the Black Hills (Shepperd and Battaglia 2002). Other vegetation present in the analysis area is discussed in the Range, Weeds and Botany section.

3.3.1.1.3 Fire Regime Group and Condition Class

Fire Regime Groups and Fire Regime Condition Classes (FRCC) have been developed as tools that land managers can use to assess the impacts that these alterations have on ecosystems. Fire regime is the role fire plays in an ecosystem. It is characterized by fire frequency, seasonality, intensity, duration and scale (patch size), as well as regularity or variability (USFS 2006). A natural, or historical, fire regime is a general classification describing the role fire would play across a landscape in the absence of modern human intervention. Fire Regime Groups are based on the average number of years between fires (also known as fire frequency or mean fire-return interval) combined with the severity (i.e., the amount vegetation replacement) of the fire and its effect on the dominant overstory vegetation. The five Fire Regime Groups are described in **Table 3-26**.

TABLE 3-26 - FIRE REGIME GROUPS AND DESCRIPTIONS			
Group	**Frequency**	**Severity**	**Severity Descriptions**
I	0-35 years	Low/mixed	Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory.
II	0-35 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation.
III	35-200 years	Mixed/low	Generally mixed severity; can also include low-severity fires.
IV	35-200 years	Replacement	High-severity fires.
V	200+ years	Replacement/any severity	Generally replacement-severity; can include any severity type in this frequency range.
Source: NIFTT 2010.			

Fire regimes in the Black Hills are varied, depending on vegetation characteristics and the local and regional climate. Three general fire regimes are generally recognized as potentially occurring in the Black Hills: frequent, low-severity; infrequent, high-severity; and mixed severity (USFS 2005). Fire return intervals for ponderosa pine communities have been estimated at between 20 and 33 years for the Black Hills of South Dakota and Wyoming. According to LandFire data (2010), the majority of the analysis area is within Fire Regime Groups I (84%) and II (12%), consistent with the estimated fire return interval for ponderosa pine. The remaining four percent is within Fire Regime Groups III (1%) and IV (2%), and water (1%).

FRCC is an interagency, standardized tool for evaluating the degree of departure between historical and current fire regimes and vegetation structural conditions across differing vegetation types (**Table 3-27**). FRCC is an index that compares current with historical fire regimes, vegetation composition, and structure to assess degree of departure on a scale from one (least departed) to three (most departed). FRCC is not a fire hazard metric, but instead measures ecological trends.

TABLE 3-27 - FIRE REGIME CONDITION CLASSES (FRCC)	
Fire Regime Condition Class	**Description**
FRCC 1	Fire regimes are within historical ranges of variability. Vegetation characteristics, fuel composition and structure are intact. The risk of losing key ecosystem components from the occurrence of fire remains relatively low.
FRCC 2	Fire regimes have a moderate departure from the historical range of variability. Fire behavior, effects and other associated disturbances are moderately departed, with composition and structure of vegetation somewhat altered. The risk of losing key ecosystem components from the occurrence of fire is moderate.
FRCC 3	Fire regimes have a high departure from the historical range of variability. Composition and structure of vegetation and fuels are highly altered with a high risk of losing key ecosystem components. Fire regimes on these lands have been significantly altered from their historic fire-return interval. These areas pose the greatest risk of ecological collapse as a result of catastrophic fire.
Sources: Menakis et al. 2004; NIFTT 2010; Schmidt et al. 2002.	

The majority of the analysis area is within FRCC 1 (58%) and FRCC 2 (31%). Eight percent (8%) of the analysis area falls under FRCC 3. The remaining three percent of the analysis area is within the category agriculture, barren, urban and water, and were not assigned a FRCC. Based on FRCC classifications, it appears that the analysis area has experienced low to moderate alteration from historic conditions.

3.3.1.1.4 Fire Hazard

For a particular forest stand, fire hazard reflects the potential scale of fire behavior and effects and is a function of fuel conditions. Fire behavior and severity of effects depend on the properties of the various fuel conditions (live and dead vegetation) and the continuity of those fuels horizontally and vertically. Fuels conditions can be broadly characterized as crown fuels (live and dead material in the tree canopy), surface fuels (grass, shrubs, litter and wood in contact with the ground surface), and ground fuels (organic soil horizons, or duff and buried wood. In general, crown fires are considered the primary threat to ecological and human values.

Fire hazard is a function of fuel volume, type, condition, arrangement and location, which determines the ease of ignition and the resistance to control (USFS 2005). Fuel consists of the living and dead biomass that is burnable under certain moisture conditions and which varies by forest type, time of year, and disturbance history. Hazard is an expression of what kind of fire may potentially occur and how it affects human values.

Fire hazard for any particular forest stand or landscape reflects the potential magnitude of fire behavior and effects as a function of fuel conditions. The fire hazard rating increases as the amount and continuity of surface and canopy fuels increase. Crown fires are generally considered the primary threat to ecological and human values, and are the primary challenge for fire managers.

The BHNF uses a matrix to designate fire hazard ratings based upon forested structural stage, species, and average tree size diameter (USFS 2005). The amount and continuity of surface and canopy fuels, especially horizontally and vertically, increases the fire-hazard rating and the intensity of a wildfire. Areas with a very high fire-hazard rating (structural stages 4C or 5) have the potential to exhibit more extreme fire behavior with more severe fire effects than those with a low hazard rating (1) (USFS 2005).The majority of the analysis area is mature forest within structural stages 4A (47%) and 4B (30%). According to the BHNF matrix, the fire hazard rating for the analysis area ranges from medium to very high. The Phase II Amendment of the LRMP focuses on fire and insect hazard reduction of forested stands. The primary emphasis for fire hazard in the LRMP is to manage for 50 to 75 percent medium-to-low fire hazard rating. The fire hazard ratings for the analysis area, by structural stage, are presented in **Table 3-28**.

TABLE 3-28 - STRUCTURAL STAGE AND FIRE HAZARD RATINGS WITHIN THE ANALYSIS AREA (ACRES)1

Structural Stage	Structural Stage Definition	Fire Hazard Rating	Acres	Percent of Analysis Area
1	Grasses and forbs	Low	588	2
2	Seedlings and saplings	Medium	863	2
3A	Young forest; trees < 9 in. dbh; canopy cover < 40%	Medium	2,771	7
3B	Young forest; trees < 9 in. dbh; canopy cover 40-70%	High	1,643	5
3C	Young forest; trees < 9 in. dbh; canopy cover > 70%	Very High	551	1
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Medium to Very High	18,051	47
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	High to Very High	11,595	30
4C	Mature forest; trees at least 9 in. dbh; canopy cover >70%	Very High	2,260	6
5	Late succession	Very High	0	0

Source: Structural stage data is based on the BHNF vegetation data (USFS 2009) and fieldwork conducted for the Proposed Project in June and August 2012.
[1]Analysis area is one mile wide. USFS 2005, 2009.

3.3.1.1.5 Fire Risk

Fire risks are defined as those uses or human activities which have the potential to result in a wildfire ignition. Three risk scales are used: high, moderate and low. High-risk areas include locations where lightning, people, or industry have commonly caused fire in the past; moderate-risk areas include locations where lightning, people or industry have periodically caused fire in the past; and low-risk areas include locations where lightning, people, or industry have infrequently caused fires in the past (USFS 2006).

Insects, diseases, and other forest health issues can change forest structure and alter fire behavior over time (USFS 2005). Outbreaks and infestations of tree insects and diseases can lead to large-scale forest die-off, resulting in increased fuel loads and potentially increased fire risk when combined with human activities and their related infrastructure. Significant tree mortality can contribute to heavy fuel loads. In addition, the dead needles retained in the tree's crown increases fire hazard for one to two years after pine trees die. Mountain pine beetle (*Dendroctonus ponderosae*) is native to the Black Hills and has a critical ecological role within healthy, functioning ecosystems. Other insects and tree diseases that may cause problems include pine engraver beetle (*Ips pini*), red turpentine beetle (*Dendroctonus valens*), two species of pine tip moth (*Rhyacionia* spp.), Armillaria root disease (*Armillaria ostoyae*), red rot (*Dichomitus squalens*), western gall rust (*Peridermium harknessii*), needle cast (*Elytroderma derformans*), and diplodia tip blight (*Sphaeropsis sapinea*; USFS 2005; Shepperd and Battaglia 2002). Tree mortality and stand replacement from insects is expected under historic disturbance regimes and these important natural processes create structure and diversity (USFS 2005). The current larger and more contiguous structure of forest landscapes makes them simultaneously susceptible to bark beetle outbreaks due to the high percentage of old, large diameter and less vigorous host trees.

The BHNF insect hazard rating for the analysis area is based on structural stages (USFS 2005). The majority of the analysis area is in the low (62%) hazard rating category for insect infestation (**Table 3-29**).

TABLE 3-29 - EXISTING INSECT HAZARD RATINGS FOR THE ANALYSIS AREA (ACRES)1

Insect hazard Rating	Acres	Percent of analysis area
Low (1, 2, 3A, 3B, 4A)	23,917	62
High (3C, 4B, 4C, 5)	14,406	38

Source: Insect Hazard Rating data is based on the BHNF vegetation data (USFS 2009).
[1]Analysis area is one mile wide. USFS 2005, 2009.

3.3.1.1.6 Fuel Loading, Including Surface Fuels

Fuel loading and depth are important fire risk factors. The potential rate of spread is partly a function of fuel type, depth, and continuity. Fuel loading is measured in tons/acre (T/ac) and represents the amount of available or burnable fuels in a specified area.

Fuels can be classified into layers based on their vertical arrangement on the landscape, including surface, aerial (or crown) and ladder fuels. Down woody debris (or coarse woody debris) also contributes to large and severe fires because it can hold smoldering fire on a site for extended periods of time which, in the presence of high winds, can increase the resistance to control. Fine woody debris greatly influences the rate of spread and intensity of surface fires and exacerbates the potential for crown fires.

Structural stage (**Table 3-28**) is one indicator of condition of aerial fuels. Structural stages 3C and 4C are comprised of canopies that are relatively closed (canopy cover >70%), indicating aerial fuels are horizontally continuous. Aerial fuels are generally less continuous in 3B and 4B stands (canopy cover 40-70%) and not continuous in 3A and 4A stands (canopy cover <40%). The majority of the analysis area is within structural stages 4A and 4B (47% and 30% respectively), indicating that aerial fuels are low to moderately continuous.

3.3.1.1.7 Values at Risk

The Black Hills National LRMP (USFS 1997) defines values at risk as “any or all natural resources, improvements, or other values that may be jeopardized if a fire occurs.” The Healthy Forest Restoration Act (2003) identifies reducing wildfire risk to communities as one of its purposes.

The US Department of Agriculture (USDA), in conjunction with the US Department of Interior (USDI), identified a list of residential communities in the Federal Register (USDA and USDI 2001). These communities are in the wildland urban interface (WUI) areas and in the vicinity of federal lands that have been identified as being at high risk from wildfire. At-risk communities identified within four miles of the analysis area include: Deerfield, Hisega, Johnson Siding, Rapid City, Silver City, and Whispering Pines. However, there are additional at-risk communities in Pennington County that were not identified in the Federal Register. The Pennington County Community Wildfire Protection Plan recognizes any community that has the potential to be affected by an uncontrollable wildfire, as a community at-risk (Black Hills Land Analysis 2010).

In addition to at-risk communities, additional resources, structures, or development at-risk include commercial timber stands, power lines (such as this Project), range improvements, such as fences and spring developments, investments in timber stand improvement and reforestation, wildlife habitat, including snags, forage, riparian areas, security cover, and mid to late seral ponderosa pine stands, sensitive animals, recreation sites, as well as water, air and visual quality. There are also BHNF and private recreation sites that provide camping and recreation activities for visitors. These can create fire evacuation and logistical concerns. Loss of aesthetics from catastrophic wildfire would be detrimental to attracting visitors to the area.

3.3.1.2 WYOMING

3.3.1.2.1 Fire History

Wildfire has and will continue to be an important influence on grassland vegetation such as that dominant vegetation types in the Wyoming portion of the analysis area. Grasslands of the Great Plains have evolved and survived in an environment that has had frequent fires and a variable climate, with fires serving to maintain these grasslands. Prior to Anglo-American settlement, fires on the Northern Great Plains were of high frequency and low intensity. Fire suppression, intended to protect property, altered this fire regime, attributing to the increase and encroachment of woody species such as big sagebrush (*Artemisia* sp.), Rocky Mountain juniper (*Juniperus scopulorum*) and ponderosa pine.

The primary fire cause is lightning and many of these fires remain small and extinguished by rain from thunderstorms. Large fires can occur during dry and windy thunderstorm events. Most of these fires are single burning period events in the sagebrush/grass fuel type, but can be longer if they occur in or burn into timber (USFS 2012). USFS fire history data indicates that 12 fires have occurred within five miles of the analysis area since 1988. Fire history data for the analysis area is presented in **Table 3-30**.

TABLE 3-30 - WYOMING FIRE HISTORY DATA FOR THE PROPOSED PROJECT (1988-2011)

Fire Name	Year	Fire Size (Acres)
Highlight South	2010	940
North Edwards	2010	732
South Edwards	2010	1,215
450 No2	2004	2
Small Road	2003	43
Teckla	2003	173
Turner Reservoir	2003	12
Power Line	2002	35
Turner	1999	1,459
Peterson-Elliott	1994	7,922
Keeline RA	1988	307

3.3.1.2.2 Vegetation

The Wyoming portion of the analysis area is dominated by shrub steppe, grassland, ponderosa pine, and developed areas. Shrub steppe communities are comprised of extended stands of big sagebrush, little sagebrush, and mixed shrub types on less-developed soils. Grasslands in the analysis area are dominated by seeded perennial grass species (e.g., crested wheatgrass). Refer to the Range, Weeds and Botany section for more information on vegetation in the analysis area.

3.3.1.2.2.1 TBNG Lands

The most common forest types on the TBNG are ponderosa pine and juniper, although neither species is dominant on TBNG lands in the analysis area. In the analysis area, ponderosa pine and juniper are infrequently scattered in shrub steppe.

3.3.1.2.2.2 BLM Lands

BLM lands in the analysis area support stands of ponderosa pine near the Wyoming-South Dakota border.

3.3.1.2.3 Fire Regime Group and Condition Class

As described above for South Dakota, fire regimes, fuel loads, and the composition and structure of vegetation have been altered by fire exclusion, livestock grazing, logging, and widespread establishment of exotic plants (Schmidt et al. 2002). According to LandFire data (2010), the majority of the analysis area is within Fire Regime Groups II (62%) and IV (24%). Fires that fall into Groups II and IV are typically high severity fires that occur at a frequency of 0 to 200 years. The remaining 14 percent of the analysis area is within Fire Regime Groups I (10%, low severity) and III (4%, low to mixed severity). Fire severity within the Northern Mixed Prairie has generally increased and fire frequency has generally decreased over the past 125 years.

The majority of the analysis area is within FRCC 1 (39%) and FRCC 2 (43%). Seven percent (7%) of the analysis area falls under FRCC 3. The remaining 12 percent of the analysis area is within the category agriculture, barren, and sparsely vegetated and were not assigned a FRCC.

3.3.1.2.4 Fire Hazard

In shrublands with bunchgrasses and widely spaced shrubs, fire spread is limited by the patchiness of the fuel source. In these communities, fires tend to burn small areas and need conditions that are hotter and drier. Fire behavior and severity of effects depend on the properties of the various fuel conditions (live and dead vegetation) and the continuity of those fuels horizontally and vertically. Fuel conditions in the analysis area are generally comprised of surface fuels (grass, shrubs, litter and wood in contact with the ground surface).

3.3.1.2.5 Fire Risk

The primary cause of fires in the analysis area is lightning, with many of these fires remaining small (USFS 2012). However, as the level of human activity increases, the risk of human-caused fire also increases (USFS 2001a). Large fires can occur during dry windy thunderstorm events. Most of these fires occur in the sagebrush/grass fuel type and are short-lived, but can be longer if they occur in or burn into timber (USFS 2012).

3.3.1.2.6 Fuel Loading including Surface Fuels

The dominant fuel types in the analysis area are sagebrush, seeded perennial grassland, and ponderosa pine stands, especially along ridges and at higher elevations. Fire spread is primarily through the fine herbaceous fuels, with plant litter and stem wood from the shrub or timber over story contributing to fire intensity. Fire risk associated with vegetation depends on the amount of fuel present and fuel continuity. Fuel continuity is important because it in part determines where a fire can go and how fast it travels. Increased fire frequencies are associated with the introduction of cheatgrass which has a very fine structure, tends to accumulate litter, and dries completely in early summer, thus becoming a highly flammable, often continuous fuel. As cheatgrass spreads in sagebrush communities, community structure shifts from a complex, shrub-dominated canopy with low fuel loads in the shrub interspaces, to one with continuous fine fuels in the shrub interspaces, thus increasing the probability of fire ignition and spread (Rice et al. 2008, Balch et al. 2012).

3.3.1.2.7 Values at Risk

The Thunder Basin LRMP defines values at-risk as “any or all natural resources, improvements, or other values that may be jeopardized if a fire occurs” (USFS 2001b). Values at-risk in the analysis area include rural residences, urban interface zones, regenerated timber stands, unique habitats, domestic watersheds, and highways (visual corridors; USFS 2001a).

The USDA in conjunction with the USDI identified a list of residential communities that are in the WUI areas and in the vicinity of federal lands that have been identified as being at high risk from wildfire. These high risk residential communities are listed in the Federal Register (USDA and USDI 2001). Osage and Upton were identified in the Federal Register and are located within four miles of the analysis area. In addition, Weston County has designated additional at-risk communities in the Weston County Community Wildfire Protection Plan (2005, 2008 as amended) and those within four miles of the analysis area include: Newcastle North, Oil Creek-Plum Creek and Beaver Creek-Buckhorn.

3.3.2 Environmental Consequences

3.3.2.1 ALTERNATIVE 1 – NO ACTION

3.3.2.1.1 South Dakota

Under the No Action Alternative, the T-O-RC Project would not be constructed and the existing conditions of fire and fuels would remain largely unaltered. Under the No Action Alternative,

there would be a potential for fuel to accumulate (i.e., encroaching trees and shrubs) within the existing unused ROW, marginally increasing available fuels and eliminate the existing fuel or fire break it creates. By not constructing the new proposed power line, no additional value-at-risk would be added and fire risk would remain the same.

Under Alternative 1, the Proposed Project would not be constructed and would not contribute to cumulative impacts for fire and fuels.

3.3.2.1.2 Wyoming

Under the No Action Alternative, the T-O-RC Project would not be constructed and no impacts to fire and fuels and no contributions to cumulative impacts would occur. The existing conditions of fire and fuels would be unaltered.

3.3.2.2 ALTERNATIVE 2 – PROPOSED ACTION

3.3.2.2.1 South Dakota

3.3.2.2.1.1 Direct/Indirect Effects

3.3.2.2.1.1.1 Vegetation

On NFS lands, implementation of the Proposed Action would include the use of approximately 31.5 miles of an existing, currently unused ROW which would be widened from the current 40 to 50 feet to 100 feet. As this existing ROW is currently cleared of tall vegetation, utilizing this existing ROW would reduce the amount of tree clearing, where applicable, and associated disturbance required for construction. For the purpose of this analysis, the area of disturbance from ROW clearing is considered to be the entire 100-foot ROW, even though the full width may not be cleared.

New disturbance for the Proposed Action would include land used for expanding the existing unused ROW, access roads, structure locations, and construction and decking areas. For the Proposed Action, new disturbance would occur primarily in locations dominated by ponderosa pine (547 acres; 86%). **Table 3-31** presents vegetation types that would be disturbed on the BHNF with the Proposed Action.

As part of Project construction, vegetation within the ROW zone that has the potential to come into contact with the line would be cleared. In addition, trees that are outside of the ROW boundary, but have potential to fall into lines or affect lines during wind-induced line swing would be removed. Dead, dying, or “danger” trees or tree limbs located near the ROW that could pose a hazard to the transmission line facilities would be identified and removed as part of BHP’s routine vegetation management program. “Danger trees” are trees or tree limbs that may be located off of the transmission line ROW (and outside of normal clearing limits), but are of such height, condition (e.g., leaning, rotted), location (e.g., side hill, proximity to transmission lines, soil characteristics), and/or species type that they represent a threat to the integrity of the transmission line conductors, pole structures, or other facilities and present a fire threat. These

trees would be identified and removed during construction mostly from within the ROW and mostly by trimming. During operation, any "danger trees" will be identified during routine inspection and trimmed or removed as needed (again accessed from the ROW).

TABLE 3-31 - VEGETATION TYPES FOR BHNF LANDS THAT WOULD BE DISTURBED (ACRES)

Vegetation Type	Acres Of New Disturbance	Percent Of Proposed Action Area
Aspen/birch	17	3
Grassland	55	9
Other[1]	3	<1
Ponderosa Pine	547	86
Riparian Hardwood	1	<1
White Spruce	11	2
TOTAL	634	100

Source: Structural stage data is based on the BHNF vegetation data (USFS 2009) and fieldwork conducted for the Proposed Project in June and August 2012.
[1]Other category includes non-vegetated areas such as gravel pits and strip mines.

The primary method of ROW clearing in steep terrain would be manual removal using powered and non-powered handheld tools to remove vegetative growth. The primary benefit of manual methods is selectivity; only unwanted or target vegetation is removed, while non-target vegetation is not disturbed. For gentle to moderately steep terrain, trees would be cut down and bunched with a mechanized feller/buncher and then a grapple skidder would transport to a decking area where the trees are processed further. The vegetation removal techniques employed by BHP will be described in detail in the ROW Clearing Plan that will be developed as part of final design.

3.3.2.2.1.1.2 Fire Regime and Condition Class

The majority of the Proposed Action area has experienced low to moderate departure from historic fire conditions and is within the estimated fire return interval for ponderosa pine. Clearing for the ROW and access roads would remove up to 576 acres of trees, which is not expected to alter the current FRCC and fire regimes. However, this is a conservative clearing estimate as the proposed transmission line would span deep valleys in places, and tree clearing would not be required where spanning is high overhead the vegetation.

3.3.2.2.1.1.3 Fire Risk and Fire Hazard

The majority (74%) of new disturbance for the Proposed Action on BHNF lands would occur in locations with a fire hazard rating of high to very high. The removal of vegetation would reduce available fuel in the area and enlarge or create a new fire and fuel break. Removal of some of the mature trees from a stand would reduce fuel available to a crown fire by decreasing canopy bulk density. Creating openings in the canopy may help fighting a fire. **Table 3-32** presents the structural stages, fire hazard rating and insect hazard rating for BHNF lands that would be disturbed by the Proposed Action.

Insect hazard ratings for BHNF lands within the Proposed Action area fall primarily within the low (66%) hazard category (**Table 3-29**). Tree removal would decrease the potential for insect infestations on a local scale. This could provide remaining trees with more resources, increasing tree health and resistance to insect infestation. As part of the Proposed Action, felled trees would be transported to a decking area for processing and slash would be treated to reduce the potential for the spread of tree insect infestations.

There may be the potential for increased fire ignition risk on a short-term basis during construction (e.g., welding, vehicle ignition). To minimize the potential for fires during construction, all applicable fire laws and regulations would be observed during the construction period and construction personnel would be advised of practical measures to report and suppress fires. A Fire Prevention Plan would be developed and would include practices such as safe operation of all internal and external combustion engines (e.g., OHVs, chainsaws, generators, heavy equipment) including being equipped with qualified spark arresters; fueling all highway-authorized vehicles off-site to minimize the risk of fire; and carrying fire suppression equipment on all vehicles and equipment (e.g., shovels, water and fire extinguishers).

Transmission lines have a potential to ignite or exacerbate fires from arcing, flashovers, lightning, and maintenance activities during operation. However, project design features implemented as standard practice for the Proposed Action would reduce this potential. The primary source of ignition associated with the operation of a transmission line occurs through electrical arcing, which occurs when an energized conductor makes contact with another conductor or grounded object (e.g., vegetation debris, conductor-to-conductor, helicopters, and lightning contact). Transmission line protection and control systems are designed to detect faults (e.g., arcing from debris contact with the line) and rapidly shut off power flow. Smoke and hot gases from a large fire under or near a transmission line can also create a conducting path between conductors and the ground, initiating flashovers. Lightning protection is provided by overhead ground wires along the line.

The Proposed Action also has the potential to affect fire and fuels as a result of ROW operations and maintenance management. This includes maintaining the ROW, removal of excessive undergrowth and hazard trees, and transmission structure replacement, as required, to minimize failure. ROW management and operations and maintenance could include the hazard tree removal, including snags and declining trees. Removal of hazard trees would decrease fire risk by preventing tree contact with the line and subsequent line arcing.

TABLE 3-32 - STRUCTURAL STAGES, FIRE HAZARD RATINGS, AND INSECT HAZARD RATINGS FOR BHNF LANDS THAT WOULD BE DISTURBED (ACRES)

Structural Stage	Structural Stage Definition	Fire Hazard Rating	Insect Hazard Rating	Acres of New Disturbance	Percent of Proposed Action Area
1	Grasses and forbs	Low	Low	63	10
2	Seedlings and saplings	Medium	Low	44	7
3A	Young forest; trees < 9 in. dbh; canopy cover < 40%	Medium	Low	50	8
3B	Young forest; trees < 9 in. dbh; canopy cover 40-70%	High	Low	21	3
3C	Young forest; trees < 9 in. dbh; canopy cover > 70%	Very High	High	7	1
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Medium to Very High	Low	240	38
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	High to Very High	High	174	27
4C	Mature forest; trees at least 9 in. dbh; canopy cover >70%	Very High	High	32	5
5	Late succession	Very High	High	0	0
Other[1]	Not categorized	Not categorized	Not categorized	3	<1
TOTAL				634	100

Source: Structural Stage, Fire Hazard Rating and Insect Hazard Rating data is based on the BHNF vegetation data (USFS 2009) and fieldwork conducted for the Proposed Project in June and August 2012.
[1]Locations not categorized include non-vegetated areas such as gravel pits and strip mines.

3.3.2.2.1.1.4 Fuel Loading

Down woody debris has an important ecological function, but increases the wildfire hazard through fuel loading. Down woody debris (or coarse woody debris) could result in a smoldering fire occurring on a site for an extended period of time and influence the rate of spread and the intensity of surface fires and exacerbate the potential for crown fires. To balance the benefit of down woody debris with the increased wildfire hazard, slash created by clearing the ROW would be lopped and scattered to a depth of 12 inches. With prior authorization, lop and scatter may be extended 50 feet from either side of the ROW in the BHNF. Windrowing of slash along the timber edge would be avoided and slash would not be piled near transmission line structures, sensitive plants, or meadows or other areas immediately adjacent to or within waters of the United States (WOUS). In addition, 70 to 90 percent of activity fuels seen from the roads edge (up to 300 feet), would be removed to reduce fire hazard.

3.3.2.2.1.1.5 Values at Risk

Values at-risk to fire include at-risk communities, commercial timber stands, power lines (such as this proposed Project), range improvements, investments in timber stand improvement and reforestation, wildlife habitat, sensitive animals, recreation sites, as well as water, air and visual quality. Impacts to these values would be reduced through implementation of the Proposed Action by providing a break in fuel continuity and fire prevention measures described above including vegetation removal to reduce fuels, creating canopy openings and increasing tree health and resistance to insect infestation, and adhering to fire prevention measures identified in the Fire Prevention Plan.

3.3.2.2.1.2 Cumulative Effects

Past activities for fire and fuels on federal lands include weed control, fuels treatments, thinning and control, and fire. Past activities for weed control on federal lands, which can reduce fine herbaceous fuels, include biocontrol and pesticide application. Past activities on federal lands for fuels treatments, thinning and control and fire include activity fuels treatment, commercial thinning, establishment cuts, fuel breaks, liberation cuts, man-cause fire damage, natural fuels treatment, patch cuts, pre-commercial thin, prep cuts, prescribed burning, shelterwood cuts, special cut, tree encroachment controls, and uneven aged management. Present and foreseeable actions on federal lands include firewood gathering and Christmas tree cutting, road construction and maintenance, subdivision development (WUI), private landowner timber harvest for lumber and fire hazard reduction, wildfires, mountain pine beetle treatments, and tree removal. The Proposed Action would create new surface disturbance and tree clearing and could create a potential increase in surface fuels in the area and an increase fire ignition potential.

The Proposed Project could increase the potential wildfire risk in the area but would also reduce the fuels within the ROW in South Dakota. The potential negative effects to fire and fuels on the BHNF resulting from the Proposed Action would be reduced through the implementation of project design features. In addition, the Proposed Action could have potential positive effects by the removal of fuels and the enhancement of the fuel break provided by the cleared ROW. Construction of a new power line will add to the existing values-at-risk, thus increasing the complexity and hazards fire managers need to take into account during future fire suppression activities.

3.3.2.2.2 Wyoming

3.3.2.2.2.1 Direct/Indirect Effects

3.3.2.2.2.1.1 Vegetation

New disturbance associated with the Proposed Action would include land used for the new ROW and structure locations. For federal lands in Wyoming, new disturbance associated with the Proposed Action would occur primarily in locations dominated by sagebrush/grassland (47

acres; 76%). Vegetation cover types and associated plant species on BLM lands are similar to those on TBNG lands. As such, the discussions and analyses for fire regime, fire risk and hazard, and fuel loading that are presented below are applicable to the portions of the Proposed Action on BLM lands. **Table 3-21** presents vegetation types that would be disturbed on federal lands in Wyoming by construction of the Proposed Action.

As described above for South Dakota, vegetation within the ROW that has the potential to come into contact with the line would be cleared. In addition, trees that are outside of the ROW but have potential to fall into lines or affect lines during wind-induced line swing would be removed. Dead, dying, or "danger" trees or tree limbs located near the ROW that could pose a hazard to the transmission line facilities would be identified and removed as part of BHP's routine vegetation management program.

Where trees are present, the primary method of ROW clearing in steep terrain would be manual removal. For gentle to moderately steep terrain, the primary method of ROW clearing would include the use of a mechanized feller/buncher and a grapple skidder or similar equipment. Where there are no trees, structure locations / work sites would be accessed via overland travel with little or no vegetation removal.

3.3.2.2.2.1.2 Fire Regime and Condition Class

The majority of the Proposed Action area in Wyoming (82%) has experienced low to moderate departure from historic fire conditions and is within the estimated fire return interval (62%). Clearing for the ROW would remove only 60 acres of vegetation so FRCC and fire regimes are not expected to be altered.

3.3.2.2.2.3 Fire Risk and Fire Hazard

It is anticipated that some construction activities would occur during summer months when the weather is hot and dry and the potential for wildland fires is high. Heat or sparks from construction vehicles or equipment have the potential to ignite dry vegetation and cause a fire.

New access combined with ground disturbance could lead to an increased potential for the establishment of non-native species. The risk of wildfire increases in areas with populations of cheatgrass and other non-native annual species. Increased use of the ROW established for the Project could lead to an increase in the number of human-caused ignitions in the Project area from campfires, un-extinguished cigarettes, and vehicle exhaust systems coming into contact with dry vegetation. However, the ROW could also be used as a fire break and access for fire fighting vehicles.

It would be unlikely the Project facilities would cause fires except in the rare case of arcing from the power line to the ground or nearby vegetation. In the event of a lightning strike, ground wires on the structures would ground the current.

Wildland fires from any cause have the potential to affect the operation of the Project facilities, and consequently, the reliability of the transmission system in the region. Smoke and hot gases

from a large fire under or near a power line can create a conducting path between conductors and the ground, initiating flashovers.

To minimize the potential for wildland fire, all applicable fire laws and regulations would be observed during the construction period and construction personnel would be regarding the applicable fire laws and regulations and measures to report and suppress fires. A Fire Prevention Plan would be developed and would include practices such as safe operation of all internal and external combustion engines (e.g., OHV, chainsaws, generators, heavy equipment) including being equipped with qualified spark arresters and carrying fire suppression equipment on all vehicles and equipment.

A Weed, Reclamation and Revegetation Plan would be developed and implemented to reduce the potential for the spread of noxious weeds and changes in plant community composition and structure that could lead to increased fire risk.

Although trees are generally scarce within most of the Proposed Action area, to prevent fires and other hazards a safe clearance would be maintained between the tops of trees and power lines. Trees that could fall into the line (e.g., danger or hazard trees) would be cleared from the ROW.

3.3.2.2.2.4 Fuel Loading

The dominant fuel types in the Wyoming portion of the analysis area are sagebrush/grassland with ponderosa pine occurring near ridge tops. Fire spread is primarily through the fine herbaceous fuels, with plant litter and stem wood from the shrub contributing to fire intensity. As mentioned earlier, increased fire frequencies are associated with the introduction of cheatgrass which has a very fine structure, tends to accumulate litter, and dries completely in early summer, thus becoming a highly flammable, often continuous fuel. As cheatgrass spreads in sagebrush communities, community structure shifts from a complex, shrub-dominated canopy with low fuel loads in the shrub interspaces, to one with continuous fine fuels in the shrub interspaces, thus increasing the probability of fire ignition and spread (Rice et al. 2008, Balch et al. 2012).

A Weed, Reclamation and Revegetation Plan would be developed and implemented to reduce the potential for the spread of noxious weeds, changes in plant community composition and structure, and increases in fine herbaceous fuels that could lead to increased fire risk.

3.3.2.2.2.5 Values at Risk

Values at-risk in and near the Wyoming portion of the Proposed Action area include rural residences, urban interface zones, regenerated timber stands, unique habitats, domestic watersheds and highways (visual corridors; USFS 2001a). Impacts to these values would be reduced through fuel reduction and fire prevention measures described above.

3.3.2.2.2.2 Cumulative Effects

Past, present, and future actions affecting fire and fuels on federal lands include dispersed recreation, livestock grazing, and roads. The Proposed Action would have a negligible contribution to cumulative effects of available fuels in the Wyoming portion of the analysis area and fire ignition potential.

3.3.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

Alternative 3 would have similar effects as the Proposed Action, with some differences as described below.

3.3.2.3.1 South Dakota

3.3.2.3.1.1 Direct/Indirect Effects

Alternative 3 (Proposed Action with Route Modifications) has been developed to address issues at six locations along the Proposed ROW in South Dakota.

Route Modification 3b (Mountain View) is an approximately 500 foot deviation from the proposed route north for about one mile to avoid existing residences. Route Modification 3b and the Proposed Action would have similar impacts to fire potential and available fuel.

Route Modification 3c (Clinton) is an approximately 1,000 foot deviation from the proposed route north for about one mile to avoid existing residences. Route Modification 3c and the Proposed Action would have similar impacts to fire potential and available fuel.

Route Modification 3d (Edelweiss) is a 1,000 foot deviation from the proposed route to the north for less than one mile to avoid sensitive biological resources. Route Modification 3d and the Proposed Action would have similar impacts to fire potential and available fuel.

Route Modification 3e (Pactola) avoids the Pactola Reservoir, a visually sensitive area identified in the LRMP. Route Modification 3e would require tree clearing of approximately one-half mile of forested ROW. There are marginal differences in impacts to fire potential and available fuel between the proposed ROW and Route Modification 3e due to differences in vegetation type present. Route Modification 3e includes areas dominated by paper birch and intermittent creek crossings, whereas the proposed ROW is dominated by ponderosa pine with some meadow habitat.

Route Modification 3f (Pactola South) would also avoid the Pactola Reservoir area and follows approximately two miles of previously cleared ROW. There are marginal differences in impacts to fire potential and available fuel between the proposed ROW and Route Modification 3f, with Route Modification 3f containing more aspen/birch stands.

Route Modification 3g (Hidden Valley) is an approximately 2,500 foot deviation from the proposed route south for about one and one-half miles to avoid planned future quarry operations. The proposed ROW does not cross any NFS lands, whereas Route Modification 3g

would impact a small amount of NFS lands dominated by ponderosa pine interspersed by small patches of prairie grassland habitat.

3.3.2.3.2 Wyoming

3.3.2.3.2.1 Direct/Indirect Effects

Route Modification 3a (Fiddler) and the corresponding portion of the Proposed Action would not be located on TBNG or BLM managed lands and would have no different identified impacts to fire potential and available fuel.

3.4 SOILS

3.4.1 Existing Conditions

3.4.1.1 SOUTH DAKOTA

In South Dakota, the Proposed Action traverses approximately 36 miles of NFS land and nine miles of private land. The Natural Resource Conservation Service (NRCS) Soil Survey of the area (NRCS 1990a, 2011) has identified soil associations each with a distinctive pattern of soils, drainage, and topography, and consisting of one or more major soils, and some minor soils. The majority of the analysis area in South Dakota falls within the Stovho-Trebor Association and the Pactola-Rock Outcrop-Virkula Association.

The Stovho-Trebor Association consists of deep and moderately deep, well drained, gently sloping to very steep, silty soils formed in material weathered from limestone and calcareous sandstone on mountains. This association is located on broad ridges, long, smooth side slopes, and wide valleys, and is dissected by a few major drainages. The deep Stovho soils are on the mid and low parts of the landscape. Slopes range from2 to 40 percent. The moderately deep Trebor soils are on high parts of the landscape and on short, steep side slopes. Slopes range from 6 to 60 percent.

The Pactola-Rock Outcrop-Virkula Association consists of rock outcrop and deep, well drained, gently sloping to very steep, loamy soils formed in material weathered from steeply tilted metamorphic rock on mountains. This association is characterized by ridges, peaks, and canyons. It is highly dissected by drainageways and major streams, which are deeply entrenched. The Pactola soils are on the upper side slopes of the landscape. Slopes range from 6 to 60 percent. The rock outcrop consists of peaks, ledges, and dikes of extremely hard, highly fractured, steeply tilted metamorphic rock. The Virkula soils are on the slightly concave, mid and low side slopes of the landscape. Slopes range from 2 to 35 percent.

3.4.1.1.1 Soil Erosion Hazard

Erosion hazard indicates the hazard of soil loss from off-road and off-trail areas after disturbance activities expose the soil surface. Erosion hazard ratings are based on slope and soil erosion factor (NRCS 1990a). Erosion hazard is described as slight, moderate, severe, or very severe. A rating of slight indicates that erosion is normally unlikely, moderate indicates that

some erosion is likely and that erosion-control measures may be needed, severe indicates that erosion is very likely and that erosion-control measures are advised, and very severe indicates that significant erosion is expected and erosion-control measures are costly and generally impractical. In the South Dakota portion of the analysis area, soil map units with severe to very severe erosion hazard cover 5,039 (or 23 percent) of NFS land and 663 (or nine percent) of private land.

3.4.1.1.2 Soil Rutting Hazard

Soil rutting hazard indicates the hazard of surface rut formation from the operation of logging equipment (NRCS 1990b). Rutting hazard is described as “slight,” “moderate,” “severe” or “very severe”. Soil rutting hazard ratings are based on depth to a water table, rock fragments on or below the surface, the unified classification of the soil, depth to a restrictive layer, and slope (NRCS 1990a).In the analysis area, soil map units with severe rutting hazard cover 21,128 (or 94 percent) of NFS land and 5,776 (or 78 percent) of private land. No soil map units with very severe rutting hazards exist within the analysis area.

3.4.1.1.3 Soil Compaction Hazard

Soil compaction tends to reduce water infiltration which affects plant production and composition, increases runoff which generally increased erosion rates, and affects organisms living within the soil. Compaction is predominantly influenced by moisture content, but is also influenced by depth to saturation, percent of sand, silt, and clay, soil structure, organic matter content, and content of coarse fragments (NRCS 2011a). Soil compaction can be caused by the operation of large construction equipment on the soil surface. In the analysis area, soil map units with a high compaction hazard cover 8,283 (37 percent) of NFS land and 2,525 (34 percent) of private land.

3.4.1.1.4 Construction Limitations for Haul Roads and Log Landings

Construction limitations for haul roads and log landings indicate the degree to which the soils are suited to this aspect of forestland management. Soil qualities limiting the construction of haul roads and log landings could also limit the construction or improvement of access roads for the Proposed Action. In the analysis area, soil map units with severe construction limitations cover 12,576 acres (56 percent) of NFS land and 4,130 acres (55 percent) of private land. No soil map units with very severe construction limitations exist within the analysis area.

3.4.1.1.5 Site Degradation Susceptibility

Site degradation susceptibility rates each soil map unit for its susceptibility to degradation during disturbance, which is a function of resistance to degradation or its ability to function without change throughout a disturbance. This depends upon soil type, vegetation, climate, land use, disturbance regime, temporal and spatial scales. In the analysis area, soil map units that are highly susceptible to site degradation cover 14,513 acres (65 percent) of NFS land and 2,694 acres (36 percent) of private land.

3.4.1.1.6 Mass Movement Potential

Standard 1108 of the Black Hills National Forest LRMP Phase II Amendment (USFS 2006) states that Citadel soils found in the northern and eastern Black Hills have a mass movement potential and that onsite slope stability examinations should be performed on slopes over 30 percent prior to building roads on or removing most or all of the timber from areas with these soils. Additional soils with similar characteristics to the soils listed in Standard 1108 have been identified in a recent update to the soil survey (Reyher 2012b). In the analysis area, soil map units with the mass movement potential cover 1,665 acres (seven percent) of NFS land and 1,076 acres (14 percent) of private land.

3.4.1.1.7 Infiltration Rates

Infiltration rate is the rate at which water penetrates the surface of the soil and is related to permeability which is the movement of water downward through the soil profile. Infiltration and permeability directly affect erosion hazard because in a highly permeable soil, most stormwater will infiltrate into the ground reducing the likelihood of erosion. In a poorly permeable soil, stormwater will sit on the surface, increasing the amount of surface runoff and, therefore, the likelihood of erosion. Highly permeable soils have a high infiltration rate, and poorly permeable soils have a slow infiltration rate. In the analysis area, soil map units with slow to very slow infiltration rates cover 7,080 acres (32 percent) of NFS land and 1,734 acres (23 percent) of private land.

3.4.1.1.8 Soil Restoration Potential

Soil restoration potential rates each soil map unit for its ability to recover from degradation, which is often referred to as soil resilience. The ability to recover from degradation means the ability to restore functional and structural integrity after a disturbance. In the analysis area, soil map units with high restoration potential cover 22,355 acres (approximately 100 percent) of NFS land and 5,910 acres (79 percent) of private land.

3.4.1.1.9 Prime Farmland

Prime farmland soils are soils that are best suited to producing food, seed, forage, fiber, and oilseed crops. These soils have properties that are favorable for the economic production of sustained high yield crops (NRCS 1990b). In the analysis area, soil map units that are considered to be prime farmland if they are irrigated cover 26 acres (less than one percent) of NFS land and 230 acres (three percent) of private land.

3.4.1.2 WYOMING

The Proposed Action traverses approximately 4.5 miles of TBNG land, 2.6 miles of BLM land, 10.3 miles of state land, and 80.9 miles of private land in Wyoming. The analysis area in Wyoming consists of rolling plains in the western portion and the Black Hills in the eastern portion.

Wyoming is divided into ten soil zones based on elevation, precipitation, temperature regime, vegetation, and soil parent material. The Wyoming analysis area includes Soil Zones 5 and 6.

Soil Zone 5 is made up of Haplocalcids and Haplargids. Above 5,000 feet elevation, the temperature regime is frigid and the soils are a complex of Hapludolls and Hapludalfs, the latter under Ponderosa Pine and Douglas Fir. Special landscape components include playas, mined land, and karst topography.

In Soil Zone 6, the Black Hills support an association of Moll sols (*Argiudolls*) under grasslands and Alfisols (*Hapludalfs*) under forests. Many soils are fine textured (fine or fine-loamy families). Below 5,000 feet in elevation, the soils are similar to those in the Powder River Basin (*Haplocambids* and *Haplargids*). Along streams, the soils are Haplaquolls and Fluvents. The Hapludalfs support stands of Ponderosa Pine (Munn and Arneson 1998).

A review of NRCS soil survey data identified 54 soil map units on the TBNG land, 46 map units on the BLM land, 83 map units on the state land, and 136 map units on the private land in the Wyoming analysis area (NRCS 1990b).

3.4.1.2.1 Soil Erosion Hazard

Erosion hazard indicates the hazard of soil loss from off-road and off-trail areas after disturbance activities expose the soil surface (NRCS 1990b). In the analysis area, soil map units with severe to very severe erosion hazard cover two percent of TBNG land, four percent of BLM land, five percent of state land, and four percent of private land.

3.4.1.2.2 Soil Rutting Hazard

Soil rutting hazard indicates the hazard of surface rut formation from the operation of logging equipment (NRCS 1990b). In the analysis area, soil map units with severe rutting hazard cover 96 percent of TBNG land, 81 percent of BLM land, 84 percent of state land, and 85 percent of private land in the Wyoming analysis area. No soil map units with very severe construction limitations exist within the analysis area.

3.4.1.2.3 Soil Compaction Resistance

Soil compaction tends to reduce water infiltration which affects plant production and composition, increases runoff which generally increased erosion rates, and affects organisms living within the soil. In the analysis area, soil map units with low compaction resistance cover 91 percent of TBNG land, 76 percent of BLM land, 74 percent of state land; and 82 percent of private land.

3.4.1.2.4 Construction Limitations for Haul Roads and Log Landings

Construction limitations for haul roads and log landings indicate the degree to which the soils are suited to this aspect of forestland management (NRCS 1990b). In the analysis area, soil map units with severe construction limitations cover 78 percent of TBNG land, 24 percent of BLM land, 40 percent of state land, and 36 percent of private land. No soil map units with very severe construction limitations exist within the analysis area.

3.4.1.2.5 Site Degradation Susceptibility

Site degradation susceptibility rates each soil map unit for its susceptibility to degradation during disturbance, which is a function of resistance to degradation or its ability to function without change throughout a disturbance (NRCS 1990b). In the analysis area, soil map units that are highly susceptible to site degradation cover six percent of TBNG land, 33 percent of BLM land, 17 percent of state land, and 10 percent of private land.

3.4.1.2.6 Mass Movement Potential

In the Wyoming portion of the analysis area, soil map units that have mass movement potential do not occur on TBNG land, include less than one percent of BLM land; cover nine percent of state land, and four percent of private land.

3.4.1.2.7 Infiltration Rates

Infiltration rate is the rate at which water penetrates the surface of the soil and is related to permeability. This quality of the soil directly affects soil erosion potential. In the Wyoming portion of the analysis area, soil map units with slow to very slow infiltration rates cover 62 percent of TBNG land, 78 percent of BLM land, 61 of state land, and 62 percent of private land.

3.4.1.2.8 Soil Restoration Potential

Soil restoration potential rates each soil map unit for its ability to recover from degradation, which is often referred to as soil resilience (NRCS 1990b). In the analysis area, soil map units with high restoration potential cover 60 percent of TBNG land, 19 percent of BLM land, 65 percent of state land, and 61 percent of private land.

3.4.1.2.9 Prime Farmland

Prime farmland soils are soils that are best suited to producing food, seed, forage, fiber, and oilseed crops. These soils have properties that are favorable for the economic production of sustained high yield crops (NRCS 1990b). One soil map unit in the Wyoming analysis area is considered to be prime farmland if it is irrigated. This soil map unit, which is on private land, covers a total of 30 acres, representing less than one percent of private land in the analysis area.

3.4.1.2.10 BLM Lands

The Proposed Action traverses approximately 2.6 miles of BLM land in Wyoming. A review of NRCS soil survey data identified 46 map units on the BLM land in the Wyoming portion of the analysis area (NRCS 1990b). The soil map units with severe to very severe erosion hazard cover four percent of BLM lands and those with severe rutting hazard cover 81 percent. Soils with low compaction resistance cover 76 percent and those with severe construction limitations cover 24 percent of BLM lands. Soils with highly susceptible to site degradation make up 33 percent of the soils while mass movement potential only occurs on less than one percent of the soils. About 78 percent of the soils have slow to very slow infiltration rates and those with high restoration potential cover 19 percent of BLM land.

3.4.2 Environmental Consequences

The analysis for most direct and indirect soil effects associated with the Proposed Action focused on the proposed ROW which would be 100 feet wide on federal land and 125 feet on private land.

3.4.2.1 ALTERNATIVE 1 – NO ACTION

3.4.2.1.1 South Dakota

3.4.2.1.1.1 Direct/Indirect Effects

Under the No Action Alternative, the T-O-RC Project would not be constructed. No soil disturbing construction activities would occur and there would be no direct or indirect impacts to soil resources.

3.4.2.1.1.2 Cumulative Effects

The No Action Alternative would not result in direct or indirect soils effects so would not add to the cumulative effects to soils resources in the South Dakota portion of the analysis area.

3.4.2.1.2 Wyoming

3.4.2.1.2.1 Direct/Indirect Effects

Under the No Action Alternative, the T-O-RC Project would not be constructed. No soil disturbing construction activities would occur and there would be no direct or indirect impacts to soil resources.

3.4.2.1.2.2 Cumulative Effects

The No Action Alternative would not result in direct or indirect soils effects so would not add to the cumulative effects to soils resources in the Wyoming portion of the analysis area.

3.4.2.2 ALTERNATIVE 2 – PROPOSED ACTION

3.4.2.2.1 South Dakota

3.4.2.2.1.1 Direct/Indirect Effects

The proposed action will disturb the soil both inside and outside the Project ROW that could lead to increased soil erosion. Removal of vegetative cover and topsoil could accelerate erosion from the unprotected soils. In addition, use of equipment could cause soil compaction which could limit infiltration and also increase erosion. The potential degradation of the soil resources could also disrupt soil biological and hydrological functions in a manner that reduces the ability of the NFS lands to supply goods and services to the American public. **Appendix B** contains the design criteria and mitigation measures that will be employed to minimize these soil impacts.

Soil disturbing activities within the South Dakota portion of the Project area would occur on 484 acres of soils with moderate to very severe erosion hazard, 589 acres of soils with moderate to severe rutting hazard (none on soils with very severe rutting hazard), 502 acres of soils with moderate to high compaction hazard' 583 acres of soils with moderate to severe construction limitations for haul roads and log landings (none on soils with very severe construction limitations), 474 acres of soils that are moderately to highly susceptible to site degradation, and 582 acres of soils with moderate to very slow infiltration rates. Impacts on private land would be similar to those on BHNF land and they would be addressed through implementation of the appropriate design criteria and mitigation measures as described in **Appendix B**.

Soil restoration potential in the Project area provides an indication of how well disturbed soils would recover from Project-related impacts. Soil disturbing activities in South Dakota would occur on three acres of soils with moderate restoration potential and 589 acres of soils with high restoration potential.

The Proposed Action would have limited impacts on soil resources in South Dakota overall. Potential impacts could involve potential soil compaction from the traffic of construction equipment; the removal of a portion of the existing topsoil resource from excavation for structure installation and blading for road construction; and erosion from disturbed soils that have not be stabilized. As indicated above, most of the soils that would disturbed have a high restoration potential. Proper implementation of the appropriate design criteria and mitigation measures in addition to compliance with federal and state regulations would reduce these impacts to negligible levels.

3.4.2.2.1.2 Cumulative Effects

Present and future projects occurring in the vicinity of the South Dakota portion of the analysis area which may have a cumulative effect on soil resources when combined with the Proposed Action include subdivision development, range developments and livestock grazing, wildfires, recreation activities including motorized vehicle use, and timber management activities. The specific locations of future projects are currently unknown but subdivision development and timber management activities are unlikely to occur within the spatial boundary of the Project area, as a transmission line ROW would be an undesirable location for a subdivision and there would be no timber to manage within the transmission line ROW. Livestock grazing, wildfires, and recreational motorized vehicle use could occur within the spatial boundary of the Project area, and could result in a cumulative impact to soils when combined with the Proposed Action. These cumulative impact levels would be reduced to negligible or minor when addressed with the appropriate design criteria and mitigation measures.

3.4.2.2.2 Wyoming

3.4.2.2.2.1 Direct/Indirect Effects

The Proposed Action will disturb the soil both inside and outside the Project area. This soil disturbance can lead to increased soil erosion. Removal of vegetative cover and topsoil could accelerate erosion from the unprotected soils. In addition, use of equipment could cause soil compaction which could limit infiltration and also increase erosion. Severe or extensive disturbance to NFS land and private land and/or the failure to apply timely and appropriate design criteria and mitigation measures have the potential to cause local land degradation on NFS, BLM, state, and private lands. **Appendix B** contains the design criteria and mitigation measures that will be employed to minimize these soils impacts.

Impacts to soils with severe to very severe erosion hazard would occur on zero acres of TBNG land. Impacts to soils with severe to very severe rutting hazard would occur on 39 acres of TBNG land. Impacts to soils with severe to very severe construction limitations for haul roads and log landings would occur on 39 acres of TBNG land. Impacts to soils that are highly susceptible to site degradation would occur on four acres of TBNG land.

Impacts to soils with low restoration potential would occur on zero acres of TBNG land. Impacts to soils with moderate restoration potential would occur on 18 acres of TBNG land. Impacts to soils with high restoration potential would occur on 28 acres of TBNG land and eight acres of BLM land.

Impacts on private land and state land would be similar to those on TBNG and BLM land, and they would be addressed through implementation of the appropriate design criteria and mitigation measures.

The Proposed Action would have limited impacts on soil resources in Wyoming overall. Potential impacts could involve potential soil compaction from the traffic of construction equipment, the removal of a portion of the existing topsoil resource from excavation for structure installation and blading for road construction, and erosion from disturbed soils before they are stabilized. Proper implementation of the appropriate design criteria and mitigation measures and compliance with federal and state regulations would reduce these impacts to negligible levels.

3.4.2.2.2.1.1 BLM Land

On BLM land, impacts to soils with severe to very severe erosion hazard would occur on one acre and impacts to soils with severe to very severe rutting hazard would occur on 29 acres. Impacts to soils with severe to very severe construction limitations for haul roads and log landings would occur on eight acres of BLM lands and about 13 acres of soils that are highly susceptible to site degradation would be impacted. About ten acres of soils with low restoration potential, 18 acres with moderate restoration potential, and eight acres with high restoration potential would be impacted.

3.4.2.2.2.2 Cumulative Effects

The Proposed Action would not be expected to substantially contribute to soils resource impacts associated with past, present, and reasonably foreseeable future actions. Future actions include ATV (All-Terrain Vehicle) and OHV (Off Highway Vehicle) traffic using existing access roads and trails, some of which will be permanently widened as part of the Proposed Action. Additionally, the Proposed Action's expanded ROW would provide a wider trail for ATV and OHV traffic. Soil impacts from the Proposed Action would be small and reduced to negligible levels when addressed with the appropriate design criteria and mitigation measures.

3.4.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

The following provides a comparison of Alternative 3 (Proposed Action with Route Modifications) and the Proposed Action (Alternative 2) regarding the effects to soils resources. For soils impacts identified, proper implementation of the appropriate design criteria and mitigation measures, in addition to compliance with federal and state regulations, would be used to reduce these impacts to negligible levels.

3.4.2.3.1 South Dakota

3.4.2.3.1.1 Direct/Indirect Effects

Route Modification 3b – Mountain View

Since the total acreage and soils types associated with Route Modification 3b are similar to those of the Proposed Action, impacts to soils are similar.

Route Modification 3c – Clinton

Route Modification 3c covers five acres of BHNF land and the Proposed Action covers two acres. This modification would disturb 1.5 times as many acres of soil as the equivalent section of the Proposed Action. Soils on Route Modification 3c are similar to those on the equivalent section of the Proposed Action and the types of impacts to soils would also be similar also similar.

Route Modification 3d – Edelweiss

The total acreage and soils types associated with Route Modification 3d are similar to those of the Proposed Action. Therefore, impacts to soils from the Proposed Action and this modification would be similar.

Route Modification3e – Pactola

Route Modification 3e covers five acres of BHNF land and the Proposed Action covers 12. The Proposed Action would have greater soils impacts to BHNF land, since it would disturb 1.4 times as many acres of soil than this modification. Soils on private lands of Route Modification

3e are similar to those on the equivalent section of the Proposed Action, and impacts to those soils are also similar.

Route Modification 3f – Pactola South

The total acreage and soils types associated with Route Modification 3f are similar to those of the Proposed Action. Therefore, impacts to soils would be similar from the Proposed Action or this modification.

Route Modification 3g – Hidden Valley

Route Modification 3g covers four acres of BHNF land and the Proposed Action covers five. The Proposed Action would have slightly greater soils impacts since it disturbs more acres of soil with similar soil characteristics. Soils on private lands of Route Modification 3g are similar to those on the equivalent section of the Proposed Action, and impacts to soils would also be similar.

3.4.2.3.2 Wyoming

3.4.2.3.2.1 Direct/Indirect Effects

Route Modification 3a – Fiddler

Soils on Route Modification 3a are similar to those on the equivalent section of the Proposed Action and impacts to those soils would be similar.

3.5 HYDROLOGY

3.5.1 Existing Conditions

3.5.1.1 SOUTH DAKOTA

Snowmelt, rainfall, and ground water discharge are the main sources of hydrology to streams and rivers in the South Dakota portion of the analysis area. The watersheds in the analysis area receive an average of 21 inches of annual precipitation, with the majority falling in the months of April through September/October. The annual snowfall ranges from 155 inches in the Black Hills to 18 inches in Rapid City. High surface water flows occur in the spring and early summer months, with the melting of the winter snowpack. Heavy rain fall during the spring thaw constitutes a serious flood threat. Flash floods, although restricted in scope, are probably the most numerous and result from locally heavy rainstorms in the spring and summer.

Three major watersheds are located within the analysis area. The Beaver watershed spans both Wyoming and South Dakota. The Rapid and Middle Cheyenne – spring watersheds are exclusive to South Dakota. The water courses associated with these watersheds are tributaries of the Cheyenne River and are part of the Mississippi River watershed via the Cheyenne and Missouri rivers.

There are twelve sub-watersheds crossed by the Proposed Action totaling 343,931 acres (USGS n.d.) with all but one located entirely within the BHNF. The major streams and water courses associated with these sub-watersheds are Rapid Creek, Victoria Creek, Newton Fork, Slate Creek, Castle Creek and Horse Creek. The three major lakes/reservoirs in these sub-watersheds are also within the BNHF: Deerfield Lake, Sheridan Lake, and Pactola Reservoir. Pactola Reservoir occurs within the analysis area.

Three sub-watersheds are located in the Beaver watershed with one located entirely within the BHNF and two partially located in the BHNF in South Dakota and Wyoming and partially located on primarily private lands in Wyoming. Within the analysis area, the only water course associated with these sub-watersheds is Little Bear Run, a perennial tributary of Stockade Beaver Creek in Wyoming.

The South Dakota Department of Environment and Natural Resources (SDDENR) is responsible for protecting and regulating the beneficial uses of the state's surface water and they rely on the water quality standards set forth by the Environmental Protection Agency (EPA) for identifying potential causes of impairment. South Dakota DENR designates uses for specific water bodies in the state. The degree of support or attainment of a designated use for a particular stream is determined by an analysis of biological, physiochemical, physical-habitat, and toxicity data. Each designated use is assessed as full support (good), partial support (fair), or nonsupport (poor). Streams in which at least one designated use is not fully supported are considered "impaired" and submitted to the EPA under Section 303(d) of the Clean Water Act as a prioritized list of impaired waters or 303(d) list.

The Black Hills region traditionally has some of the best surface water quality in the state (SDDENR 2012). This is primarily due to a cooler climate and higher precipitation than the surrounding plains due to greater elevation and forest cover. Also contributing to the water quality in this region are the local bedrock formations which are much less erodible than the highly erosive and leachable marine shales and badlands on the surrounding plains. The Black Hills streams are vulnerable to losses of flow exacerbated by periodic droughts and high summer ambient air temperature causes elevated water temperatures. The high water temperatures result in impairments for coldwater fisheries (SDDENR 2012). In addition, grazing of streamside vegetation, which causes stream bank erosion, water temperature, and nutrient loading, also continues to be a problem in some streams in this area (SDDENR 2012).

There are no lakes, reservoirs, or streams on the 303(d) list within the one-mile wide analysis area (0.5 mile on either side of the centerline) for the Proposed Action (DENR 2012).

Groundwater resources were not evaluated because the Proposed Action would not use or affect these resources.

3.5.1.2 WYOMING

Snowmelt, rainfall, and ground water discharge are the main sources of hydrology to streams and rivers in the Wyoming portion of the analysis area. The watersheds in the analysis area receive an average of 15 inches of annual precipitation, with the majority falling in the months of

April through September/October. The annual snowfall ranges from 60 inches just west of the Black Hills to 38 inches in the western analysis area. High surface water flows occur in the spring and early summer months with the melting of the winter snowpack. Heavy rains falling during the spring thaw constitute a serious flood threat. Flash floods, although restricted in scope, are probably the most numerous and result from locally heavy rainstorms in the spring and summer.

Three major watersheds are located within the Wyoming analysis area. The Beaver watershed spans both Wyoming and South Dakota. Two watersheds are exclusive to Wyoming: Upper Belle Fourche, and Upper Cheyenne. The waters courses from these watersheds are tributaries of the Cheyenne River and are part of the Mississippi River watershed via the Cheyenne and Missouri rivers.

There are nine sub-watersheds crossed by the Proposed Action in Wyoming totaling 275,065 acres (USGS n.d.). The perennial streams associated with these sub-watersheds include Skull Creek, Poison Creek, Turner Creek, Beaver Creek, Sheep Canyon Creek, Buffalo Creek, Hay Creek, East Fork Hay Creek, West Fork Hay Creek and Lone Tree Creek. No rivers or lakes occur in these sub-watersheds but there are numerous reservoirs. One small reservoir, the Y T Reservoir, is located partially on BLM lands east of Osage.

Four of the sub-watersheds are located in the Beaver Creek watershed: Lower Skull Creek – Oil Creek, Beaver Creek – Sheep Canyon Creek, Fiddler Creek, and Beaver Creek – Soda Creek. Land uses in this watershed include livestock grazing, hay production and oil and gas development. Many of the streams in the Beaver Creek watershed originate in the Black Hills and are perennial. The perennial water courses in the analysis area located in the Beaver Creek watershed are Skull Creek, Poison Creek, Turner Creek, Beaver Creek, and Sheep Canyon Creek.

Upper Buffalo Creek is the only sub-watershed located in the Upper Belle Fourche watershed. This watershed includes those waters upstream of the confluence of Beaver Creek with the Belle Fourche River. Outside of the TBNG, coal and coal bed methane development are important land uses in the western portion of the watershed, while logging, wildlife habitat and recreation are common in the Black Hills to the east. Livestock grazing and hay production are common land uses throughout this watershed. Most streams originating in the plains in this watershed are naturally intermittent. Buffalo Creek is perennial and the only named creek in the Upper Buffalo Creek sub-watershed and is a tributary of the Belle Fourche River.

Four of the sub-watersheds are located in the Upper Cheyenne watershed: Hay Creek – Lodgepole Creek, Deep Creek – Lodgepole Creek, West Fork Hay Creek, and Lodge Creek – Rough Draw. Land uses in this watershed include coal mining, grazing, and oil and gas development. Lowland streams are usually intermittent or ephemeral. Within this watershed, the sedimentary rocks in the rolling plains of the Powder River geologic basin contribute elevated levels of iron, manganese and sulfate to surface waters. As a result, several streams have had their secondary drinking water criteria) for iron and manganese removed (Wyoming DEQ 2012). The water courses in the analysis area for the Upper Cheyenne watershed are Hay Creek, East Fork Hay Creek, West Fork Hay Creek, and Lone Tree Creek, all of which are perennial.

The Wyoming DEQ is responsible for protecting and regulating the beneficial uses of the state's surface water and they rely on the water quality standards set forth by the EPA for identifying potential causes of impairment. Wyoming DEQ designates uses for specific water bodies in the state. Most of the surface waters on the TBNG are believed to be meeting all designated water quality uses but only a small subset of the waters have recent comprehensive analysis data. There are no known water bodies with water quality impairments (303(d) list) on TBNG lands within the one mile analysis area (Wyoming DEQ 2012).

Groundwater resources were not evaluated because the Proposed Action would not use or affect these resources.

3.5.1.2.1 BLM Land

Poison Creek flows through the Osage Oil Field into Beaver Creek near Osage and a portion of this creek crosses BLM lands. Some small oil seeps reach Poison Creek, but the extent to which these seeps are natural versus anthropogenic is unknown (Wyoming DEQ 2012). The Wyoming Oil and Gas Conservation Commission has conducted cleanup efforts to prevent contamination of Poison Creek and protect aquatic life other than fish and wildlife and Wyoming DEQ assessed and removed Poison Creek from the 303(d) list (Wyoming DEQ 2012). There are no known water bodies with water quality impairments (303(d) list) on BLM lands within the one mile analysis area (Wyoming DEQ 2012).

3.5.2 Environmental Consequences

3.5.2.1 ALTERNATIVE 1 – NO ACTION

3.5.2.1.1 South Dakota

3.5.2.1.1.1 Direct/Indirect Effects

Under the No Action Alternative, the Project would not be constructed and no hydrology or surface water quality impacts would occur. Surface water and surface water quality would be unchanged from existing conditions.

3.5.2.1.1.2 Cumulative Effects

The No Action Alternative would not add to the cumulative hydrology and water quality effects of other past, present, and reasonably foreseeable future actions in the South Dakota portion of the analysis area.

3.5.2.1.2 Wyoming

3.5.2.1.2.1 Direct/Indirect Effects

Under the No Action Alternative, the Project would not be constructed and no hydrology or surface water quality impacts would occur. Surface water and surface water quality would be unchanged from existing conditions.

3.5.2.1.2.2 Cumulative Effects

The No Action Alternative would not add to the cumulative hydrology and water quality effects of other past, present, and reasonably foreseeable future actions in the Wyoming portion of the analysis area.

3.5.2.2 ALTERNATIVE 2 – PROPOSED ACTION

3.5.2.2.1 South Dakota

3.5.2.2.1.1 Direct/Indirect Effects

The Proposed Action would cross 62 water courses in South Dakota on public and private lands. There are 49 water course crossings located on BHNF lands and 13 water course crossings located on private land as shown in **Table 3-33**. Of the four perennial streams crossed by the Proposed Action, two are on BHNF lands (South Fork Castle Creek and Slate Creek) and two are on private lands (Slate Creek and Rapid Creek).

TABLE 3-33 - NUMBER OF WATER COURSES CROSSED IN THE TRANSMISSION LINE ROW IN SOUTH DAKOTA

Type Of Water Course	Alternative 2 Proposed Action		
	BHNF	Private	Total
Perennial streams	2	2	4
Intermittent streams	47	11	58
Total	49	13	62

All water courses, including associated riparian vegetation, would be spanned by the transmission line. Cutting and thinning of vegetation in bottoms and low areas would be minimized and work limited to periods of low flows or dry channel to the extent practicable. Structures would not be placed in streams and construction work will avoid streams and disturbance in and adjacent to stream corridors. Spanning of water courses would result in negligible long term impacts to surface water resources or surface water quality from implementation of the Proposed Action. Existing roads with perennial creek crossings (South Fork Castle Creek and Nichols Creek) may need improvements to support access for construction but the existing culverts at both of these creek crossings would not be improved.

Implementation of environmental design criteria/mitigation and best management practices (BMPs) would reduce impacts to negligible levels, as described in **Appendix B**.

Soils disturbance during construction of the Proposed Action has the potential to impact water quality. Soils disturbance would occur from construction of roads, construction and decking yards, and transmission structure installation. Soils within the ROW would be temporarily disturbed from vegetation removal, overland travel, transmission structure installation, and sites for splicing and pulling/tensioning. The primary soil disturbance activity in the ROW will be installation of the transmission structures each resulting in 100 x 100 feet (<1 acre) of soil disturbance. Temporary disturbance of soils with the ROW would also result from splicing or pulling/tensioning sites (100 x 300 feet or <1 acre per site). Land that will be permanently disturbed would be the structure base at ten square feet per pole.

Soils would also be temporarily disturbed outside of the ROW from development of construction and decking yards. On BHNF lands, approximately one 20 acre construction yard and approximately 44 one-half to five acre decking yard sites totaling approximately 34 acres would be developed. Construction yards and decking yards would not be placed in or within 300 feet of streams or stream corridors.

The construction of temporary spur roads and improvements to existing access roads needed to access the ROW and structure locations would also result in temporary soils disturbance. Approximately 11 miles of new temporary spur roads would be constructed on NFS land and approximately 44 miles of existing access roads would likely require improvements. Roads would be a minimum of 14 feet wide and improvements to existing roads could involve clearing vegetation and adding additional fill. New spur roads would avoid steep slopes greater than 40 percent to the extent practicable to reduce potential erosion. If roads are built on 40 percent or greater slopes, they would be reclaimed to their approximate original condition after construction.

Overland travel will be used for approximately 14 miles on BHNF land. During overland travel, vegetation would be driven over but not cropped and soil may be compacted, but no surface soil would be removed. Overland travel and new spur roads would either avoid streams and stream corridors or stream crossings will be used if necessary.

Construction related disturbance of very severe and severe erosion hazard soils could accelerate erosion and increase sediment in storm water runoff to receiving waters. This would cause increased turbidity and channel sedimentation. Construction activities could also result in compaction and rutting of soils as discussed in the Soils section. A total of 124 acres of very severe and severe erosion hazard soils would be impacted by the Proposed Action (122 acres on BHNF lands and two acres on private lands).

The impacts to surface water hydrology and water quality from disturbance of highly erodible soils would be short term and minor to negligible during construction. A Stormwater Pollution Prevention Plan (SWPPP) would be developed and implemented that utilizes standard engineering practices and lists BMPs that would be used to minimize or prevent significant sediment from leaving the construction site. Monitoring of BMPs during and after construction

will ensure impacts to water quality from disturbance of highly erodible soils would be negligible over the long term.

Impact to water quality could also result from accidental spills and leaks of petroleum, oil, and lubricants from equipment and vehicles used during construction of the transmission line. Implementation of design criteria/mitigation and BMPs would reduce impacts to water quality to negligible levels from accidental spills and leaks.

Additionally, the Forest Service Watershed Conservation Practices manual would be followed which would, in combination with the above actions and design criteria/mitigation, reduce impacts to surface water hydrology and water quality impacts to negligible levels.

3.5.2.2.1.2 Cumulative Effects

The contribution of the Proposed Action to cumulative effects on surface water hydrology and water quality in South Dakota would be negligible. The current condition described in the affected environment section above reflects cumulative effects of past and present projects in the analysis area. Future projects may result in temporary degradation of water quality depending on the location of the project improvements in relation to surface water resources. Present and future projects which may impact surface water and surface water quality include timber management activities, prescribed burns, wildfires, road and utility ROW clearing, subdivision development, range developments and livestock grazing (including fencing, dugouts, wells, spring developments, etc.), and recreation activities including motorized vehicle use. Since there are few perennial streams that would be affected by the Proposed Action or other actions in the South Dakota portion of the analysis area, surface water hydrology and surface water quality impacts would likely be avoided or reduced to negligible or minor impact levels through adherence to federal and state regulations and implementation of design criteria/mitigation and BMPs identified in **Appendix B**.

3.5.2.2.2 Wyoming

3.5.2.2.2.1 Direct/Indirect Effects

The Proposed Action would result in 440 crossings of streams and flow lines in Wyoming. There would be 43 crossings located on TBNG lands, 30 crossings on BLM lands, six crossings on State lands, and 361 crossings on private land as shown in **Table 3-34**. Only 36 of the total crossings are named streams, six of which are on public lands (State).

All water courses and associated riparian vegetation would be spanned by the transmission line. Cutting and thinning of vegetation in bottoms and low areas would be minimized and work would be limited to periods of low flows or dry channel to the extent practicable. Spanning of water courses would result in negligible long term impact to surface water hydrology or surface water quality. Existing roads with stream crossings may need improvements to support access for construction. Implementation of environmental design criteria/mitigation and BMPs would reduce these potential impacts to negligible levels.

TABLE 3-34 - NUMBER OF WATER COURSES CROSSED IN THE TRANSMISSION LINE ROW IN WYOMING					
Type Of Water Course	Alternative 2 Proposed Action				
	TBNG	BLM	State	Private	Total
Named streams	0	0	6	30	36
Flow lines (includes intermittent streams and all major and minor drainage paths)	43	30	0	331	404
Total	43	30	6	361	440

There are 82 acres of very severe and severe erosion hazard soils within the ROW of the Proposed Action. Two acres of these soils would be disturbed on federal lands and two acres of these soils would occur within 300 feet of a named stream within the ROW on private lands.

Disturbance of these very severe and severe erosion hazard soils may accelerate erosion and increase sediment in storm water runoff to receiving waters causing increased turbidity and channel sedimentation. Construction activities may also result in compaction and rutting of soils.

The impacts to surface water resources and surface water quality from disturbance of highly erodible soils would be short term and minor to negligible during construction as a SWPPP would be implemented to minimize or prevent significant sediment from leaving the construction site.

As described for the South Dakota portion of the Project, soils within the ROW may be temporarily disturbed from vegetation removal, overland travel, transmission structure installation, and sites for splicing and pulling/tensioning. Soils may be temporarily disturbed outside the ROW by construction and decking yards on private lands. There would be no construction or decking yards on federal lands in Wyoming. Construction yards and decking yards would not be placed in or within 300 feet of streams or stream corridors.

Soils may be temporarily disturbed from improvements made to existing access roads. Improved existing and new spur roads would be a minimum of 14 feet wide. New spur roads will avoid steep slopes greater than 40 percent to the extent practicable to reduce potential erosion. If roads are built on 40 percent or greater slopes, they will be reclaimed to their approximate original condition after construction.

The primary access on federal lands in Wyoming would be overland travel over approximately eight miles. This would result in vegetation being driven over but not cropped. Soil may be compacted but no surface soil would be removed. The overland travel activities would avoid streams and stream corridors to the extent possible and stream crossings would be used if necessary.

Impact to water quality could also result from accidental spills and leaks of petroleum, oil, and lubricants from equipment and vehicles used during construction of the transmission line.

Implementation of design criteria/mitigation and BMPs would reduce impacts to water quality to negligible levels from accidental spills and leaks.

Additionally, the Forest Service BMP manual would be followed which would, in combination with the above actions and design criteria/mitigation, reduce the water quality impacts to negligible.

3.5.2.2.2.1.1 BLM Land

The Proposed Action would result in 440 crossings of streams and flow lines (flow line designation includes intermittent streams and all major and minor drainage paths) in Wyoming including 30 crossings on BLM lands. No named streams would be crossed by the Proposed Action on BLM lands.

3.5.2.2.2.2 Cumulative Effects

The contribution of the Proposed Action to cumulative effects on surface water hydrology and water quality in Wyoming would be negligible. The current condition described in the affected environment section above reflects cumulative effects of past and present projects in the analysis area. Present and future projects may result in temporary degradation of water quality depending on the location of the project improvements in relation to surface water resources. Present and future projects which may impact surface water and surface water quality include dispersed recreation, grazing, roads, fences, telecommunication lines, fuels reduction, water development (i.e., wells, water lines, and watering troughs), coal bed natural gas wells, coal exploration and mining, and geophysical exploration. Since there are few named and perennial streams in the Wyoming portion of the analysis area, surface water hydrology and surface water quality impacts would likely be avoided or reduced to negligible or minor impact levels through adherence to federal and state regulations and implementation of design criteria/mitigation and BMPs.

3.5.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

The following provides a comparison of Alternative 3 (Proposed Action with Route Modifications) and the Proposed Action.

3.5.2.3.1 South Dakota

Direct/Indirect Effects

3.5.2.3.1.1 Route Modification 3b – Mountain View

Both Route Modification 3b and the corresponding section of the Proposed Action would have two intermittent stream crossings and would not cross very severe or severe erosion hazard soils. Therefore, the impacts to hydrology and water quality would be similar.

Route Modification 3c – Clinton

Both Route Modification 3c and the corresponding section of the Proposed Action would cross three intermittent streams and would not cross very severe or severe erosion hazard soils. Impacts to hydrology and water quality would be similar.

Route Modification 3d – Edelweiss

Neither Route Modification 3d nor the corresponding section of the Proposed Action would have stream crossings. Both would cross three acres of very severe and severe erosion hazard soils. Therefore, impacts to hydrology and water quality would be similar.

Route Modification 3e – Pactola

Route Modification 3e would cross three intermittent streams and the corresponding section of the Proposed Action would have six intermittent stream crossings. Route Modification 3e would cross 20 acres of very severe and severe erosion hazard soils and the Proposed Action would cross 23 acres of very severe and severe erosion hazard soils. Therefore, impacts to hydrology and water quality would potentially be greater for the Proposed Action than Route Modification 3e.

Route Modification 3f – Pactola South

Route Modification 3f would cross one intermittent stream and the corresponding section of the Proposed Action would have six intermittent stream crossings. Route Modification 3f would cross seven acres of very severe and severe erosion hazard soils and the Proposed Action would cross 23 acres of very severe and severe erosion hazard soils. Therefore, impacts to hydrology and water quality would be greater for the Proposed Action than Route Modification 3f.

Route Modification 3g – Hidden Valley

Modification 3g would cross eight intermittent streams and the corresponding section of the Proposed Action would cross two intermittent streams. Neither Route Modification 3g nor the Proposed Action would cross very severe or severe erosion hazard soils. Therefore, impacts to hydrology and water quality would be greater for Route Modification 3g than the corresponding section of the Proposed Action.

3.5.2.3.2 Wyoming

3.5.2.3.2.1 Direct/Indirect Effects

Route Modification 3a would include 11 crossings of Sheep Canyon Creek, crossings of 12 flow lines, and three acres of very severe and severe erosion hazard soils. The corresponding section of the Proposed Action would cross no named streams, 15 flow lines, and five acres of

very severe and severe erosion hazard soils. Therefore, impacts hydrology and water quality would potentially be greater for Route Modification 3a than the Proposed Action.

3.6 WETLANDS

3.6.1 Existing Conditions

3.6.1.1 SOUTH DAKOTA

The analysis area is located in the Black Hills Major Land Resource Area, which consists of hills rising out of the surrounding plains of western South Dakota and eastern Wyoming. The dominant factors influencing the distribution of wetlands in this area are moisture, topography, and composition of surficial materials. Precipitation and runoff rates differ annually and with season and location. Annual precipitation in the South Dakota portion of the analysis area ranges from 16 to 27 inches, with the majority (70 percent) falling during the growing season (April through September/October). The average annual runoff is approximately two inches in the Black Hills with a large percentage occurring as a result of snowmelt and rainfall in the spring and early summer. The annual snowfall ranges from 155 inches in the Black Hills to 18 inches in Rapid City. About 75 percent of the annual evaporation occurs during the growing season and evaporation exceeds precipitation in most years.

Although wetlands cover only four percent of South Dakota (Dahl 1990), they are of substantial ecological and economic importance to the State and Nation. Depressional wetlands and wetlands associated with reservoirs and manmade stock ponds provide important breeding and resting habitat for migratory and resident waterfowl. South Dakota wetlands also provide important habitat to many other nongame and game wildlife species, including pheasants and whitetail deer. The USFWS has estimated that from the 1780s to the 1980s, wetland area in South Dakota decreased by about 35 percent, primarily from agricultural conversions. Other practices that have had an adverse effect on South Dakota wetlands include inundation of wetlands during reservoir filling, timber harvesting, dugout construction (for livestock watering) in existing wetlands, contamination from inadequately treated sewage and industrial waste, and urban development. Some land use practices have created new wetlands or enlarged existing ones including irrigation projects (primarily Belle Fourche and Angostura Reservoirs), artesian wells constructed for livestock watering or fish production, stock ponds constructed for livestock watering, and reservoir construction.

The Cowardin system was used to describe and classify wetlands. In the Black Hills, wetlands are primarily associated with streams (riverine system) and adjacent riparian areas. Saturated wet meadow montane wetlands characterized by sedges and associated wetland plants occur along some stream/riparian corridors. Most of these wetlands are classified as palustrine, emergent, saturated wetlands. Saturated scrub/shrub or forested palustrine wetlands, with various water regimes, also occur in association with these riverine systems. Additionally, beaver ponds along stream corridors are of local significance and add a unique diversity to these riverine systems.

The most significant water courses in the South Dakota portion of the analysis area are three perennial streams: Boxelder Creek, Rapid Creek, and Spring Creek. They flow from west to east and are roughly parallel to each other in the eastern portion of the analysis area. Rapid Creek flows from west to east across nearly the entire length of the analysis area. There are three major lakes/reservoirs in the sub watersheds included in the analysis area: Deerfield Lake, Sheridan Lake, and Pactola Reservoir. These three lakes/reservoirs are all within the BHNF.

Plant species commonly associated with marshes and wet meadows in the analysis area include sedges, rushes, grasses (e.g., *Calamagrostis canadensis*, *Carex utriculata, Carex nebrascensis, and Deschampsia caespitosa*). Common plant species along narrow ribbons of wetland adjacent to small streams in montane zones include larkspur (*Delphinium* spp.), monkey-flower (*Mimulus* spp.), monkshood (*Aconitum columbianum*), and groundsel (*Senecio* spp.). Other common riparian-wetland plant species include boxelder (*Acer negundo*), narrow-leaf cottonwood (*Populus angustifolia*), quaking aspen (*Populus tremuloides*), and Bebb willow (*Salix bebbiana*).

Fens are a type of wetland located in the Black Hills region. Fens receive inputs of groundwater and support herbaceous communities dominated by sedges (e.g., *Carex aquatilis* and *C. utriculata*), rushes (*Juncus* spp.), spikerushes (e.g., *Eleocharis acicularis*), and grasses (e.g., *Calamagrostis canadensis*). Some fens support a woody overstory of willow (e.g., *Salix planifolia*, *S. wolfii*) and dwarf birch (*Betula glandulosa*) (Windell et al. 1986). Fens garner special status because of their unique characteristics and plant species. Fens are known to occur in the analysis area (see Botany section).

Wetland resources within the area potentially affected by the Proposed Action were identified on National Wetland Inventory (NWI) maps and also evaluated in the field. Surveys were conducted within the proposed 100-foot ROW, focusing on areas where areas that would be designated as WOUS could be filled with dredge or fill material. The wetland survey identified three wetlands that were not identified by the NWI they were added to the geographic information system (GIS) wetland database. **Table 3-35** provides a summary of wetlands located within the ROW. There are no wetlands associated with the other Proposed Action features.

The results of the wetland surveys have not yet been confirmed as to jurisdictional status by the US Army Corps of Engineers (USACE), of the agency responsible for compliance with Section 404 of the Clean Water Act. It is assumed that all wetlands identified within the ROW could be jurisdictional as they drain to navigable waters. Where applicable, the USACE would be consulted to determine which wetlands are jurisdictional and where wetland impacts can be avoided to the extent practicable.

3.6.1.2 WYOMING

The Wyoming portion of the analysis area is located in the Western Great Plains subregion, which consists of an elevated piedmont plain that adjoins the Rocky Mountains along nearly their entire length. The location and persistence of the water supply for wetlands is a function of interdependent climatic, physiographic, and hydrologic factors including precipitation and runoff

patterns, evaporation potential, topography, and ground-water discharge. Combinations of these factors create conditions that support wetlands in four settings: mountain ranges, river drainages, closed basins, and areas of human activity. Average annual precipitation in the analysis area ranges from 13 to 22 inches with the majority of precipitation occurring in the months of April through September/October. The annual snowfall ranges from 60 inches just west of the Black Hills to 38 inches in the western portion analysis area. Many of the wetlands in the Western Great Plains subregion exist because water storage from aquifers extends the season of flow in drainages beyond the spring snowmelt period.

Although wetlands comprise only about two percent of the State's area, their ecologic and economic value is greater than their surface area might indicate. Both the number and area of natural wetlands continue to decline, while the acreage of ponds and other human-created water bodies has increased. In addition, many riparian systems throughout the West are in poor condition due to the influence of regulated stream flows, grazing, and other land use practices. Wetlands are the most diverse ecosystems in Wyoming's semiarid environment. About 90 percent of the State's wildlife use wetlands daily. Wyoming wetlands support large numbers of breeding birds and many species of spring and fall migrants. Wetlands are the focus of varied recreational and tourist activities such as hunting, fishing, bird watching, camping, and hiking. In addition, water and forage for Wyoming's livestock are provided by wetland areas.

The Cowardin system was used to describe and classify wetlands. In the analysis area, wetlands are primarily associated with perennial streams (riverine system) and adjacent riparian areas. Most of these wetlands are classified as palustrine, emergent, and temporary wetlands. Wetlands associated with riverine systems include oxbows, beaver ponds, and seasonally flooded or sub-irrigated meadows and shrub/scrub types. The plains also contain low densities of seasonally flooded basins called playas that formed in blowouts and in some cases, a result of tectonic activity.

The major streams in the analysis area include Stockade Beaver Creek, Salt Creek, Oil Creek, Sand Creek, Beaver Creek, Lodgepole Creek, Bacon Creek, Black Thunder Creek, Little Thunder Creek, and Porcupine Creek. There are no rivers or major lakes or reservoirs in the Wyoming analysis area.

Common woody species in riparian and floodplain wetlands in the Wyoming portion of the analysis area include plains cottonwood (*Populus deltoides ssp. monilifera*), narrowleaf cottonwood (*P. angustifolia*), and various willows (*Salix*, spp.). Other wetland plants include saltgrass (*Distichlis spicata*), alkali sacaton (*Sporobolus airoides*), inland rush (*Juncus interior*), foxtail barley (*Hordeum jubatum*), and various sedges (*Carex,* spp.).

The Wyoming Joint Ventures Steering Committee has identified priority wetland complexes within the state. The Steering Committee identified the Northeast Wyoming area (Little Missouri River / Belle Fourche River / Beaver Creek) as a priority wetland complex, based on unique ecological values and/or high project interest.

Wetland resources within the area potentially affected by the Proposed Action were identified on National Wetland Inventory (NWI) maps and also evaluated in the field. Surveys were

conducted within the proposed 100-foot ROW, focusing on areas where WOUS may be filled with dredge or fill material. The wetland field survey identified two wetlands that were not identified by the NWI and they were added to the GIS wetland database. See **Table 3-36** for a summary of wetlands within the ROW in Wyoming.

The results of the wetland surveys have not yet been confirmed as to jurisdictional status by the USACE. It is assumed that all wetlands identified within the ROW could be jurisdictional as they drain to navigable waters. Where applicable, the USACE would be consulted to determine which wetlands are jurisdictional and where wetland impacts must be avoided to the extent practicable.

3.6.1.2.1 BLM Land

A total of 0.1 acre of emergent (PEM) wetland type is located on BLM lands within the transmission line ROW, with no occurrence of palustrine, Aquatic Bed (PAB), or Unconsolidated Shore (PUS) wetland types.

3.6.2 Environmental Consequences

3.6.2.1 ALTERNATIVE 1 – NO ACTION

3.6.2.1.1 South Dakota

3.6.2.1.1.1 Direct/Indirect Effects

Under the No Action Alternative, the Project would not be constructed and no wetland impacts would occur. Wetlands would be unchanged from existing conditions.

3.6.2.1.1.2 Cumulative Effects

Under the No Action Alternative, the Project would not be constructed and would not contribute to cumulative wetland impacts in the South Dakota portion of the analysis area.

3.6.2.1.2 Wyoming

3.6.2.1.2.1 Direct/Indirect Effects

Under the No Action Alternative, the Project would not be constructed and no wetland impacts would occur. Wetlands would be unchanged from existing conditions.

3.6.2.1.2.2 Cumulative Effects

Under the No Action Alternative, the Project would not be constructed and would not contribute to cumulative wetland impacts in the Wyoming portion of the analysis area.

3.6.2.2 ALTERNATIVE 2 – PROPOSED ACTION

3.6.2.2.1 South Dakota

3.6.2.2.1.1 Direct/Indirect Effects

Direct impacts would include loss of wetlands by placement of fill, changes in hydrology, degradation of water quality, erosion and sedimentation, or other means; removal of wetland vegetation; and soil disturbance activities in wetlands. Direct impacts could alter various wetland functions including wildlife habitat, trapping of sediment and nutrients (maintenance or improvement of water quality), reduction of flood flow and erosion, water storage, aquifer recharge and discharge, and facilitation and/or augmentation of surface water flow. Removal of wetland vegetation could also increase water and soil temperatures, thus potentially altering the plant species composition within the wetland as well as aquatic species and microbes. Removal of vegetation in forested wetlands (wetlands dominated by woody vegetation 20 feet or taller would temporarily or permanently involve a conversion to a different wetland type (i.e., a change to shrub or herbaceous type). Conversion of forested wetlands to a different wetland type may change the functions of the wetland as described above. For example trees are considered better at resisting water velocities than herbaceous plants during flooding, which would also help reduce sedimentation and erosion.

Indirect impacts would include soil disturbances which lead to invasive plant species that alter the composition and function of wetlands; soil disturbances and dust from construction that temporarily alters the wetland's ability to moderate flood flow and erosion, control sediment, or facilitate surface water flow; and soil disturbances and withdrawal of water for use during construction that temporarily impact wetland hydrology by increasing or decreasing water input.

The Proposed Action ROW would cross less than one acre of wetlands for the entire length of the Project in South Dakota. All of wetlands are located on NFS lands as indicated in **Table 3-35**. The majority of the wetlands crossed by the Proposed Action are palustrine scrub-shrub wetlands (<1 acre). There is also less than one acre of both palustrine aquatic bed wetlands and palustrine unconsolidated shore wetlands. All wetlands would be spanned to the extent practicable and structures would not be placed between clustered wetlands to the extent practicable. There would be no vegetation removal in the scrub-shrub wetlands.

The botany survey also identified fen-like habitat at the Prairie Creek crossing. The Prairie Creek crossing is included as a creek crossing in the hydrology technical report analysis and not included in **Table 3-33**. There would be no direct impacts to wetlands from access roads, overland travel to structures, and construction and decking yards as described above. Structures would span wetlands and any new access or spur roads would not be placed in or next to a wetland. If overland travel is necessary, wetlands would be avoided and undisturbed. Construction and decking yards would be placed a minimum of 100 feet from wetland locations. The hydrology section provides a discussion of potential impacts to surface water and surface water quality which may cause indirect impacts to wetlands.

TABLE 3-35 - ACRES OF NWI AND FIELD IDENTIFIED WETLANDS WITHIN THE TRANSMISSION ROW IN SOUTH DAKOTA				
WETLAND TYPE	ALTERNATIVE 2 PROPOSED ACTION			
	BHNF	Private Land	Total	Anticipated Fill and Vegetation Removal
Palustrine				
Aquatic Bed (PAB)	0.1	0	0.1	0
Scrub-Shrub (PSS)	0.3	0	0.3	0
Unconsolidated Shore (PUS)	0.02	0	0.02	0
Total	0.4	0	0.4	0

Because the ROW for Proposed Action would only cross less than one acre of wetlands in South Dakota and they would be spanned and not directly affected by access, the direct and indirect impacts to wetlands would be negligible. Engineering design, structure spotting (spanning of wetlands), BMPs, Water Conservation Plans (WCP)s(USFS 2006), and compliance with regulatory policy would ensure impacts to wetlands would be minimized or eliminated. Applicable BMPs and WCPs include those described in the Stormwater Pollution Prevent Plan (SWPPP).

3.6.2.2.1.2 Cumulative Effects

The Proposed Action would not appreciably contribute to cumulative wetland impacts in South Dakota because it would span wetlands and avoid wetland impacts during construction, operation, and maintenance. The current condition described in the affected environment section above reflects cumulative effects of past projects in the analysis area. Present and future projects may result in the loss of wetlands depending on the location of the project improvements in relation to existing wetlands. Present and future projects that may impact wetlands include timber management activities, prescribed burns, wildfires, road and utility ROW clearing, subdivision development, range developments and livestock grazing (including fencing, dugouts, wells, spring developments, etc.), and recreation activities including motorized vehicle use.

3.6.2.2.2 Wyoming

3.6.2.2.2.1 Direct/Indirect Effects

Direct and indirect impacts to wetlands in Wyoming could result from the actions described above for South Dakota. The Proposed Action ROW would cross just over nine acres of wetlands for its entire length in Wyoming, including public and private lands (**Table 3-36**). There are no wetlands associated with the other Proposed Action features such as access roads. The majority of wetlands are located on private lands (just over eight acres), with 0 acres on NFS lands, less than one acre on BLM lands, and less than one acre on state lands.

The majority of wetlands in the Proposed Action ROW in Wyoming are palustrine emergent (just over eight acres total). There is also less than one acre of both palustrine aquatic bed wetlands and unconsolidated shore wetlands. All wetlands would be spanned to the extent practicable and structures would not be placed between clustered wetlands, to the extent practicable.

TABLE 3-36 - ACRES OF NWI AND FIELD IDENTIFIED WETLANDS WITHIN THE TRANSMISSION LINE ROW IN WYOMING

WETLAND TYPE	ALTERNATIVE 2 PROPOSED ACTION					
	TBNG	BLM	State	Private Land	Total	Anticipated Fill and Vegetation Removal
Palustrine						
Aquatic Bed (PAB)	0	0	0	0.7	0.7	0
Emergent (PEM)	0	0.1	0.6	7.5	8.2	0
Unconsolidated Shore (PUS)	0	0	0	0.2	0.2	0
Total	0	0.1	0.6	8.4	9.1	0

The Project analysis area would cross a portion of the Beaver Creek – Upton priority wetland complex. This complex is not one of the nine primary focus areas, but this area was placed on the priority list. The proposed transmission line ROW would cross nine named streams and nine small emergent wetlands in this wetland complex, all of which would be spanned and avoided. There are no other priority wetland complexes that are within the remaining transmission line ROW.

While the ROW for the Proposed Action crosses just over nine acres of wetlands, the direct impacts would be negligible. Engineering design, structure spotting (spanning of wetlands), BMPs, WCPs (USFS 2006), and compliance with regulatory policy would minimize or eliminate impacts to wetlands. Applicable BMPs and WCPs include those described in the SWPPP. A National Pollutant Discharge Elimination System permit would be required because the Proposed Action will disturb more than one acre of total land area within 100 feet of streams and rivers. As part of this permitting process, a SWPPP would be developed and implemented that utilizes standard engineering practices and lists BMPs that will be used to minimize or prevent “significant sediment” from leaving the construction site.

There would be negligible to minor indirect impacts to wetlands from access roads, overland travel to structures, and construction and decking yards as described above. Structures would span wetlands and any new access or spur roads would not be placed in or next to a wetland. Overland travel would be the primary mode of travel to structure locations and wetlands would be avoided and undisturbed. Construction and decking yards would be placed a minimum of 100 feet from wetland locations. See the Hydrology section for a discussion of potential impacts to surface water and surface water quality in Wyoming which contribute to indirect impacts to wetlands.

3.6.2.2.2.1.1 BLM Land

No fill or vegetation removal is anticipated with regard to the 0.1 acre emergent wetland type located on BLM lands within the transmission line ROW.

3.6.2.2.2.2 Cumulative Effects

The Proposed Action would not appreciably contribute to cumulative wetland impacts in Wyoming because it would span wetlands and avoid wetland impacts during construction, operation, and maintenance. The current condition described in the affected environment section above reflects cumulative effects of past projects in the analysis area. Present and future projects may result in the loss of wetlands depending on the location of the project improvements in relation to existing wetlands. Present and future projects which may impact wetlands include dispersed recreation, grazing, roads, fences, telecommunication lines, fuels reduction, water development (i.e., wells, water lines, and watering troughs), coal bed natural gas wells, coal exploration and mining, and geophysical exploration.

3.6.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

3.6.2.3.1 South Dakota

The following provides a comparison of Alternative 3 (Proposed Action with Route Modifications) and the Proposed Action.

3.6.2.3.1.1 Direct/Indirect Effects

Route Modification 3b – Mountain View

Route Modification 3b and the comparable section of the Proposed Action would have no wetlands in the ROW.

Route Modification 3c – Clinton

Route Modification 3c would have less than one acre of wetlands in the ROW on BHNF lands and the comparable section of the Proposed Action would have no wetlands in the ROW. Impacts would potentially be greater for Route Modification 3c compared to this section of the Proposed Action but, like wetlands in other areas, they would be spanned and not directly affected.

Route Modification 3d – Edelweiss

Route Modification 3d and the comparable section of the Proposed Action would have no wetlands in the ROW.

Route Modification 3e – Pactola

Route Modification 3e and the comparable section of the Proposed Action would have no wetlands in the ROW.

Route Modification 3f – Pactola South

Route Modification 3f and the comparable section of the Proposed Action would have no wetlands in the ROW.

Route Modification 3g – Hidden Valley

Route Modification 3g and the comparable section of the Proposed Action would have no wetlands in the ROW.

3.6.2.3.2 Wyoming

3.6.2.3.2.1 Direct/Indirect Effects

Route Modification 3a would cross five acres of wetlands in the ROW in comparison to less than one acre of wetlands in the ROW for the comparable section of the Proposed Action. All of the wetlands in this area are on private lands. While direct impacts would be avoided by spanning the wetlands, indirect impacts could potentially be greater for Route Modification 3a compared to this section of the Proposed Action because of the greater number of wetlands that could be impacted.

3.7 VISUAL RESOURCES

3.7.1 Existing Conditions

3.7.1.1 SOUTH DAKOTA

3.7.1.1.1 Landscape Character and Existing Scenic Integrity

The Black Hills landscape is rich in visual variety. The slopes are primarily covered with evergreen forest, which is dominated by Ponderosa Pine. Aspen cover considerable areas, often along the edges of open areas. Other deciduous trees are found along streams in the area. The tree cover is broken by occasional rock outcrops and gives way to grassy parkland in the valley bottoms, where shrubs such as sagebrush are common. Wildflowers dot the meadows and are scattered along roadsides, adding seasonal color. The most prominent water features in the landscape are two manmade reservoirs, Pactola Reservoir and Deerfield Reservoir. Both reservoirs are bounded by steep forested slopes and open savannah. Streams are also present, winding through the valleys. Cultural and historic features in the landscape include recreation residences on NFS land, residences on private land, commercial facilities such as campgrounds and stores, roads, bridges, existing electrical transmission and

distribution lines, and parking areas. **Figures 3-3** to **3-6** show the existing visual condition in the area.

The Black Hills earned their name from the dark appearance of their slopes, due to the dark green color of the Ponderosa Pine. However, large swaths of trees have been killed by mountain pine beetle or are presently infested. The vegetation is undergoing rapid change due to the loss of trees that is highly visible and will impact the scenery of the area. The trees limited visibility from many areas and their loss will result in a reduction of vegetation screening, creating more expansive views and potentially exposing manmade structures and development that were previously hidden from view.

Scenery resources in the BHNF are currently managed under the Forest Service Scenery Management System (SMS). The term existing scenic integrity, according to the SMS, is the current state of the landscape, considering previous human alterations (USFS 1995). The landscape of the analysis area overall exhibits a high level of existing scenic integrity (ESI) and an established sense of place because the elements that detract from the visual condition are generally subordinate to the natural elements of the characteristic landscape. The expanses of coniferous forest, groves of aspen, and rolling parklands and savannah do not appear altered. While mountain pine beetle activity is rapidly altering the scenery, it is not a human alteration. Castle Creek has been dammed to create Deerfield Reservoir and Rapid Creek has been dammed to create Pactola reservoir. These water bodies add to the picturesque nature of the area, and other than the actual dams themselves, contribute a dominant element of water to the surrounding landscape, enhancing its scenic value.

Cultural or man-made features within the analysis area both add and detract from the existing scenic integrity of the landscape. Linear man-made features include US Highway 385 (US Highway 385), South Dakota Highway 44 (SD Hwy 44), BHNF roads, and an existing transmission line. Structures on BHNF lands, including campground and picnic area facilities, the Pactola Visitor Center, and other BHNF facilities, and recreation residences, are typically tucked into the forested slopes or perched on the edges of the reservoirs. Structures on BHNF lands are typically constructed with natural finish materials such as stone and wood that are non-reflective and blend into the color palette and texture of the surrounding landscape. These features generally have a neutral effect on the existing scenic integrity. Residential and commercial development located on private lands is scattered throughout the analysis area. A large concentration is located at the east end of the analysis area, where Rapid City is located. Additional, smaller concentrations are found at Hisega and in the Clinton area. The materials and finishes used for these structures vary. Use of natural, non-reflective materials reduces visual contrast with the color and texture of the surrounding scenery while artificial or reflective materials or contrasting colors increase visual contrast. Many of the developments on private lands are visually dominant due to their location in open clearings where they are highly visible. Although development on private land is not subject to LRMP standards, it generally reduces the overall scenic integrity of the natural setting in the Black Hills.

3.7.1.1.2 Landscape Visibility

3.7.1.1.2.1 Sensitive Viewpoints

Landscape visibility refers to the viewing context, or in other words, who sees the analysis area, where the analysis area is seen from, what viewers are doing when they view the scenery, what importance the viewers' place on the scenery, and how long the scenery is viewed.

Viewers of the landscape of the Black Hills may be residing in it, recreating in it, or traveling through it. Value placed on scenery varies for viewers depending on their activity and expectation.

3.7.1.1.2.1.1 Views from Private Residences

Two recreation residences in the Pactola Reservoir area would be located in the immediate foreground distance zone, four would be located in the foreground distance zone and two would be located in the middleground distance zone. Two recreation residences north of Hisega would be located in the foreground distance zone. Seven recreation residences in the Hisega area would be located in the middleground distance zone. Numerous residences on private property would be located within the analysis area in all distance zones.

3.7.1.1.2.1.2 Views from Special Interest Areas and Developed Recreation Areas

Special interest areas and developed recreation areas within the analysis area include trails and trailheads and established recreation sites such as camp grounds, picnic areas, swimming sites, boating sites, observation or overlook sites, the Black Hills visitor center, and fishing sites. Private campgrounds, rental cabins, and stores and other commercial enterprises catering to recreationists and tourists are also located within the analysis area.

The Mickelson Trail and the Centennial Trail would both be crossed by the Proposed Project. The Deerfield trail would be located in the middleground distance zone.

In the Pactola Reservoir area, the Black Hills visitor center and the Pactola North and Pactola South observation sites on the east side of the reservoir would all be within the foreground distance zone while the recreation areas on the north and west sides of the reservoir, including the Pactola Point swimming site and picnic ground, Veterans Point, the south and north boat sites, and the Osprey trail and Pactola campground would be located in the middleground distance zone. Although not a designated fishing site, the pool below the spillway and Rapid Creek are popular for fishing. Two Centennial Trail trailheads would be also located within the foreground distance zone in this area.

In the Deerfield Reservoir Area, the Gold Run trailhead and a small portion of the Deerfield Lake Loop trail would be located in the foreground distance zone. All other recreation sites around the Lake, including the Whitetail, Dutchman, and Custer Trail campgrounds, the Mountain City and Lakeshore picnic grounds, the Custer Trail and Deerfield boating sites, the Deerfield Lake Loop trail and its trailheads (Custer Trail, Hill Top, and North Shore), and the Kinney Canyon, Little

House, Custer Camp and Miller fishing sites would be located in the middleground distance zone.

The Ditch Creek campground and the Redbank Spring campground would be located in the middleground distance zone.

3.7.1.1.2.1.3 Views from Sensitive Transportation Corridors

Sensitive transportation corridors within the analysis area include US Highway 385, SD Highway 44 and Rochford Road. US Highway 385 would be located in the immediate foreground distance zone for approximately 0.3 mile and would be crossed by the Project on BHNF lands. SD Highway 44 would be crossed by the Project on private lands and would roughly parallel the Project in the foreground distance zone for approximately two miles where the Project would be located on BHNF lands in the Hisega area. Rochford Road would also be crossed by the Project on a small parcel of private property that is surrounded by BHNF lands.

3.7.1.1.3 Scenic Value

The analysis area includes all three scenic attractiveness classes: A (Distinctive), B (Typical), and C (Indistinctive).A total of 5.4 miles of Class A, 19.8 miles of Class B, and 10.8 miles of Class C would be crossed by the Proposed Action. A total of 0.3 mile of Class A, 3.2 miles of Class B, and 0.6 mile of Class C would be crossed by Alternative 3 (Proposed Action with Route Modifications).

Scenic Classes within the analysis area and crossed by the T-O-RC Project are predominantly composed of Classes 1 and 2, which indicate high public value for scenery and high value for scenery relative to the value of other forest resources. A total of 10.0 miles of Scenic Class 1 areas, 14.3 miles of Scenic Class 2 areas, and 8.1 miles of Scenic Class 3 and 4 areas would be crossed by the Proposed Action. A total of 2.4 miles of Scenic Class 1 areas, 0.5 mile of Scenic Class 2 areas, and 1.1 miles of Scenic Class 3 areas would be crossed by Alternative 3 (Proposed Action with Route Modifications)..

3.7.1.1.4 Visual Resource Management – BHNF Scenic Integrity Objectives

Scenic Integrity Objectives (SIOs) are management objectives that were adopted from the scenic class values. Scenic Integrity is a measure of the degree to which a landscape is visually perceived to be “complete”. The highest scenic integrity ratings are given to those landscapes that have little or no deviation from the character valued by constituents for its aesthetic appeal. Within the analysis area, 10.5 miles of high SIO areas, 14.4 miles of moderate SIO areas, and 11.4 miles of low SIO areas would be crossed by the Proposed Action. Approximately2.6 miles of high SIO areas, 0.6 mile of moderate SIO areas, and 1.1 miles of low SIO areas would be crossed by Alternative 3 (Proposed Action with Route Modifications.

3.7.1.2 WYOMING

3.7.1.2.1 TBNG

3.7.1.2.1.1 Landscape Character and Existing Scenic Integrity

The easternmost portion (13.5 miles of the Wyoming analysis area) is located within the Black Hills physiographic section, and is described above in Existing Conditions, South Dakota. The western portion of the analysis area in Wyoming is composed of smoothly rolling terrace-like plains with small mesas with cliff escarpments and occasional high buttes. **Figures 3-7** to **3-9** show representative views of the Wyoming portion of the analysis area.

Scenic resources in the TBNG are currently managed under the Forest Service Scenery Management System (SMS). The term existing scenic integrity, according to the SMS, is the current state of the landscape, considering previous human alterations (USFS 1995). Much of the landscape of the analysis area overall exhibits a moderate to high level of existing scenic integrity because much of the landscape is unaltered, with the exception of the vegetation composition, which has been altered. Where mineral and gas and oil development have occurred the existing scenic integrity is generally low.

Cultural or man-made features within the scenic resources study detract from the existing scenic integrity of the landscape and include mineral and oil and gas facilities and residential and agricultural structures. Linear man-made features include WY Highway 59, WY Highway 450, WY Highway 116, US Highway 16, county and local roads, and existing transmission lines (see **Figures 3-7** to **3-9**).

3.7.1.2.1.1.2 Landscape Visibility

3.7.1.2.1.1.2.1 Views from Sensitive Viewpoints and Corridors

Private residences are scattered throughout the analysis area and would potentially have views of the T-O-RC Project on private land and TBNG and BLM-administered lands. The town of Osage would be located within the foreground distance zone of a portion of the T-O-RC Project.

No special interest areas, developed recreation sites or sensitive transportation corridors are located within the analysis area that would have potential views of the T-O-RC Project on TBNG or BLM managed lands or on private lands. The Buffalo Ridge and Cellars special interest areas are located outside the scenery resource study area. The T-O-RC Project would cross 0.2 mile of BLM managed lands within the Stateline Special Recreation Management Area (SRMA).

3.7.1.2.1.1.2.2 Scenic Value

The scenery of the public TBNG and BLM managed lands and private lands are generally common to the region and relatively indistinctive within the Great Plains physiographic province. T-O-RC Project would cross the Minnelusa Foothills near the Wyoming state border, which form the interior boundary of the Red Valley, or Racetrack, a ring shaped feature characterized by

vibrant red valley walls and soil that circles the Black Hills and is separated from the plains by the Dakota Hogback. The sense of enclosure created by these geological features and the vibrant colors of the soil and walls of the valley contribute to scenery that is above average for the Wyoming portion of the analysis area. This area is composed of private lands as well as the 0.2 mile of BLM managed lands within the Stateline SRMA that the T-O-RC Project would cross.

3.7.1.2.1.1.3 Scenic Resource Management – TBNG Scenic Integrity Objectives

The T-O-RC Project would cross 4.7 miles of TBNG, all of which has been designated as low SIOs.

3.7.1.2.2 BLM Land

The Newcastle Field Office conducted a visual resource inventory of scenic quality in 2012. The Project intersects seven Scenic Quality Rating Units (SQRUs). In the visual resource inventory process, public lands are given an A, B, or C rating based on the apparent scenic quality which is determined using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. During the rating process, each of these factors are ranked on a comparative basis with similar features within the Great Plains physiographic province. The inventory classified five of the seven SQRUs, including all parcels east and south of Highway 16 as containing low scenic quality.

3.7.1.2.2.1 Landscape Visibility

3.7.1.2.2.1.1 Views from Sensitive Viewpoints and Corridors

Private residences are scattered throughout the analysis area and would potentially have views of the T-O-RC Project on BLM managed lands.

No special interest areas, developed recreation areas or sensitive transportation corridors are located within the analysis area that would have potential views of the T-O-RC Project on BLM managed lands. The T-O-RC Project would cross 0.2 mile of BLM managed lands within the Stateline Special Recreation Management Area (SRMA).

3.7.1.2.2.1.2 Scenic Value

The scenery of the BLM managed lands are generally common to the region and relatively indistinctive. T-O-RC Project would cross the Minnelusa Foothills near the Wyoming state border, which form the interior boundary of the Red Valley, or Racetrack, a ring shaped feature characterized by vibrant red valley walls and soil that circles the Black Hills and is separated from the plains by the Dakota Hogback. The sense of enclosure created by these geological features and the vibrant colors of the soil and walls of the valley contribute to scenery that is above average for the Wyoming portion of the analysis area. This area is composed of private lands as well as the 0.2 mile of BLM managed lands within the Stateline SRMA that the T-O-RC Project would cross.

3.7.1.2.2.2 Scenic Resource Management – BLM Visual Objectives

The T-O-RC Project would cross 2.6 miles of Visual Resource Management (VRM) Class III areas managed by the Newcastle BLM Field Office. The objective of Class III areas is to partially retain the existing character of the landscape.

3.7.2 Environmental Consequences

3.7.2.1 ALTERNATIVE 1 – NO ACTION

3.7.2.1.1 South Dakota

3.7.2.1.1.1 Direct/Indirect Effects

Under the No Action Alternative, the Proposed Project would not be constructed and no additional impacts to the existing scenic integrity would occur.

3.7.2.1.1.2 Cumulative Effects

Under the No Action Alternative, the Proposed Project would not be constructed and would not add to any cumulative impacts. The existing scenic integrity would remain the same.

3.7.2.1.2 Wyoming

Direct and indirect effects and cumulative effects would be the same in Wyoming as described for South Dakota above. The Project would not be constructed, would not add to any cumulative impacts and the existing scenic integrity would remain the same.

3.7.2.2 ALTERNATIVE 2 – PROPOSED ACTION

3.7.2.2.1 South Dakota

3.7.2.2.1.1 Direct/Indirect Effects

While view screening by topography is generally permanent, vegetation screening may be reduced over time due to fire, disease or insect damage, or may increase due to growth or increased vegetation density. Large swaths of trees in the study area have been killed by mountain pine beetle or are presently infested. The vegetation is undergoing rapid change due to the loss of trees that is highly visible and will impact the scenery of the area. The trees limited visibility from many areas and their loss will result in a reduction of vegetation screening, creating more expansive views and potentially exposing the T-O-RC Project in areas that were forested. Thus while vegetation screening was reviewed during field observation, it is a factor that may fluctuate over time and was not a factor when assessing the visual impacts of the Project.

Impacts to sensitive viewers would vary depending on the visual contrast of the Project, visibility of the Project, and the distance zone where the observation points and corridors would be located. The typical effects that viewers would see in each distance zone are:

- Immediate Foreground (IFG) (0 to 300 feet) which is the zone where the greatest level of detail is evident to viewers;
- Foreground (FG) (300 feet to 0.5 mile) where individual forms are dominant in the foreground distance zone;
- Middleground (MG) (0.5 to visual resources study area boundary) where individual transmission structures would be visible but hardware would only be perceived as part of the larger form.

Table 3-37 summarizes the impacts to views from sensitive viewpoints in South Dakota.

TABLE 3-37 - IMPACTS ON VIEWS FROM SENSITIVE VIEWPOINTS AND CORRIDORS RESULTING FROM CHANGES TO THE EXISTING SCENIC INTEGRITY IN SOUTH DAKOTA

	Miles of High Impacts*	Miles of Moderate Impacts*	Total Miles
Private Residences	**14.1** (1.9 miles IFG views; 12.2 miles FG views)	**19.1** (0.4 mile FG views; 18.7 miles MG views)	33.2
Recreation Residences	**1.7** (0.2 mile IFG views; 1.5 miles FG views)	**1.7** (0.3 mile FG views; 1.4 miles MG views)	3.4
Recreation Sites	**1.5** (1.5 miles FG views)	**9.4** (0.4 mile FG views; 9.0 miles MG views)	10.9
Trails	**3.7** (0.2 mile IFG views; 3.5 miles FG views)	**14.2** (0.4 mile FG views; 13.8 miles MG views)	17.9
Transportation Corridors	**10.5** (0.7 mile IFG views; 9.8 miles FG views)	**11.7** (0.4 mile FG views; 11.3 miles MG views)	22.2

IFG = Immediate Foreground Distance Zone; FG = Foreground Distance Zone; MG = Middleground Distance Zone
*Impacts identified in 0.1 mile segments for portions of the Proposed Action that are located on BHNF lands. Low impacts are not included in the table because no low impacts to views from sensitive viewpoints and corridors were identified in the South Dakota portion of the scenery resource study area.

Beyond the boundary of the visual resources study area, the overall repetitive, linear pattern of the transmission line across the landscape and the straight, cleared ROW would be visible depending on atmospheric and viewing conditions. However, texture would not be apparent and the transmission line would appear as a uniform color in the landscape. At this distance, the cleared ROW would still be obvious and draw the eye in winter during snow cover. Specular reflection could result in the conductors standing out against the landscape under certain lighting conditions.

3.7.2.2.1.1.1 Views from Private Residences

The greatest impacts to private residences would occur where unobstructed views with no vegetation screening occur. Although trees would screen the T-O-RC Project from view for many private residences, vegetation screening may be reduced over time due to fire, disease or insect damage.

Because the transmission line would be so close to any viewers in the immediate foreground distance zone, it would dominate views in all vegetation types and result in high impacts to sensitive viewers.

High impacts to viewers in the foreground distance zone and moderate impacts to middleground distance zone viewers would result where the transmission line would introduce large vertical structures, strong horizontal lines, and linear, unnatural vegetation clearing to a landscape where no existing transmission lines would be paralleled and no similar structures and clearing are present. High impacts would also occur where the transmission line would parallel a single 69 kV transmission line in forested areas, requiring either widening of the existing vacant cleared ROW or clearing of new ROW, and in shrubland areas. High impacts to viewers in the foreground distance zone and moderate impacts to viewers in the middleground distance zone would also occur where new spur roads would be required in forested areas with or without existing transmission lines and in shrubland areas where no existing transmission lines would be present.

Moderate impacts to viewers in the foreground distance zone and low impacts to viewers in the middleground distance zone would occur where a 230 kV transmission line or multiple 69 kV transmission lines would be paralleled in all vegetation types, and where a single 69 kV transmission line would be paralleled in vegetation types other than forested.

Private residences are scattered throughout the area. Numerous residences are located between Rapid City and Pactola Reservoir, especially along Nemo Road and Wild Irishman Road, in the Hisega area, and extending along SD Highway 44 from Hisega to Johnson Siding. Additional smaller clusters and scattered residences are located further west in the scenery resource study area. Impacts to views from private residences are summarized in **Table 3-37** above. A total of 84 residences would be located in the immediate foreground distance zone, 1,296 residences would be located in the foreground distance zone, and several thousand residences would be located in the middleground distance zone.

The majority of the T-O-RC Project alignment would be located on BNHF lands in South Dakota. However, portions that are located on private lands would be seen by large numbers of residences north and west of Rapid City, as well as by smaller numbers of residences elsewhere along the alignment where private lands would be crossed. High impacts would occur for immediate foreground and foreground residential viewers and moderate impacts would occur for middleground residential viewers in this area. High impacts to residential viewers would also occur where the T-O-RC Project alignment would be located on private lands in the residential area where the alignment would cross Highway 44 and Rapid Creek west of Hisega, in the Clinton area, and where the alignment would cross Mystic Road and the Mickelson Trail.

Figure 3-10 illustrates what the Proposed Project would look like from the view north of the Hisega residential area. The proposed T-O-RC Project alignment would be located north of and parallel an existing transmission line and SD Highway 44 in this area. The private residences of the Hisega residential area would have views of the proposed transmission line and the cleared ROW through the trees on the hillside.

Figure 3-11 illustrates what the Project would look like from Gillette Prairie Road looking toward the proposed alignment of the T-O-RC Project. Mountain Meadow Resort is visible in the photo. Several private residences are located further south along the road in the vicinity of the proposed alignment.

3.7.2.2.1.1.2 Views from Recreation Residences

In the Pactola Reservoir area, two recreation residences would have immediate foreground views of the T-O-RC Project where the line would pass nearly overhead and two others would have foreground views. Two residences are currently screened by trees but would have foreground views if vegetation screening is reduced over time due to damage from insects, disease, or fire. High and moderate visual impacts would occur in this area. Two residences north of SD Highway 44 in the Hisega area would have foreground views of a short segment of the Proposed Project (approximately 1,000 feet). High and moderate visual impacts would occur for the two residences.

3.7.2.2.1.1.3 Views from Special Interest Areas and Developed Recreation Areas

3.7.2.2.1.1.3.1 Pactola Reservoir Area

The T-O-RC Project would parallel two 69 kV transmission lines and pass through the Pactola substation in this area. The existing electrical transmission facilities are dominant elements in the landscape that substantially detract from the ESI. Because these facilities are already present, the Project would result in an incremental change to the ESI and would contribute to an overall high level of visual contrast in the landscape resulting from the combination of the existing facilities and the Proposed Project.

Views from the Pactola North Observation Point, Pactola South Observation Point and the Black Hills Visitors Center are currently screened or partially screened by ponderosa pine trees. However, if screening is reduced over time, foreground views of the Project and high and moderate impacts would occur for these viewpoints. Viewers at these locations are typically oriented toward the Pactola reservoir and away from the T-O-RC Project alignment. The Centennial trail would be crossed by the T-O-RC Project and would have views of the Project in all distance zones. Up to 1.8 miles of the Project would be visible in the foreground distance zone from the trail. In the Rapid Creek valley below Pactola dam, foreground views would occur from the trail's Rapid Creek and Tamarack trailheads, as well as from Rapid Creek and the pool below Pactola dam, which is a popular fishing area. The Osprey Trail on the west shore of Pactola Reservoir, which is primarily used for fishing access, would have middleground views of the Project where it would parallel existing 69 kV transmission lines, although much of these

views were screened by vegetation at the time of this study. High and moderate impacts to views from Centennial Trail and viewpoints in the Rapid Creek valley below Pactola dam would occur. Moderate impacts to views from the Osprey Trail would occur.

Figure 3-12 illustrates the view southeast from the North Observation Point on the east side of Pactola Reservoir toward the proposed T-O-RC Project.

3.7.2.2.1.1.3.2 Deerfield Reservoir Area

Views from the Deerfield Reservoir Area would be screened by trees. However, if screening is reduced over time, the following impacts would potentially occur. The Deerfield Lake Loop trail would have foreground views of approximately 1.6 miles of the Project. The Gold Run trailhead on the Deerfield Lake Loop would have a foreground view of a short segment of the Project (approximately 600 feet). Dutchman Campground and the Kinney Canyon trailhead on the Deerfield Trail would have middleground views of the Project. The Deerfield Lake Loop Trail would potentially have extensive middleground views of the T-O-RC Project if tree screening is reduced. High and moderate impacts to views from the trails and trailheads would occur.

3.7.2.2.1.1.3.3 Mickelson Trail

The Mickelson Trail would be crossed by the T-O-RC Project on private land and views of the Project down the cleared ROW at the crossing location on BHNF land would occur. The Trail would have views of the Project in all distance zones from this crossing location. Potential views of the Project from most of the trail would be screened by trees, but if screening is reduced over time foreground views could include approximately 0.9 mile of the proposed transmission line as well as extensive middleground views. High and moderate impacts to views from the trail would occur.

Figure 3-13 illustrates the view of the Project looking south from the Mickelson Trail toward the location where the T-O-RC Project would cross the trail. The proposed T-O-RC Project would cross the Mickelson Trail on private land and would continue on BHNF land. Because the alignment would be approximately perpendicular to the trail at the crossing site, recreationists using the trail would view the line across the trail as they approach it from north or south and then cross under the conductors where they would span the trail. Existing vegetation partially screened the view from the trail from the photo location.

3.7.2.2.1.1.3.4 Other Developed Recreation Sites

Views from Ditch Creek Campground are screened. However, if vegetation screening was lost, the campground could have middleground views of approximately 2,200 feet of the Project and moderate impacts to views from the campground would occur.

Red Bank Campground would have middleground views of up to 1.8 miles of the Project. Moderate impacts to views from Red Bank Campground would occur.

The Deerfield Trail could potentially have extensive middleground views of the T-O-RC Project if tree screening is reduced and moderate impacts to views would occur.

3.7.2.2.1.1.4 Views from Sensitive Transportation Corridors

SD Highway 44 would be crossed by the T-O-RC Project on private land and would have foreground views of approximately 2.9 miles of the proposed transmission line in the Hisega area, in addition to more distant middleground views. High and moderate impacts to views from SD Highway 44 would occur.

US Highway 385 would be crossed by the Project on BHNF lands and would have immediate foreground views of approximately 0.3 mile and foreground views of approximately 2.2 miles of the proposed transmission line, in addition to more distant middleground views. High and moderate impacts to views from US Highway 385 would occur. The view from US Highway 385 in the vicinity of the North Observation Point on the east site of Pactola Reservoir toward the proposed T-O-RC Project would be similar to the photo simulation in **Figure 3-4**.

Rochford Road would be crossed by the T-O-RC Project on BHNF lands and would have immediate foreground views of approximately 0.1 mile and foreground views of approximately 3.2 miles of the proposed transmission line, in addition to more distant middleground views. High and moderate impacts to views from Rochford Road would occur.

Table 3-38 summarizes the impacts to scenic attractive classes in South Dakota.

TABLE 3-38 - IMPACTS ON SCENIC ATTRACTIVENESS CLASS RESULTING FROM CHANGES TO THE ESI IN SOUTH DAKOTA

Scenic Attractiveness Class (miles)*	Scenic Class (miles)*				Total Miles
	Class 1	Class 2	Class 3	Class 4	
Class A (Distinctive)	3.0	4.5	0	0	7.5
Class B (Common)	8.8	8.7	4.1	0	21.6
Class C (Common	1.8	2.8	0	1.3	5.9
Total Miles	13.6	16.0	4.1	1.3	35

*Distances identified in 0.1 mile segments for portions of the Proposed Action that are located on BHNF lands.
Note: Scenic classes 1 and 2 indicate high public value for scenery and high value for scenery relative to the value of other forest resources. Scenic classes 3 and 4 indicate moderate public value for scenery.

The visual contrast of the T-O-RC Project would reduce the ESI of the landscape of the BHNF. The impact of changes to the ESI would be greatest in areas of Class A scenic attractiveness (which indicates distinctive scenery) that are also identified as scenic Class 1 and 2 areas (where scenery has high public value). These areas are crossed by the T-O-RC Project alignment in the Rapid Creek/SD Highway 44 corridor, just east of Pactola Reservoir, and in the Slate Creek corridor and the South Fork Castle Creek/Ditch Creek Road corridor, as well as a

few smaller areas. Lesser impacts would occur in areas of Class B scenic attractiveness that are also identified as scenic Class 1 and 2 areas. The lowest impacts would occur in areas of Class C scenic attractiveness and areas identified as scenic Class 3 and 4.

3.7.2.2.1.1.5 Compatibility with Black Hills National Forest Scenic Integrity Objectives

A total of 24.9 miles of the T-O-RC Project alignment would cross areas of the BHNF with High and Moderate SIOs and would not be compatible with the SIOs due to strong and moderate visual contrast levels that would result from the Project. All of the alignment across High SIO areas (10.5 miles) would be visible to sensitive viewers. A total of 9.5 miles of the alignment across Moderate SIO areas would be visible to sensitive viewers while 1.9 miles of the Moderate SIO areas crossed would not be visible to any sensitive viewers. Prominent viewing locations in the BHNF from which the Proposed Action would be visible include the Pactola Reservoir Area, the Deerfield Reservoir Area, the Mickelson Trail, the Centennial Trail, SD Highway 44 in the Hisega Area, US Highway 385, and Rochford Road. The Proposed Action would also be viewed from the numerous private residence scattered throughout the visual resources study area. The Proposed Action would be located in an existing ROW where a transmission line was previously located. A total of 11.4 miles of the T-O-RC Project alignment would cross areas of the BHNF with Low SIOs and would be compatible with the SIOs. Pennington County does not have regulations pertaining to aesthetics and electrical transmission lines.

3.7.2.2.1.2 Cumulative Effects

The spatial boundary for evaluating cumulative effects is a study analysis area that extends approximately three miles on either side of the existing transmission line (six mile total width). The current condition described in the Affected Environment section reflects past projects in the study area. The T-O-RC Project would cumulatively add to the visual impacts of the existing transmission lines and substation east of Pactola Reservoir, reducing the ESI in this area and impacting views from the numerous sensitive recreation viewpoints and SD Highway 44 in the Pactola Reservoir area and impacting views from private residences located between Rapid City and Pactola Reservoir, especially in the Hisega area.

Planned or ongoing projects which may impact scenery resources include road/utility ROW clearing on non-NFS lands and subdivision development. The mountain pine beetle epidemic will also continue to change the scenery where it might not have already been changed. The T-O-RC Project would cumulatively add to the combined, incremental effects of many individual road and residence projects and to increased vegetation clearing, grading and manmade structures in the landscape. Commercial and non-commercial thinning on BHNF lands; timber harvests by private landowners; and wildfires may reduce vegetation density and screening, resulting in increased visibility of the T-O-RC Project from sensitive viewpoints and increased visual impacts.

3.7.2.2.2 Wyoming

3.7.2.2.2.1 Direct/Indirect Effects

3.7.2.2.2.1.1 Views from Private Residences

The greatest impacts to private residences would occur where unobstructed views with no vegetation screening occur. Because vegetation in the Wyoming portion of the scenery resource study area is primarily composed of grassland and shrubland, vegetation screening is limited in many areas and views are typically open.

Residences are located in all distance zones (immediate foreground, foreground and middleground) in Wyoming that would have views of the T-O-RC Project where it would be located on private property. A total of seven residences would be located in the immediate foreground distance zone, 113 residences would be located in the foreground distance zone, and a total of 1,076 residences would be located in the middleground distance zone. Most residential viewers would see the Project where it crosses private lands because the majority of the alignment in Wyoming crosses private lands. High impacts would occur for residences with immediate foreground views of the Project. The majority of the T-O-RC Project alignment in Wyoming would not parallel existing transmission lines. In these areas, high impacts would occur for foreground residential viewers and moderate impacts would occur for middleground residential viewers. Where the Project would parallel an existing transmission line, moderate impacts would occur for foreground residential viewers and low impacts would occur for middleground residential viewers. A total of 1.0 mile of moderate impacts and 1.0 mile of low impacts would occur for residences with middleground views of the Project where it crosses TBNG managed lands.

3.7.2.2.2.1.2 Scenic Value – Changes to the Existing Scenic Integrity of Areas of High Scenic Attractiveness

The contrast of the T-O-RC Project with the landscape would have a moderate impact on the scenic value of the portion of the Stateline SRMA that would be crossed, which has above average scenery. The Project would reduce the ESI and existing scenic integrity of the Red Valley in this area. The T-O-RC Project would have a low impact on the scenic value of all other TBNG and BLM managed lands, which have scenery that is generally common to the region and relatively indistinctive.

3.7.2.2.2.1.3 Scenic Resource Management – Compatibility with Thunder Basin National Grassland Scenic Integrity Objectives

The T-O-RC Project would be compatible with the Low SIOs of the TBNG managed areas crossed and with the VRM Class III objectives of the Newcastle and Buffalo Field Offices managed areas crossed. Weston and Campbell Counties do not have regulations pertaining to aesthetics and electrical transmission lines.

3.7.2.2.2.1.4 BLM Land

3.7.2.2.2.1.4.1 Scenic Value – Changes to the Existing Scenic Integrity of Areas of High Scenic Attractiveness

The contrast of the T-O-RC Project with the landscape would have a moderate impact on the scenic value of the portion of the Stateline SRMA that would be crossed, which has above average scenery. The Project would reduce the ESI and existing scenic integrity of the Red Valley in this area. The T-O-RC Project would have a low impact on the scenic value of all other BLM managed lands, which have scenery that is generally common to the region and relatively indistinctive.

3.7.2.2.2.1.4.2 Scenic Resource Management – Compatibility with BLM Visual Objectives

The T-O-RC Project would be compatible with the VRM Class III objectives of the Newcastle Office managed areas crossed.

3.7.2.2.2.2 Cumulative Effects

The current condition described in the Affected Environment section reflects past projects in the study area. The T-O-RC Project would cumulatively add to the visual impacts of the existing transmission lines and substation facilities that are near the proposed alignment, reducing the ESI in this area and impacting views from private residences.

Planned or ongoing projects which may impact scenery resources include road, utility and mine projects particularly within the western portion of the Wyoming visual analysis area. The T-O-RC Project would cumulatively add to the combined, incremental effects of individual road, utility and mine projects and increased grading and soil exposure, vegetation clearing, and manmade structures in the landscape.

3.7.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

The following provides a comparison of Alternative 3 (Proposed Action with Route Modifications) and the Proposed Action.

3.7.2.3.1 South Dakota

3.7.2.3.1.1 Direct/Indirect Effects

Route Modification 3b (Mt. Meadow), Route Modification 3c (Clinton), and Route Modification 3d (Edelweiss) would each have similar visual impacts as the Proposed Action.

Route Modification 3e (Pactola) would have fewer visual impacts than the Proposed Action. Visibility of this modification from sensitive viewpoints and corridors including private residences, recreation residences, recreation sites, the Centennial Trail and US Highway 385 would be similar and would result in similar impacts. However, because Route Modification 3e is

shorter, the overall distance of transmission line that would be viewed from sensitive viewpoints and overall mileage of high and moderate impacts would be shorter.

Rote Modification 3f (Pactola South) would have fewer impacts to private residences, recreation residences, recreation sites along the east side of Pactola Reservoir and below the dam, the Centennial Trail and US Highway 385.

Route Modification 3g (Hidden Valley) would result in greater visual impacts on BHNF lands than the Proposed Action. More extensive high visual impacts for residences located in the immediate foreground and foreground distance zones of Route Modification 3g and more extensive moderate visual impacts for travelers along SD Highway 44 would result from middleground views of this modification.

3.7.2.3.2 Wyoming

3.7.2.3.2.1 Direct/Indirect Effects

Route Modification 3a (Fiddler) and the corresponding portion of the Proposed Action would not be located on TBNG or BLM managed lands but would have similar visual impacts as the Proposed Project in this area.

3.8 RECREATION

The geographic analysis area for recreation includes the network of existing and proposed facilities, such as campgrounds, recreation residences, trails and visitor centers in the vicinity of the Proposed Action.

3.8.1 Existing Conditions

3.8.1.1 SOUTH DAKOTA

The South Dakota portion of the analysis area includes many types of recreation opportunities. Developed recreation facilities include campgrounds, boat launches, marinas, picnic areas, swim beaches, recreation residences, visitor center and trails. Recreational activities include biking, hiking, horseback riding, cross-country skiing, hunting, fishing, snowmobiling, ATV use, and boating. **Figure 3-14** depicts the location of these recreation resources.

3.8.1.1.1 Campgrounds, Boat Launches, Marinas, Swim Beaches and Picnic Areas

Campgrounds, boat launches, marinas, swim beaches and picnic areas are located at the Deerfield Reservoir Complex, Pactola Reservoir Complex, Ditch Creek Campground, and Redbank Spring Campground. The areas around Deerfield Reservoir and Pactola Reservoir are designated as Management Area 8.2-Developed Recreation Complexes in the BHNF LRMP. These areas are managed to maintain high scenic integrity. The Proposed Action is located less than one-half mile from these two areas. Mallow Camp and Beaver Creek Campground are situated approximately eight to ten miles north of the Proposed Action.

3.8.1.1.1.1 Deerfield Reservoir Complex

The Deerfield Reservoir Complex provides a variety of recreation opportunities. There are three campgrounds in the complex: Custer Trail, Dutchman and Whitetail. Recreation opportunities include camping, boating, fishing, hiking, biking, horseback riding, snowmobiling and wildlife-viewing. Deerfield Reservoir is a popular area for ice fishing and South Dakota Game, Fish and Parks staff plows one-half mile of road from Highway 17 into the Lakeshore Picnic Ground for ice fishermen to access the ice with ice shacks. **Figure 3-15** shows the recreation resources near Deerfield Reservoir.

3.8.1.1.1.2 Pactola Reservoir Complex

Pactola Reservoir is the largest and deepest reservoir in the Black Hills, featuring 14 miles of shoreline and 150-foot depths on 800 acres. The Bureau of Reclamation manages the dam and water.

The Pactola Reservoir Complex provides opportunities for visitors to bike, hike, swim and fish. Two Centennial Trail trailheads, Rapid Creek and Tamarack Gulch, serve hikers, horseback riders, and mountain bikers (USFS 2012a). Dakota Angler & Outfitter, Inc. provides guided fly-fishing trips to individuals and groups and operates under a special use permit on the BHNF. **Figure 3-16** shows the recreation resources near Pactola Reservoir.

Lake trout fishing and fly-fishing below the spillway is popular. Reservoir facilities include a full service marina, parking for cars and trailers, gasoline and oil, groceries and food service, showers, potable water, and a vault restroom. Forest facilities include campgrounds, swim beach, picnic areas, boat launches, a paved accessible trail, day use trails, and portions of both the Centennial and Deerfield trails. Campgrounds in the area include Bear Gulch and Pactola. Picnic areas include Jenny Gulch, Veterans Point, and Pactola Point Swim Beach and Picnic Ground. The National Forest visitor center on the south side of the dam is open seasonally during the summer and provides visitors with information about the building of the dam and forest management.

Visitor usage at the reservoir is heavy. In 2010, the north and south boat launches accommodated 195 people and 300 people at one time, respectively, while the visitor center accommodated 200 people at one time (USFS 2011). Fly-fishing occurs along Rapid Creek in the Pactola Basin from the stilling pond to a couple of miles downstream.

3.8.1.1.1.3 Other Campgrounds

Other campgrounds in the analysis area include Ditch Creek located approximately four miles south of the Deerfield Reservoir and Redbank Spring located just northwest of the South Castle Road-Briggs Springs Road intersection.

3.8.1.1.2 Recreation Residences

Recreation residences in and near the analysis area are concentrated adjacent to the Hisega community off Highway 44 and Pactola Reservoir. Recreation residences are privately owned

homes authorized under special use permit to occupy National Forest System lands. Permit holders are limited to occupying their homes up to 180 days a year and are not year round residences.

There are nine recreation residence lots at the Hiseaga area approximately one mile south of Highway 44 and two lots located one half mile west of Hiseaga off Log Porch Road to the north of Highway 44. Eight recreation residences are located around Pactola Reservoir.

Placerville Church Camp is authorized under an organizational camp special use permit on National Forest System Lands. This camp is used mainly in the summer months by various denominations for religious gatherings and family reunions.

3.8.1.1.3 Trails

The most prominent trails in the South Dakota portion of the analysis area include the Centennial Trail and the George S. Mickelson Trail.

3.8.1.1.3.1 Centennial Trail

The Centennial Trail extends 111 miles between Bear Butte State Park in the north and Wind Cave National Park in the south. Centennial Trail #89 is part of the National Recreation Trails program. This national recognition is reserved for an elite class of trails. Within the analysis area, the trail is accessible via nine trailheads. Backpacking, cross-country skiing and hiking are allowed along the entire length of the trail. Biking and horseback riding are allowed on most of the trail and motorized use is not permitted (USFS 2012a).

3.8.1.1.3.2 George S. Mickelson Trail

The George S. Mickelson Trail extends approximately 109 miles between Deadwood in the north and Edgemont in the south, with an additional nine miles of spur trails. The trail is aligned along the abandoned Burlington Northern Railroad line. The trail is accessible via fifteen trailheads. Biking, hiking, horseback riding, and cross-country skiing are permitted on the trail. Snowmobiling is limited to a portion of the Deadwood to Dumont section (USFS 2012a).

3.8.1.1.3.3 Other Trails

The Deerfield Trail is 18 miles in length, and connects Deerfield Lake with Rapid Creek and Pactola Reservoir. The trail offers scenery, wildlife, and historic sites including a log flume, cabins, mines, tunnels and railroad grades.

The Osprey Trail's trailhead is located on Pactola Lake's southwest side. The 2.2-mile-long Osprey Trail features two loop trails and a spur trail to an overlook. During the summer, the USFS charges visitors a day-use fee to park at the trailhead. The trail is maintained for biking and hiking, with no motorized use allowed.

The Veterans Point Trail has interpretive signs along the paved 3/4 mile trail that winds among large ponderosa pines.

3.8.1.1.4 Hunting

Visitors hunt in the BHNF for big game and small game species, including bighorn sheep, deer, elk, game birds, mountain goat, mountain lion, rabbits, and turkeys. The South Dakota Department of Game, Fish and Parks manage game species on the BHNF. The USFS designates certain areas where motorized elk retrieval is allowed.

3.8.1.1.5 ATV Use

Per the BHNF's January 1, 2012 Motor Vehicle Use Map (MVUM), vehicles 62 inches or less in width are permitted to use designated trails. In the analysis area, these trails are primarily located west of the Clinton area. The longest trail is USFS Trail 3550, which extends approximately eight miles in the former 69 kV transmission line project analysis area's ROW between South Castle Creek Road to the east and Boles Canyon Road to the west. The Proposed Action would be located within this currently vacant ROW. USFS Trail 3550, along with most of the other ATV trails in the Project analysis area, is only open for use from May 15 through December 15. The remaining ATV trails in the Project analysis area are open 365 days a year. Snowmobile traffic and trails are open during the snowmobile season, which lasts from December 15 through March 31 annually.

3.8.1.1.6 Dispersed Recreation

Dispersed recreation activities include camping, fly-fishing, ice fishing, hunting, target shooting, and wildlife viewing. Non-motorized dispersed recreation is allowed on the entire BHNF unless otherwise posted. In the analysis area, dispersed camping areas are situated west of the Clinton area. Dispersed camping is not allowed within 100 feet of lakes and within one-half mile of developed recreation sites. Motorized vehicle off-road access for dispersed camping is restricted to certain areas as depicted on the MVUM.

Visitors camp around Deerfield Lake, fish in creeks and the lake, ice fish on the lake in the winter, and hunt deer, elk, and turkey in the fall and spring (USFS 2012a). Farther west, between Redbank Spring Campground and the Wyoming state line, dispersed recreation on BHNF land is heavy during the non-snow months. Visitors camp and hunt for turkeys in the spring, camp and ride OHVs on trails during the summer, and hunt big game and ride OHVs on trails in the fall. During winter, there is snowmobile use on the trails in the Hell Canyon area.

3.8.1.2 WYOMING

The primary recreation use in the Wyoming portion of the analysis area is hunting. The Wyoming Game and Fish Department manages game species on federal, state and private lands in Wyoming. The Department and local retailers sell hunting licenses. Although there are typically few hunters in the vicinity of the Proposed Action, trophy mule deer and antelope are the primary game species that are hunted. SNS Outfitters & Guides lead hunts for mule deer and antelope on private ranches in the Cellars Loop area, located near the Wyoming (WY) Highway 116 and WY Highway 450 intersection.

The Flying V Cambria Inn and RV Park Campground is located on US Highway 85's east side north of Newcastle. The Inn includes lodging, RV campground, events center and bar and lounge. No other developed recreational facilities exist on private, state, TBNG or BLM lands in the Wyoming portion of the analysis area.

3.8.1.2.1 BLM Land

The primary recreational activity on BLM lands in the area is hunting and there are no developed recreational facilities on BLM lands in the area.

Three of the five BLM-administered parcels along the proposed powerline have legal public access for recreationists. Public access within the NFO is limited and thus these parcels have relatively high recreational value when compared to other non-accessible lands administered by the Newcastle Field Office.

The proposed powerline would cross 0.2 miles of the Stateline Special Recreation Management Area (SRMA). The Stateline SRMA Management Objective is to: "Ensure continued public use and enjoyment of recreation activities, while protecting and enhancing natural and cultural values; improving opportunities for high quality outdoor recreation; and, improving visitor services related to safety, information, interpretation, and facility development and maintenance" (USDI BLM, 2000, p. 19).

The primary recreational activity within the planning area is hunting and associated camping, hiking and OHV use. Currently there are no developed recreational facilities on BLM-administered lands within the project area.

3.8.2 Environmental Consequences

3.8.2.1 ALTERNATIVE 1 – NO ACTION

3.8.2.1.1 South Dakota

3.8.2.1.1.1 Direct/Indirect Effects

Under the No Action Alternative, the Proposed Project would not be constructed. No public use of recreation sites and private use of recreation residences would be affected. No construction workers would require lodging at analysis area hotels and campgrounds. There would be no temporary closures of campgrounds, picnic areas, hiking or snowmobile trails, and/or roads for construction activities or for emergency repairs to the proposed transmission line. There would be no adverse impacts to recreation opportunities on BHNF or private lands.

3.8.2.1.1.2 Cumulative Effects

The No Action Alternative would not add to other past, present, and reasonably foreseeable future actions in the analysis area and would not contribute to cumulative recreation effects.

3.8.2.1.2 Wyoming

3.8.2.1.2.1 Direct/Indirect Effects

Under the No Action Alternative, the Proposed Project would not be constructed. There would be no temporary closures of roads for construction activities or for emergency repairs to the proposed transmission line. There would be no impacts to hunting.

3.8.2.1.2.2 Cumulative Effects

The No Action Alternative would not add to other past, present, and reasonably foreseeable future actions in the analysis area and would not contribute to cumulative recreation effects.

3.8.2.2 ALTERNATIVE 2 – PROPOSED ACTION

3.8.2.2.1 South Dakota

3.8.2.2.1.1 Direct/Indirect Effects

During construction, the Proposed Action would create short-term impacts to the public's use of campgrounds, picnic areas, marinas, boat launches, and the Pactola visitor center, most noticeably at Deerfield Reservoir and Pactola Reservoir. Construction workers requiring lodging would stay at campsites and hotel rooms, temporarily reducing the number of campsites and hotel rooms available to recreation visitors for the duration of construction in any area. Construction may require temporary closure of USFS roads or reduce travel to one lane to access structure work areas, the construction yard/staging area, decking yards, and wire-pulling, tensioning, and splicing sites. These road closures along with construction noise, dust, and increased traffic may impact the experience of recreation visitors. Construction may also impact hunters and dispersed campers who seek locations away from developed recreation sites and those who enjoy the solitude that the BHNF offers.

Construction would also create short-term impacts to backpackers, bicyclists, equestrians, and hikers along the Centennial and Mickelson trails, as well as other trails in the area. Construction of the Proposed Action could require temporarily closing portions of these trails where crossed. During the possible trail closures, there would be a need for trail users to be provided a temporary reroute to complete an end-to-end hike of the Centennial Trail. Since construction would occur from early spring to late fall, no interruptions to snowmobiling, cross-country skiing or to the trails' snow-grooming operations are anticipated. The Proposed Action would not create long-term impacts to these trails and no structures would be placed in the Mickelson Trail's ROW. Placing structures within any trail ROW would be avoided to the greatest extent practicable.

In South Dakota, the proposed transmission line would cross ATV/OHV/snowmobile trails approximately 14 times. Both the Mickelson and Centennial Trails would be crossed once each and ATV trails would be crossed 12 times.

During construction, public use of the existing motorized trails (including USFS Trail 3550) would be prohibited in the abandoned transmission line ROW within which the Proposed Action would be located. Currently, ATV and OHV enthusiasts ride this trail which BHP maintains. At trail entrances, BHP would install and maintain lockable steel gates and carsonite signs that read “Closed to Public Access” to restrict ATV and OHV traffic within the abandoned transmission line ROW. Trail closures could prompt off-road enthusiasts to create illegal new trails on new locations and/or use newly created construction access roads. Following construction, BHP would obliterate any newly created access roads as close as possible to pre-construction conditions and public use would be prevented. .

The Proposed Action would not create new permanent access roads nor would it create new campgrounds or access to new recreational areas in the forest. After construction is complete, minor benefits to ATV and OHV traffic may include permanent widening to some existing access roads and trails. The expanded abandoned transmission line ROW would also provide a wider trail for ATV and OHV traffic, which may appeal to some trail-riders who prefer to travel at higher speeds. However, some trail-riding enthusiasts could prefer a narrower trail with short-radius turns, interesting overlooks, and a spectrum of challenging natural features that provide a more interesting experience.

Besides meeting trail riders’ expectations of trails, the USFS seeks to maintain a motorized trail system that provides a sustainable grade and water drainage that minimizes maintenance, and limits soil and water erosion. USFS personnel would identify sections of access roads that are deficient in trail design standards and BHP would reconstruct the access roads during reclamation to meet trail design standards. Sections of access roads that do not meet standards can remain, but would only be used for the T-O-RC Project’s construction, operation, and maintenance activities and would be closed to public use.

Construction of the Proposed Action could also impact snowmobile traffic on trails during the snowmobile season, which lasts from December 15 through March 31 annually. Snowmobile traffic is exempt from cross-country limitations. BHP would coordinate construction schedules with the South Dakota Department of Game, Fish and Parks to avoid or minimize impacts to snowmobile traffic and trails.

The Proposed Action would have only a minor impact on hunting opportunities. The land affected by construction represents a negligible amount of the suitable hunting grounds in the Project’s vicinity. Once construction is complete, hunting would not be affected.

In addition to the public uses above, construction could also impact the private use of recreation residences along Log Porch Road. Access to the recreation residence on Log Porch Road could be interrupted during construction of the Proposed Action where the ROW crosses Log Porch Road north of this residence.

During operation and maintenance activities, impacts to recreation facilities and recreational opportunities would be minimal. Conducting scheduled maintenance activities may temporarily affect ROW access for trail users, but these activities would only occur infrequently or during emergencies.

Indirect effects on recreation resources would also be minimal. The Proposed Action could cause crowding at Mallow Camp, Beaver Creek Campground, or other campgrounds in the vicinity if used by construction workers.

3.8.2.2.1.2 Cumulative Effects

With a slightly higher number of people in the area during the construction period, there could temporarily be a slight cumulative increase in demand for the use of the recreational resources. However, construction of the Proposed Action would not substantially alter recreation resources or visitation patterns, when added to other past, present, and reasonably foreseeable future actions.. The Proposed Action operation and maintenance activities would also cause no measurable contribution to cumulative recreation impacts.

3.8.2.2.2 Wyoming

3.8.2.2.2.1 Direct/Indirect Effects

During construction, the Proposed Action would result in minimal direct and indirect effects on hunting opportunities. However, during the fall, construction could affect more hunting opportunities in the fall than during other construction periods. Hunters and hunting guides in the Cellers Loop area would experience no impacts as construction would occur several miles to the northeast.

Maintaining the proposed transmission line could have minimal impacts on hunting opportunities during infrequent maintenance or emergency repairs.

3.8.2.2.2.1.1 BLM Land

Public access to public lands is scarce within the Newcastle Field Office. The proposed action intersects three parcels that provide legal access and opportunities for recreation that are unique within the regional context of BLM-administered parcels. The Proposed Action would result in minimal direct and indirect effects on hunting opportunities through short-term disturbance during the construction period, and no to negligible effects during project operations. Impacts to the aesthetic landscape are discussed under visual resources.

3.8.2.2.2.2 Cumulative Effects

With a slightly higher number of people in the area during the construction period, there could temporarily be a slight cumulative increase in demand for the use of the recreational resources. However, construction of the Proposed Action would not substantially alter recreation resources or visitation patterns, when added to other past, present, and reasonably foreseeable future actions. Operation and maintenance activities would also cause no measurable cumulative recreational impacts.

3.8.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

The following provides a comparison of Alternative 3 (Proposed Action with Route Modifications) and the Proposed Action.

3.8.2.3.1 South Dakota

3.8.2.3.1.1 Direct/Indirect Effects

Because they occur in the same general area, Route Modification 3b (Mountain View), Route Modification 3c (Clinton), Route Modification 3d (Edelweiss Mountain), or Route Modification 3g (Hidden Valley) would have no measurably different direct or indirect effects on recreation resources than the Proposed Action.

Route Modification 3e (Pactola) or Route Modification 3f (Pactola South) would have less impact to recreation resources the heavily-visited Pactola Reservoir's complex of campgrounds, boat launches, picnic areas, and trails than the Proposed Action. Route Modification 3f would cross the Centennial Trail in one location, and would cross one ATV trail. These modifications would result in the proposed transmission line being located farther and less noticeable from this area. Route Modification 3e could interrupt access to recreation residences on McCurdy Gulch Road during construction.

3.8.2.3.2 Wyoming

3.8.2.3.2.1 Direct/Indirect Effects

Because it is in the same general location, Route Modification 3a (Fiddler) would have no measurably different direct or indirect effects on recreation resources than the Proposed Action.

3.9 RANGE AND NOXIOUS WEEDS

3.9.1 Existing Conditions

3.9.1.1 SOUTH DAKOTA

3.9.1.1.1 Range

3.9.1.1.1.1 Capable Rangeland Area

The majority of the analysis area in South Dakota is located on the BHNF. The BHNF defines capable rangeland as lands that are accessible to livestock, produce forage or have inherent forage producing capabilities, and can be grazed on a sustained basis (USFS 2005). The entire analysis area on the BHNF is considered to be capable rangeland, except in areas such as roads, ROWs, developed areas, and other areas that do not meet the definition of capable rangeland (J. McConkey 2012). Non-developed private and state lands would be expected to be similar to BHNF lands.

3.9.1.1.1.2 Grazing Levels

Grazing levels are represented by the permitted and authorized cow/calf pairs and number of yearlings for allotments on NFS lands in the analysis area. Cow/calf pairs (c/c) generally correspond to animal unit months (AUMs), which is defined as "the amount of forage required by one mature cow of approximately 1,000 pounds and a calf up to weaning, usually six months of age, or their equivalent, for a period of one month" (NRCS 2003). The Proposed Action occurs in two BHNF ranger districts: Hell Canyon and Mystic. Hell Canyon Ranger District (RD) has 1,675 c/c and 50 yearlings, and Mystic Ranger District (RD) has 1,761 c/c within the proposed ROW.

3.9.1.1.1.3 Grazing Distribution

Under current management direction, most of the land associated with the Proposed Project on the BHNF is grazed annually by livestock. The distribution of livestock grazing within the allotments is influenced by topography, fencing, and water developments.

3.9.1.1.1.3.1 Range Improvement

There are various range improvements that are within or crossed by the analysis area, such as fences, gates, water improvements, and water developments. Hell Canyon RD has seven interior fences, 14 gates, four cattle guards, 13 stock ponds, seven reservoirs, three storage tanks, two troughs, and one spring development in the analysis area (K. Marchand 2012,; J. McConkey 2012). Mystic RD has 25 interior fences, 17 boundary fences, seven non-classified fences, 68 gates, 15 cattle guards, 20 ponds, three storage tanks, two troughs, one dugout, and 16 spring developments in the analysis area (K. Marchand 2012).

3.9.1.1.2 Invasive and Noxious Weeds

Invasive and noxious weeds (weeds) were included as an issue because ground disturbance, ROW clearing, new spur roads, access road widening, and increased vehicle activity may cause new weed populations to become established and existing populations to expand. Weeds can produce negative environmental and economic consequences, including hydrological changes (i.e., decreased water quality, sediment deposition, and erosion), impaired biological diversity, habitat degradation and loss, displacement of wildlife and plant species, reduced forage and production for domestic and wild grazing ungulates, increased fuel loading and associated fire risk, and reduced recreation quality.

Invasive weeds are those species, usually non-native, able to establish and potentially exclude or replace more desirable species. Noxious weeds are species that are legally defined for a given country, state, county, or other jurisdictional entity. This legal status provides guidance for prioritizing weed prevention and treatment efforts to those species that are considered to have the greatest negative economic and/or ecological impacts.

Table 3-39 lists the weed species relevant to the Proposed Action and whether they have been documented in the analysis area in South Dakota.

TABLE 3-39 - INVASIVE AND NOXIOUS WEEDS OF SOUTH DAKOTA

SCIENTIFIC NAME	COMMON NAME	SD NOXIOUS STATUS[1]	INVASIVE STATUS[2]	AREA(S) DOCUMENTED	
				PENNINGTON COUNTY [2,3,4]	ANALYSIS AREA[5]
Cardaria draba	Hoary cress (whitetop)	Yes	BHNF	Y	N
Carduus nutans	Musk thistle	No	BHNF	Y	Y
Centaurea diffusa	Diffuse knapweed	No	BHNF	Y	N
Centaurea maculosa (SYN=Centaurea stoebe)	Spotted knapweed	No	BHNF	Y	Y
Centaurea nigrescens	Tyrol knapweed	No	BHNF	Y	N
Centaurea repens (SYN=Acroptilon repens)	Russian knapweed	Yes	BHNF	Y	N
Chrysanthemum leucanthemum (SYN=Leucanthemum vulgare)	Ox-eye daisy	No	BHNF	Y	Y
Cirsium arvense	Canada thistle	Yes	BHNF	Y	Y
Cynoglossum officinale	Houndstongue	No	BHNF	Y	Y
Euphorbia esula	Leafy spurge	Yes	BHNF	Y	Y
Hyoscyamus niger	Black henbane	No	BHNF	Y	N
Hypericum perforatum	Common St. Johnswort	No	BHNF	Y	Y
Linaria dalmatica & Linaria genistifolia	Dalmatian toadflax	No	BHNF	Y	Y
Linaria vulgaris	Yellow toadflax	No	BHNF	Y	Y
Lythrum salicaria	Purple loosestrife	Yes	No	N	N
Polygonum sachalinense	Giant knotweed	No	BHNF	Y	N
Potentilla recta	Sulphur cinquefoil	No	BHNF	Y	N
Sonchus arvensis	Perennial sowthistle	Yes	No	Y	N
Tamarix spp.	Saltcedar	Yes	BHNF	Y	N
Tanacetum vulgare	Common tansy	No	BHNF	Y	Y
Verbascum thapsus	Common mullein	No	BHNF	Y	Y

[1]SDDA 2011, [2]USFS 2010a, [3]Rice 2012, [4]RMH 2012, [5]J. McConkey 2012.

3.9.1.2 WYOMING

3.9.1.2.1 Range

Capable Rangeland Area

Capable rangeland for TBNG is defined as areas that are accessible to livestock, and have stable soils, sufficient forage (≥200 pounds of forage per acre), available or developable natural water or developed water, and <40 percent slopes (USFS 2006). Nearly all of the analysis area on TBNG lands in Wyoming is considered to be capable rangeland.

Grazing Levels

The permitted capacity of AUMs on all grazing units occurring on NFS lands within the analysis area is 5,917 AUMs. However, this permitted capacity is calculated for all land ownerships in the analysis area, of which TBNG lands only comprise 4,061 acres or 26 percent.

Under current management direction, federal lands in the analysis area classified as capable range are annually grazed by livestock. The distribution of livestock grazing within the allotments is influenced by topography, fencing, and water developments.

On TBNG lands, range improvements on the analysis area include one well, one windmill, and many fence lines totaling 11 miles in length.

3.9.1.2.2 Invasive and Noxious Weeds

Invasive and noxious weeds (weeds) were included as an issue because ground disturbance, ROW clearing, access road widening, and increased vehicle activity may cause new weed populations to become established and existing populations to expand. Invasive weeds are those species, usually non-native, able to establish colonies and potentially exclude or replace more desirable species. Noxious weeds are species that are legally defined for a given country, state, county, or other jurisdictional entity. This legal status provides guidance for prioritizing weed prevention and treatment efforts to those species that are considered have the greatest negative economic and/or ecological impacts. **Table 3-40** lists the weed species with potential to occur on federal, state, and private lands within the analysis area in Wyoming.

TABLE 3-40 - INVASIVE AND NOXIOUS WEEDS OF WYOMING

SCIENTIFIC NAME	COMMON NAME	WY NOXIOUS STATUS[2]	INVASIVE STATUS[4,7]	DOCUMENTED IN PROJECT COUNTIES[6]
Agropyron repens (SYN=Elymus repens)	Quackgrass	Yes	TBNG, BLM	Y
Arctium minus	Common burdock	Yes	TBNG, BLM	Y
Bromus tectorum	Cheatgrass	No	TBNG, BLM	Y
Cardaria draba & Cardaria pubescens	Hoary cress (whitetop)	Yes	TBNG, BLM	Y
Carduus acanthoides	Plumeless thistle	Yes	TBNG, BLM	N
Carduus nutans	Musk thistle	Yes	TBNG, BLM	Y
Centaurea diffusa	Diffuse knapweed	Yes	TBNG, BLM	Y
Centaurea maculosa (SYN=Centaurea stoebe)	Spotted knapweed	Yes	TBNG, BLM	Y
Centaurea repens (SYN=Acroptilon repens)	Russian knapweed	Yes	TBNG, BLM	Y
Centaurea virgata ssp. squarrosa	Squarrose knapweed	No	TBNG, BLM	N
Ceratocephala testiculata	Curveseed buttercup	No	TBNG, BLM	N
Chrysanthemum leucanthemum (SYN=Leucanthemum vulgare)	Ox-eye daisy	Yes	TBNG, BLM	Y
Cirsium arvense	Canada thistle	Yes	TBNG, BLM	Y
Cirsium vulgare	Bull thistle	No	TBNG, BLM	Y
Convolvulus arvensis	Field bindweed	Yes	TBNG, BLM	Y
Cynoglossum officinale	Houndstongue	Yes	TBNG, BLM	Y
Elaeagnus angustifolia	Russian olive	Yes	TBNG, BLM	Y
Euphorbia esula	Leafy spurge	Yes	TBNG, BLM	Y
Franseria discolor (SYN=Ambrosia tomentosa)	Skeletonleaf bursage	Yes	TBNG, BLM	Y
Hyoscyamus niger	Black henbane	No	TBNG, BLM	Y
Hypericum perforatum	Common St. Johnswort	Yes	TBNG, BLM	Y
Isatis tinctoria	Dyers woad	Yes	TBNG, BLM	N
Lepidium latifolium	Perennial pepperweed	Yes	TBNG, BLM	Y

TABLE 3-40 - INVASIVE AND NOXIOUS WEEDS OF WYOMING				
SCIENTIFIC NAME	COMMON NAME	WY NOXIOUS STATUS[2]	INVASIVE STATUS[4,7]	DOCUMENTED IN PROJECT COUNTIES[6]
	(giant whitetop)			
Linaria dalmatica & Linaria genistifolia	Dalmatian toadflax	Yes	TBNG, BLM	Y
Linaria vulgaris	Yellow toadflax	Yes	TBNG, BLM	N
Lythrum salicaria	Purple loosestrife	Yes	TBNG, BLM	Y
Onopordum acanthium	Scotch thistle	Yes	TBNG, BLM	Y
Potentilla recta	Sulphur cinquefoil	No	TBNG, BLM	Y
Sonchus arvensis	Perennial sowthistle	Yes	TBNG, BLM	Y
Taeniatherum caput-medusae	Medusahead	No	TBNG, BLM	N
Tamarix spp.	Saltcedar	Yes	TBNG, BLM	Y
Tanacetum vulgare	Common tansy	Yes	TBNG, BLM	N
Tripleurospermum perforatum	Scentless chamomile	No	TBNG, BLM	N
Verbascum thapsus	Common mullein	No	TBNG, BLM	Y
[2]WWPC 2012, [4]USFS 2010b, [5]Rice 2012, [6]RMH 2012; [7] Grimes 2013				

In Wyoming, the estimated total project-related disturbance is 138 acres. Disturbance to big sagebrush (81 acres) and seeded grasslands (27 acres) account for the majority of the proposed disturbance. Overland access (61 acres) and within-ROW activities (76 acres) account for the majority of disturbance types. **Table 3-21**, presented previously, details the acres of disturbance by vegetation type and proposed activity.

3.9.2 Environmental Consequences

3.9.2.1 ALTERNATIVE 1 – NO ACTION

3.9.2.1.1 South Dakota

3.9.2.1.1.1 Direct/Indirect Effects

Under the No Action Alternative, there would be no new project-related impacts to range or range condition. There would be no new project-related impacts related to the establishment or spread of weeds. There would be no weed management of the proposed ROW and associated project disturbances, as described in the Weed, Reclamation, and Revegetation Plan.

3.9.2.1.1.2 Cumulative Effects

Under the No Action Alternative, there would be no contribution to cumulative range, invasive and noxious weeds impacts.

3.9.2.1.2 Wyoming

3.9.2.1.2.1 Direct/Indirect Effects

Under the No Action Alternative, the proposed transmission line would not be constructed and there would be no new disturbance and no impacts to range or weeds.

3.9.2.1.2.2 Cumulative Effects

Under the No Action Alternative, there would be no contributions to cumulative range, invasive and noxious weeds impacts.

3.9.2.2 ALTERNATIVE 2 – PROPOSED ACTION

3.9.2.2.1 South Dakota

3.9.2.2.1.1 Direct/Indirect Effects

3.9.2.2.1.1.1 Range

Most of the proposed ROW included in the Proposed Action is capable rangeland and approximately 12 acres would be affected. Tree removal associated with the expansion of the ROW would be expected to increase forage production. As a result, there would be positive but relatively limited effects to capable rangeland on the BHNF.

There are various range improvement structures, including fences, gates, and water developments, that would be crossed and potentially modified during construction and maintenance activities.

Range improvement structures would be avoided or repaired if impacted and gates would be closed after use. There may also be minor, negative impacts to grazing levels and livestock distribution during active construction and maintenance activities. However, grazing levels and distribution would be influenced by management of range improvement structures and would likely be effectively mitigated by project design features, as described in **Appendix B**.

3.9.2.2.1.1.2 Invasive and Noxious Weeds

Implementation of the Proposed Action has the potential to spread or establish weeds in the Project Area. The area where weeds occur within the Proposed Project footprint represent the weed species with the greatest risk of spreading. Construction activities could increase potential to establish and spread weeds. Equipment brought into the area from other areas that are infested with weed propagules (i.e., seeds, roots) can be a source of new weed infestations and the more open, unforested habitat created by development of the ROW could be more suitable for weeds. Implementation of the Weed, Reclamation, and Revegetation Plan that will be developed as part of the COM Plan during final design and the related project design criteria outlined in **Appendix B**, would be effective at controlling weeds in the Project area.

3.9.2.2.1.2 Cumulative Effects

The Proposed Action would have relatively small contributions to impacts to range resources and improvements and weed management. These small potential impacts would be mitigated through the Weed, Reclamation, and Revegetation Plan, resulting in no net change regarding cumulative effects.

3.9.2.2.2 Wyoming

3.9.2.2.2.1 Direct/Indirect Effects

There would be limited tree clearing on TBNG lands and BLM lands. Where needed, tree clearing would be expected to increase forage production for cattle and where not needed, there would be little change in forage production expected.

On TBNG lands, there are several fence lines crossed by the Proposed Project ROW that would be repaired and/or gated as necessary. Range improvement structures would be avoided or repaired if impacted.

There could be minimal impacts to grazing levels and distribution during active construction activities. However, grazing capacities would be expected to return to existing levels following reclamation. Grazing levels and distribution would also be influenced by management of range improvement structures and be reduced to negligible using project design features.

Construction activities associated with the proposed transmission line could establish and spread weeds through ground disturbance or equipment brought into the area from other areas infested with weeds. Linear disturbances have varying effects on noxious weeds. Bradley and Mustard (2006), reported varying occurrence patterns and distances of influence associated with land use (agriculture), roads, and power lines. Some studies have demonstrated relationships between various species of noxious weeds, types of disturbance, and effects on native communities (Bradley and Mustard 2006; Duniway et al. 2010; Gelbard and Belnap 2003). One study evaluated the relationship of six specific variables, including roads and power lines, on the proliferation of cheatgrass. Cheatgrass occurrence was found to be significantly associated with the distance from the nearest road and power line. Another important aspect of cheatgrass proliferation is the distance to existing occurrences of cheatgrass. Bradley and Mustard (2006) reported the probability of cheatgrass presence was higher within 700 meters (2,297 feet) of roads, and highest directly adjacent to roads. They also reported that cheatgrass was more likely to be found within 1 kilometer (km) (3,280 feet) of a power line. The strongest predictor of cheatgrass establishment is existing cheatgrass occurrence, followed by proximity to cultivated lands, power lines and roads.

A detailed Weed, Reclamation, and Revegetation Plan will be developed as part of the Construction, Operation, and Maintenance (COM) Plan in consultation with the land managing agencies during final design. This plan would incorporate the related project design criteria outlined in **Appendix B** and would be designed to be effective at controlling weeds in the Project area.

A detailed analysis of weed species by type and location will be provided as part of implementation of the project-specific Weed Management Plan. The plan will include specific measures to control the type and distribution of weed species located in the proposed project area.

3.9.2.2.2.2 Cumulative Effects

Past, present, and future cumulative actions for range and weeds for the Wyoming portion of the analysis area include dispersed recreation, livestock grazing, roads, and fences. The Proposed Action would have a negligible contribution to cumulative effects of range and weeds through implementation of the weed plan developed in consultation with the agencies, as described above. Coal, natural gas, and infrastructure development is a substantial part of the landscape in this area and the Proposed Project would be consistent with land management direction there.

3.9.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

The following provides a comparison of Alternative 3 (Proposed Action with Route Modifications) and the Proposed Action.

3.9.2.3.1 South Dakota

3.9.2.3.1.1 Direct/Indirect Effects

Route Modification 3b

There is no difference between the proposed ROW and Route Modification 3b for range resources. Route Modification 3b is slightly more infested with weeds than the proposed ROW, particularly in the western portion.

Route Modification 3c

This modification contains a water-storage pond and the proposed ROW contains no range improvement structures. There is no difference between the proposed ROW and Route Modification 3c relative to weeds between the two options.

Route Modification 3d

There is no difference between range resources and weeds occurrences within the proposed ROW and Route Modification 3d.

Route Modification 3e

This modification contains no range improvement structures and the corresponding portion of the proposed ROW is crossed by a fence two times. There is no difference in weed potential between the two options.

Route Modification 3f

There is no difference in range resources between the proposed ROW and Route Modification 3f. Areas where access roads may need to be improved for this modification have more weed species than the proposed ROW and associated roads.

Route Modification 3g

There is no difference between range resources or weeds in the proposed ROW and Route Modification 3g.

3.9.2.3.2 Wyoming

3.9.2.3.2.1 Direct/Indirect Effects

There is no data available for differences in capable range, forested land, range improvement structures or weeds between Route Modification 3a (Fiddler ()which is all on private lands and the Proposed Action, although these would be expected to be similar to Wyoming federal lands in the Proposed Action.

3.10 BOTANY

3.10.1 Existing Condition

3.10.1.1 SOUTH DAKOTA

The analysis area on NFS lands in South Dakota includes portions of the Black Hills Mountain Range. Most of the analysis area is vegetated with upland forests and woodlands that are dominated by ponderosa pine (*Pinus ponderosa*) (**Table 3-5**; **Figures 3-15** and **3-16**). Other habitats that occur in the analysis area include riparian/wetlands, grasslands, sparse vegetation (e.g., limestone outcrops), and shrublands. The terrain varies from generally steep in the eastern portion, to more flat and undulating in the western portion of the analysis area. The elevation of the Project on NFS lands in South Dakota ranges from 3,369 to 6,854 feet.

All geomorphic regions of the Black Hills are bisected by the Project. These regions are distributed concentrically and include the Central Core (ancient Precambrian granitic and metamorphic rocks), Limestone Plateau (Paleozoic Pahasapa Limestone), Minnekahta Foothills and Plains (broad and rolling foothills), Red Valley (red sandstones and siltstones), and Hogback Rim (sandstones, siltstones, and shales) (Marriott et al. 1999). The geomorphology is a strong factor in determining the vegetation and potentially associated sensitive plant species.

General descriptions of the habitats intersected by the Project are provided below. These descriptions are based on June 2012 field surveys and the Black Hills Community Inventory (Marriott and Faber-Langendoen 2000).

3.10.1.1.1 Forests and Woodlands

Forests and woodlands include dry coniferous forests and woodlands and mesic coniferous forests and woodlands. In the analysis area, there are 19,434 acres of ponderosa pine on BHNF lands and 3,082 acres on private lands. Dry coniferous forests and woodlands are dominated by ponderosa pine with bearberry (*Arctostaphylos uva-ursi*), creeping barberry (*Mahonia repens*), poverty oatgrass (*Danthonia spicata*), or little bluestem (*Schizachyrium scoparium*), and non-native species such as smooth brome (*Bromus inermis*) and/or quackgrass (*Elymus repens*). Mesic coniferous forests and woodlands are dominated by ponderosa pine and white spruce (*Picea glauca*) with twinflower (*Linnaea borealis*), common juniper (*Juniperus communis*), quaking aspen (*Populus tremuloides*), Rocky Mountain juniper (*Juniperus scopulorum*), arrowleaf balsam root (*Balsamorhiza sagittata*), chokecherry (*Prunus virginiana*), or western snowberry (*Symphoricarpos occidentalis*). White spruce, riparian and upland hardwoods are described in further detail below.

3.10.1.1.2 Grasslands

Grasslands include dry mixed-grass prairie, mesic mixed-grass prairie, as well as exotic herbaceous grasslands. In the analysis area, there are 1,894 acres of grasslands on BHNF lands and 2,247 acres on private lands. Non-native upland grasslands are the most prevalent of this category and are common in the analysis area.

Dry mixed-grass prairie is dominated little bluestem with associates such as green needlegrass (*Nassella viridula*) or non-native Canada bluegrass (*Poa compressa*). Mesic mixed-grass prairie is dominated by western wheatgrass (*Pascopyrum smithii*) with associates such as intermediate wheatgrass (*Thinopyrum intermedium*) and green needlegrass. Most upland grasslands are dominated by non-native species such as Canada bluegrass, smooth brome, timothy, Kentucky bluegrass, or intermediate wheatgrass.

There are no prairie dog grassland complexes, or mesic tall-grass prairies in the analysis area on NFS lands in South Dakota. Black Hills montane grasslands are mapped as occurring in the analysis area, and are described in further detail below.

3.10.1.1.3 Sparse Vegetation, including Non-Vegetated

Sparse vegetation is characterized by limestone cliffs or outcrops and metamorphic outcrops in dry ponderosa pine habitats. In the analysis area, there are zero acres of sparse vegetation mapped on BHNF lands and 116 acres on private lands. However, limestone cliffs or outcrops do infrequently occur in the eastern portion of the analysis area on the BHNF. No caves were documented in these habitats, but they could have been overlooked because of the steep terrain at some sites.

3.10.1.1.4 Shrublands

Upland shrublands are less common in the analysis area and are dominated by Saskatoon serviceberry (*Amelanchier alnifolia*) with chokecherry. In the analysis area, there are six acres of shrublands on BHNF lands and 566 acres on private lands.

3.10.1.1.5 Agriculture and Developed Lands

In the analysis area, there are 17 acres of agricultural lands and 998 acres of developed lands under private land ownership, as well as 78 acres of developed lands under BHNF. Developed lands include urbanized areas, strip mines, gravel pits, and other developed lands.

3.10.1.1.6 Habitats Associated with Special Status Plant Species

Dominant habitat types that have the potential to support BHNF special status plant species, include grasslands (described above), white-spruce hardwoods, and riparian/wetlands/fens. The following sections briefly describe these dominant habitat types.

3.10.1.1.6.1 White-Spruce Hardwoods

In the analysis area, there are 317 acres of white spruce on BHNF lands and zero acres on private lands. All white spruce stands in the proposed ROW are in the western portion of analysis area.

There are approximately 601 acres of hardwoods in the analysis area. Hardwoods are predominantly characterized by quaking aspen stands (Marriott and Faber-Langendoen 2000; USFS 2009; Owens 2012a). Based on notes from 2012 plant surveys, approximately 80 percent of the quaking aspen stands that occur in the analysis area are appropriately characterized as upland hardwoods.

3.10.1.1.6.2 Riparian/Wetlands/Fens

Riparian, wetland, and fen habitat in the analysis area includes Plains riparian forests and shrublands, dry riparian forests and shrublands, high elevation riparian forests and shrublands, and riparian/wet meadows. Dry riparian forests and shrublands, which are the most prevalent of this category, support riparian vegetation, but do not flow water for most of the year. They are scattered in level to steep drainages in the analysis area. Aquatic habitat occurs as narrow streams and infrequent ponds. There are no saline meadows or marshes in the analysis area.

As described above, there are eight acres of riparian hardwoods on BHNF lands and two acres on private lands. Other riparian habitats are mapped on 111 acres of private lands, but none are mapped on other land ownerships. In addition, there are 130 acres of reservoirs and impoundments in the analysis area, four acres of which are on BHNF lands. There are numerous perennial and intermittent streams, and 76 wetlands including one documented fen. In addition, there is an intermittent creek in the proposed ROW that has fen-like properties due to its hummocky and spongy substrate. Fens are waterlogged ecosystems with waters rich in mineral nutrients, vegetation rooted in wet peat (partially decomposed plant material), a winter

water table at ground-level or above, and are usually dominated by sedges (*Carex* spp.) (Lincoln et al. 1998).

Plains riparian forests and shrublands are dominated by western snowberry or boxelder (*Acer negundo*) with understory associates such as chokecherry, dames rocket (*Hesperis matronalis*), leadplant (*Amorpha canescens*), western snowberry, or goldenrod (*Solidago* spp.). Dry riparian forests and shrublands are dominated by paper birch (*Betula papyrifera*), ironwood (*Ostrya virginiana*), or quaking aspen with understory associates such as western snowberry, chokecherry, or blackberry (*Rubus* spp.). High elevation riparian forests and shrublands are dominated by Bebb willow (*Salix bebbiana*) and understory associates such as beaked sedge (*Carex utriculata*) and various other sedge species. Riparian/wet meadows are dominated by Nebraska sedge (*Carex nebrascensis*), beaked sedge, or the noxious weed species, common tansy (*Tanecetum vulgare*).

Most mesic grasslands in edge habitat adjacent to riparian/wetland/meadows are dominated by non-native species such as Kentucky bluegrass (*Poa pratensis*) or timothy (*Phleum pratense*) with associates such as orchardgrass (*Dactylis glomerata*) or smooth brome.

3.10.1.1.7 Special Status Plant Species

3.10.1.1.7.1 Federally-Listed Endangered, Threatened and Proposed Species

There are no federally-listed endangered, threatened, or proposed plant species with the potential to occur in the South Dakota analysis area (USFWS 2012c). Threatened, endangered, and proposed plant species that could potentially occur on the Black Hills National Forest were identified and addressed through informal consultation with the South Dakota and Wyoming Field Offices of USFWS during the Phase II Amendment development (USDA Forest Service 2005). Subsequently, these threatened, endangered, or proposed species do not need to be further analyzed and are not mentioned in subsequent sections. No further analysis is needed for species not known or suspected to occur in the analysis area.

3.10.1.1.7.2 BHNF Sensitive Plant Species

3.10.1.1.7.2.1 Grassland Associated Sensitive Plant Species

3.10.1.1.7.2.1.1 Iowa Moonwort (Botrychium campestre)

Habitat: Iowa moonwort is a grassland species associated with well-drained soils in non-forested habitats, and occasionally under shrubs or at the margins of these habitats. It is known to occur in sandy grassland habitats in prairies, dunes, railroad sidings, and fields over limestone. All known Black Hills Iowa moonwort occurrences occur on limestone substrate associated with varying levels of previous disturbance (USFS 2010). All BHNF occurrences are on substrates with some component of limestone and are primarily in open grasslands, usually associated with high forb diversity and sometimes a high proportion of rocky soils (USFS 2010). Little bluestem (*Schizachyrium scoparium*), a native prairie grass, and western snowberry

(*Symphoricarpos occidentalis*), a native shrub, occur at most occurrences. BHNF occurrences range in elevation from 3,870 to 5,640 feet.

Distribution, Status, and Trend: Iowa moonwort is a North American endemic that ranges from the Canadian provinces of Alberta, Manitoba, New Brunswick (historical), Ontario, and Saskatchewan to Colorado, Illinois, Iowa, Michigan, Minnesota, Montana, Nebraska, New York (historical), North Dakota, Oregon, South Dakota, Wisconsin, and Wyoming (NatureServe 2013). It is considered an uncommon species with a patchy, widespread distribution; however, due to its inconspicuous nature it is probably more common across its range than is apparent.

Currently known occurrences are found on the Bearlodge, Hell Canyon, and Mystic Ranger Districts (USFS 2010). There are eleven known occurrences of Iowa moonwort on the BHNF with additional occurrences from private lands adjacent to National Forest and Wind Cave National Park (USFS 2010).

Rangewide, it is believed to be declining because many historical records have not been relocated in areas that were historically plowed, but the short-term trend appears to be stable (NatureServe 2013). In the Black Hills, the number of individual plants at the known occurrences range between one and over 1,000 though the number of individual plants fluctuates from year to year (USFS 2012). The number of individuals necessary for a sustained population is unknown.

According to the 2009 monitoring report (USFS 2010), the known populations of Iowa moonwort are stable with two new occurrences having monitoring data collected in 2009. In 2009, no evidence of weed treatment adversely affecting populations was noted.

Iowa moonwort is currently assigned a rank of S1, critically imperiled, in Wyoming (WYNDD 2012), and S2S3, imperiled/vulnerable, in South Dakota (SDNHP 2009), and has a global rank of G3G4, vulnerable/apparently secure (NatureServe 2013).

Project Review: Since specific habitat relationships for this species are poorly understood, a conservative approach dictates the assumption that suitable habitat may occur in the analysis area. There are no known populations in the analysis area, but there are populations within the Hell Canyon and Mystic Ranger Districts, which are intersected by the analysis area. This species was not located during plant surveys of potentially suitable habitats in the impact area; however, it is possible the species is present but undetected during surveys.

3.10.1.1.7.2.1.2 Slender Moonwort (Botrychium lineare)

Habitat: Slender moonwort is associated with a wide variety of ecological conditions making it difficult to describe suitable habitat. Generally, it is found in areas of open canopy over calcareous soils with a history of disturbance. Most populations in the western U.S. occur primarily on limestone substrates in a variety of habitats including heavily forested sites, meadows, fen-like seeps, and gravelly roadsides. All BHNF slender moonwort populations occur on limestone substrate in open to partially shaded areas, in habitats dominated by native plant species, and at elevations of 4,200 to 6,120 feet (USFS 2010).

Distribution, Status, and Trend: Slender moonwort is a North American endemic that ranges from the Canadian provinces of Alberta, British Columbia, New Brunswick (historical), Quebec (historical), and Yukon Territory to Alaska, California, Colorado, Idaho (historical), Minnesota, Montana, possibly Nevada, Oregon, South Dakota, Utah, Washington, and Wyoming (NatureServe 2013). It is considered an uncommon species with a patchy distribution; however, due to its inconspicuous nature it is probably more widespread and abundant across its range than is apparent.

Currently known occurrences are found on the Bearlodge, Hell Canyon, and Mystic Ranger Districts (USFS 2010). There are seven known occurrences of slender moonwort on the Black Hills National Forest with two of the occurrences discovered in 2008 (USFS 2010).

According to the 2009 monitoring report (USFS 2010), existing populations are stable with two new sites having monitoring data collected in 2009. No invasive plant populations were noted in the occurrence areas though existing weed patches are still present.

Rangewide, it is believed to be declining because many historical records have not been relocated, but the short-term trend appears to be stable (NatureServe 2013). In the Black Hills, the number of individual plants at each occurrence ranges between one and over 1,000 (USFS 2012) though the number of individual plants fluctuates from year to year. The number of individuals necessary for a sustained population is unknown at this time.

Slender moonwort is currently ranked S1, critically imperiled, in both Wyoming and South Dakota (SDNHP 2009; WYNDD 2012), and has a global rank of G2, imperiled (NatureServe 2013).

It was listed as a USFWS Candidate species until 2007 when it was officially removed from the candidate species list by the USFWS (USFWS 2007d).

Project Review: Since specific habitat relationships for this species are poorly understood, a conservative approach dictates the assumption that suitable habitat may occur in the analysis area. There are no populations in the analysis area, but there are populations within the Hell Canyon and Mystic Ranger Districts, which are intersected by the analysis area. This species was not located during plant surveys of potentially suitable habitats in the impact area; however, it is possible the species is present but undetected during surveys.

3.10.1.1.7.2.2 White Spruce/Hardwood Associated Sensitive Plant Species

3.10.1.1.7.2.2.1 Lesser Yellow Lady's Slipper (Cypripedium parviflorum)

Habitat: Rangewide, lesser yellow lady's slipper is generally found in shady deciduous and mixed woodlands; relatively open oak, ash (*Fraxinus*), and hazelnut woodland; or shrublands, swamps, bogs, and spruce and pine forests, from sea level to 9,700 feet (Mergen 2006). Plants are usually found on soils that have developed over a calcareous substrate (Mergen 2006). Habitat in the Black Hills includes stream banks under both white spruce and deciduous trees, moist cliffs (usually north-facing), and moist areas/seeps under white spruce or mixed conifer forest, at elevations of 3,500 to 6,500 feet (USFS 2010).

Distribution, Status, and Trend: Yellow lady's slipper ranges from most provinces in Canada south into nearly every state in the United States, and is known to occur in all states within Region 2 (USFS 2012; NatureServe 2013). However, lesser yellow lady's slipper is primarily circumboreal in distribution, and from Canada its main areas of distribution are the Rocky Mountains, Great Lakes region, Midwest, and Appalachians (FNA 1993+).

There are approximately 4,000 individuals known to over 50 occurrences of lesser yellow lady's slipper on the Bearlodge, Mystic, and Northern Hills Ranger Districts in the Black Hills (USFS 2010). The number of individual plants at the known occurrences range between one and over 500 (USFS 2012). The number of individuals necessary for a sustained population is unknown at this time. Population viability analysis conducted on a similar species, *Cypripedium calceolus*, found that populations composed of over 50 individuals had a greater chance of survival than those with less than 50 individuals (Nicole et al. 2005).

There are two historical occurrences of lesser yellow lady's slipper with imprecise location data with an uncertainty buffer that includes the analysis area, but was probably really located several miles south of the analysis area (SDNHP 2012). The 1891 occurrence was noted as occurring in Rapid City, and has probably since been extirpated. The 1909 occurrence was noted as occurring on the BHNF, at Spring Creek Flume in Rockerville, SD. This location description would probably put this occurrence over five miles south of the analysis area.

According to the 2009 monitoring report (USFS 2010), populations of lesser yellow lady's slipper appear to be stable; however, OHV damage to suitable habitat was documented at two sites.

Lesser yellow lady's slipper is currently ranked as S2, imperiled, in Wyoming (WYNDD 2012) and S3, vulnerable, in South Dakota (SDNHP 2009). The global rank is G5, secure (NatureServe 2013).

Project Review: Although there are a few areas of stream banks with white spruce and deciduous trees and moist areas/seeps under white spruce or mixed conifer forest (elements of suitable habitat) in the analysis area, this species was not located during surveys of potentially suitable habitat. There are no extant populations in the analysis area, although they are located in the Mystic Ranger District, which is intersected by the analysis area. The analysis area contains some areas of suitable habitat; therefore lesser yellow lady's slipper is included in the effects analysis.

3.10.1.1.7.2.2.2 Groundcedar (Lycopodium complenatum)

Habitat: Rangewide, groundcedar is restricted to moist microhabitats within boreal plant communities in ravines, steep drainages, and on moist streamside benches. In the Black Hills, groundcedar is restricted to shaded, north-facing, white spruce dominated slopes often with paper birch or quaking aspen from 4,960 to 6,340 feet.

Distribution, Status, and Trend: Groundcedar is circumboreal and common across northern latitudes but is disjunct or sparse at the southern limits of the species' distribution, such as in the

Black Hills. In the Black Hills, groundcedar is disjunct from the nearest occurrences in the Rocky Mountains.

Currently known occurrences are found on the Bearlodge and Northern Hills Ranger Districts (USFS 2010). There are ten known occurrences of groundcedar on the BHNF and four additional occurrences found on private lands adjacent to National Forest (USFS 2012).

Based on the 2009 monitoring report (USFS 2010), known groundcedar occurrences appear stable but may be receiving more competition from adjacent vegetation. One occurrence was recently extirpated by livestock trailing and spruce downfall.

There is no information available on global population trend (NatureServe 2013). The number of individual plants at the known occurrences is unknown due to the rhizomatous nature of the species (USFS 2012). The number of individuals necessary for a sustained population is unknown at this time.

Groundcedar is currently ranked as S1, critically imperiled, in South Dakota and Wyoming (SDNHP 2009; WYNDD 2012), and has a global rank of G5, secure (NatureServe 2013).

Project Review: This species was not located in any surveys of potentially suitable plant habitats in the impact area; however, it is possible that the species is present but undetected during surveys. It is unlikely that groundcedar would be found because of the 316 acres of white spruce in the analysis area, only 20 acres of white spruce dominated slopes are also in the impact area, and these are homogenous stands that are not mixed with hardwood species. There are no populations in the analysis area, or within the Hell Canyon and Mystic Ranger Districts, which are intersected by the analysis area. However, because potentially suitable habitat is present, groundcedar is included in the effects analysis.

3.10.1.1.7.2.2.3 Large Roundleaf Orchid (Platanthera orbiculata)

Habitat: Rangewide, large roundleaf orchid occurs in mesic to wet coniferous and deciduous forests, particularly fen forests (FNA 1993+). This species is associated with a dense to partially open canopy with filtered light, dense understory vegetation, and damp, humid soil with a thick litter layer. High soil moisture appears to be a key component of its habitat (USFS 2012). Black Hills occurrences are found at elevations of 4,350 to 6,150 feet, primarily on shady, north-facing slopes in paper birch/hardwood or white spruce forests on moist, rich, humus soils. In the Black Hills, the species is primarily limited by the small extent of cool, moist boreal habitat (USFS 2010).

Distribution, Status, and Trend: Large roundleaf orchids are found in boreal regions of North America including Canada, the Appalachians, Great Lakes region, Black Hills, and westward to the Pacific Northwest (USFS 2010; NatureServe 2013). Currently known occurrences are found on the Bear Lodge, Northern Hills, and Hell Canyon Ranger Districts (USFS 2010).

There are over 30 occurrences of large roundleaf orchid on the BHNF in three geographically separated regions of the Forest (Bearlodge Mountains, northwestern Black Hills, and Black Elk Wilderness) (USFS 2010). There is no information available on global population trend

(NatureServe 2013). The number of individual plants at the known occurrences range between one and over 100 (USFS 2012). The number of individuals necessary for a sustained population is unknown at this time.

According to the 2009 monitoring report (USFS 2010), seven of the ten sites monitored appeared healthy although all occurrences had reports of insect damage. No disturbance from livestock, recreation or OHV use was noted.

Large roundleaf orchid is currently ranked as S1, critically imperiled, in Wyoming (WYNDD 2012), and S3, vulnerable, in South Dakota (SDNHP 2009), and has a global rank of G5, secure (NatureServe 2013).

Project Review: This species was not located during plant surveys of potentially suitable habitats in the impact area; however, it is possible that the species is present but undetected during surveys. There are no populations in the analysis area, but there are populations within the Hell Canyon Ranger District, which is intersected by the analysis area. The analysis area contains paper birch/hardwood and white spruce, but these habitats do not mix and it is unlikely that moisture conditions in these areas would support large roundleaf orchid. However, because potentially suitable habitat exists within the analysis area, large roundleaf orchid is included in the effects analysis.

3.10.1.1.7.2.2.4 Bloodroot (Sanguinaria canadensis)

Habitat: Rangewide, bloodroot occurs in moist to dry woods and thickets, often on floodplains and shores or near streams on slopes, less frequently in clearings and meadows or on dunes, and rarely in disturbed sites (FNA 1993+). In BHNF, bloodroot occupies floodplains, forested terraces, drainage bottoms, and north-facing foot slopes in open, rich hardwood plant communities, at elevations of 3,940 to 5,000 feet (USFS 2010). It is most frequently found in paper birch/ironwood, ironwood/bur oak, and quaking aspen/beaked hazelnut community types (USFS 2012).

Distribution, Status, and Trend: Bloodroot is widespread in mesic hardwood forests across the eastern US and southeastern Canada, from Nova Scotia to Florida and westward to Manitoba and south to Texas (USFS 2010). It is believed to be declining locally through much of its range due to both habitat conversion and collection from wild populations (NatureServe 2013).

There are 22 known occurrences of bloodroot on the BHNF, all limited to the Northern Hills Ranger District (USFS 2010). Populations range from a few individuals to several thousand stems (USFS 2012). The number of individual plants at the known occurrences range from ten to over 1,000 stems (USFS 2010). The number of individuals necessary for a sustained population is unknown at this time.

The 2009 monitoring report (USFS 2010) indicates that habitat degradation and human caused disturbance is a threat to known Black Hills populations. Powerline maintenance, trash dumps, OHV trails, canopy loss, livestock trails, hiking trails, rodents, beavers, slash and weeds were documented as disturbances at known sites.

Bloodroot is ranked S4, apparently secure, in South Dakota (SDNHP 2009) and is not known to Wyoming (WYNDD 2012; NatureServe 2013). The global ranking is G5, secure (NatureServe 2013).

Project Review: This species was not located during plant surveys of potentially suitable habitats in the impact area; however, it is possible the species is present but undetected during surveys. There are no populations in the analysis area, or in the Ranger Districts intersected by the analysis area. The analysis area contains rich hardwood communities; therefore bloodroot is included in the effects analysis.

3.10.1.1.7.2.2.5 American Cranberry Bush (Viburnum opulus var. americanum)

Habitat: Rangewide, American cranberry bush occurs primarily on well-drained soils in sunlit, non-forested habitats at low elevations, although it may grow under shrubs in or at the margins of these habitats (NatureServe 2013). In the Black Hills, American cranberry bush is found at elevations of 3,800 to 5,700 feet, in wet, shaded habitats along streams, springs, and canyon bottoms and lower slopes. Known occurrences are nearly always associated with paper birch with ironwood or hazelnut. Other associates sometimes also include white spruce and quaking aspen, and infrequently, ponderosa pine/bur oak (USFS 2010).

Distribution, Status, and Trend: American cranberry bush is widely distributed across north central North America in the Great Plains, Great Lakes region, Pacific Northwest, most of central Canada, and is historically known to the Northeast U.S. (NatureServe 2013). There is no information available on global population trend (NatureServe 2013).

There are more than 30 known occurrences of American cranberry bush on the BHNF, all in the Bearlodge and Northern Hills Ranger Districts (USFS 2010). The number of individual plants at the known occurrences range between one and over 100 (USFS 2012). The minimum number of individuals necessary for a sustained population is unknown at this time (Nellessen 2006).

The 2009 monitoring report (USFS 2010) notes that four of the five populations appear healthy despite insect damage and herbivory. The fifth site was reported to have been severely impacted by insect damage.

American cranberry bush is currently ranked as S2, imperiled, in Wyoming (WYNDD 2012) and unranked in South Dakota (NatureServe 2013). The global and trinomial (variety) rank is G5T5, secure (NatureServe 2013).

Project Review: This species was not located during plant surveys of potentially suitable habitats in the impact area; however, it is possible the species is present but undetected during surveys. There are no populations in the analysis area, or in the Ranger Districts intersected by the analysis area. The analysis area contains several areas of wet, shaded streams, springs, and canyon bottoms associated with mixed hardwood stands; therefore American cranberry bush is included in the effects analysis.

3.10.1.1.7.2.3 Wetland/Riparian/Aquatic Associated Sensitive Species

3.10.1.1.7.2.3.1 Foxtail Sedge (Carex alopecoidea)

Habitat: Rangewide, foxtail sedge occurs on seasonally saturated soils in wet meadows, openings in alluvial woods, stream banks, particularly on calcareous substrates (FNA 1993+). In the BHNF, foxtail sedge is usually found in the transition between saturated and mesic soils along open, perennial streams, often near historic beaver dams or ponds, at elevation of 3,840 to 5,900 feet. Occurrences have also been documented in riparian corridors dominated by white spruce and in drainages with dense shrub cover (USFS 2010).

Distribution, Status, and Trend: Foxtail sedge is widely distributed from eastern to central Canada, northeastern United States, Great Lakes region south to Tennessee, and west to Wyoming (USFS 2012; NatureServe 2013). There is no information available on global population trend (NatureServe 2013).

In the Black Hills, foxtail sedge was discovered in 2000, and is currently known from two general areas, the Cement Ridge area along the South Dakota–Wyoming border, and in the Bear Lodge Mountains in Wyoming (USFS 2010, 2012).

There are over 30 occurrences of foxtail sedge known to the BHNF between the Bear Lodge and Northern Hills Ranger Districts (USFS 2010). The number of individual plants at the known occurrences range between one and over 500 with the number of individual plants remaining fairly constant from year to year (USFS 2012). The number of individuals necessary for a sustained population is unknown at this time.

According to the 2009 monitoring report (USFS 2010), populations of foxtail sedge appear to be stable, however direct effects from livestock are a threat at four sites.

Foxtail sedge is currently ranked as S2S3, imperiled/vulnerable, in South Dakota (SDNHP 2009) and S2, imperiled, in Wyoming (WYNDD 2012). The global rank is G5, secure (NatureServe 2013).

Project Review: Although there are perennial stream crossings with saturated to mesic soils (elements of suitable habitat) in the analysis area, this species was not located during surveys of potentially suitable habitat. There are no populations in the analysis area, or in the Ranger Districts intersected by the analysis area. However, because known habitat types occur within the analysis area, foxtail sedge is included in the effects analysis.

3.10.1.1.7.2.3.2 Sageleaf Willow (Salix candida)

Habitat: Rangewide, sageleaf willow generally occurs on floodplains, marl bogs, fens, and meadows, calcareous substrates, at elevations from sea level to 9,200 feet (FNA 1993+). In the Black Hills, sageleaf willow is known to a single occurrence in a fen at 6,000 feet. The local habitat is described as cold seep or spring-fed saturated substrates produced by unusual hydrologic conditions where sedimentary layers of the Limestone Plateau intersect impermeable schist of the crystalline Central Core (USFS 2010).

Distribution, Status, and Trend: Sageleaf willow is found throughout Canada, the northern continental United States, and Alaska (USFS 2010; NatureServe 2013). It is considered secure throughout its range, but locally rare in Region 2 and the Black Hills (USFS 2010). The McIntosh Fen Botanical Area, in the Mystic Ranger District west of Deerfield, is the only known site of sageleaf willow in the Black Hills.

According to the 2009 monitoring report (USFS 2010), McIntosh Fen is stable, neither expanding nor contracting. In 2009, there was no evidence of livestock grazing or weed treatment adversely affecting sageleaf willow. However, evidence of impact from willow borer was present.

Sageleaf willow is currently ranked as S1, critically imperiled, in South Dakota (SDNHP 2009) and S2, imperiled, in Wyoming (WYNDD 2012). The global rank is G5, secure (NatureServe 2013).

Project Review: The analysis area contains one confirmed fen (elements of suitable habitat) that is not in or adjacent to the impact area. There is also one unconfirmed fen area along Prairie Creek that is in both the analysis area and impact area; however sageleaf willow was not located despite surveys conducted in this potentially suitable habitat. It is possible, but unlikely that the species is present but undetected during surveys; therefore sageleaf willow is included in the effects analysis.

3.10.1.1.7.2.3.3 Autumn Willow (Salix serissima)

Habitat: Rangewide, autumn willow is found in wet thickets, fens, brackish marshy strands, marly lakeshores, treed bogs, gravelly stream banks, and lakeshores, at elevations from sea level to 9,800 feet (FNA 1993+). In the Black Hills, autumn willow has similar habitat requirements as sageleaf willow, and is found in calcareous, rich fens with a high mineral content, along stream banks near fens, and in wet meadows with high concentrations of calcium and minerals, at elevations of 5,620 to 6,000 feet (USFS 2010).

Distribution, Status, and Trend: Autumn willow is found in Canada and the northern continental United States, from Colorado, Wyoming, and Montana, eastward to the Great Plains, Great Lakes, and Northeast states (USFS 2010; NatureServe 2013). There is no information available on regional population trend, as monitoring has largely not been conducted (Decker 2006b). There are four known sites of autumn willow on the Mystic and Northern Hills Ranger in the BHNF (USFS 2010, 2012). Autumn willow is known to occur in McIntosh Fen, Middle Fork of Boxelder Creek, and Nahant and Silver Creeks (USFS 2010).

According to the 2009 monitoring report (USFS 2010), the populations at known locations appear stable, neither expanding nor contracting. owever, evidence of impact from willow borer and a defoliating fungal infection are present. The number of individual plants at the known occurrences range from one to over 500 (USFS 2010) with most populations being on the lower end. Population viability analyses have not been done for autumn willow, therefore the minimum number of individuals necessary for a sustained population is unknown at this time.

Autumn willow is currently ranked as S1, critically imperiled, in both Wyoming and South Dakota (SDNHP 2009; WYNDD 2012). The global rank is G4, apparently secure (NatureServe 2013).

Project Review: The analysis area contains one confirmed fen (elements of suitable habitat) that is not in or adjacent to the impact area. There is also one unconfirmed fen area along Prairie Creek that is in both the analysis area and impact area; however autumn willow was not located despite surveys conducted in this potentially suitable habitat. It is possible, but unlikely that the species is present but undetected during surveys; therefore autumn willow is included in the effects analysis.

3.10.1.1.7.2.3.4 Narrowleaf Sphagnum (Sphagnum angustifolium)

Habitat: Rangewide, narrowleaf sphagnum is found in a wide range of habitats at low to high elevations, including fens, mires, bogs, growing as floating mats, or on low hummocks and hummock sides (FNA 1993+). Within Region 2, narrowleaf sphagnum is found in oligotrophic iron fens and poor fens characterized by low pH (USFS 2010). It can occur in relatively dry to moderately wet areas within the fen, or as an understory species or in the open (USFS 2010). In the Black Hills, it is only known to a single occurrence in the Rochford Cemetery Fen, at 5,500 feet (USFS 2010).

Distribution, Status, and Trend: Narrowleaf sphagnum is widely distributed across Europe, Canada, and south to the United States as far south as California, Colorado, Missouri, and South Carolina (USFS 2010; FNA 1993+). The single occurrence of narrowleaf sphagnum in the Black Hills is on the Mystic Ranger District (USFS 2010).

According to the 2009 monitoring report (USFS 2010), Canada thistle (*Cirsium arvense*) was observed in the vicinity of the site, but did not co-occur with the sphagnum moss.

Narrowleaf sphagnum is currently ranked as S1, critically imperiled, in both Wyoming and South Dakota, and the global rank is G5, secure (NatureServe 2013).

Project Review: The analysis area contains one confirmed fen (elements of suitable habitat) that is not in or adjacent to the impact area. There is also one unconfirmed fen area along Prairie Creek that is in both the analysis area and impact area; however narrowleaf sphagnum was not located despite conducting surveys in this potentially suitable habitat. It is possible, but unlikely that the species is present but undetected during surveys; therefore narrowleaf sphagnum is included in the effects analysis.

3.10.1.1.7.2.3.5 Slender Moonwort (Botrychium lineare)

See existing conditions for this species under Grassland Associated Species above.

3.10.1.1.7.3 BHNF Plant Species of Local Concern

A Species of Local Concern is described in the Forest Service Manual as plant, fish or wildlife species (including subspecies or varieties) that do not meet the criteria for sensitive status.

These could include species with declining trends in only a portion of Region 2, or those that are important components of diversity in a local area. The local area is defined as NFS lands within the Black Hills National Forest. The most recent list of Species of Local Concern (SOLC) issued by the Black Hills National Forest Deputy Supervisor took effect August 23, 2011.

Downy gentian (*Gentiana puberulenta*) is the only BHNF Plant SOLC known to the analysis area (see **Table 3-41**). No SOLC, including downy gentian, have been documented in the analysis area based on prior surveys by BHNF since 2005 and evaluation of BHNF and SDNHP sensitive plant location data (Owens 2012a, personal communication; Scott 2012, personal communication; SDNHP 2012). In addition, no SOLC were discovered in the impact area during the field surveys of suitable habitat which took place on June 19-26 and 29, and August 14-18, 2012.

Habitat for nine SOLC, including downy gentian, does occur in the analysis area (see **Table 3-41**). In general, these habitats are also characterized by wetlands, riparian areas, native prairie, shady ravines, and moist, rich woods.

No further analysis is needed for species that are not known nor suspected to occur in the analysis area, and for which no suitable habitat is present.

TABLE 3-41 - SPECIES OF LOCAL CONCERN WITH POTENTIAL HABITAT

Scientific Name	Common Name	Known to occur in Analysis Area	Suitable habitat in Analysis Area
Adiantum capillus-veneris	Common maidenhair fern	N	N
Botrychium multifidum	Leathery grapefern	N	Y
Carex bella	Southwestern showy sedge	N	N
Eleocharis rostellata	Beaked spikerush	N	N
Gentiana puberulenta	Downy gentian	Y	Y
Listera convallarioides	Broadlipped twayblade	N	Y
Lycopodium annotinum	Stiff clubmoss	N	Y
Mitella pentandra	Fivestamen miterwort	N	Y
Oxyria digyna	Alpine mountainsorrel	N	N
Petasites frigidus var. sagittatus	Arrowleaf sweet coltsfoot	N	Y
Pinus flexilis	Limber pine	N	N
Polystichum lonchitis	Northern hollyfern	N	Y
Salix lasiandra var. caudata	Shining willow	N	Y
Salix lucida	Shining willow	N	Y

3.10.1.1.7.4 BHNF Target Plant Species

The BHNF manages a list of 243 target plant species that are based on sensitive plant lists for the Wyoming Natural Diversity Database (WYNDD), South Dakota Natural Heritage Program (SDNHP), and adjacent land ownership (Owens 2012b, personal communication). This list is used for screening the potential for each species to be added as a BHNF SOLC. There are 27 BHNF target plant species documented in the analysis area, including six species having only

historical records. There are 13 BHNF target plant species located in the analysis area, including three species that are based on prior Forest Service records and ten species that were discovered during 2012 surveys (see **Table 3-42**). No target species with accurate location information are documented by the SDNHP in the analysis area (SDNHP 2012).

TABLE 3-42 - BHNF TARGET PLANT SPECIES THAT OCCUR ON SOUTH DAKOTA LANDS IN THE ANALYSIS AREA

SPECIES NAME[1]	BLOOM[2,3,4]	HABITAT[2,3]	SPECIES IN PROJECT FOOTPRINT (Y/N)[5,6,7]	SPECIES IN ANALYSIS AREA (Y/N)[5,6,7]
Smallflower columbine *Aquilegia brevistyla*	May to June	Wooded hillsides at higher altitudes of the Black Hills.	Y	Y
Frenchman's bluff moonwort *Botrychium gallicomontanum*	Mid-spring to summer	Limestone grasslands of the Black Hills.	Y	Y
Least grapefern *Botrychium simplex*	June to August	Meadows; rich wooded valleys below timberline in the Black Hills.	Y	Y
Fairy slipper orchid *Calypso bulbosa*	June to July	Rich hills of higher Black Hills.	N	Y
Hair sedge *Carex capillaris*	July to August	Moist, rocky woods along streams in Black Hills.	N	Y
Delicate sedge *Carex leptalea*	June to July	Rich woods, forested wetlands of higher Black Hills.	Y	Y
Richardson's sedge *Carex richardsonii*	June to July	Dry woods of the Black Hills.	N	Y
Rosy sedge *Carex rosea*	June to July	Rich woods.	Y	Y
Pale coral-root *Corallorhiza trifida*	June to July	Rich woods, cool, moist forests at higher elevations of the Black Hills.	N	Y
Tufted hairgrass *Deschampsia cespitosa*	July to August	Moist, wet meadows at higher altitudes of the Black Hills.	Y	Y
Buff fleabane *Erigeron ochroleucus*	June to August	Open places in woods; from Black Hills hogback ridge.	N	Y-historical
Northern gentian *Gentiana affinis*	July to August	Moist, montane meadows of Black Hills.	N	Y
Yellow hawkweed *Hieracium fendleri*	Late June to mid-August	Woods and slopes.	Y	Y
Great Plains bladderpod *Lesquerella arenosa var. argillosa*	May to June	Badlands.	N	Y-historical
Long-leaved lousewort *Pedicularis procera*	July to August	Shaded hillsides of the Black Hills; localized near Deerfield in mixed forest and clearings.	Y	Y
Purple cliffbrake *Pellaea atropurpurea*	July to August	Rock crevices in lower altitudes of the Black Hills.	Y	Y
Gastony's cliffbrake *Pellaea gastonyi*	Mid-June to mid-October	Usually sedimentary rock crevices.	N	Y
Smooth cliffbrake *Pellaea suksdorfiana*	Early June to mid-October	Usually sedimentary rock crevices.	N	Y
Threadleaf phacelia *Phacelia linearis*	April to June	Plains, hills, sandy soils near the Black Hills.	N	Y-historical
Alpine timothy *Phleum alpinum*	June to July	Meadows at higher altitudes of the central and northern Black Hills.	Y	Y

TABLE 3-42 - BHNF TARGET PLANT SPECIES THAT OCCUR ON SOUTH DAKOTA LANDS IN THE ANALYSIS AREA

SPECIES NAME[1]	BLOOM[2,3,4]	HABITAT[2,3]	SPECIES IN PROJECT FOOTPRINT (Y/N)[5,6,7]	SPECIES IN ANALYSIS AREA (Y/N)[5,6,7]
Purple rattlesnakeroot *Prenanthes racemosa* var. *multiflora*	August to September	Moist soil.	Y	Y
One-flower wintergreen *Pyrola uniflora*	June to July	Mature spruce forests, deep canyons of the north Black Hills.	N	Y
Nodding saxifrage *Saxifraga cernua*	June to July	Moist rock crevices at higher elevations of Black Hills.	N	Y-historical
Three-nerved goldenrod *Solidago sparsiflora*	August to September	Dry or rocky soil of the Black Hills.	N	Y-historical
European bur-reed *Sparganium emersum*	June to July	Shallow ponds of the Black Hills.	Y	Y
Easter daisy *Townsendia exscapa*	April to May	Plains and hills; dry soil of the south and southwest SD.	N	Y-historical
Squashberry *Viburnum edule*	June to July	Rich, wooded ravines.	Y	Y

Note: Project footprint includes proposed ROW, access roads that may need improved, new spur roads, and other associated disturbance impacts.

Sources: [1]USFS 2011c, [2]USFS 2011b, [3]Van Bruggen 1985, [4]RMH 2012, [5]Owens 2012a, [6]Scott 2012, [7]SDNHP 2012. Notes: Species that are historical are based on pre-1970 data, which have low precision location data (at least 2.5 to 13.5 mile diameter). These historical species may or may not have been documented in the analysis area and have been withheld from the Project Footprint because of the low location accuracy.

The three BHNF target plant species in the analysis area that are based on Forest Service records include smallflower columbine (*Aquilegia brevistyla*), Frenchman's Bluff moonwort (*Botrychium gallicomontanum*), and least grapefern (*Botrychium simplex*) (Owens 2012a, Scott 2012). The ten BHNF target plant species were discovered in the analysis area during the field surveys of suitable habitat that took place on June 19-26 and 29, and August 14-18, 2012. These include bristly stalked sedge (*Carex leptalea*), rosy sedge (*Carex rosea*), tufted hairgrass (*Deschampsia cespitosa*), yellow hawkweed (*Hieracium fendleri*), long-leaved lousewort (*Pedicularis procera*), purple cliffbrake (*Pellaea atropurpurea*), alpine timothy (*Phleum alpinum*), purple rattlesnake root (*Prenanthes racemosa* var. *multiflora*), European bur-reed (*Sparganium emersum*), and squashberry (*Viburnum edule*).

3.10.1.1.8 Rare Plant Communities

3.10.1.1.8.1 Montane Grasslands

Based on BHNF GIS data, there are 650 acres of montane grasslands in the analysis area (**Table 3-42**). However, much of this occurs on private lands or on habitats classified as bluegrass, oatgrass, ponderosa pine, or white spruce by the BHNF. For this analysis, montane grassland includes grassland areas classified as grasslands or was not classified and there are 17 acres of montane grasslands on BHNF lands and 306 acres on private lands.

Montane grasslands are dominated by needle and thread or Canada bluegrass with associates such as smooth brome, and showed sign of active livestock grazing. High quality montane

grassland habitat is characterized by prairie dropseed (*Sporobolus heterolepis*), Richardson's needlegrass (*Achnatherum richardsonii*), and timber oatgrass (*Danthonia intermedia*) (Marriott and Faber-Langendoen 2000), which were not observed at the montane grassland habitat during 2012 field surveys.

3.10.1.1.8.2 Special Management Areas

There are no special botanical management areas known within the South Dakota analysis area.

3.10.1.2 WYOMING

3.10.1.2.1 Cover Types

Shrublands and grasslands are the most common land cover types within the analysis area in Wyoming. Agricultural, developed, exotic herbaceous, hardwoods, non-vegetated and sparsely vegetated, and riparian land cover types are also present (**Table 3-43**). The terrain varies from level plains to barrens, buttes, mesas, and erosion pavement. Elevation of the analysis area in Wyoming ranges from 4,042 to 6,322 feet.

TABLE 3-43 - LAND COVER TYPES OF THE WYOMING ANALYSIS AREA (ACRES)

LAND COVER TYPE	BLM	TBNG	PRIVATE	STATE	TOTAL
Agricultural	<1	1	6,124	411	6,537
Conifer Woodlands	319	14	4,073	1,669	6,074
Developed	8	0	407	40	455
Grassland/ Exotic Herbaceous	795	1,811	21,155	2,490	26,252
Hardwood	1	0	4	2	7
Non-Vegetated/Sparsely Vegetated	34	146	1,039	113	1332
Riparian	15	6	378	101	500
Shrubland	1,340	2,142	18,193	2,245	23,919
Total	**2,512**	**4,120**	**51,372**	**7,071**	**65,075**

Source: LANDFIRE dataset

General descriptions of the habitats present on federal lands in the analysis area are provided below. LANDFIRE data were used for summarizing land cover types throughout the analysis area by land ownership. Field surveys on the proposed ROW were used for describing more specific information about the vegetation types in the impact area of the Project.

3.10.1.2.1.1 Grasslands

In the Wyoming analysis area, there are 1,811 acres of grasslands, including exotic herbaceous, on TBNG lands, 795 acres on BLM lands, 21,155 acres on private lands, and 2,490 acres on state lands (**Table 3-43**). Grasslands are dominated by native herbaceous species. Portions of the TBNG where the ROW is proposed contained introduced species such as crested wheatgrass (*Agropyron cristatum*). These grasslands are most prevalent in the westernmost portion of the proposed ROW, although native grasslands are prevalent elsewhere.

3.10.1.2.1.2 Shrublands

In the Wyoming analysis area, there are 2,142 acres of shrublands on TBNG lands, 1,340 acres on BLM lands, 18,193 acres on private lands, and 2,245 acres on state lands (**Table 3-43**). On TBNG lands, shrublands are dominated by big sagebrush (*Artemisia tridentata*) and little sagebrush (*Artemisia arbuscula* ssp. *longiloba*). Understory associates include blue grama (*Bouteloua gracilis*), prairie Junegrass (*Koeleria macrantha*), needle and thread, crested wheatgrass, and/or cheatgrass (*Bromus tectorum*).

3.10.1.2.1.3 Wetlands/Riparian

In the Wyoming analysis area, there are six acres of riparian on TBNG lands, 15 acres on BLM lands, 378 acres on private lands, and 101 acres on state lands (**Table 3-43**). On TBNG lands, the only wetland or riparian area known in the analysis area includes an intermittent drainage dominated by inland rush (*Juncus interior*) and foxtail barley (*Hordeum jubatum*). The only wetland or riparian area on BLM lands are also intermittent drainages and a dry wetland no longer supporting wetland vegetation.

3.10.1.2.1.4 Conifer Woodlands

In the Wyoming analysis area, there are 14 acres of conifer woodlands on TBNG lands, 319 acres on BLM lands, 4,073 acres on private lands, and 1,669 acres on state lands (**Table 3-43**). On TBNG lands, there is one site with scattered ponderosa pine occurring with big sagebrush, blue grama, and needle and thread.

3.10.1.2.1.5 Other

Other land cover types include lands classified as agricultural, developed, hardwood, and non-vegetated and sparsely vegetated. Land areas of the land cover types are presented in **Table 3-43**.

3.10.1.2.2 Special Status Plant Species

3.10.1.2.2.1 Federally-Listed Endangered, Threatened and Proposed Species

Of the federally listed plant species that have the potential to occur on federal lands in the Wyoming analysis area, those with the greatest potential to occur within the area are discussed below.

The Federal ESA (7 United States Code [U.S.C.] §136; 16 U.S.C. §460 et seq.) is implemented by the USFWS, which is required by Section 7 that their actions (including permitting) are not likely to jeopardize the continued existence of a federally-listed endangered or threatened species or result in the destruction or modification of its habitat.

3.10.1.2.2.1.1 Ute Ladies'-tresses

The USFWS considers Ute ladies'-tresses (*Spiranthes diluvialis*) to have the potential to occur in Campbell and Weston Counties (USFWS 2012a, b). Currently, Ute ladies'-tresses is a Threatened species under the Federal Endangered Species Act of 1973. Ute ladies'-tresses is distributed in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, Wyoming in the United States; and British Columbia, Canada (NatureServe 2013). Ute ladies'-tresses is a perennial orchid with erect stems five to 24 inches tall and thick roots. In Wyoming, Ute ladies'-tresses flowers between very late July to mid-September, although there can be great variability of flowering times between years and even sites (Heidel 2007).

Rangewide, Ute ladies'-tresses occurs in moist meadow habitats along floodplains, oxbows, and stream and river terraces; subirrigated or spring-fed abandoned stream channels and valleys; and lakeshores (Fertig et al. 2005). In Wyoming, Ute ladies'-tresses is known to occur along the banks of perennial creeks in the watersheds of Antelope Creek (Cheyenne River tributary), Niobrara River, and Horse Creek (North Platte River tributary) (Heidel 2007). Specifically, Ute ladies'-tresses habitat in Wyoming is characterized as subirrigated, seasonally flooded wet meadows that remain moist in summer, and occur on low, flat floodplain terraces or abandoned oxbows at elevations of 4,650 to 5,420 feet. All but one Ute ladies'-tresses populations in Wyoming occur within 50 feet of small, perennial streams; the exception is spring-and seep-fed and more distant from the stream (Heidel 2007).

Data on sensitive plants for Wyoming were accessed from the Wyoming Natural Diversity Database (WYNDD 2012), which affirmed there are no known Ute ladies'-tresses occurrences in the Project Area. The nearest known Ute ladies'-tresses occurrence is approximately 25 miles southwest of the westernmost end of the Proposed Action, in a wet meadow along the banks of Antelope Creek, Converse County (Fertig et al. 2005; Heidel 2007). No suitable habitat for Ute ladies'-tresses was found on NFS and BLM lands during habitat screening, which occurred June and late July 2012.

3.10.1.2.2.1.2 Blowout Penstemon

The USFWS does not consider blowout penstemon to have any potential to occur in Campbell or Weston counties, although it formerly considered Campbell County to have potential for blowout penstemon (USFWS 2012a). No suitable habitat for blowout penstemon (sand dunes and blowouts) was observed on TBNG or BLM lands in Campbell and Weston County.

3.10.1.2.2.2 TBNG Sensitive Species

No TBNG R2 Sensitive plant species are documented in the analysis area (WYNDD 2012) and none were observed during surveys of the area. However, the following R2 TBNG sensitive plant species were included in the analysis based on the potential occurrence of suitable habitats in the analysis area: Barr's milkvetch (*Astragalus barri*), prairie dodder (*Cuscuta plattensis*), Dakota buckwheat (*Eriogonum visheri*), woolly twinpod (*Physaria didymocarpa* var.

lanata), and largeflower triteleia (*Triteleia grandiflora*). Species abstracts and descriptions of existing conditions are provided in the TBNG BE.

3.10.1.2.2.3 TBNG Plant Species of Local Concern

Bitter root (*Lewisia rediviva*) is the only TBNG Species of Local Concern discovered on TBNG lands in the analysis area. Suitable habitat for summer milkvetch (rafleaf bahia, smooth goosefoot, Watson's goosefoot, slimleaf panicgrass, rosy palafox, and lemon scent was present but no plants were observed during surveys.

No other TBNG SOLC plant species were discovered in the proposed ROW or are otherwise documented in the Wyoming analysis area (WYNDD 2012).

3.10.1.2.2.4 BLM Sensitive Plant Species

No BLM Sensitive plant species are documented on BLM lands in the Wyoming analysis area (WYNDD 2012).

3.10.1.2.2.5 Special Management Areas with Botanical Emphasis

There are no special management areas with a botanical emphasis on TBNG or BLM lands in the Wyoming analysis area.

3.10.2 Environmental Consequences

The analysis area for botany is defined as the area within 0.5 mile of either side of the proposed right-of-way centerline (one-mile wide). The impact area is defined as the proposed ROW, and areas outside of the proposed ROW including access roads that may need improved, new spur roads that would be constructed, structure work areas, overland travel areas, and other areas where surface disturbance would occur.

3.10.2.1 ALTERNATIVE 1 – NO ACTION

3.10.2.1.1 South Dakota

3.10.2.1.1.1 Direct/Indirect Effects

Under the No Action Alternative, there would be no new effects to sensitive plant locations, unoccupied suitable habitat, or special botanical management areas.

3.10.2.1.1.2 Cumulative Effects

Under the No Action Alternative, there would be no contribution to cumulative botany impacts.

3.10.2.1.2 Wyoming

3.10.2.1.2.1 Direct/Indirect Effects

Under the No Action Alternative, there would be no new effects to sensitive plant locations, unoccupied suitable habitat, or special botanical management areas.

3.10.2.1.2.2 Cumulative Effects

Under the No Action Alternative, there would be no contributions to cumulative botany impacts.

3.10.2.2 ALTERNATIVE 2 – PROPOSED ACTION

3.10.2.2.1 South Dakota

3.10.2.2.1.1 Direct and Indirect Effects

3.10.2.2.1.1.1 Federally-Listed Threatened and Endangered Species

There are no federally-listed plant species that are known to occur in the analysis area. Implementation of the Proposed Action will have "**no effect**" on federally-listed plant species.

3.10.2.2.1.1.2 BHNF Sensitive Plant Species

3.10.2.2.1.1.2.1 Grassland Associated Species

Suitable habitat for grassland-associated BHNF R2 sensitive plants exists in the analysis area as small patches of higher quality montane grassland and grassland/bluegrass. In the analysis area, there are 48 acres of montane grassland and 1,894 acres of grassland (predominantly non-native dominated grasses). Of this, there are two acres of montane grassland that would be in the proposed ROW, in/adjacent to roads that may need improved or new spur roads. There are also 118 acres of grassland that would be affected through implementation of the Proposed Action. These include areas that would be in/adjacent to roads that may need improvement, the proposed ROW, new spur roads, overland travel areas, decking areas, and related construction areas.

No USFS R2 Sensitive plant species associated with grassland habitat are known to occur in the analysis area. Direct impacts are limited to any R2 Sensitive plants present in the analysis area or impact area, but not found during surveys. Direct impacts to undetected individuals could include burial, crushing, and uprooting of individuals during structure placement, road construction, and related activities. In addition, herbicide application associated with the Proposed Action could inadvertently kill undetected individuals.

Indirect effects to sensitive plant species from implementation of the Proposed Action could include an increase in dust pollution and soil erosion, noxious and invasive weeds, and increased fire risk caused by new ignition sources (power line in the event of a break,

equipment and vehicles). Sensitive plants that are undetected in the impact area could experience reduced photosynthetic capacity caused by coating of dust on the leaves. Ground disturbance that creates bare soil would make these habitats more prone to invasion by noxious weeds. Once established, noxious weeds could out-compete native vegetation causing a shift in the plant species composition of the area. Also, improving existing roads and constructing new spur roads may also open access to recreation, timber harvest, and livestock.

The likelihood of directly impacting R2 sensitive plant species is low, based on the lack of occurrence in the analysis area and impact areas. Impacts to potentially suitable, but unoccupied habitats, may occur but would be avoided, reduced, or mitigated through the application of appropriate mitigation measures and PDFs pertaining to fire, erosion, weeds, and botany listed in **Appendix B**.

3.10.2.2.1.1.2.2 White Spruce/Hardwood Associated Species

Suitable habitat for white spruce/hardwood-associated BHNF R2 Sensitive plants exists throughout the analysis area. In the analysis area, there are 609 acres of hardwoods (including riparian) and 316 acres of white spruce. Of this, there are 47 acres of hardwoods and 20 acres of white spruce in the impact area, predominantly along existing roads that may be improved and within the proposed ROW.

No USFS R2 Sensitive plant species associated with spruce/hardwood habitat are suspected to occur in the analysis area. The effects are limited to any R2 Sensitive plants present in the analysis area or impact area, but not found during surveys. Direct impacts to undetected individuals could include burial, crushing, and uprooting of individuals during ROW clearing, structure placement, road construction, and related activities. In addition, herbicide application associated with the Proposed Action could inadvertently kill undetected individuals.

Indirect effects to sensitive species from the Proposed Action could include an increase in dust pollution and soil erosion, noxious and invasive weeds, increased solar radiation, and increased fire risk due to having greater sources of ignition (power line in the event of a break, equipment and vehicles). Sensitive plants that are undetected in the impact area could experience reduced photosynthetic capacity caused by a coating of dust on the leaves. Ground disturbance from equipment and log skidding could create bare soil, which could wash downslope and cover sensitive species habitat, making the conditions more prone to weed invasion. Timber clearing for the ROW would result in a more open canopy and allow more sunlight and precipitation to reach the ground, possibly altering habitat characteristics. Timber clearing for the ROW and ground disturbance would make these habitats more prone to invasion by noxious weeds. Once established, noxious weeds could out-compete native vegetation causing a shift in the plant species composition of the area. Also, improving existing roads and constructing new spur roads may also open access to recreation, timber harvest, and livestock

The likelihood of directly impacting R2 sensitive plant species is low, based on the lack of occurrence in the Analysis and impact areas. Impacts to potentially suitable, but unoccupied habitats, may occur but would be avoided, reduced, or mitigated through the application of

appropriate mitigation measures and PDFs pertaining to fire, erosion, weeds, and botany listed in **Appendix B**.

3.10.2.2.1.1.2.3 Wetland/Riparian/Aquatic Associated Species

Suitable habitat for wetland/riparian-associated USFS R2 Sensitive plants is scattered across the analysis area. In the analysis area, there are three perennial creek crossings, 64 intermittent creek crossings, and 76 wetlands including one documented fen. In the impact area, there are four perennial creek crossings, seven crossings of intermittent creeks having summertime water, and 42 crossings of intermittent creeks not having summertime water. One of the intermittent creek crossings (Prairie Creek) also includes one unconfirmed fen.

Wetlands are protected from damaging management activities by the Clean Water Act, the USFS R2 Watershed Conservation Practices Handbook, South Dakota Best Management Practices, and LRMP standards and guidelines. Most creek crossings and wetlands would be avoided by spanning of the transmission line. There are also existing roads that may need improved that cross two perennial creeks (including one that is paralleled for two miles) and one intermittent creek, as well as skirting along four wetlands. There is also one new spur road that would be constructed to cross as intermittent creek having summertime water.

No USFS R2 Sensitive plant species are known to occur in the analysis area. The effects would be limited to any R2 Sensitive plants present in the analysis area or impact area, but that were undetected during surveys. Direct impacts to undetected individuals could include burial, crushing, and uprooting of individuals during ROW clearing, structure placement, road construction, and related activities. In addition, herbicide application associated with the Proposed Action could inadvertently kill undetected individuals.

Indirect effects to sensitive species from the Proposed Action could include an increase in dust pollution and soil erosion, increased erosion events, noxious and invasive weeds, increased solar radiation, and increased fire risk due to having greater sources of ignition (equipment and vehicles). Sensitive plants that are undetected in the impact area could experience reduced photosynthetic capacity due to a coating of dust on the leaves. Ground disturbance from equipment and log skidding could create bare soil, which could wash downslope and cover sensitive species habitat, making the conditions more prone to weed invasion. Timber clearing for the ROW would result in a more open canopy and allow more sunlight and precipitation to reach the ground, possibly altering habitat characteristics.

Large rain events could cause erosion of hillsides and increase sediments and/or debris in drainage ways and streams. Rain and snow melt reaching wetlands may also increase in the short term because there would be less vegetation to stop or slow the movement of surface water down drainage ways. Debris that could travel to the wetland with the surface flows could include weed seeds that could establish in the wetland. Timber clearing for the ROW and ground disturbance will also make these habitats more prone to invasion by noxious weeds. Once established, noxious weeds could out-compete native vegetation causing a shift in the plant species composition of the area. Also, improving existing roads and constructing new spur roads may also open access to recreation, timber harvest, and livestock. Habitat fragmentation

could be caused by the loss and degradation of habitat that could be colonized by nearby populations, the associated effects to pollinators, and if there were mortality of individual plants, the potential reduction of genetic flow between adjacent populations.

The likelihood of directly impacting R2 sensitive plant species is low, based on the lack of occurrence in the analysis areas. Impacts to potentially suitable, but unoccupied habitats, may occur and would be avoided, reduced, and mitigated through the application of appropriate mitigation measures and PDFs pertaining to fire, erosion, weeds, and botany listed in **Appendix B**.

3.10.2.2.1.1.2.4 Cumulative Effects for BHNF Sensitive Plant Species

Grassland Associated Species

The cumulative effects are bound by the analysis area, which already includes a buffer to incorporate the influence of other management activities on grassland-associated USFS R2 Sensitive plants. The cumulative effects are bound in time ten years prior to the decision and ten years after the decision because this is the average amount of time between vegetation treatments in any given area.

The analysis area is in Management Area 3.7 - Late Successional Forest Landscape, 4.1 - Limited Motorized Use and Forest Products, 5.1 - Resource Production Emphasis, 5.4 - Big Game Winter Range, and 8.2 - Developed Recreation Complexes. Management of these areas would continue as directed by the LRMP regardless of which alternative is chosen. These activities could include, but are not limited to, range improvements, prescribed burning, road or trail improvements, and recreational developments. These activities would require separate environmental review and analysis of effects on resources to comply with NEPA, therefore they will not be addressed in the cumulative effects analysis.

Past activities include 105 acres of hardwood regeneration, 388 acres of hardwood release, 9,916 acres of wildlife habitat inventory, 392 acres of wildlife habitat management, 2,074 acres of wildlife habitat prescribed fire, 3,135 acres of wildlife surveys, one acre of range fence obliteration, 53 acres of range seeding and planting, 85 acres of classic biocontrol, and 5,070 acres of pesticide application.

Present and foreseeable activities are managing sensitive plants and habitats according to the BHNF LRMP standards, guidelines and objectives, cattle grazing and maintenance of range improvement structures recreation wildfire suppression, ROW maintenance, and weed treatments to reduce or eliminate weeds.

Cattle grazing impacts most grassland habitats in the analysis area, with the greatest impacts on meadows, riparian, and wet areas. Under the Proposed Action, cattle grazing may be less concentrated in and near the proposed ROW and related construction areas, as tree cutting would potentially increase forage availability.

Under the Proposed Action, there would be new surface disturbance, creating the potential for habitat degradation or loss of grassland habitats, which would be minimized by using PDFs and mitigation measures which would be expected to be successful.

White Spruce/Hardwood Associated Species

The cumulative effects for white spruce/hardwood associated species would be the similar to Grasslands Associated Species Cumulative Effects, which is discussed above. The main exception would be that potential benefits of cattle grazing to white spruce/hardwood associated species would not apply.

Under the Proposed Action, there would be new surface disturbance and tree clearing, creating the potential for loss or degradation of white spruce/hardwood habitats, which would be minimized by using PDFs and mitigation measures which would be expected to be successful.

Wetland/Riparian/Aquatic Associated Species

The cumulative effects for wetland/riparian associated species would be the similar to Grasslands Associated Species Cumulative Effects, which is discussed above. The main exception would be that potential benefits of cattle grazing to wetland/riparian associated species would not apply.

Under the Proposed Action, there would be new surface disturbance and tree clearing, creating the potential for loss or degradation of wetland/riparian habitats, which would be minimized by using PDFs and mitigation measures, including spanning and avoidance, which would be expected to be successful. The potential negative effects would be fully addressed and mitigated through PDFs and mitigation measures, so there would be no net change regarding cumulative effects.

3.10.2.2.1.1.2.5 Determinations for BHNF Sensitive Plant Species

Grassland Associated Species

The determination of effects for the Proposed Action on USFS R2 Sensitive plant species were made as the result of the information gathered from pre-field review, field reconnaissance, survey results, and effects analysis for all action alternatives. The basis for these determinations was potential habitat, distribution, and effects from proposed activities. The determination language is set forth in Forest Service Manual 2670.

Objectives, standards, and guidelines have been identified in the LRMP Phase II to conserve USFS R2 Sensitive species found on the BHNF (USFS 2005). This Project would follow the objectives, standards, and guidelines that are applicable to those species and habitats found in the analysis area.

The analysis area was surveyed for grassland associated USFS R2 Sensitive plant species however none were found. For both species with identified suitable but unoccupied grassland habitat within the analysis area (Iowa moonwort, slender moonwort), habitat is generally located in small areas of native grassland. While the montane grassland in the impact area is dominated by non-native herbaceous species, there is montane grassland elsewhere in the analysis area

that could support such patches of native grassland. The grassland in the impact area was also dominated by non-native herbaceous species, except for a few patches in the far eastern portion of the analysis area near Rapid City.

Implementation of the Proposed Action would have both positive and negative effects to suitable habitat for grassland-associated USFS R2 plant species. Under the Proposed Action, there would be 47 acres of disturbance to grassland habitats, after excluding decking areas that were selected because of their prior surface disturbance (eight acres) and buffers of 50 feet on either side of roads which overestimate surface disturbance (approximately 63 acres). Based on field observations, of the 47 acres of grassland habitat, there were only a few acres of native grassland habitat which appeared to be suitable for grassland-associated USFS R2 plant species. However, most of the habitat would be spanned, and where there would be surface disturbance, these species may benefit from this disturbance, as they both appear to require a certain amount of historical disturbance such as road construction to establish. Slender moonwort is also associated with wetlands and riparian areas, and suitability of this species will also be addressed later in this document.

With implementation of the LRMP Phase II Amendment and all of the standards and guidelines adopted therein, and project specific design criteria, a determination of "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend toward federal listing or a loss of species viability range-wide" is made for the Proposed Action for Iowa moonwort and slender moonwort. Implementation of Alternative 1 (No Action) would have "**no impact**" on the Iowa moonwort or slender moonwort.

White Spruce/Hardwood Associated Species

The determination of effects for the Proposed Action on white spruce/hardwood associated USFS R2 Sensitive plant species were made as the result of the information gathered from pre-field review, field reconnaissance, survey results, and effects analysis for all action alternatives. The basis for these determinations was potential habitat, distribution, and effects from proposed activities. The determination language is set forth in Forest Service Manual 2670.

Objectives, standards, and guidelines have been identified in the LRMP Phase II to conserve USFS R2 Sensitive species found on the BHNF (USFS 2005). This Project will follow the objectives, standards, and guidelines that are applicable to those species and habitats found in the analysis area.

The impact area was surveyed for USFS R2 Sensitive plant species however none were found. For three of the species with identified suitable but unoccupied white spruce/hardwood habitat within the analysis area (groundcedar, large roundleaf orchid), habitat is generally located on north-facing white spruce forests and often mixed with paper birch or quaking aspen. For bloodroot, American cranberry bush, and large roundleaf orchid, habitat is generally located in paper birch/ironwood, ironwood/bur oak, or quaking aspen/beaked hazelnut community types. White spruce is scattered among several stands in the western portion of the analysis area. Hardwood species are primarily in large quaking aspen stands with some paper birch stands, located through much of the central analysis area. Other hardwood types are uncommon but occasionally found along ravines that would be spanned by the proposed ROW. American

cranberry bush is also associated with wetlands and riparian areas, and suitability of this species will also be addressed later in this document.

Implementation of the Proposed Action would presumably have negative effects because some white spruce would be cleared, although these habitats would be avoided to the extent possible with PDFs and mitigation measures specific to these habitats.

With implementation of the LRMP Phase II Amendment and all of the standards and guidelines adopted therein, and Project specific design criteria, a determination of "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend toward federal listing or a loss of species viability range-wide" is made for the Proposed Action for lesser yellow lady's slipper, groundcedar, large roundleaf orchid, bloodroot, and American cranberry bush. Implementation of Alternative 1 (No Action) would have "**no impact**" on these species.

Wetland/Riparian/Aquatic Associated Species

The determination of effects for the Proposed Action on wetland/riparian associated USFS R2 Sensitive plant species were made as the result of the information gathered from pre-field review, field reconnaissance, survey results, and effects analysis for all action alternatives. The basis for these determinations was potential habitat, distribution, and effects from proposed activities. The determination language is set forth in Forest Service Manual 2670.

Objectives, standards, and guidelines have been identified in the LRMP Phase II to conserve USFS R2 Sensitive species found on the BHNF (USFS 2005). This Project will follow the objectives, standards, and guidelines that are applicable to those species and habitats found in the analysis area.

The impact area was surveyed for USFS R2 Sensitive plant species however none were found. For four species with identified suitable but unoccupied wetland/riparian habitat within the analysis area (slender moonwort, sageleaf willow, autumn willow, narrowleaf sphagnum), habitat generally includes fens or fen-like seeps. There is only one confirmed fen in the analysis area, plus one unconfirmed fen area along Prairie Creek in the impact area, which would be spanned; therefore, habitat for these species is limited both in distribution and size in the analysis area.

Foxtail sedge is associated with open, perennial streams, which do occur in the analysis area and impact area; although these would all be spanned or avoided. American cranberry bush occurs in shaded, hardwood habitats along streams, springs, and canyon bottoms and lower slopes. There are some patches of this habitat in the eastern portion of the analysis area, although most would be spanned as they are far below in canyon bottoms.

Implementation of the Proposed Action could result in indirect effects to potentially suitable, but unoccupied habitats. Such habitats would be avoided to the extent possible with PDFs and mitigation measures specific to these habitats, including spanning and avoidance.

With implementation of the LRMP Phase II Amendment and all of the standards and guidelines adopted therein, and Project specific design criteria, a determination of "may adversely impact

individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend toward federal listing or a loss of species viability range-wide" is made for the Proposed Action for slender moonwort, foxtail sedge, sageleaf willow, autumn willow, narrowleaf sphagnum, and American cranberry bush. Implementation of Alternative 1 (No Action) would have "**no impact**" on these species.

3.10.2.2.1.1.3 BHNF Plant Species of Local Concern

No known locations of plant species of local concern would be impacted by implementation of the Proposed Action.

3.10.2.2.1.1.4 BHNF Target Plant Species

Implementation of the Proposed Action could impact populations of thirteen target plant species that are known to exist in the analysis area. The potential for impacts to these species would be diminished by avoiding disturbance in areas known to support populations and by avoiding known individuals in occupied habitats.

3.10.2.2.1.1.5 Rare Plant Communities

Implementation of the Proposed Action has the potential to disturb up to three acres (two acres associated with road improvement; and less than one acre associated with the ROW). Implementation of the Proposed Action would have no impacts on special botanical management areas because none of these exist in the South Dakota analysis area.

3.10.2.2.2 Wyoming

3.10.2.2.2.1 Direct/Indirect Effects

3.10.2.2.2.1.1 Federally-Listed Threatened and Endangered Species

3.10.2.2.2.1.1.2 Ute Ladies'-tresses

As no Ute ladies'-tresses or suitable habitat occurs on federal lands in the analysis area, there would be no habitat loss or direct mortality as a result of the Proposed Action. It is also highly unlikely that there would be habitat degradation, invasive and noxious weeds, and herbicide application that would affect Ute ladies'-tresses as a result of the Proposed Action. If Ute ladies'-tresses occurs adjacent to the impact area in the Plant analysis area, there would be a potential for habitat degradation from increased invasive and noxious weeds and erosion-related sedimentation.

Implementation of the Proposed Action may result in the establishment and spread of invasive and noxious weeds that, may in turn, impact nearby unidentified habitats that may support Ute ladies'-tresses habitat. This would present a permanent indirect impact if noxious weeds could

not be controlled after colonization. Invasive and noxious weeds negatively impact Ute ladies'-tresses primarily by competition for resources.

The TBNG LRMP (USFS 2001), BLM RMP (BLM 2000), and other legal guidance (BLM 2007, USFS 1994, and USFS 2011) have been compiled into Appendix B: Design Criteria, Mitigation, and Monitoring. Adherence to Appendix B will ensure that Ute ladies'-tresses potentially located adjacent to the impact area would not be negatively affected by increased invasive and noxious weeds, erosion-related sedimentation, and herbicide drift as a result of the Proposed Action.

Cumulative Effects

Cumulative short- and long-term disturbances to the species considered in this analysis arise from multiple sources. These occur on federal and non-federal lands and include direct and indirect impacts of mining, extraction of conventional oil and gas and CBNG reserves, road and rail line development or relocation, grazing (livestock and wildlife), drought, occupied residences, hunting and trapping, and other forms of dispersed recreation. Those activities have occurred in the Project Area in the past and most are expected to continue at similar levels. Both mining, and oil and gas development activities have requirements for reclamation of disturbed areas as resources are depleted. As new areas of disturbance related to these two activities are added, mined-out areas are restored and reclaimed and oil and gas well sites are reclaimed when depleted wells are abandoned.

Effects Determination

Implementation of the Proposed Action would have "No Effect" on Ute ladies'-tresses. If Ute ladies'-tresses is present on lands adjacent to the impact area, there would be a potential for indirect effects of habitat degradation. However, these indirect effects would be fully mitigated through adherence to **Appendix B**: Design Criteria, Mitigation, and Monitoring.

Under the Proposed Action, there would be no effects on federally-listed plant species, including blowout penstemon based on the lack of known occurrences and absence of highly suitable habitats in the analysis area.

3.10.2.2.2.1.2 TBNG Sensitive Plant Species

Under the Proposed Action, there would be no effects on TBNG sensitive plant species based on the lack of known occurrences in the analysis area. Five TBNG sensitive plant species were selected for analysis, based on the potential of suitable habitat occurring in the proposed ROW. These species include Barr's milkvetch, prairie dodder, Dakota buckwheat, woolly twinpod, and largeflower triteleia. None of these species is known to occur in the plant analysis area.

3.10.2.2.2.1.3 TBNG Species of Local Concern

Bitter root (*Lewisia rediviva*) is the only TBNG Species of Local Concern discovered on TBNG lands in the analysis area. No other TBNG SOLC plant species were discovered in the proposed ROW or are otherwise documented in the analysis area (WYNDD 2012).

Under the Proposed Action, there would be no effects on the only TBNG plant species of local concern that is known to occur in the Wyoming analysis area, bitter root. Known occurrences of this species in the analysis area would be avoided.

3.10.2.2.2.1.4 BLM Sensitive Plant Species

Under the Proposed Action, there would be no effects on the BLM sensitive plant species based on the lack of known occurrences or highly suitable habitats in the analysis area.

3.10.2.2.2.1.5 Special Management Areas with Botanical Emphasis

Under the Proposed Action, there would be no effects on BLM special management areas with a botanical emphasis, based on the absence of these areas in the analysis area.

3.10.2.2.2.2 Cumulative Effects

Past, present, and future cumulative actions for botany for the Wyoming portion of the analysis area include dispersed recreation, livestock grazing, roads, and fences. The Proposed Action would have a negligible contribution to cumulative effects of botany. Coal, natural gas, and infrastructure development is a substantial part of the landscape in this area and the Project would be consistent with land management direction there.

3.10.2.3 ALTERNATIVE3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

The following provides a comparison of Alternative 3 (Proposed Action with Route Modifications) and the Proposed Action.

3.10.2.3.1 South Dakota

3.10.2.3.1.1 Direct/Indirect Effects

Route Modification 3c: Grassland habitats are similar between the proposed ROW and Route Modification 3c, except that Route Modification 3c has more mapped montane grassland. The proposed ROW and Route Modification 3c each contain one wet portion of an intermittent creek that would be spanned. There would be a new spur road nearby that contains a third wet portion of the same intermittent creek, but this new spur road would be needed for either option.

Route Modification 3e: Habitat for sensitive plants is better in route Modification 3e, because it includes areas dominated by paper birch, whereas the proposed ROW is dominated by ponderosa pine with some meadow habitat. Suitable, but unoccupied habitat for sensitive plants is of better quality in Route Modification 3e than the proposed ROW, and includes areas dominated by intermittent creek crossings.

Route Modification 3f: Route Modification 3f contains extensive aspen/birch stands, whereas the proposed ROW has less aspen/birch stands.

Route Modification 3g: The proposed ROW in this area exists on private land whereas Route Modification 3g contains NFS lands dominated by ponderosa pine interspersed by small patches of prairie grassland habitat.

3.10.2.3.2 Wyoming

3.10.2.3.2.1 Direct/Indirect Effects

The impacts to vegetation resulting from Route Modification 3a would be the same as the Proposed Action.

3.11 TIMBER/SILVICULTURE

3.11.1 Existing Condition

3.11.1.1 SOUTH DAKOTA

3.11.1.1.1 Timber Species

In South Dakota, the analysis area is dominated by ponderosa pine (*Pinus ponderosa*), which covers approximately 78 percent of the analysis area. White spruce (*Picea glauca*) and quaking aspen (*Populus tremuloides*) each cover approximately one percent of the analysis area. Because of the natural regeneration of trees and gentle slopes that exist throughout the majority of the Black Hills, the area is ideal for the production of commercial wood products (USFS 2001a).

3.11.1.1.1.1 Ponderosa Pine

Ponderosa pine is a common conifer species that occurs in the western United States and is prevalent in the Black Hills of South Dakota. Ponderosa pine occurs at elevations from 3,700 to 6,700 feet, on all soil types and aspects. Historically, ponderosa pine forest development and maintenance was promoted by non-lethal fires ignited by both humans and lightning. Ponderosa pine is relatively fire resistant and able to survive low-intensity surface fires largely because of its protective outer bark. If allowed to mature without human intervention and use, much of the Black Hills would have been composed of a mosaic of even- and multiple-aged trees but now primarily comprised of a monoculture of even-aged stands.

3.11.1.1.1.2 White Spruce

White spruce is typically widespread throughout Canada and the northern lake states, with an isolated population occurring in the Black Hills of South Dakota and Wyoming. In the analysis area, white spruce stands are found at high elevations and in cooler canyon bottoms, but also occurs as a subdominant species in stands of quaking aspen.

3.11.1.1.1.3 Quaking Aspen

Quaking aspen is the most widely distributed tree species across North America, and in the Black Hills aspen occurs at small isolated sites often surrounded by ponderosa pine stands. Aspen is a disturbance-dependent species well adapted to the frequent fire regimes that existed prior to European settlement. Growing conditions for aspen in the Black Hills are marginal.

3.11.1.1.2 Forest Structure

Structural stage is an important forest attribute that categorizes the developmental stages of tree stands based on tree size and the extent of canopy closure created (USFS 2005). Vegetation structural stages that are established in Forest planning documents are measures of the desired forest condition.

3.11.1.1.3 Forest Plan Guidance (LRMP)

The BHNF LRMP provides guidance for all resource management activities on the BHNF. It provides overall forest management goals and objectives, standards and guidelines, and management area-specific goals, objectives, standards, and guidelines (USFS 1997, 2005, 2006). LRMP guidelines, objectives and standards identified for timber within the analysis area are listed in **Appendix D.**

3.11.1.1.4 Forest Health

3.11.1.1.4.1 Tree Insects and Disease

Insects, diseases, and other forest health issues can change forest structure and alter fire behavior over time (USFS 2005). Outbreaks and infestations of tree insects and diseases can lead to large-scale forest die-off, resulting in increased surface fuel loads and changed fire hazard. Dead needles (red-needle phase) stock the canopy with dry, fine fuels that can ignite quickly during favorable fire conditions and can affect fire spread, rate of spread, rate of energy release and fire severity (USFS 2005).

Insects and pathogens are natural components of forest ecosystems and their distribution, abundance, and community composition depend on the structure of the stands within the forest landscape and the condition of trees within these stands. Under the correct conditions, these pests erupt into outbreaks that kill thousands of trees over vast areas, lasting several years, and impacting aesthetic values, water production, recreation, timber production, wildlife habitat and other important resources. Exclusion of disturbance and fire in a forest ecosystem can lead to timber stand overstocking, and thereby create conditions conducive to forest pest outbreaks and susceptibility to insect infestation.

Mountain pine beetle (*Dendroctonus ponderosae*) is native to the Black Hills and has a critical ecological role within healthy, functioning ecosystems. Other insects and tree diseases that are known to affect forests in the analysis area include pine engraver beetle (*Ips pini*), red turpentine beetle (*Dendroctonus valens*), two species of pine tip moth (*Rhyacionia* spp.), Armillaria root disease (*Armillaria ostoyae*), red rot (*Dichomitus squalens*), western gall rust

(*Peridermium harknessii*), needle cast (*Elytroderma derformans*), and diplodia tip blight (*Sphaeropsis sapinea*). The current larger and more contiguous structure of forest landscapes makes them susceptible to mountain pine beetle outbreaks.

Mountain pine beetles generally attack ponderosa pine trees in dense stands and stands with a basal area of more than 120 square feet per acre may be at the highest hazard of beetle infestation.

The BHNF insect hazard rating for the analysis area is based on structural stages and the majority of the analysis area is in the low (62%) hazard rating category for insect infestation (**Table 3-44**).

TABLE 3-44 - EXISTING INSECT HAZARD RATINGS FOR THE ANALYSIS AREA (ACRES)[1]

Hazard Rating	Acres	Percent of analysis area
Low (1, 2, 3A, 3B, 4A)	23,917	62
High (3C, 4B, 4C, 5)	14,406	38

[1]Analysis area is one mile wide. USFS 2005, 2009b.

3.11.1.1.4.2 Snags

Snags are important for wildlife habitat in forested environments. The BHNF defines a 'snag' as a standing dead tree, or a standing portion, from which at least the leaves and smaller branches have fallen (USFS 2005). Maintaining snag availability and recruitment in the forest ecosystem is important for wildlife species that depend on snags for foraging and nesting/roosting cavities and the LRMP sets the objective for providing an average of three snags per acre in conifer forests and the current average snag density for the analysis area is four snags per acre.

3.11.1.2 WYOMING

3.11.1.2.1 Timber Species

Timber species are a relatively minor component of the TBNG, occupying approximately six percent of the total area (USFS 2001b). The TBNG is in a transitional area between the plains of the central United States and the mountain provinces in the West. Plant species typical of this transitional area include sagebrush and a variety of grasses but foothill and lower-elevation mountain species are also present, including ponderosa pine TBNG LRMP guidelines, objectives and standards identified for timber within the analysis area are listed in **Appendix D.**

3.11.1.2.2 Forest Health

As described above for South Dakota, insects, diseases and other forest health issues can change forest structure and alter fire behavior over time (USFS 2005). The patchy distribution of ponderosa pines within the Wyoming portion of the analysis area should result in a lower occurrence of beetle-killed trees.

Like in the BHNF, the TBNG sets the objective for providing an average of four hard snags per forested acre in conifer forests, (snags/acre) (USFS 2001a).

3.11.1.2.3 BLM Land

Timber species are a minor component of BLM lands. There are no specific BLM management actions identified for timber within the analysis area**.**

3.11.2 Environmental Consequences

3.11.2.1 ALTERNATIVE 1 – NO ACTION

3.11.2.1.1 South Dakota

Under the No Action Alternative, the Project would not be constructed and the existing conditions for timber and silviculture would remain largely unaltered. There would be continued potential for continued infestation of mountain pine beetle, the resulting loss of live trees, and no removal of dead trees caused by beetle infestation within the ROW. In addition, under the No Action Alternative no salvageable logs would be available from the ROW for sale.

Under the No Action Alternative, the Project would not contribute to any cumulative impacts to timber and silviculture.

3.11.2.1.2 Wyoming

Under the No Action Alternative, the Project would not be constructed and no salvageable logs from the small timbered area within the ROW in Wyoming would be available for sale.

3.11.2.2 ALTERNATIVE 2 – PROPOSED ACTION

3.11.2.2.1 South Dakota

3.11.2.2.1.1 Direct/Indirect Effects

On NFS lands in South Dakota, the Action would utilize approximately 31.5 miles of an existing, currently unused ROW. This ROW has a cleared width of approximately 40 to 50 feet and would be widened to 100 feet. As this existing ROW is currently cleared of tall vegetation, its use would reduce the amount of tree clearing and associated disturbance required for construction. For this analysis, the entire 100-foot ROW is assumed to be cleared, even though the full width may not need to be cleared.

New disturbance for the Proposed Action would include some areas of new ROW, expansion of the existing unused ROW, new spur roads, potential improvements to existing roads, structure locations, and construction and decking areas. For the Proposed Action, new disturbance would occur primarily in locations dominated by ponderosa pine (547 acres; 86%). In South Dakota, there would be a total of approximately 559 acres of tree clearing on NFS lands.

As part of Project construction, any vegetation within or outside the ROW that has the potential to come into contact with the line would be cleared. Dead, dying, or “danger” trees or tree limbs located near the ROW that could pose a hazard to the transmission line facilities would be identified and removed as part of BHP’s routine vegetation management program.

The primary method of ROW clearing in steep terrain would be manual removal using powered and non-powered handheld tools to remove vegetative growth. For gentle to moderately steep terrain, the primary method of ROW clearing would include the use of a mechanized feller/buncher and a grapple skidder or similar equipment to cut down trees, bunch them, and transport them to a decking area where the trees are processed. The vegetation removal techniques employed by BHP will be described in detail in the ROW Clearing Plan that will be part of the Project Construction Operation and Maintenance (COM) Plan which will be developed as part of the final design.

At designated decking yards or laydown areas, the trees would be processed and loaded onto trucks for transportation to a sawmill. These areas would be accessible by existing roads or allow for overland travel. In South Dakota, several log decking yards approximately one-half to five acres each would be required for the temporary storage, collection, and handling, sorting and/or loading of trees or logs. Yards would be located on NFS lands and/or private property and, if possible will be located on previously disturbed areas. In some areas, logs and/or trees removed from the ROW could be transported to the decking yards by helicopter.

To balance the benefit of down woody debris with risk of wildfire and subsequent loss of timber, slash would be lopped and scattered to a depth of 12 inches. With prior authorization from the USFS, lop and scatter may be extended 50 feet from either side of the ROW in the BHNF to reduce fire hazard.

The Proposed Action would require new spur roads for accessing structure locations. However, existing roads and trails would be used and/or improved, wherever feasible, for access to minimize new disturbance and timber removal. Where possible, overland access would be conducted with tracked or rubber tired equipment to access a site without substantially modifying the landscape.

3.11.2.2.1.1.1 Forest Structure and Forest Health

The majority (70%) of new disturbance on NFS lands would occur in mature forests categorized as Structural Stage of 4 (4A, 4B, and 4C). Structural stages are not anticipated to be altered with construction of the Proposed Action. **Table 3-45** presents the structural stages and insect hazard rating for NFS lands that would be disturbed by the Proposed Action.

Insect hazard ratings for NFS lands within the Proposed Action area fall primarily within the low (66%) hazard category (**Table 3-45**). Tree removal would decrease the potential for insect infestations on a local scale. Remaining trees adjacent to the Proposed Action area will have access to additional resources such as water and sunlight as a result of tree removal within the Proposed Action area. All removed timber will be decked and processed according BHNF requirements to limit the potential for mountain pine beetle infestations to the adjacent trees.

TABLE 3-45 - STRUCTURAL STAGES AND INSECT HAZARD RATINGS FOR NFS LANDS THAT WOULD BE DISTURBED WITH THE PROPOSED ACTION (ACRES)

Structural Stage	Structural Stage Definition	Insect Hazard Rating	Acres of new disturbance on NFS	Percent of Proposed Action Area
1	Grasses and forbs	Low	63	10
2	Seedlings and saplings	Low	44	7
3A	Young forest; trees < 9 in. dbh; canopy cover < 40%	Low	50	8
3B	Young forest; trees < 9 in. dbh; canopy cover 40-70%	Low	21	3
3C	Young forest; trees < 9 in. dbh; canopy cover > 70%	High	7	1
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Low	240	38
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	High	174	27
4C	Mature forest; trees at least 9 in. dbh; canopy cover >70%	High	32	5
5	Late succession	High	0	0
Other[1]	Not categorized	Not categorized	3	<1
TOTAL			634	100

Source: Structural Stage, Fire Hazard Rating and Insect Hazard Rating data is based on the BHNF vegetation data (USFS 2009a) and fieldwork conducted for the Proposed Project in June and August 2012.
[1]Locations not categorized include non-vegetated areas such as gravel pits and strip mines.

Tree clearing would be kept to the minimum required to construct the Project and meet utility industry standards regarding clearances between transmission lines and trees. In addition, a Logging Plan would be prepared prior to construction that includes pre-construction timber cruising, determination of area and volume of timber to be removed, acres of trees to be removed that were killed by beetle infestation, snags to be removed or retained and the quantity of timber available for sale.

3.11.2.2.1.1.2 Consistency with BHNF LRMP

The Proposed Action and route alternatives would comply with forest-wide management goals and standards for timber (USFS 1997, 2005, 2006). These include:

- Conserving and managing for aspen, bur oak, white spruce, and birch/hazelnut (Objectives 201, 204, 238a, and 238c);
- Managing tree stands to enhance the scenic quality and recreational opportunities (Guideline 2414);
- Manage for hard and soft snags (Objective 211; Standards 2301a, 2301b, and 2305).
- Retain coarse woody debris (Standard 2308a).
- Conduct treatments that are consistent with high, moderate or low ratings for risk, hazard or value (Guideline 4110; Goals 10-01 and 10-04).

Consistency with these objectives, guidelines and standards would be accomplished by utilizing the existing unused ROW and existing access roads to minimize tree removal; developing and implementing a Fire Prevention Plan to reduce the fire hazard; developing and implementing a Logging Plan that specifies pre-construction timber cruising requirements; determination of area and volume of timber to be removed and, acres of trees to be removed that were killed by beetle infestation, snags to be removed or retained, and the quantity of timber available; and lopping and scattering slash to a depth of 12 inches.

3.11.2.2.1.2 Cumulative Effects

Past activities for timber and silviculture on federal lands include weed control, fuels treatments, thinning and control, associated road construction, and fire. These activities include: 4,679 acres of activity fuels treatment; 4,313 acres of commercial thinning; 2,797 acres of establishment cutting; 52 acres of fuel break; eight acres of liberation cutting; 595 acres of man-cause fire damage; 483 acres of natural fuels treatment; 67 acres of patch cut; 6,380 acres of pre-commercial thinning; 1,198 acres of preparation cutting; 688 acres of prescribed burning; 2,587 acres of shelterwood cutting; 124 acres of special cutting; 120 acres of tree encroachment control; and 243 acres of uneven aged management. Present and foreseeable actions for federal lands include: firewood gathering and Christmas tree cutting; road construction and maintenance and ROW brushing on NFS administered lands; wildfires; mountain pine beetle treatments and tree removal. The Proposed Action would require clearing an additional 50 feet of the existing ROW and some clearing of new ROW which would only contribute marginally to the local timber industry and to timber and silviculture cumulative effects.

3.11.2.2.2 Wyoming

3.11.2.2.2.1 Direct/Indirect Effects

New disturbance for the Proposed Action would include land used for the new ROW and structure locations. For federal lands in Wyoming, new disturbance associated with the Proposed Action would occur primarily in locations dominated by sagebrush/grassland. In Wyoming, there would be a total of approximately four to seven acres of tree clearing on federal lands.

Trees within and outside of the ROW would be removed. The methods of tree removal are the same as described above. The detailed vegetation removal techniques employed by BHP will be described in the ROW Clearing Plan.

3.11.2.2.2.1.1 Consistency with TBNG Plan

The Proposed Action would comply with the TBNG LRMP guidelines, objectives and standards (USFS 2001c) for timber and silviculture. These include managing snags and dead woody material, retaining hard and soft snags, and retaining large and coarse woody debris.

Consistency with these objectives, guidelines and standards would be accomplished by the same management actions described for South Dakota.

These include:

- Utilizing the existing unused ROW and existing access roads to minimize tree removal;
- Developing and implementing a Fire Prevention Plan to reduce the fire hazard;
- Developing and implementing a Logging Plan that specifies pre-construction timber cruising requirements;
- Determination of area and volume of timber to be removed and, acres of trees to be removed that were killed by beetle infestation, snags to be removed or retained, and the quantity of timber available; and
- Lopping and scattering slash to a depth of 12 inches

3.11.2.2.2.1.2 BLM Land

Tree clearing is not expected to be needed on BLM Lands.

3.11.2.2.2.2 Cumulative Effects

Because the Proposed Action would impact so few timbered acres in the Wyoming portion of the analysis area, it would have a negligible contribution to cumulative effects relevant to timber and silviculture. In the small area of the proposed ROW on TBNG lands that supports scattered ponderosa pine trees, these are the only cumulative effects relevant to timber and silviculture.

3.11.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

The following provides a comparison of Alternative 3 (Proposed Action with Route Modifications) and the Proposed Action.

3.11.2.3.1 South Dakota

3.11.2.3.1.1 Direct/Indirect Effects

Differences to timber and silviculture between route modifications and the proposed ROW on BHNF lands are described below.

Route Modification 3b (Mountain View) is an approximate 500 foot deviation from the proposed route north for about one mile to avoid existing residences. Route Modification 3b and the Proposed Action would have similar impacts to timber and silviculture.

Route Modification 3c (Clinton) is an approximate 1,000 foot deviation from the proposed route north for about one mile to avoid existing residences. This modification and the Proposed Action would have similar impacts to timber and silviculture.

Route Modification 3d (Edelweiss) is a 1,000 foot deviation from the proposed route to the north for less than one mile to avoid a sensitive wildlife area. This modification and the Proposed Action would also have similar impacts to timber and silviculture.

Route Modification 3e (Pactola) avoids the Pactola Reservoir, a visually sensitive area identified in the LRMP. This modification would require tree clearing of approximately one-half mile of forested ROW. There are marginal differences in impacts to timber and silviculture between the proposed ROW and this modification because of differences in tree species. Route Modification 3e includes areas dominated by paper birch and intermittent creek crossings while the proposed ROW is dominated by ponderosa pine with some meadow habitat.

Route Modification 3f (Pactola South) would also avoid the Pactola Reservoir area and follows approximately two miles of previously cleared ROW. There are marginal differences in impacts to timber and silviculture between the proposed ROW and this modification which contains less than one acre of additional aspen/birch stands.

Route Modification 3g (Hidden Valley) is an approximately 2,500 foot deviation from the proposed route south for about one and one-half mile to avoid planned future quarry operations. The proposed ROW does not cross any BHNF lands, while this modification would impact a minor amount of BHNF lands dominated by ponderosa pine interspersed by small patches of prairie grassland habitat.

3.11.2.3.2 Wyoming

3.11.2.3.2.1 Direct/Indirect Effects

Route Modification 3a (Fiddler) and the corresponding portion of the Proposed Action would not be located on TBNG or BLM managed lands and would have no identified impacts to timber and silviculture.

3.12 CULTURAL RESOURCES

3.12.1 Background

Cultural resources provide information about past human behavior and activities. They are found in a variety of physical forms that include, but are not limited to, material objects, archaeological sites, historic architecture, traditional cultural properties, and cultural landscapes. Cultural resources also include sacred sites which may include non-tangible properties not represented by artifacts or other cultural features or objects. Cultural resources are non-renewable assets that frequently consist of ephemeral materials susceptible to irreparable destruction or deterioration.

The Cultural Resources section provides an overview of the authorities which govern the management of cultural resources, a brief summary of the procedures used to identify and evaluate cultural resources for this proposal, and a short discussion on the area of potential effect. A programmatic agreement will be used to comply with the Agencies' cultural resources

legal mandates and the intent and content of that document is reviewed. This section also presents a consultation summary and the results of a records search and literature review designed to provide information on the currently identified cultural resources inventories (referred to as a Level I or Class I review).

3.12.1.1 APPLICABLE LEGAL AUTHORITIES

The most relevant laws, regulations, executive orders, and directives governing the management of cultural resources relevant to this study include:

- Organic Act of 1897
- Antiquities Act of 1906
- National Historic Preservation Act of 1966 (NHPA)
- American Indian Religious Freedom Act of 1978 (AIRFA)
- Archaeological Resources Protection Act of 1979 (ARPA)
- Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)
- Federal Regulation 36 CFR §261.9(g,h), Prohibitions
- Executive Orders 1593, 13007, and 13175
- BHNF Land and Resource Management Plan
- TBNG Land and Resource Management Plan
- Medicine Bow National Forest Land and Resource Management Plan
- Newcastle Field Office Record of Decision and Approved Resource Management Plan
- SDCL 1-19A-11.1 Preservation of Historic Property
- SDCL 34-27-25 Reporting Discovery of Human Skeletal Remains
- SDCL 34-27-26 Disturbing human skeletal remains or funerary objects as felony
- SDCL 34-27-28 Notification to landowner and coroner – notification to state archaeologist and tribal officials – Time limits
- Wyoming Antiquities Act of 1935
- Wyoming State Archaeologist Statute, 1967
- Wyoming's Comprehensive Statewide Historic Preservation Plan 2007-2015

The National Historic Preservation Act of 1966, as amended (16 U.S.C. 470), is the principal federal law governing the management of cultural resources. Section 106 of the NHPA directs all federal agencies to take into account the effects of their undertakings (i.e., actions, financial support, and authorizations) on historic properties (defined below).

The Section 106 implementing regulations found at 36 CFR §800 provide procedures for evaluating the effects of proposed federal undertakings on historic properties. The regulation outlines the procedures for identifying cultural resources, evaluating their significance for the National Register of Historic Places (NRHP), assessing project effects, and developing measures to mitigate adverse effects (if required). The regulation also addresses consultation mandates.

3.12.1.2 HISTORIC PROPERTIES

The effects analysis in the Cultural Resources section refers repeatedly to the concept of a "historic property". The term, where employed, has a specific meaning under the NHPA:

> *"Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria."* (36 CFR §800.16(l)(1))

According to the definition above, not all cultural resources qualify as historic properties; consequently, not all cultural resources are subject to protection measures or mitigation treatments.

The 36 CFR §800 regulations use the NRHP as a planning tool to help federal agencies evaluate the significance of cultural resources. The criteria for determining whether cultural resources are eligible for listing on the NRHP are provided at 36 CFR §60.4.

A Traditional Cultural Property (TCP) consists of a cultural site that is eligible for inclusion on the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. A TCP must be a tangible property, that is, a district, site, building, structure, or object as defined in 36 CFR §64.4 and in National Register Bulletin No. 38 (USDI National Park Service 1994). TCPs are managed under the authority of the NHPA.

Because TCPs are managed under the authority of the NHPA and must also be determined eligible to the NRHP, the term "historic properties", where employed throughout this document, is inclusive of TCPs—provided those properties are formally demonstrated eligible for the NRHP.

Sacred sites are managed under the authority of Executive Order 13007 – Indian Sacred Sites. They are defined in the Executive Order as:

> *"…any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site."*

It is the responsibility of an Indian tribe or an Indian individual to identify sacred sites. Sacred sites must be specific, narrowly delineated locations, but unlike TCPs, sacred sites do not necessarily have to have tangible features. The NRHP is not the appropriate vehicle for recognizing cultural values that are purely intangible. Sacred sites and TCPs are not mutually

exclusive. The definition of sacred site is broader than that for TCP as it does not specify that there be a tangible property.

3.12.1.3 ASSUMPTIONS

The following assumption applies in our assessment of effects to cultural resources:

- All cultural resources identified within the area of potential effect for all alternatives are considered historic properties for the purposes of this undertaking, unless they have previously been determined not eligible for the National Register of Historic Places in consultation with the State Historic Preservation Officer or through other agreed on procedures (36 CFR §60.4; 36 CFR §800).

3.12.1.4 PROGRAMMATIC AGREEMENT

The Agencies, in consultation with the Advisory Council on Historic Preservation, the Wyoming and South Dakota SHPOs, and interested tribes, are developing a programmatic agreement (PA) to fulfill NHPA Section 106 obligations for this project. A PA is desirable because of the multi-state scope of the project (pursuant to 36 CFR §800.14(b)(1)(i)). A PA is also warranted because the effects of the project cannot be fully determined prior to signing an Environmental Impact Statement (EIS) Record of Decision (pursuant to 36 CFR §800.14(b)(1)(ii)).

The lead agency (identified below) extended an invitation to participate in the development of the PA to all tribes that have expressed a historical or traditional interest in the project area. One tribe has formally accepted the invitation (also identified below).

The specific stipulations of the PA have not yet been finalized, but the PA will be signed and executed before the Record of Decision for this EIS is published.

3.12.1.5 AREA OF POTENTIAL EFFECT

The Area of Potential Effect (APE) must be identified before an assessment of effects can be completed. An APE is defined in the NHPA implementing regulations as:

> *"… the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking."* (36 CFR §800.16(d))

The specific APE for direct effects on historic properties is still being deliberated by the PA signatory parties. At minimum, the APE for the transmission line will include 63 feet either side of the right-of-way (ROW) centerline for a total width of 125 feet. The APE will include access and service roads in addition to any ancillary areas including marshalling yards, construction turnarounds/pullouts, decking yards, staging areas, guard pole locations, splicing/pulling set-up areas, and the footprints of the pulling/tensioning sites. The APE will include buffers around all ancillary areas.

The APE for indirect effects on historic properties considers visual, audible, and atmospheric elements that could diminish the integrity of those properties for which setting, feeling, and/or association are qualifying characteristics of NRHP eligibility. The indirect APE for the Undertaking may extend beyond the transmission line corridor and associated ancillary activity areas. The specific APE will be defined and reported in the programmatic agreement.

3.12.1.6 FIELD SURVEY

No new field survey has yet been conducted for this project. Field survey will be completed prior to implementation activities and according to stipulations in the programmatic agreement being developed for the project. In those cases where programmatic agreement stipulations may not apply, applicable cultural resources laws, rules, and directives will be followed. A summary of cultural resources previously identified within the project area is provided in the Existing Conditions section below.

3.12.1.7 CONSULTATION

Consultation with state, tribal, and local governments in addition to the general public ensures that federal agencies apply consistent criteria to protect and manage cultural resources on the public lands they administer. Section 101(d) of the NHPA and Executive Order 13175 direct federal agencies to consult with American Indian tribes. The implementing regulations for Section 106 of the NHPA, found at 36 CFR §800.2, also instruct federal agencies to consult on their undertakings and it identifies the parties to be consulted.

In a case like the present project where more than one federal agency is involved in an undertaking, the agencies may designate a lead agency (pursuant to 36 CFR §800.2(a)(2)) to serve as the agency official who shall act on their collective behalf, fulfilling their mutual responsibilities under Section 106. The Black Hills National Forest has been designated lead agency for the proposed Black Hills Power 230 kV transmission line.

The following is a summary of the consultation specific to cultural resources that has been conducted for this project to date.

3.12.1.7.1 Tribal

Input from tribal representatives is an important component of this project. Certain types of cultural resources can be difficult to identify by means of standard archaeological survey. Traditional knowledge can provide unique insight into physical features or geographic areas that are of particular spiritual or sacred significance to American Indian communities.

Tribal input has been solicited throughout the course of this project. Tribal governments and organizations have been notified of NEPA-related actions coincident with all public scoping and consultation efforts. Tribal governments are being asked to review the project proposal and the proposed treatments in order to solicit indigenous knowledge of spiritual-use areas, traditional cultural properties, or sacred sites that may not be readily identifiable. Details of this project proposal have also been presented to tribal representatives at formal government-to-government meetings hosted by the Forest (summary provided below). Regarding Section 106

of the NHPA, tribal authorities have been invited to voice their concerns and share traditional knowledge by participating in the development of a programmatic agreement that will be used to comply with NHPA mandates for this project.

Tribal contact lists for all three federal agencies involved with this project were combined for purposes of tribal consultation. As a result, tribal consultation has been initiated for this project with 17 different tribes with tribal headquarters located in six states.

- Cheyenne River Sioux Tribe
- Cheyenne/Arapaho Tribes of Oklahoma
- Crow Creek Sioux Tribe
- Eastern Shoshone Tribe
- Flandreau Santee Sioux Tribe
- Fort Peck Agency
- Lower Brule Sioux Tribe
- Mandan, Hidatsa & Arikara Nation
- Northern Arapaho Tribe
- Northern Cheyenne Tribe
- Oglala Sioux Tribe
- Rosebud Sioux Tribe
- Santee Sioux Nation
- Sisseton-Wahpeton Sioux Tribe
- Spirit Lake Sioux Tribe
- Standing Rock Sioux Tribe
- Yankton Sioux Tribe

Tribal governments were first informed of the proposed project during initial NEPA scoping efforts with information letters dated August 25, 2011. All 17 Tribes were subsequently notified of the agencies' intent to develop a PA for this project to fulfill NHPA Section 106 mandates. Tribal leaders were invited to participate in the drafting of the PA with a letter dated October 31, 2011. The Mandan, Hidatsa & Arikara Nation (Three Affiliated Tribes) responded with a request to participate.

The project has been on the agenda for five face-to-face meetings with Tribal representatives. The first three meetings were located in Ft. Pierre, SD and the two most recent in Custer, SD. Tribal attendance at these invitational meetings varied, but has generally been low.

- The first meeting was held on June 22, 2011, prior to the Notice of Intent being published in the Federal Register (August 26, 2011).
- A second meeting was held on June 11, 2012, after the Notice of Intent was distributed.
- The project was on the agenda for a third Tribal meeting on September 5, 2012.
- A fourth meeting that included an update and discussion of the project was held on June 25, 2012.
- The BHNF hosted a fifth tribal meeting on June 25, 2013 prior to publication of the DEIS in which this project was summarized and questions were addressed.

Consultation with tribal officials will continue as appropriate during the NEPA process and implementation phases.

3.12.1.7.2 Advisory Council on Historic Preservation

The BHNF (lead agency), with a letter dated October 25, 2011, informed the ACHP of its intent to develop a PA with the Wyoming and South Dakota SHPOs in order to fulfill the Agencies' NHPA Section 106 obligations for the project. The ACHP initially responded to the BHNF's invitation on December 2, 2011. The ACHP concluded that Appendix A, *Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, of the regulations, "Protection of Historic Properties" (36 CFR §800), did not apply to this undertaking at the current time.

Subsequent discussions between the SHPOs and the BHNF revealed the need to consult with the ACHP. As a result of a series of discussions conducted in early 2013 the ACHP determined, with a letter dated March 26, 2013, that they would henceforth participate in the development of the PA.

3.12.1.7.3 State Historic Preservation Officers

The BHNF has consulted on this project with the South Dakota and Wyoming SHPOs multiple times as a result of a mutual agreement to develop a PA for this undertaking. At the time of this writing the PA has not yet been executed, but consultation with both SHPOs and other consulting parties will continue until the document is finalized. Consultation with the SHPOs will also continue during the implementation phase pursuant to stipulations in the PA and/or the 36 CFR §800 regulations as appropriate.

3.12.1.7.4 Public

The public was informed of the Agencies' intent to develop a PA via legal notices published in six local newspapers distributed across the project location: Hill City Prevailer (weekly), Rapid City Journal (daily), News Letter Journal (Newcastle – weekly), Gillette News Record (daily), Douglas Budget (weekly), and Sundance Times (weekly). All six notices were published in November, 2011. The purpose of the PA was briefly outlined and members of the public were invited to submit comments and/or participate in the development of the PA. The BHNF concurrently posted a similar notice on the BHNF external website under the link for this project. No responses were received from the general public.

3.12.2 Existing Conditions

This section summarizes existing conditions based on current available data. In the vernacular of the cultural resources legal framework cited above, the affected environment will, by definition, be limited to the APE. The Agencies have acknowledged above that the APE has not yet been defined with certainty. For present purposes, the data presented below are based on a significantly expanded, two-mile wide geographic area (centered on the proposed route of the transmission line) which will be referred to as the "study area". The study area is not synonymous with the APE, although the latter will ultimately incorporate parts of the former. The data reported below provide a broad overview of existing conditions and they may be useful

to better predict the quantity and type of resources that may ultimately be identified in the actual APE.

It is important to reiterate that no field investigations have yet been completed for this project. The data presented in **Table 3-46** are derived exclusively from a review of existing literature. In the State of South Dakota, 210 separate projects have been conducted within a two-mile corridor centered on the proposed route of the transmission line. In Wyoming, 251 investigations have been recorded. Significantly more investigations have been conducted on public compared with private lands.

On the South Dakota side of the project, approximately 442 acres, or 66%, of the 665 acre (two-mile-wide) study area have been intensively surveyed in the past 20 years. In the State of Wyoming, approximately 3,123 acres, or 2.4%, of the 128,248 acre (two-mile-wide) study area have been intensively surveyed after 1982 (when the Wyoming standards became more stringent).

A total of 532 cultural resources, excluding isolated finds, have been identified to date in the two-mile wide study corridor (**Table 3-47**). Of that number, 244 cultural resources qualify as—or have the potential to qualify as—historic properties. The remaining 288 resources have been determined not eligible for the NRHP pursuant to 36 CFR §63. The total excludes all isolated finds (not eligible for the NRHP by definition).

The quantities reported in **Table 3-47** tally all cultural resources, excluding isolated finds, identified in a two-mile wide study area. The actual number of sites in the APE, once defined, is expected to be significantly fewer.

TABLE 3-46 - SUMMARY OF PREVIOUS CULTURAL RESOURCE INVESTIGATIONS

Agency	South Dakota	Wyoming
Black Hills National Forest	193	0
Bureau of Land Management	0	82
Thunder Basin National Grasslands	0	71
Wyoming State Lands	0	5
Private Lands	17	76
Multiple Agencies	0	12
U.S. Fish & Wildlife Service	0	3
Department of Environmental Quality	0	1
Federal Highway Administration	0	1
Totals	**210**	**251**

TABLE 3-47 - SUMMARY OF ALL PREVIOUSLY IDENTIFIED CULTURAL RESOURCES				
State	**NRHP Eligible**	**NRHP Unevaluated**	**NRHP Not Eligible**	**Totals**
South Dakota	46	58	173	**277**
Wyoming	17	123	115	**255**
Totals	**63**	**181**	**288**	**532**

Of the 532 cultural resources identified to date, 267 are located on lands managed by the BHNF, 178 on private lands, 63 on lands managed by the TBNG, nine under the jurisdiction of the State of Wyoming, eight on BLM-managed lands, and seven that overlap multiple jurisdictions (**Table 3-48**).

TABLE 3-48 - LAND OWNERSHIP OF PREVIOUSLY IDENTIFIED CULTURAL RESOURCES		
Jurisdiction	**South Dakota**	**Wyoming**
Black Hills National Forest	267	0
Bureau of Land Management	0	8
Thunder Basin National Grasslands	0	63
Wyoming State Lands	0	9
Private Lands	10	168
Multiple Jurisdiction	0	7
Totals	**277**	**255**[1]

[1] Six Wyoming sites have boundaries that overlap two landowner jurisdictions and a seventh site overlaps three different landowners.

No National Monuments, National Memorials, National Historic Landmarks, National Historic Parks, National Historic Trails, National Historic Sites, or State Register-Listed Sites have yet been identified within the two-mile-wide study area. One NRHP-listed property, called the Johnson Siding, House and Sawmill District (Record Number 389270) is located within the boundaries of the two-mile study area. A concise summary is provided below.

The following sections use currently available data to provide a more detailed summary of existing conditions delineated geographically by state followed by landowner.

3.12.2.1 SOUTH DAKOTA

The two-mile-wide study area in South Dakota is centered on the proposed transmission line from the Wyoming border to the Lange Substation northwest of Rapid City—a total of 45.4 miles (excluding six Alternative 3 route modifications). In South Dakota, the proposed ROW crosses two land jurisdictions composed of 36.3 miles of lands managed by the BHNF and 9.1 miles of private lands.

3.12.2.1.1 Field Investigations

A total 210 cultural resources investigations have been conducted within the two-mile study area on the South Dakota side of the project (**Table 3-49**). Some of the field investigations, however, were conducted many years ago and may not meet contemporary professional standards. Of the 210 projects, 193 investigations were located on some portion of the BHNF; the remaining 17 investigations were conducted on private lands. A total 190 investigations were reported as surveys or intensive surveys that suggest all of the individual analytical areas were surveyed for cultural resources. The total does not include investigations that were listed as reconnaissance level surveys which limit field coverage of the project area. The total also disregards all sample surveys and investigations for which field methods were ill-defined.

TABLE 3-49 - PREVIOUS CULTURAL RESOURCES INVESTIGATIONS IN SOUTH DAKOTA

Jurisdiction	Number of Investigations
Black Hills National Forest	193
Private Landowners	17
Total	**210**

An intensive survey typically consists of pedestrian transects spaced no greater than 30 meters (100 feet) apart. Earlier surveys (1970s-1980s) frequently, but not always, employed transects spaced at greater intervals. Of the total 210 investigations, 105 were conducted prior to 1992 and a percentage of those areas may need to be re-examined prior to project implementation. One-hundred one cultural resources investigations composed of intensive survey post-date 1992. The remainder of the investigations was composed of literature reviews and NRHP evaluations.

Alternative 3 addresses issues at six locations along the South Dakota segment of the proposed ROW. A significant percentage of the proposed modifications have been inventoried for cultural resources. Details are provided in **Table 3-50**.

TABLE 3-50 - PREVIOUS CULTURAL RESOURCES INVESTIGATIONS IN ALTERNATIVE ROUTES

Alt.	Name	Description	Percent Inventoried	Land Owner
3b	Mountain View	500 foot deviation for about one mile to avoid existing residences	82	BHNF/private
3c	Clinton	1,000 foot deviation for about one mile to avoid existing residences	29	BHNF/private
3d	Edelweiss	1,000 foot deviation for less than one mile to avoid sensitive wildlife	99	BHNF
3e	Pactola	Avoids Pactola Reservoir, a visually sensitive area	93	BHNF
3f	Pactola South	Avoids Pactola Reservoir area and follows approximately two miles of previously cleared ROW	100	BHNF
3g	Hidden Valley	2,500 foot deviation for about one and one-half miles to avoid planned quarry operations	0	BHNF/Private

3.12.2.1.2 Cultural Sites

A total of 277 cultural resources have been documented in the State of South Dakota within the two-mile wide study area. Of these, 10 are located on private property. The remaining 267 cultural resources are located on lands administered by the BHNF.

Table 3-51 enumerates previously identified cultural sites in the study area delineated according to chronological framework and NRHP eligibility. Of the 277 resources recorded in the South Dakota study area, 183 represent historic-era components most frequently associated with transportation, Civilian Conservation Corps (CCC) road construction, lumber/timber, and homesteading activities. Other historic-era resources consist of mining-related features (mine shafts, adits, prospecting pits, ditches), trash scatters, cabin remains, structural foundations, railroad grades, road segments, small dams, and lumber-related debris or structures (sawmill, log deck, dumps with saw blades), and a prayer site associated a Christian church camp.

TABLE 3-51 - CULTURAL RESOURCES PREVIOUSLY IDENTIFIED IN SOUTH DAKOTA

Site Type	NRHP Eligible	NRHP Unevaluated	NRHP Not Eligible	Totals
Historic Sites	27	32	124	**183**
Prehistoric Sites	15	21	42	**78**
Multi-component Sites	4	4	6	**14**
Unknown Age	0	1	1	**2**
Totals	**46**	**58**	**173**	**277**

Twenty-seven historic resources have been determined eligible for listing on the NRHP. Another 32 historic-era resources remain unevaluated for the NRHP. The remaining 124 historic-era resources have been determined not eligible for the NRHP.

The “Historic Sites” category includes 25 architectural resources, including recreational residence properties and bridges. The group also includes the John Johnson House and outbuildings which are included in the NRHP-listed Johnson Siding Historic District. Seven of the architectural resources have been determined eligible for listing on the NRHP with South Dakota SHPO concurrence. Twelve of the architectural resources have been determined not eligible for listing on the NRHP. The NRHP significance of the remaining six structures has not been determined.

Seventy-eight prehistoric sites have been documented within the study area. Prehistoric resources include 60 lithic scatters (21 of which consist of nine or fewer artifacts), one lithic scatter with stone circles, four quarries, one campsite, one habitation site, seven rock shelters with artifacts, one site with three slate-lined depressions, one with a bison skull and flakes, and one consisting of two stone circles. The remaining site did not include an adequate description of site contents.

Fifteen of the 78 prehistoric resources have been determined eligible for the NRHP. Forty-two prehistoric resources have formally been determined not eligible. The NRHP significance of the remaining 21 prehistoric resources has not been determined.

Fourteen of the resources are composed of both prehistoric and historic components (termed multicomponent). Four of the 14 multicomponent sites have been determined eligible for the NRHP. Another four remain unevaluated. The six remaining multicomponent sites have been determined not eligible for the NRHP with SHPO concurrence.

In addition to the historic sites, there are 41 historic and 38 prehistoric isolated finds within the two-mile study area. Historic isolates consist of single cans, small clusters of cans (< 3), pieces of metal, car parts, one resource consisting of two prospect pits and sheet metal, and one resource consisting of five prospect pits and a trash scatter. One historic isolated find consists of a single beer can in association with a projectile point, scraper, and two flakes. All of the historic isolates and the one in association with prehistoric isolates are, by definition, not eligible for the NRHP. The prehistoric isolates consist of eight or fewer flakes and/or individual stone tools.

3.12.2.2 WYOMING

The two-mile-wide study area in Wyoming is centered on the proposed transmission line from the Teckla substation south of Gillette to the South Dakota border—a total of 98.5 miles excluding the Alternative 3 Fiddler modification. The proposed ROW crosses multiple land jurisdictions including private landowners (80.9 miles), State of Wyoming (10.3 miles), TBNG (4.7 miles), and BLM (2.6 miles).

3.12.2.2.1 Field Investigations

A total 262 cultural resources investigations have been conducted completely, or partially within, the two-mile study area. A majority (n=253) of the investigations were intensive (Class III) surveys, four were sample (Class II) surveys, three were site testing/NRHP evaluations, one was a monitoring project, and one was an historic overview and evaluation for a NRHP-listed site.

The Wyoming Cultural Records Office (WYCRO) does not have an official policy regarding when cultural resources surveys are considered out-of-date or insufficient. In 1982 survey standards became more stringent, so it is more likely that surveys conducted prior to 1982 would fall short of current standards. Eighty-seven of the 262 investigations were conducted between 1974 and 1981 and are therefore unlikely to be adequate. The remaining 175 investigations were conducted after 1981. Of the 175 investigations, 168 were intensive Class III surveys that are more likely to meet current WYCRO standards. It is likely that some areas will need to be re-surveyed for cultural resources prior to project implementation.

Of 262 cultural resources studies, 82 investigations are on BLM-managed lands, 71 on TBNG, 76 on private lands, and five on Wyoming State lands. The remaining 28 projects were conducted under the aegis of other agencies, some of which are not formally land-managing agencies (**Table 3-52**).

Alternative 3 addresses issues at a single location along the Wyoming segment of the proposed ROW. The Alternative 3 Fiddler modification (3a), if selected, would be located on private lands and this segment has not previously been surveyed for cultural resources in the State of Wyoming.

TABLE 3-52 - PREVIOUS CULTURAL RESOURCES INVESTIGATIONS IN WYOMING

Jurisdiction	Number of Investigations
Bureau of Land Management	82
Thunder Basin National Grasslands	71
Wyoming State Lands	5
Private Landowners	76
Multiple Agencies	12
U.S. Fish & Wildlife Service	3
Department of Environmental Quality	1
Federal Highway Administration	1
Total	**251**

3.12.2.2.2 Cultural Sites

A total of 255 cultural resources have been documented in the State of Wyoming within the two-mile wide study area (excluding 296 isolated finds). Of these, 168 are located on private property, 63 on lands managed by the TBNG, nine on lands managed by the State of Wyoming, eight on lands managed by the BLM, and seven resources overlap more than one jurisdiction. Regarding the latter, two sites overlap both private and state-owned parcels, two cross TBNG and private lands, two intersect BLM and private properties, and one overlaps private, state, and BLM-managed lands.

Table 3-53 tallies previously identified cultural resources delineated according to chronological framework and NRHP eligibility. Of the 255 sites previously recorded in the study area, 62 represent historic-era activities, 172 indicate prehistoric sites, and 20 sites exhibit evidence of both historic and prehistoric components. The age of the single remaining site cannot be determined with certainty.

TABLE 3-53 - CULTURAL RESOURCES PREVIOUSLY IDENTIFIED IN WYOMING				
Site Type	**NRHP Eligible**	**NRHP Unevaluated**	**NRHP Not Eligible**	**Totals**
Historic Sites	2	34	26	**62**
Prehistoric Sites	14	76	82	**172**
Multi-component Sites	1	12	7	**20**
Unknown Age	0	1	0	**1**
Totals	**17**	**123**	**115**	**255**

Of the 255 cultural sites identified to date, 17 have been determined eligible to the NRHP, 123 have not been evaluated for NRHP significance, and 115 have been determined not eligible to the NRHP.

One historic property in the two-mile-wide Wyoming segment of the study area is currently listed on the National Register of Historic Places. The historic Flying V Guest Ranch/Cambria Casino-Park Memorial (48WE63) was listed in 1980 for its role in memorializing the Cambria mining area (36 CFR 60.4(a)) and for the resort's architecture (36 CFR 60.4(c)).

There are 10 previously recorded architectural resources in the study area. Of the 10 architectural resources, one has been listed on the NRHP (Flying V Guest Ranch), three have been determined not eligible to the NRHP with SHPO concurrence, and six remain unevaluated.

In addition to the archaeological sites, there are 296 previously recorded isolated finds within the study area. Of that number, 249 were composed of prehistoric artifacts and 46 historic artifacts. The single remaining isolated find contained both prehistoric and historic components. All of the isolated finds are, by definition, not eligible to the NRHP.

3.12.3 Environmental Consequences

The effects analyses reported in the Environmental Consequences section are first divided by Alternative and then subdivided and reported according to state segments.

3.12.3.1 ALTERNATIVE 1 – NO ACTION

Under the No Action Alternative, the Agencies would not issue a ROW to Black Hills Power and the project would not be constructed across federal lands. Consequently, there would be no ground-disturbing activities associated with the construction of the transmission line nor would other undertaking-associated activities be needed such as clearing vegetation, grading of new access roads, improving existing access roads, overland vehicular travel, installing tower foundations, assembling and installing tower structures, stringing and tensioning conductors, and any restoration and re-vegetation measures. The No Action Alternative would result in no cultural resources being adversely affected in either state.

Because the proposed project would not be constructed under the No Action Alternative, there would be no cumulative effects to cultural resources as a result of the undertaking.

3.12.3.2 ALTERNATIVE 2 – PROPOSED ACTION

The Proposed Action was developed as a response to the Purpose and Need. Alternative 2 is designed to strengthen the integrated transmission network, improve transmission system reliability by creating additional operating flexibility, and help meet future demand for growth for electricity and economic development in the region.

Cultural resources within the transmission line ROW may potentially be subject to direct and/or indirect impacts. Direct impacts would result primarily from ground disturbance associated with the construction and maintenance of the transmission line, substations, staging areas/decking yards, access roads, and other ancillary facilities. Increased use of existing and new access roads may encourage unauthorized access to historic properties and increase the potential for illegal artifact collection and vandalism of cultural resources.

Indirect effects to cultural resources may result from activities that occur near, but not physically on top of cultural resources. Indirect effects, though separated by time or space from project activities, may still pose a significant threat to historic properties. Indirect visual impacts, for example, may occur to some types of NRHP-eligible cultural resources (e.g., Native American sacred sites, historic trails, and certain classes of historic buildings) when modern structures (e.g., transmission towers) are introduced into the viewsheds of these resources. The term "viewshed" refers to an area of land visible from a fixed vantage point, such as a historic property or TCP.

The introduction of modern structures into the viewshed of a cultural resource may adversely affect the integrity of the historic setting. A cultural resource maintains its integrity of setting if the surrounding landscape has changed very little since the period of importance with which the resource is associated. Setting may include topography, vegetation, simple man-made features, and relationships between buildings, other features, and open spaces. In cases where archaeological sites are considered significant because of the scientific data they contain rather than their setting, they would not be as likely to be adversely affected by visual intrusions.

Cumulative effects are the progressive alteration or destruction of a site owing to the repetitive nature of one or more impacts. They are generally further removed in time from the original project. An example would be potential access-related impacts that may occur to cultural resources when public accessibility is increased to a previously remote area because of new or improved roads and equipment staging areas.

Increased potential for wildfires may also be considered a cumulative effect. Trees that may foster increased potential for wild fires would be identified, trimmed as needed, or removed from the ROW during the construction and/or maintenance phases.

Because the entirety of each alternative has not yet been fully inventoried for cultural resources, a uniform and accurate method to calculate the quantity and nature of historic properties is elusive until field survey has been completed prior to implementation activities.

3.12.3.2.1 South Dakota

3.12.3.2.1.1 Direct/Indirect Effects

In South Dakota, of the 45.4 miles of transmission line ROW (excluding Alternative 3 modifications), 36.3 miles are managed by the BHNF. In addition, the APE will ultimately include new spur roads, overland travel roads, and all access roads that may require improvements. The APE will also include all decking yards (expected to average 0.1 acre to 3.9 acres) and one construction yard anticipated to be roughly 20 acres in size

When the South Dakota modifications in Alternative 3 are calculated, the total length of the proposed transmission line ROW would be approximately 52.2 miles. Impacts to cultural resources are only assessed for those that are eligible for the NRHP and those whose significance has not yet been evaluated. Resources that have been formally determined not eligible are not considered significant and are subsequently released from management unless extenuating circumstances require otherwise.

One-hundred one intensive surveys post-dating 1992 have been conducted on South Dakota lands in the two-mile study area. Collectively, these investigations (most of which are considered methodologically adequate) represent roughly 66% of the study area. Other areas have been investigated as well, but the age and quality of the older field surveys may be suspect. Although the discussion above states that 277 cultural resources have been documented to date in the study area, only 104 of that number have been determined to be, or have the potential to qualify as, historic properties eligible for the NRHP. It is important to remain cognizant of the fact that these numbers reflect known properties identified in a two-mile wide study area. The actual direct APE, once identified, will be considerably more narrow. While these totals will decrease substantially as a result, other cultural resources will undoubtedly be identified in the APE where no field survey has yet been conducted.

While the Proposed Action has the potential to adversely affect historic properties, it is anticipated that potential effects can be minimized or eliminated by altering the location of support towers, access roads, staging areas, etc. A more definitive analysis of the effects on historic properties will be completed after field survey is complete and prior to initiation of any construction activities as per stipulations in the PA.

The APE for visual (indirect) effects may be significantly expanded beyond the APE. Consequently, adverse effects to viewsheds may encompass additional historic properties. Indirect effects will be considered after field survey is complete and data sets are more comprehensive. Although no TCPs have been identified in the study area to date, additional tribal consultation may shed light on indirect effects as a result of the project proposal.

3.12.3.2.1.2 Cumulative Effects

Potential cumulative effects to historic properties in South Dakota under the Proposed Action could result from increased motorized traffic as a result of the development of new access roads, maintenance of existing roads, and maintenance of the transmission line and associated

infrastructure. Opportunities for this type of damage on the South Dakota segment are reduced due to the quantity of previous archaeological investigations conducted on BHNF lands.

Completed field inventories will also help to lessen some of the cumulative effects to historic properties. Any future activities beyond the scope of this proposal that are proposed on federal lands would be subject to NHPA Section 106 mandates. Adverse effects can frequently be avoided or minimized through the implementation of appropriate site-specific protection measures through consultation with the Advisory Council on Historic Preservation (ACHP), SHPOs, Tribal governments, and the public, as appropriate.

3.12.3.2.2 Wyoming

3.12.3.2.2.1 Direct/Indirect Effects

The proposed transmission line ROW in the State of Wyoming would be 103.9 miles (including the Alternative 3 Fiddler modification). Of that total, 4.7 miles are located on lands managed by the TBNG, 2.6 miles on BLM lands, 10.3 miles on State lands, and 86.3 on private lands. Because of the large percentage of the project proposed on private lands, existing cultural resources data is less comprehensive than it is for the South Dakota segment.

In the State of Wyoming, approximately 3,123 acres, or 2.4%, of the 128,248 acre (two-mile-wide) study area have been intensively surveyed after 1982 (when the Wyoming standards became more stringent). Other areas have been investigated as well, but the age and quality of the older field surveys may be suspect.

Of the 255 cultural sites identified in the study area to date, 17 have been determined eligible to the NRHP and 123 have not been evaluated for NRHP significance, for a total 140 *potential* historic properties. Impacts to cultural resources are only assessed for those that are listed on the NRHP and those whose significance has not yet been evaluated. Resources that have been formally determined not eligible are not considered significant and are subsequently released from management unless extenuating circumstances require otherwise. To date, 115 cultural resources sites have been determined not eligible to the NRNP.

As was stated above for the South Dakota segment, it is important to recognize that these numbers reflect known properties identified in a two-mile wide study area. The actual direct APE, once identified, will be considerably more narrow. While the total number of previously identified cultural sites in the APE will decrease substantially as a result, other cultural resources will undoubtedly be identified in the large segment of the APE where no field survey has yet been conducted.

While the Proposed Action has the potential to adversely affect historic properties, it is anticipated that potential effects can be minimized or eliminated by altering the location of support towers, access roads, staging areas, etc. A more definitive analysis of the effects on historic properties will be completed after field survey is complete and prior to initiation of any construction activities as per stipulations in the PA.

When modern structures such as large transmission towers are introduced into the viewshed of some historic properties, the properties may be adversely affected by visual impacts to the setting. Examples of these types of properties include Native American sacred sites, historic trails, and the settings of certain classes of historic buildings. This type of potential indirect effects will be analyzed once field survey is complete on the Wyoming segment.

There were no TCPs identified during the records search within the analysis area, although there is one archaeological site that has been described as possibly ceremonial within the Wyoming segment of the Proposed Action. If the site is continually used ceremonially to maintain the identity of the tribe or group then it may be considered a TCP by the Native American tribe or group. Tribal consultation will continue as the proponent fulfills stipulations in the PA.

3.12.3.2.2.1 Cumulative Effects

Potential cumulative effects to Wyoming historic properties under the Proposed would be similar to those in South Dakota. Examples include increased motorized travel as a result of the development of new access roads, maintenance of existing roads, and maintenance of the transmission line and associated infrastructure.

The data obtained from completed archaeological and historical surveys will help minimize the cumulative effects to cultural resources sites because future federal activities—or federally funded projects—would be subject to NHPA Section 106 compliance mandates. Adverse effects can frequently be avoided or minimized through the implementation of appropriate site-specific protection measures through consultation with the ACHP, SHPOs, Tribal governments, and the public, as appropriate.

3.12.3.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

Alternative 3 has been developed to address specific issues at seven locations along the proposed route. Each of the modifications is located within one mile either side of the Proposed Action route. Six modifications are located in the State of South Dakota (**Table 3-50**) and a single modification is located in the State of Wyoming.

3.12.3.3.1 South Dakota

3.12.3.3.1.1 Direct/Indirect Effects

Collectively, roughly 67% of the six Alternative 3 modifications proposed in the State of South Dakota have been surveyed for the purpose of identifying cultural resources. Three of the six modifications are located exclusively on lands managed by the BHNF; the remaining three modifications intersect both BHNF and private lands.

The two modifications where the least is known about cultural resources are the Hidden Valley and Clinton variations. No investigations have been conducted within the boundaries of the former and only 29% of the latter has been adequately investigated (**Table 3-50**).

To date, two historic properties have been identified within the six South Dakota modifications included in Alternative 3. The BHNF, with SHPO concurrence, determined in 2005 that one historic structure within the Pactola modification ROW was determined eligible for the NRHP. In 2001 a prehistoric site consisting of a lithic scatter and stone tools was determined NRHP eligible within the boundaries of the proposed Edelweiss modification.

3.12.3.3.1.2 Cumulative Effects

Potential cumulative effects to historic properties in South Dakota under Alternative 3 could result from increased motorized traffic as a result of the development of new access roads, maintenance of existing roads, and maintenance of the transmission line and associated infrastructure. Opportunities for this type of damage on the South Dakota segment are reduced due to the relatively large percentage (67%) of the Alternative 3 modifications that have been surveyed. Completed field inventories will help to lessen some of the potential for cumulative effects to historic properties.

Any future activities beyond the scope of this proposal that are proposed on federal lands—or are funded by federal tax dollars—would be subject to NHPA Section 106 mandates. Adverse effects can frequently be avoided or minimized through the implementation of appropriate site-specific protection measures through consultation with the Advisory Council on Historic Preservation (ACHP), SHPOs, Tribal governments, and the public, as appropriate.

3.12.3.3.2 Wyoming

3.12.3.3.2.1 Direct/Indirect Effects

The Alternative 3 Fiddler modification (3a) constitutes the only modification to the Proposed Action in the State of Wyoming. The Fiddler modification would be limited to private lands. No portion of Alternative 3 in the State of Wyoming has been surveyed for cultural resources. Consequently, no resources have been identified to date.

3.12.3.3.2.2 Cumulative Effects

Potential cumulative effects to Wyoming historic properties under Alternative 3 would be similar to those suggested for the South Dakota modifications. Examples include increased motorized travel as a result of the development of new access roads, of existing roads, and maintenance of the transmission line and associated infrastructure. Adverse effects can frequently be avoided or minimized through the implementation of appropriate site-specific protection measures through consultation with the ACHP, SHPOs, Tribal governments, and the public, as appropriate.

3.13 PALEONTOLOGICAL RESOURCES

3.13.1 Existing Conditions

Paleontological resources are closely associated with the geologic units that contain them. With this knowledge, paleontologists can predict where these resources are likely to occur based on presence of the geologic units.

Areas of potential impacts to paleontological resources are defined as all areas incorporating paleontologically sensitive geologic units that could potentially be subject to ground disturbance resulting from project activities. The USFS and BLM employ separate methods for assigning paleontological sensitivity to geologic units but both methods address the same issues and sensitivity ratings for both agencies are used. Generally, these rankings are:

- Class 1 – Very Low. Igneous and metamorphic geologic units not likely to contain recognizable fossil remains.
- Class 2 – Low. Sedimentary geologic units not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils.
- Class 3 – Moderate or Unknown. Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential.
- Class 4 – High. Geologic units containing a high occurrence of significant fossils that have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation.
- Class 5 – Very High. 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.

Geologic units assigned a rating of 3 to 5 according to BLM and USFS sensitivity rating systems could potentially be affected by project-related activities. Formations rating 1 and 2 are not discussed due to the low or very low likelihood of significant paleontological resource occurrences.

3.13.1.1 SOUTH DAKOTA

Seventeen geologic units were encountered in the analysis area in South Dakota. The units range in age from recent alluvium to Proterozoic metamorphosed basalts. Five of the seventeen geologic units encountered along the South Dakota ROW have been assigned a rating of 3, 4, or 5 according to the USFS and BLM sensitivity rating systems. These include:

- White River Group, Eocene to Oligocene - Class 5 (NFS), Class 5 (BLM)
- Sundance and Gypsum Spring Formations, Jurassic - Class 3 (NFS), Class 3 (BLM)
- Minnekahta Limestone, Permian - Class 3 (NFS); Class 3 (BLM)
- Englewood Limestone, Mississippian/Devonian - Class 3 (NFS); Class 3 (BLM)
- Deadwood Formation, Ordovician/Cambrian - Class 3 (NFS); Class 3 (BLM)

A review of available paleontological data resulted in the identification of no known paleontological resource sites within the one-mile analysis area in South Dakota.

3.13.1.2 WYOMING

Twenty eight geologic units are encountered in the analysis area in Wyoming. The units range in age from recent alluvium to Mississippian/Devonian Pahasapa and Englewood limestones.The units on the federal lands within the Wyoming analysis area with ratings of 3, 4, and 5 are described below.

3.13.1.2.1 Fort Union Formation (Tongue River and Lebo Members, Undivided) Paleocene - Class 3 (USFS), Class 3 (BLM)

The Fort Union Formation consists of three members, from youngest to oldest the Tongue River Member, the Lebo Member and the Tullock Member, respectively. The Lebo and Tullock members outcrop in the study area. Massive white sandstone and light to dark gray slightly bentonitic shale occur throughout the unit (Denson and Horn 1975). Although few paleontological resources have been recovered from the Fort Union Formation in the Powder River Basin, extensive collections have been obtained from Fort Union outcrops at better exposures in the Hanna, Big Horn and Wind River and other Wyoming basins (University of Wyoming 2012).

3.13.1.2.2 Carlile Shale, Cretaceous - Class 3 (USFS), Class 3 (BLM)

This unit is subdivided into three members in the Newcastle area: the uppermost Sage Breaks Member composed of soft grayish black calcareous shale with gray limestone concretions; the Turner Sandy Member composed of ridge-forming gray sandy shale and brownish-red sandstone; and the basal unnamed lower member (Pool Creek Member as found in Merewether et al. 2011) consisting of dark gray shale with fossiliferous concretions and numerous siltstone beds. The marine Carlile shale bears many coiled ammonites of genera *Scaphites* and *Prionocyclus* and pelecypod genera of *Inoceramus* and *Mytiloides* (Merewether et al. 2011).

3.13.1.2.3 Skull Creek Shale, Cretaceous - Class 3 (USFS), Class 3 (BLM)

The Skull Creek is described as black, soft fissile shale with scattered siderite concretions. This unit is not well exposed within the analysis area. Balster (1971) notes *Inoceramus bellevuensis* as indicative of this formation, and Holbrook and Ethridge (1996) report abundant trace fossils in the upper portion of the Skull Creek.

3.13.1.2.4 Lakota Formation, Cretaceous - Class 5 (USFS), Class 3 (BLM)

The Lakota Formation is described as a basal gray conglomeratic sandstone overlain by variegated claystone and sandstone. The upper part tends to contain more conglomerate, the lower part contains more coal, including a gold bearing coal seam near the base of the formation. The Lakota Formation forms a resistant hogback at outer edge of the Black Hills and includes the resource-rich section exposed in Dinosaur Park near Rapid City include

carnivorous dinosaurs, the Thyreophoran *Hoplitosaurus marshi*, Ornithopods such as a *Hypsilophodon*, and *Iguanodon lakotaensis* and *Camptosaurus depressus*. Trace fossil trackways and footprint impressions have been recorded along bedding surfaces within the Lakota Formation (Bjork and Tallman 1995).

3.13.1.2.5 Morrison Formation, Jurassic - Class 5 (USFS) , Class 5 (BLM)

The Morrison Formation is a continental unit with compositional variations throughout its aerial extent. Within the project area the Morrison is described as dull olive to purplish gray siliceous claystone containing nodular limestone and gray silt sandstone lenses. The Morrison Formation is the source of many well preserved vertebrate fossils of the Jurassic Period. Familiar vertebrate forms recovered from the Morrison include *Stegosaurus, Allosaurus, Apatosaurus, Camarasaurus, Diplodocus, Camptosaurus* and many others. It also bears significant invertebrate and plant assemblages.

3.13.1.2.6 Wasatch Formation, Eocene/Paleocene - Class 5 (USFS), Class 3a (BLM)

The Wasatch Formation covers much of the relatively level ground on the western area of the analysis area. The Wasatch in this region is characterized as gray, brown, and reddish-pink conglomeritic to fine-grained arkosic sandstone, siltstone, carbonaceous shale, and coal. A two- to four-foot conglomerate composed primarily of black chert pebbles, is present locally at the base (Denson and Horn 1975). The Wasatch Formation contains a well preserved but fragmentary record of vertebrate fossils, including fish, reptiles, birds, and mammals, as well as invertebrate and plant fossils.

A review of available paleontological data resulted in the identification of one known paleontological resource site within the one-mile analysis area in Wyoming.

3.13.2 Environmental Consequences

Two types of impacts to paleontological resources could occur from transmission line construction and operation: direct impacts due to ground disturbance and indirect impacts due to factors such as accelerated erosion or increased public access.

Impacts connected with ground disturbance are those associated with:

- Construction of spur and access roads
- Tower/pole site clearing and excavation
- Foundation excavation
- Laydown areas
- Construction yards/staging areas
- Log decking yards
- Conductor pulling and tensioning sites

Direct impacts can be mitigated to below a significant level through implementation of paleontological resource mitigation measures developed to avoid or minimize impacts to paleontological resources.

Indirect impacts associated with accelerated erosion are those that cause degradation or loss of resources due to inadvertent surficial exposure and transport by gravity, water and wind. Erosion, transport and re-deposition eliminate the possibility of studying the resources *in-situ* to assess source unit identity. Indirect impacts associated with increased public access are those related to long-term effects of increased public use of areas that were previously remote or less accessible.

3.13.2.1 ALTERNATIVE 1 – NO ACTION

3.13.2.1.1 South Dakota and Wyoming

Under this Alternative, the proposed transmission line would not be constructed and there would be no new disturbance that could impact paleontological resources.

3.13.2.2 ALTERNATIVE 2 – PROPOSED ACTION

3.13.2.2.1 South Dakota

3.13.2.2.1.1 Direct/Indirect Effects

In South Dakota, the proposed line would cross approximately 3 miles of areas that have been assigned a sensitivity rating of 3, 4, or 5. In these areas, paleontological resources could be impacted by the ground disturbing activities identified above. Impacts would be expected to be minor because most disturbance would be relatively shallow and would not be expected to directly impact the sensitive strata.

3.13.2.2.2 Wyoming

3.13.2.2.2.1 Direct/Indirect Effects

The proposed project would cross approximately 7 miles of federally owned property in Wyoming and these areas have been assigned a sensitivity rating of 3, 4, or 5. Paleontological resources could be impacted by the ground disturbing activities identified above but impacts would be expected to be minor because disturbance would be relatively shallow.

3.13.2.3 ALTERNATIVE 3 – PROPROSED ACTION WITH ROUTE MODIFICATIONS

3.13.2.3.1 South Dakota

3.13.2.3.1.1 Direct/Indirect Effects

All route modifications in South Dakota occur in areas with low to very low potential to contain paleontological resources. Therefore, the impacts associated with this alternative would be similar to the Proposed Action.

3.13.2.3.2 Wyoming

3.13.2.3.2.1 Direct/Indirect Effects

The route modification in Wyoming is located on private land and the impacts associated with this alternative would be similar to the Proposed Action.

3.14 TRANSPORTATION AND TRAVEL MANAGEMENT

3.14.1 Existing Conditions

The geographic analysis area for transportation/travel management covers the Proposed Action's two-mile-wide analysis area and includes U.S. Highways, State Highways, county highways in Pennington County, South Dakota, and in Weston and Campbell counties, Wyoming, NFS Roads (NFSR), unauthorized roads, roads on private lands, and railroads.

3.14.1.1 SOUTH DAKOTA

Figure 3-17 shows the major roads and **Table 3-54** lists designations and mileages for roads in the South Dakota portion of the analysis area. The designations are included in BHNF's 2012 Motor Vehicle Use Map (MVUM) data.

TABLE 3-54 - EXISTING TRANSPORTATION SYSTEM MILEAGE – SOUTH DAKOTA

Designation	Number of Miles
Interstate	5
Other Public State	24
Roads Open to All Vehicles	17
Roads Open to All Vehicles – Seasonal Restrictions	9
Roads Open to Highway-Legal Vehicles Only	55
Roads Open to Highway-Legal Vehicles Only – Seasonal Restrictions	30
Other Public Roads	22
Total Miles	162

3.14.1.1.1 Existing Travel Management – BHNF

In April 2007, the USFS announced a new regulation governing off-highway vehicles (OHV) and other motor vehicle use on national forests and grasslands. The new rule requires each national forest or ranger district to designate roads, trails, and areas open to motor vehicle use.

On May 7, 2010, the USFS signed the ROD for BHNF's *Travel Management Plan*. Implementing the plan began with publishing the MVUM effective December 1, 2010. The ROD designates certain roads and trails as open to motorized vehicle traffic on USFS administered lands and assigns a vehicle class and season of use to these designated roads or trails. Trail designations in the ROD were the result of either changing an existing NFSR to a Forest

System Trail, or converting an unauthorized route to a system trail. Some NFSRs were also changed from the status of "highway-legal only" to "mixed use", which is also referred to as roads open to all motorized uses.

Of the 162 miles listed in **Table 3-54**, 111 miles are USFS roads. **Table 3-55** lists the USFS roads and trails in the BHNF portion of the analysis area that are open yearlong or seasonally. Additionally, **Table 3-56** lists the USFS miles per management area in the BHNF portion of the analysis area. The information in **Tables 3-54, 3-55 and 3-56** is based on BHNF's 2012 MVUM. **Figure 3-17** depicts the existing transportation system in the South Dakota portion of the analysis area.

TABLE 3-55 - BHNF TRAVEL MANAGEMENT PLAN MILEAGE – DESIGNATED ROADS AND TRAILS

Designation	Number of Miles		
	Open Yearlong	Open Seasonal (May 15 to December 15)	Total
Roads Open to All Vehicles	17	9	26
Roads Open to Highway-Legal Vehicles Only	55	30	85
Trails Open to All	<1	10	10
Trails Open to Vehicles < 62" wide	8	11	19
Total Miles	80	60	140

TABLE 3-56 - BHNF TRAVEL MANAGEMENT PLAN MILEAGE – MANAGEMENT AREAS

Management Area	Number of Miles
3.7 – Late Successional Forest Landscapes	<1
4.1 – Limited Motorized Use and Forest Products	1
5.1 – Resource Protection Emphasis	67
5.4 – Big Game Winter Range Emphasis	62
8.2 – Developed Recreational Complexes	7
Total Miles	137

In addition to the number of miles available for motorized travel in the BHNF, it is important to note what kinds of uses are permitted, specifically with regard to motorized recreation opportunities. The ROD provides 90 miles of single-track motorcycle trails, as well as "rock crawler" routes for 4x4 enthusiasts. The ROD also provides for utility terrain vehicle (UTV) use along with traditional ATV use. Most UTVs manufactured are 62 inches or less in width. The motorized trail system in the South Dakota portion of BHNF focuses on recreation opportunities for this vehicle class. Roads, and trails that are open to all, provide opportunities for larger, wider vehicles.

It is also important to note that the ROD sets limits on motor vehicle use for retrieving big game (elk only); for dispersed camping; for cross-country travel; and also sets limits on motor vehicle noise. The motor vehicle use for big game retrieval (elk) is limited to within 300 feet of certain designated roads and within one mile of other designated roads. Motor vehicle use for dispersed camping is limited to within 300 feet of USFS roads where motor vehicle use is allowed. Dispersed camping is prohibited in or near developed recreation sites, or on adjacent lands of other ownership such as the Mickelson Trail ROW. Motorized cross-country travel is limited to designated areas and in the areas identified above for retrieving elk and for dispersed camping. Motor vehicle noise is limited to 96 decibels for OHVs manufactured on or after January 1, 1998, and 99 decibels for OHVs manufactured prior to January 1, 1998 (USFS 2010).

3.14.1.1.2 Airports

Airports in the Proposed Action's vicinity in South Dakota include Ellsworth Air Force Base and Rapid City Regional Airport. Ellsworth Air Force Base is located approximately eight miles east of the Lange Substation (the Proposed Action's east terminus) and Rapid City Regional Airport is located on SD Highway 44 approximately 11 miles southeast of the Lange Substation.

3.14.1.2 WYOMING

3.14.1.2.1 Existing Transportation System

The transportation system in the Wyoming portion of the analysis area includes U.S. Highways 16 and 85, Wyoming Highways 59, 116, 450, and 451, and various county roads, private roads, and unauthorized roads. **Figure 3-18** depicts the proposed overland travel routes in the Wyoming portion of the analysis area.

3.14.1.2.2 Existing Travel Management – TBNG

3.14.1.2.2.1 TBNG 2002 LRMP

Prior to the July 31, 2002 LRMP, the TBNG was open to off-road travel. The LRMP restricts motorized travel to existing routes, while calling for site-specific analysis and designation of motorized routes with public involvement to designate permanent transportation facilities. The LRMP does not designate or accept user-created routes, some of which may be designated or decommissioned in the future and the USFS would restore areas where routes had been decommissioned. The USFS would continue to allow authorized uses, including grazing, fencing, salting, approved mineral exploration and development, fire control, wildlife surveys, and emergency needs (USFS 2002).

The 2002 LRMP allocates 25,780 acres, approximately five percent of the land in TBNG, to Management Area 4.32 – Dispersed Recreation, High Use. The USFS manages these areas to allow visitors to recreate in a relatively natural environment, while pursuing unstructured activities, including camping, fishing, picnicking, and using ATVs. During certain times of the

year, motorized travel may be restricted in these areas. Oil and gas leasing will be allowed subject to appropriate limitations as defined in the 2002 LRMP, **Appendix D**.

3.14.1.2.2.2 Travel Management Rule

Revised in April 2007, the Travel Management Rule requires each National Forest and Grassland to identify and designate those roads, trails, and areas that are open to motor vehicle use. The Motor Vehicle Use Map (MUVM) is a requirement of the Travel Management Rule and reflects travel management plan decisions. The MVUM displays NFS roads, trails, and areas that are designated open to motor vehicle travel. The MVUM also displays allowed uses by vehicle class (highway-legal vehicles, vehicles less than or equal to 50 inches wide, and motorcycles), seasonal allowances and provides information on other travel rules and regulations. Routes (includes both roads and trails) not shown on a MVUM are not open to public motor vehicle travel. Routes designated for motor vehicle use may not always be signed on the ground but will be identified on the MVUM.

3.14.1.2.2.3 Roads Analysis – Minimum Road System

On January 12, 2001, the USFS issued the final NFS Road Management Rule. This rule revises regulations concerning the management, use, and maintenance of the national forest or national grassland transportation system. Forest Service Manual 7700-Transportation System directs each national forest, national grassland, and experimental forest to determine the minimum road system that is safe and responsive to public needs and desires; is affordable, efficient, has minimal adverse effects on ecological processes and ecosystem health, diversity, and productivity of the land; and is in balance with available funding for needed management actions.

A Travel Management Rule Implementation Action Plan was prepared in 2006 and revised in 2007. This Action plan serves a tool for implementation of the 2005 Travel Management rule on the Medicine Bow and Routt National Forests and Thunder Basin National Grassland, and is prepared for use in: project scheduling; allocating forest-wide resources for travel management; establishing an implementation team; coordination with other National Forests and monitoring and evaluation progress of planned activities. Travel Management was completed in 2009 and includes a minimum road system.

3.14.1.2.2.4 Roadless Area Conservation Rule

There are six inventoried roadless areas on the TBNG: Cow Creek Buttes, Downs, Duck Creek, HA Divide, Miller Hills, and Red Hills. The Proposed Action would not cross any inventoried roadless areas and is closest to HA Divide, which lies approximately seven miles south. The USFS identified these roadless areas as having special values for semi-primitive recreation opportunities and/or biological diversity. In all of these roadless areas, the USFS seeks to retain semi-primitive recreation opportunities and/or biological diversity characteristics.

3.14.1.2.3 BLM Land

The existing transportation system affecting BLM lands is similar to that described above for the other federal lands in Wyoming.

3.14.1.2.4 Airports

Airports in the vicinity of the Proposed Action in Wyoming include Mondell Field in Weston County, a landing strip in Campbell County, and Upton Municipal Airport. Mondell Field is on U.S. Highway 16-Weston County Highway 10 intersection's south side, approximately five miles south of the Proposed Action. A landing strip at Jacobs Ranch in Campbell County is just west of Jacobs Road, approximately eight miles east of the Proposed Action. Upton Municipal Airport is approximately eight miles north of the Proposed Action.

3.14.2 Environmental Consequences

3.14.2.1 ALTERNATIVE 1 – NO ACTION

3.14.2.1.1 South Dakota

3.14.2.1.1.1 Direct/Indirect Effects

Under the No Action Alternative, the Proposed Project would not be constructed. Existing NFS roads would not be used to access the transmission line ROW, no new access roads would be created on previously undisturbed land, and tracked equipment would not be used to access structure locations via overland travel. Additionally, traffic volumes along federal, state, and local roads would be maintained at current conditions.

3.14.2.1.1.2 Cumulative Effects

The No Action Alternative would not add to other past, present, or reasonably foreseeable future actions in the South Dakota portion of the analysis area and would not contribute to cumulative transportation or travel management effects.

3.14.2.1.2 Wyoming

3.14.2.1.2.1 Direct/Indirect Effects

Under the No Action Alternative, the Proposed Project would not be constructed. Existing NFS roads would not be used to access the transmission line ROW, no new access roads would be created on previously undisturbed land, and tracked equipment would not be used to access structure locations via overland travel. Additionally, traffic volumes along federal, state, and local roads would be maintained at current conditions.

3.14.2.1.2.2 Cumulative Effects

The No Action Alternative would not add to other past, present, or reasonably foreseeable future actions in the Wyoming portion of the analysis area and would not contribute to cumulative transportation or travel management effects.

3.14.2.2 ALTERNATIVE 2 – PROPOSED ACTION

3.14.2.2.1 South Dakota

3.14.2.2.1.1 Direct/Indirect Effects

Most of the Proposed Action's direct effects on transportation and travel management would occur during construction activities. Construction would include workers and equipment traveling to and from structure work areas in the ROW, the construction yard, decking yards, and wire-pulling, tensioning, and splicing sites. The effects described below are based on the Proposed Action's preliminary engineering design.

The Proposed Action would not create new permanent access roads at new locations. BHP would use existing roads and trails, improve existing roads where necessary, construct new roads, and use tracked or rubber-tired equipment for overland travel to access the areas identified in the paragraph above. In implementing the Proposed Action, BHP would use approximately 44 miles of existing USFS roads. Some of these existing roads (all on BHNF land) may need to be improved, by widening to a minimum of 14 feet, smoothing, clearing vegetation, and adding fill. BHP would also construct approximately 11 miles of new temporary access roads and would also route construction vehicles and equipment for approximately 14 miles via overland travel on NFS land. During and after construction activities, gravel would be replaced as necessary to be consistent with similar-scale road reclamation projects. At entrances to all newly created temporary access roads, BHP would place large boulders, stumps, or earthen berms to effectively restrict motorized travel.

Also, per the mitigation measures discussed below, BHP would revegetate temporary roads and overland travel routes after construction is complete, returning roads and trails as close as possible to pre-construction conditions to help discourage ATV, OHV, and other vehicle traffic from using the newly created, temporary access roads and overland travel routes. By implementing these mitigation measures, BHP would comply with USFS policies to limit motorized travel to USFS-designated routes.

The alignment of any new temporary access roads or overland travel routes would follow the landform contours in designated areas where practicable, providing that such alignment does not impact other resource values. BHP would use tracked equipment as well as backhoes, dump trucks, and crew-haul vehicles as needed to improve existing access roads and construct new access roads. All of the access would accommodate the turning radii and weight needed for the equipment.

The construction traffic when added with existing public use could impact U.S. Highways, State Highways, county roads, and NFSRs and trails. Heavy equipment could produce cracks in the

pavement, and increase compaction of dirt and gravel roads to create a more impervious surface, which may then lead to increased runoff during storm events. Where existing roads are improved, members of the public could possibly drive faster than permitted by construction zone speed limits and could cause vehicle accidents. Flagmen and pilot cars may delay traffic so that construction vehicles can safely travel to and from construction sites. BHP would follow standard design criteria to reduce road construction impacts and ensure workers' and the public's health and safety. BHP would also file a traffic control plan with the appropriate authorities and obtain any necessary federal, state, and local government permits for routing oversize and overweight equipment along analysis area roads.

It is possible that construction activities could impact the level of service (LOS) on the U.S. Highways, State Routes, and county roads in the analysis area. LOS provides a qualitative measure of the operational traffic conditions and how motorists and passengers perceive these conditions. LOS includes six categories: A, B, C, D, E, and F. LOS A represents free-flowing traffic conditions. LOS C represents a stable flow, but most drivers would be restricted in selecting their own speed, changing lanes, or passing. LOS F represents a system breakdown. Construction of the Proposed Action would not be expected to reduce the LOS below LOS C on any of the roads in the analysis area.

During operation and maintenance activities, direct effects on transportation and travel management would be minimal. Maintenance activities would be infrequent and of short duration, occurring only once every 15 to 20 years and during emergencies.

Indirect effects during construction could include increased traffic volumes along local, state, and federal roads outside of the analysis area. These effects are expected to be minor as relatively low numbers of workers and equipment will be accessing any one location along the Proposed Action ROW at any given time. Motorists may also use these roads outside the analysis area to avoid construction traffic occurring within the analysis area.

3.14.2.2.1.2 Cumulative Effects

Construction of the Proposed Action would be expected to create minor to moderate impacts when added to other past, present, and reasonably foreseeable future actions. Other actions in the area primarily include timber operations, such as examining timber stands and non-commercial and commercial thinning and logging activities are expected to continue. Present and reasonably foreseeable future actions in the area also include constructing and maintaining roads on non-NFS lands and developing subdivisions.

Logging, road construction, subdivision development, and construction of the Proposed Action would primarily occur during the summer months when road and weather conditions are most suited for these activities. Routing construction equipment associated with the Proposed Action along local, state, and federal roads would add to the commercial traffic associated with the logging trucks, skidders, and cranes working in the BHNF. Collectively, these construction vehicles could cause minor traffic delays for the public. Similarly, highway maintenance vehicles and equipment, as well as construction equipment used for commercial and residential development, would also be expected to cause minor traffic delays along analysis area roads.

When added to summer visitor traffic in the BHNF, these activities could cause some periodic traffic delays along analysis area roads.

The Proposed Action operation and maintenance activities would cause no measurable impacts when added to other past, present, and reasonably foreseeable future actions.

3.14.2.2.2 Wyoming

3.14.2.2.2.1 Direct/Indirect Effects

The direct and indirect effects associated with the Proposed Action in Wyoming would route construction vehicles and equipment approximately eight miles via overland travel on NFS administered lands. At entrances to overland travel routes, BHP would install carsonite signs reading "Closed to Public Access." Per the mitigation measures below, BHP would revegetate overland travel routes and would return these routes as close as possible to pre-construction conditions. This would help discourage ATV, OHV, and other vehicle traffic from using the overland travel routes and would comply with USFS policies that seek to permit motorized travel only on USFS-designated routes.

BHP would file a traffic control plan with the appropriate authorities in Wyoming and obtain any necessary federal, state, and local government permits for routing oversize and overweight equipment along analysis area roads. Additionally, where the Proposed Action is on state lands in Wyoming, BHP would coordinate construction activities with the Wyoming Office of State Lands and Investments and/or the Wyoming State Forestry Division.

In Wyoming, the Proposed Action's impacts during construction to traffic and the LOS on U.S. Highways, State Highways and county roads would be minimal. The Proposed Action's operation and maintenance activities would not affect traffic and transportation because of the infrequency of activities.

3.14.2.2.2.1.1 BLM Land

The direct and indirect effects associated with the Proposed Action on BLM land would be similar to those described above for other federal lands in Wyoming.

3.14.2.2.2.2 Cumulative Effects

The Proposed Action's construction activities would be expected to create minor transportation and travel management impacts when added to other past, present, and reasonably foreseeable future actions. Past actions primarily include thinning and burning timber stands in the Upton-Osage area, and constructing approximately 4.4 miles of new roads on NFS administered lands at the North Antelope Rochelle Mine. For the area around Teckla numerous existing roads associated with coal mining and oil and gas development exists and it is anticipated the activities from the Proposed Action will not significantly add to the existing conditions. Given the relatively small impact associated with the Proposed Action and the scale of oil and gas development in the Proposed Action's vicinity, the T-O-RC Project would

contribute only minor impacts which would be mitigated with additional USFS approved signage. The Proposed Action's operation and maintenance activities would cause no measurable impacts when added to other past, present, and reasonably foreseeable future actions.

3.14.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

The following provides a comparison of Alternative 3 (Proposed Action with Route Modifications) and the Proposed Action.

3.14.2.3.1 South Dakota

3.14.2.3.1.1 Direct/Indirect Effects

Route Modifications 3b through 3g would not be expected to have significantly different impacts than the Proposed Action on transportation, travel management, and access road construction in the BHNF. There is no substantial difference between the number of miles of new access roads that would be constructed for each route modification and the number of miles of new access roads that would be constructed for the Proposed Action.

3.14.2.3.2 Wyoming

3.14.2.3.2.1 Direct/Indirect Effects

Implementing Route Modification 3a would not be expected to have a significant impact on transportation and travel management in Wyoming. BHP would not construct new access roads or improve existing access roads to implement this modification and would access construction work areas via overland travel routes only.

3.15 SOCIOECONOMICS

3.15.1 Existing Conditions

The analysis area for socioeconomics includes the communities near the proposed transmission route. It includes the City of Rapid City and Pennington County in South Dakota. In Wyoming, the analysis area includes Weston and Campbell Counties and the communities of Newcastle, Osage, and Upton in Weston County, and Wright and Gillette in Campbell County. Though Gillette is farther removed from the proposed transmission route than the other communities above, it could possibly provide a labor force for project construction, operation, and maintenance activities.

3.15.1.1 SOUTH DAKOTA

3.15.1.1.1 Population

From 2000 to 2010, populations grew in the South Dakota portion of the analysis area. Rapid City's population grew 14 percent, totaling 67,956 residents and Pennington County's population also grew 14 percent, totaling 100,948 residents (U.S. Census Bureau 2010).

3.15.1.1.2 Minority and Low-Income Populations

On February 11, 1994, President Clinton signed Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Executive Order 12898 directs federal agencies to focus attention on the human health and environmental conditions in minority populations and low-income populations. The purpose of the Executive Order is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. The USFS has considered all input from persons or groups regardless of age, race, income status, or other social and economic characteristics.

Rapid City's percentages are higher for minority and low-income variables relative to Pennington County and the state. Also in Rapid City, the percentage of families living below the poverty level and the percentage of those under 18 living below the poverty level may indicate low-income populations. In Pennington County, the percentage of those under 18 living below the poverty level may also indicate a low-income population. Neither Rapid City nor Pennington County data cross the threshold that would indicate minority populations.

3.15.1.1.3 Employment and Income

From 2006 to 2010, the percent of civilians age 16 or older who were employed in the labor force in Rapid City, Pennington County, and the state totaled 63 percent, 64.7 percent, and 65.8 percent, respectively. During this time period, the unemployment rate totaled 7.1 percent in Rapid City, six percent in Pennington County, and 4.7 percent in South Dakota (U.S. Census Bureau 2010).

During this same time period, the largest employment industries in Rapid City and Pennington County were educational services, and health care and social assistance at 24.7 percent and 23.2 percent of the labor force; retail trade at 12.9 percent for both geographic areas; and arts, entertainment, and recreation, and accommodation and food services at 11.6 percent and 11.9 percent of the labor force. (U.S. Census Bureau 2010).

In 2010, using inflation-adjusted dollars, the median household income in Rapid City totaled $44,099. In Pennington County and the state, the values totaled $46,849 and $46,369, respectively. In 2010, per capita incomes in the three geographic areas were also similar. Using 2010 inflation-adjusted dollars, the Rapid City per capita income totaled $25,861, with Pennington County totaling $25,894. For the state, the per capita income totaled $24,110. The percentage of persons living below the poverty level ranked highest in Rapid City at 16.3 percent. In Pennington County and the state, the percentages fell to 14 percent and 13.7 percent, respectively (U.S. Census Bureau 2010).

3.15.1.1.4 Housing

In 2010, the U.S. Census Bureau reported 30,254 housing units in Rapid City and 44,949 housing units in Pennington County. Both figures reflect a 20 percent increase in housing units compared to 2000 Census data. In 2010, the median value of owner-occupied housing units in

Rapid City and Pennington County were similar at $147,200 and $149,700, respectively. Both figures reflect a 64 percent increase in value since the 2000 Census.

Single-family, detached housing units typify the residential land uses in the analysis area. These housing units are concentrated in the Big Bend area along South Dakota Highway 44. Single-family residences are also located along South Canyon Road/Nemo Road on Rapid City's western outskirts.

There is a large inventory of motel rooms and campgrounds in Pennington County and Custer County that provide temporary housing to visitors to the area.

3.15.1.2 WYOMING

3.15.1.2.1 Population

In general, from 2000 to 2010, populations grew in the Wyoming portion of the analysis area. Weston County's population grew approximately 8.5 percent, totaling 7,208 residents. Campbell County's population grew approximately 37 percent, totaling 46,133 residents. In 2010, population densities ranged from three persons per square mile in Weston County to 9.6 persons per square mile in Campbell County.

3.15.1.2.2 Minority and Low-Income Populations

Key indicators of minority and low-income populations in Weston and Campbell counties show that neither Weston County nor Campbell County cross the thresholds that would indicate minority or low-income populations.

3.15.1.2.3 Employment and Income

From 2006 to 2010, the percent of civilians age 16 or older who were employed in the labor force in Weston County, Campbell County, Gillette, and the state totaled 64.2 percent, 76.3 percent, 77.9 percent, and 66.2 percent, respectively. During this time period, the unemployment rate totaled 2.3 percent in Weston County, 3.5 percent in Campbell County, 4.1 percent in Gillette, and 4.4 percent in Wyoming (U.S. Census Bureau 2010).

For the same time period, in Weston County, Campbell County, and Gillette, the largest employment industries were oil and gas, agriculture, forestry, fishing and hunting, and mining at 24.8 percent, 25 percent, and 21.4 percent of the labor force; educational services, and health care and social assistance at 18.5 percent, 17.2 percent, and 17.9 percent of the labor force; and retail trade at 11.4 percent, 11.1 percent, and 11.7 percent of the labor force.

Median household incomes were highest in Campbell County and Gillette, with Weston County nearly equal to the Wyoming state level. In 2010, using inflation-adjusted dollars, the median household income in Campbell County totaled $76,576, with Gillette household income averaging $72,697. The median household income in Weston County totaled $53,853.

3.15.1.2.4 Housing

Between 2000 and 2010, the U.S. Census Bureau reported an increase in the number of housing units across the Wyoming portion of the analysis area, with the exception of Osage. In Weston County, the 2010 median value was $115,200, a nearly 73 percent increase since 2000. In Campbell County and Gillette, the median value was $197,700 and $189,500, reflecting a 92 percent and 90 percent increase, respectively, since 2000.

Single-family, detached housing units typify the residential land uses in the analysis area. In Weston County, these units are concentrated in Osage along U.S. Highway 16. Single-family residences are also located along Beaver Creek Road near the Wyoming-South Dakota state line, along Big Plum Creek Road and Plum Creek Road, at the Upton Fairview Road-Jesse Road intersection, off of Wyoming Highway 116 at Shepperson Ranch, and along Raven Creek Road at Hoffman Ranch. In Campbell County, single-family residences are located approximately two miles north of Keeline Road, along Keeline Road, and at the Keeline Road-Hilight Road intersection. Single-family residences are also located along Edwards Road and at Bridle Bit Ranch, located approximately 1.7 miles east of Wyoming Highway 59.

3.15.2 Environmental Consequences

3.15.2.1 ALTERNATIVE 1 – NO ACTION

3.15.2.1.1 South Dakota

3.15.2.1.1.1 Direct/Indirect Effects

Under the No Action Alternative, the proposed 230 kV transmission line would not be constructed. None of the socioeconomic benefits associated with increasing the reliability and capacity of the regional electrical system would be realized. The improved electrical system that could support future economic development in the project area and region would not be realized.

There would be no increase in demand for temporary accommodations, no temporary loss of grazing or timber uses, and no decrease in material resource supplies. There would be no short-term increase in revenue from consumer goods purchases, no procurement of construction supplies or purchase of lodging and food during construction, and no increase in local tax revenues.

3.15.2.1.1.2 Cumulative Effects

If the No Action Alternative were implemented, the needs for increasing the reliability and capacity of the regional electrical system would not be realized. The region could be susceptible to periodic power outages making it potentially less appealing to future economic development. Without the proposed project, the needed improvements to system reliability would have to be met by developing another transmission line(s) connecting Wyoming and South Dakota or by

developing additional generation distributed throughout the area. This additional generation could use renewable or non-renewable technologies.

3.15.2.1.2 Wyoming

3.15.2.1.2.1 Direct/Indirect Effects

Under the No Action Alternative, the proposed 230 kV transmission line would not be constructed. None of the socioeconomic benefits associated with increasing the reliability and capacity of the regional electrical system would be realized. The improved electrical system that could support future economic development in the project area and region would not be realized.

There would be no increase in demand for temporary accommodations, no temporary loss of grazing or timber uses, and no decrease in material resource supplies. There would be no short-term increase in revenue from consumer goods purchases, no procurement of construction supplies or purchase of lodging and food during construction, and no increase in local tax revenues.

3.15.2.1.2.2 Cumulative Effects

If the No Action Alternative were implemented, the needs for increasing the reliability and capacity of the regional electrical system would not be realized. The region could be susceptible to periodic power outages making it potentially less appealing to future economic development. Without the proposed project, the needed improvements to system reliability would have to be met by developing another transmissionline(s) connecting Wyoming and South Dakota or by developing additional generation distributed throughout the area. This additional generation could use renewable or non-renewable technologies.

3.15.2.2 ALTERNATIVE 2 – PROPOSED ACTION

The new transmission line is being proposed to improve the capacity and reliability of the regional electrical system and not to specifically support new development. The proposed project would help provide redundancy allowing the system to operate if a portion of the existing transmission system or some of the regional generation sources are out of service. Having a more reliable electrical system would improve the climate for future economic development in the project area and region but the availability of reliable power is only one of several factors needed to facilitate economic development. So, while this proposed project would improve electrical capacity and reliability, little if any development is expected to be induced directly or indirectly by its implementation.

BHP is expected to employ approximately 502 workers for 16 months to construct the Project. Because specific skills are required for construction of electrical transmission lines, it is assumed that 70 percent of the Project's construction workers would be transient workers who temporarily move to the analysis area from other parts of the north-central United States. The

remainder of construction workers would likely include Rapid City residents and others in the analysis area.

Assuming an hourly wage of $16, and that BHP would employ 502 workers for 16 months – from March to October in 2014 and in 2015 – the Proposed Action's construction labor would cost approximately $20.6 million, or approximately $140,000 per mile. Construction workers would spend a portion of this money to purchase the consumer resources within the analysis area. Consumer resources that construction workers would require include, but are not limited to:

- Food, including groceries and meals at eating and drinking establishments;
- Lodging at hotels and campgrounds;
- Emergency and law enforcement services, including police, fire, and rescue;
- Medical, dental, and other health-related services;
- Laundry services;
- Landfill – trash collection and disposal;
- Banking and postal services;
- Automotive services; and
- Arts, entertainment, shopping, personal care services, and retail trade services.

The Project would also be required to purchase material resources for construction that would include, but not be limited to:

- Wood and steel for the transmission poles;
- Aluminum and steel for the conductors;
- Steel for the OPGWs;
- Transformers and other electrical equipment;
- Cement for pole foundations;
- Explosives for blasting through rock;
- Fill material, if not available near the work area;
- Culverts, cattleguards, gates, signs, fencing – related to roads;
- Other equipment and vehicle parts/supplies;
- Gravel for construction yards/staging areas;
- Office trailers for construction yards/staging areas; and
- Gasoline and diesel fuel for the construction equipment and vehicles mentioned above.

Securing monetary capital, assumed to cost $10 million, and material resources, assumed to cost $30.9 million, yields a cost of approximately $41 million, or approximately $280,000 per mile. Of this $280,000 per mile, material resources are expected to cost approximately $210,000 per mile. When added to the construction labor cost, part of which is assumed to be spent on consumer resources, construction activities would be expected to cost approximately $62 million.

3.15.2.2.1 South Dakota

3.15.2.2.1.1 Direct/Indirect Effects

3.15.2.2.1.1 Population

During construction, the approximately 351 transient workers would represent a minor increase in the analysis area's population of 168,904. A direct effect of this influx of workers would be an incremental increase the demand for consumer resources. The existing supply of consumer resources would be expected to accommodate the transient workers' demands so construction would have minor or negligible direct and indirect effects on the analysis area's population and resource supply.

After construction is completed, the transient workers would leave the analysis area and return home. However, it is possible that some could relocate to the analysis area. If so, the addition of these workers and their dependents would have negligible to minor, direct and indirect effects on the analysis area's population and resource supply.

The Proposed Action's operation and maintenance activities would not impact the analysis area's population as they would be performed infrequently. The Proposed Action could help spur development in the analysis area by providing more reliable electricity for commercial, industrial, and residential purposes. The long-term operation and maintenance activities would have no significant direct or indirect effect on the analysis area's population and resource supply.

3.15.2.2.1.2 Minority and Low-Income Populations

The Proposed Action would not have disproportionately high and adverse human health or environmental effects on minority or low-income populations in the analysis area.

3.15.2.2.1.3 Employment and Income

Implementing the Proposed Action would cause a slight increase in local employment and an influx of transient workers temporarily moving to the analysis area during the projected 16-month timeframe. As discussed above, of the approximately 502 workers employed for the T-O-RC construction, 351 are project to be transient and 151 would be local. Also, local timber harvesting contractor(s) may need to hire additional staff to meet the Project's demands.

The transient workers would spend a portion of their incomes on the consumer resources described above, directly and indirectly increasing sales and tax revenues for local businesses in the analysis area during the construction period. The indirect benefit would include an increase in demand for local goods and services.

Transient workers would require temporary housing and would use hotels in and around Rapid City, Hill City, Custer, and Newcastle, as well as several campgrounds in the BHNF. The Proposed Action would not place a substantial demand on worker housing. Additionally, by

booking lodging in the early spring, when construction is expected to begin, transient workers would not have to compete with tourists arriving during the summer, and with crowds associated with the Sturgis Motorcycle Rally taking place in July and August.

The remainder of construction workers would likely include residents of Rapid City and other communities in the analysis area. Utilizing labor from the Rapid City Metropolitan Statistical Area could help reduce its 7.1 percent unemployment rate, highest rate in the analysis area.

3.15.2.2.1.4 Local Services

Implementing the Proposed action could result in short-term increased demand for some local services. These would include increased demand for local goods and services. Also, demand for services such as law enforcement, medical services, and others could increase as a result of the influx of temporary workers.

3.15.2.2.1.5 Increases in Energy Rates

The Proposed Action's lifecycle costs would have negligible direct effects on BHP customers.

3.15.2.2.1.6 Housing

As discussed above, transient workers would be expected to utilize hotels and campgrounds during construction. It is assumed that hotels in and around Rapid City, Hill City, and Custer, the campgrounds in the analysis area and other parts of the BHNF would provide ample space to accommodate these workers.

The Proposed Action's operation and maintenance activities would have no direct or indirect effects on housing availability in the analysis area.

3.15.2.2.1.7 Property Taxes and Assessed Values

The Proposed Action's principal economic indirect effect would come from property taxes that BHP would pay for ROW and improvements in the South Dakota portion of the analysis area. The assessed value of the proposed ROW and improvements has not yet been determined, so it is not possible to project the amount of tax revenues that would accrue to Rapid City or Pennington County or fees to the USFS.

The Proposed Action would have a negligible effect, if any, on the assessed values of private property and thereby, property taxes. BHP designed the proposed transmission route to minimize the amount of private property that the route would cross. BHP would compensate private landowners for the Proposed Action's impacts on private land.

In South Dakota, approximately 14 residences would be located within 150 feet on either side of the proposed transmission line.

Environmental analyses for other transmission line projects have concluded that market conditions influence whether power lines are a factor in property sales or values. Studies conducted on the impacts of high-voltage transmission lines to residential property have shown that they are not easily measurable. Research shows that the effects of high voltage transmission lines on residential properties are varied and are affected by five interplaying factors: proximity to transmission structures and lines; the view of transmission structures and lines; the type and size of structures; the appearance of easement landscaping; and surrounding topography. Many studies indicate that transmission lines have no significant effect on residential property values. Other studies, however, have shown a small reduction in value attributable to the close proximity of transmission lines (an average between one and ten percent of property value). The diminution in value is attributed to the visual unattractiveness of the lines, concern about potential health hazards, noise concerns, and safety concerns. These impacts diminish as distance from the line increases and disappear at a distance of 200 feet from the lines (Pitts and Jackson 2007).

3.15.2.2.1.2 Cumulative Effects

When added to other past, present, and reasonably foreseeable future actions, the Proposed Action would have a minor impact on socioeconomic resources in the South Dakota portion of the analysis area. Other actions in the area primarily include non-commercial and commercial logging activities to thin timber stands and to reduce fuel loads. It is assumed that timber harvesters in the analysis area performing these activities would also be hired to remove timber from the Proposed Action's expanded ROW width. Timber from the expanded ROW width would create a small and short-term increase to harvesters' sales to sawmill operators who would also experience an increase in milled timber. After construction is complete, sales and profits would return to pre-construction levels.

Present and reasonably foreseeable future actions include road and utility ROW construction projects, subdivision development, and recreation activities. The workers needed for road and utility projects and subdivision development would be drawn from construction contractors in and around Rapid City. Since the Proposed Action would employ mostly transient workers and because of the local unemployment rate, no major impacts to the analysis area's labor pool would occur. The Proposed Action would cause only a minor increase in the demand for raw materials including cement, gravel, and lumber, needed for road and utility construction and subdivision development. However, when added to subdivision development, during the long-term, the Proposed Action may cause a moderate increase in the amount of property taxes accruing to Rapid City, and Pennington County.

The Proposed Action's construction would occur between early spring and late fall. During this time, use of the BHNF's recreation sites and the associated user fees would increase as hotels and campgrounds accommodate transient construction workers in addition to the visiting public.

3.15.2.2.2 Wyoming

3.15.2.2.2.1 Direct/Indirect Effects

The direct and indirect effects on population, minority, and low-income populations, employment and income, and housing in the Wyoming portion of the analysis area would be similar to the effects in South Dakota.

3.15.2.2.2.1.1 Minority and Low-Income Populations

It is assumed that the construction of the Proposed Action would offer employment opportunities for minority and low-income residents in the analysis area at a rate similar to their percentage of the local population.

3.15.2.2.2.1.2 Employment and Income

The short-term addition of transient workers would represent a negligible increase in the analysis area's population of 89,075. Employment of construction trades would experience a slight increase, during the 16-month construction period. Operation and maintenance activities would experience no change as BHP and/or its local contractor(s) would perform maintenance activities on an infrequent, as-needed basis and during emergencies. BHP does not expect to contribute to the local ranch land fire department.

The Proposed Action would not substantially alter the revenue streams in Weston and Campbell counties. While transient workers would contribute to the local economy, the majority of their wages would likely be transmitted to their families located at their permanent residences outside of the analysis area. Due to the small amount of timber in the Wyoming portion of the analysis area, effects from timber harvests and sales would be negligible. The amount of grazing land lost to transmission poles would also be negligible relative to the amount of land available for grazing.

3.15.2.2.2.1.3 Housing

During construction, transient workers would stay in local hotels or campgrounds. It is assumed that area hotels in Gillette and Newcastle and campgrounds in the western portion of the BHNF would provide ample space to accommodate transient workers so there would be no effect on local housing. The operation and maintenance activities associated with the Proposed Action would have no direct or indirect effects on housing availability in the analysis area.

3.15.2.2.2.1.4 Property Taxes and Assessed Values

The impact of the Proposed Action on property taxes and assessed values in the Wyoming portion of the analysis area would be expected to have similar impacts as in South Dakota. The property taxes that BHP would pay for ROW and improvements in and assessed value of the

proposed ROW and improvements in Wyoming has not yet been determined, so it is not possible to project the amount of tax revenues

BHP would compensate private landowners for the Proposed Action's impacts on private land. The effect of the Proposed Action on residential property values would be the same as that described for South Dakota. In Wyoming, approximately one residence would be located within 150 feet on either side of the proposed transmission line.

3.15.2.2.2.2 Cumulative Effects

When added to other past, present, and reasonably foreseeable future actions, the Proposed Action would have a minor impact on socioeconomic resources in the Wyoming portion of the analysis area.

Past actions included drilling for coal, installing electric power and fiber optic lines, relocating mine roads, and thinning timber stands to reduce fuel loads. Present actions include installing dewatering wells at the Black Thunder Mine. Reasonably foreseeable future actions are expected to include installing a fiber optic line between Keeline and Wright and conducting an oil and gas exploration project on 120,480 acres of the TBNG.

3.15.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

Implementation of any of the route modifications (3a through 3g) would result in the same socioeconomic impacts as the Proposed Action.

3.16 HAZARDOUS MATERIALS/PUBLIC HEALTH AND SAFETY

3.16.1 Background

The geographic analysis area for hazardous materials and public health and safety includes properties adjacent to the proposed transmission route; the Proposed Action's material staging sites, construction yards, decking yards, and access roads; streams located in the Proposed Action's two-mile-wide analysis area; and a 100-foot-wide buffer on each side of the streams.

3.16.1.1 HAZARDOUS MATERIALS

During construction, operation, and maintenance activities, hazardous materials including vehicle fuels, oils, and other vehicle maintenance fluids would be stored and used in construction staging areas. During these activities, accidental releases of these materials could contaminate soil and/or water resources and have adverse effects on human health and the environment.

3.16.1.2 ELECTRIC AND MAGNETIC FIELDS (EMF)

EMFs are present wherever electricity flows: around appliances and power lines, in offices, schools, and homes. Electric fields are invisible lines of force, created by voltage, and are shielded by most materials. Units of measure are kiloVolts per meter (kV/m). Magnetic fields are

invisible lines of force, created by electric current and are not shielded by most materials, such as lead, soil and concrete. Units of measure are Gauss (G) or MilliGauss (mG). Electric and magnetic field strengths diminish with distance. These fields are low energy, extremely low frequency fields, and should not be confused with high energy or ionizing radiation such as X-rays and gamma rays.

3.16.1.2.1 Electric Fields

The electric field created by a high-voltage transmission line extends from the energized conductors to other conducting objects such as the ground, towers, vegetation, buildings, vehicles, and persons. Potential field effects can include induced currents, steady-state current shocks, spark discharge shocks and, in some cases, field perception and neurobehavioral responses.

Design considerations for electric power lines that address electric fields and the potential for electric shock include the clearance of the power lines above ground, measures to prevent unauthorized climbing of the poles, and the proximity of the transmission lines to other metal features such as oil wells and pipelines.

Features reducing the level of potential for induced current in objects near the transmission line also reduce the level of a possible induced current shock. The proposed lines would be constructed in accordance with industry and BHP standards to minimize hazardous shocks from direct or indirect human contact with an overhead, energized line. The proposed transmission line is expected to pose minimal electrical field hazards.

3.16.1.2.2 Magnetic Fields

Current and voltage are required to transmit electrical energy over a transmission line. A 60-Hertz (Hz; cycles per second) magnetic field is created in the space around transmission line conductors by the electric current flowing in the conductors. This is the frequency of ordinary household current, usually referred to as 60 cycles. The strength of the magnetic field produced by an electric transmission line depends on the amount of current flowing through the conductor (the higher the electrical load, the higher the current), the configuration of the conductors (spacing and orientation), the height of the conductors, the distance from the line, and the proximity of other electrical lines. As the electric load (and the resulting current) on the transmission line varies continually on a daily and seasonal basis, the magnetic fields likewise vary throughout the day and year. Magnetic fields are highest closer to the line and diminish with distance. Physical structures, such as buildings, are transparent to magnetic fields in that they do not provide any shielding.

3.16.2 Environmental Consequences

3.16.2.1 ALTERNATIVE 1 – NO ACTION

3.16.2.1.1 South Dakota

3.16.2.1.1.1 Direct/Indirect Effects

Under the No Action Alternative, the Proposed Action would not be constructed and no hazardous materials would be brought into the analysis area. BHP would manage the potential exposure to hazardous materials from on-going operation and maintenance of its existing transmission and distribution lines in accordance with its existing operations practices which comply with local, state, and federal requirements.

3.16.2.1.1.2 Cumulative Effects

The No Action Alternative would not add to other past, present, or reasonably foreseeable future actions in the South Dakota portion of the analysis area and would not contribute to cumulative hazardous materials or public health and safety effects.

3.16.2.1.2 Wyoming

3.16.2.1.2.1 Direct/Indirect Effects

Under the No Action Alternative, the Proposed Action would not be constructed and no hazardous materials would be brought into the analysis area. BHP would manage the potential exposure to hazardous materials from on-going operation and maintenance of its existing transmission and distribution lines in accordance with its existing operations practices, which comply with local, state, and federal requirements.

3.16.2.1.2.2 Cumulative Effects

The No Action Alternative would not add to other past, present, or reasonably foreseeable future actions in the Wyoming portion of the analysis area and would not contribute to cumulative hazardous materials or public health and safety effects.

3.16.2.2 ALTERNATIVE 2 – PROPOSED ACTION

EMF from the proposed 230 kV transmission line was calculated at the edge of the proposed ROW and throughout the ROW. The ROW width would be 125 feet on private land and 100 feet on NFS land. EMF levels were calculated at a height of approximately three feet (one meter) above ground with the bottom phase conductors of the transmission and distribution lines modeled at minimum heights above ground (according to the National Electric and Safety Code [NESC] clearance requirements).

The conductor types for the proposed transmission lines is a single 1,272 kcmil (1,000 circular mils) 45/7 “Bittern” conductor for the phase and 3/8 inch extra high strength (EHS) steel for the

shield wires. Three 230 kV transmission line structures were analyzed: Wood H-Frame, Steel H-Frame and Tubular Steel Single Pole. For the analysis of EMF levels from the proposed 230 kV transmission line, a maximum operating voltage of 105 percent of nominal voltage (242 kV Line-Line) was used for electric field calculations and a maximum electrical loading of 438 megavolt-amperes (mVA) (1,046 amps per phase) was assumed for the magnetic field calculations.

The calculated electric and magnetic field results from the EMF study are summarized in **Table 3-57**.

TABLE 3-57 - ELECTRIC AND MAGNETIC FIELDS

Structure	Electric Field [kV/m]		Magnetic Field [mG]	
	Maximum at Edge of ROW	Maximum in ROW	Maximum at Edge of ROW	Maximum in ROW
Wood H-Frame	<1	4	51	267
Steel H-Frame	1	4	80	290
Tubular Steel Single Pole	<1	3	27	145

The states of Wyoming and South Dakota do not have established EMF regulations and there are no limits that are known to have health effects. Because there is a lack of scientific evidence establishing health effects resulting from EMF exposure, there are no state or federal health-based standards for limiting exposure to those fields. Several states, have implemented engineering standards regarding EMF within and at the edge of transmission line ROW as shown in **Table 3-58** (NIEHS 2002). Montana sets an electric field limit of one kV/m at the edge of all transmission line ROW in residential areas (EPRI 1999). Magnetic field levels have been set in two states (New York and Florida) to limit magnetic fields at the ROW edge under certain maximum electrical loading conditions so that new transmission lines will have similar field levels to existing, operational transmission lines.

TABLE 3-58 - SUMMARY OF STATE TRANSMISSION LINE STANDARDS AND GUIDELINES

State	Electric Field		Magnetic Field	
	On ROW	ROW Edge	On ROW	ROW Edge
Florida*	8 kV/m [a] 10 kV/m [b]	2 kV/m	---	150 mG [a] (max load) 200 mG [b] (max load) 250 mG [c] (max load)
Minnesota	8 kV/m	---	---	---
Montana	7 kV/m [d]	1 kV/m [e]	---	---
New Jersey	---	3 kV/m	---	---
New York	12 kV/m 11 kV/m [f] 7 kV/m [d]	2 kV/m	---	200 mG (max load)
Oregon	9 kV/m	---	---	---

* ROW includes certain additional areas adjoining the ROW for Florida only.
a – For lines of 69-230 kV.
b – For 500 kV lines.
c – For 500 kV lines on certain existing ROW.
d – Maximum for highway crossings.
e – May be waived by the landowner.
f – Maximum for private road crossings.
Source: NEIHS/DOE EMF RAPID Program Questions & Answers Booklet 2002

Exposure limits have been established or recommended by several different organizations. These address both electrical field and magnetic field exposure for a variety of conditions.

The Institute of Electrical and Electronics Engineers (IEEE) specifies an unperturbed power frequency electric field of five kV/m for the general public at the ROW edge, ten kV/m within the ROW, and 20 kV/m in a controlled environment.[1] For magnetic fields, the general public exposure should be below 9,040 mG. In controlled environments, this increases to 27,100 mG (IEEE 2002). These magnetic field values are unlikely to be encountered in either residential or occupational settings.

A general international standard by The International Commission on Non-Ionizing Radiation Protection (ICNIRP), has established a public (uncontrolled) exposure magnetic field guideline of 833 mG and an electric field guideline of 4.167 kV/m for 60 Hz fields (ICNIRP 1998).

The American Conference of Governmental Industrial Hygienists (ACGIH) published "Threshold Limit Values" for EMF (ACGIH 2001). Recommended occupational exposures should not exceed 25 kV/m for electric fields and 10,000 mG for magnetic fields. Above 15 kV/m, the ACGIH recommends the use of protective clothing. For workers with cardiac pacemakers, recommended exposures should not exceed one kV/m for electric fields and 1,000 mG for magnetic fields.

The International Committee on Electromagnetic Safety (ICES) published a guideline recommending magnetic field levels below 9,040 mG, based on the IEEE general public exposure value (ICES 2002). The overwhelming consensus, expressed in multidisciplinary reviews of EMF research, is that the epidemiologic evidence is insufficient to demonstrate a causal relationship between Extremely Low Frequency ([ELF] which refers to power facilities) EMF and any health effect. These reviews include those made by the National Institute of Environmental Health Sciences (NIEHS 1998; NIEHS 1999), the Health Council of the Netherlands (HCN 2001; HCN 2004), the National Radiological Protection Board of Great Britain (NRPB 2001; NRPB 2004b), and the International Agency for Research on Cancer (IARC 2002).

[1] Controlled Environment is defined by the IEEE as "An area that is accessible to those who are aware of the potential for exposure as a concomitant of employment, to individuals cognizant of exposure and potential adverse effects, or where exposure is the incidental result of passage through areas posted with warnings, or where the environment is not accessible to the general public and those individuals having access are aware of the potential for adverse effects." (IEEE 2002)

3.16.2.2.1 South Dakota

3.16.2.2.1.1 Direct/Indirect Effects

As shown above, the maximum calculated electric and magnetic field levels at the edge of the ROW for the proposed T-O-RC 230 kV transmission line are two kV/m and 80 mG respectively. These calculated maximum EMF levels are for the steel H-frame structures. These EMF levels are less than national and international EMF standards and guidelines. There would be no expected human health risks from EMF because the calculated levels from the proposed 230 kV transmission line are significantly below national and international standards and guidelines.

In South Dakota, 102 residences would be within 500 feet on either side of the proposed transmission line.

During construction, operation, and maintenance activities associated with the Proposed Action, there is the possibility that improperly using, storing, and/or disposing of hazardous materials (fuels, oils, maintenance fluids) could result in a release that could cause contamination and exposure. Direct effects would include contaminating soil and water resources. Indirect effects would include exposing humans, wildlife, and vegetation to the contamination. It is expected that BHP would store less than 2,200 pounds of hazardous waste per month which would be under the Resource Conservation and Recovery Act (RCRA) storage limit to qualify as a Conditionally Exempt Small Quantity Generator. This would require that BHP transport, treat, and dispose of hazardous waste in accordance with state and federal regulations.

Implementing the Proposed Action would also generate non-hazardous waste. The amount of non-hazardous waste generated would be relatively small consistent with similar-sized utility construction or logging projects. These wastes would be disposed of at the local landfill. The amount of non-hazardous waste that the Proposed Action would generate is not expected to substantially reduce the landfill's available capacity.

BHP would implement plans and procedures to minimize the risk of contaminating soil and water resources and the associated exposure to humans, wildlife, vegetation, and air quality. The Proposed Action's design, best management practices (BMPs), and mitigation measures would further minimize the risk of contamination and exposure. BHP would implement an Environmental Emergency Response Plan and Hazardous Materials Management Plan to minimize risk and contamination and ensure that necessary resources are available to respond to a release.

BHP would also implement a Stormwater Pollution Prevention Plan (SWPPP) to prevent erosion and sedimentation; prevent, identify, reduce, or eliminate construction-related stormwater contamination and water pollution; prevent violations of surface water quality, groundwater quality, or sediment management standards; and during construction, control peak flow rates and stormwater runoff volumes to prevent adverse water quality impacts to receiving waters.

Additionally, BHP would implement an Environmental Training and Monitoring Program to communicate environmental concerns and appropriate work practices, including spill prevention,

control, and countermeasure protocols to all field personnel. The training program would be consistent with BHP's corporate environmental health and safety policy. Furthermore, during construction, operation, and maintenance activities, BHP would implement a monitoring program to ensure that field personnel follow plan guidelines.

3.16.2.2.1.2 Cumulative Effects

Because of the low risks to public health and safety associated with the Proposed Action, it would not be expected to add to past, present, and reasonably foreseeable future actions in South Dakota.

3.16.2.2.2 Wyoming

3.16.2.2.2.1 Direct/Indirect Effects

The Proposed Action's direct and indirect effects resulting from EMF and the storing, using, and disposing of hazardous materials and hazardous waste would be similar to the effects described for South Dakota.

In Wyoming, ten residences would be within 500 feet on either side of the proposed transmission line.

3.16.2.2.2.2 Cumulative Effects

Because of the low risks to public health and safety associated with the Proposed Action, it would not be expected to add to past, present, and reasonably foreseeable future actions in Wyoming.

3.16.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

The following provides a comparison of Alternative 3 (Proposed Action with Route Modifications) and the Proposed Action.

3.16.2.3.1 South Dakota

3.16.2.3.1.1 Direct/Indirect Effects

Route Modification 3b – Mountain View

Route Modification 3b would locate the proposed transmission line farther from existing residences relative to the Proposed Action. As a result, the potential direct and indirect hazardous materials and health and safety effects would likely be less than those of the Proposed Action.

Route Modification 3c – Clinton

Route Modification 3c would have similar potential direct and indirect hazardous materials and health and safety effects as Route Modification 3b.

Route Modification 3d – Edelweiss

Route Modification 3d would locate the proposed transmission line farther from sensitive wildlife resources relative to the Proposed Action. As a result, the potential direct and indirect effects on the sensitive wildlife resources would likely be less than those of the Proposed Action. No residences are within 500 feet of either side of the proposed transmission line, thus the potential direct and indirect hazardous materials and health and safety effects would likely be less than those of the Proposed Action.

Route Modification 3e – Pactola

Route Modification 3e would locate the proposed transmission line farther from the Pactola Reservoir relative to the Proposed Action. As a result, the potential direct and indirect hazardous materials and health and safety effects would likely be less than those of the Proposed Action.

Route Modification 3f – Pactola South

Route Modification 3f would have similar direct and indirect hazardous materials and health and safety effects as Route Modification 3e.

Route Modification 3g – Hidden Valley

Route Modification 3g would locate the proposed transmission line farther from a proposed quarry operation relative to the Proposed Action. As a result, the potential direct and indirect effects on quarry operations would likely be less than those of the Proposed Action. No residences are within 500 feet of either side of the proposed transmission line, thus the potential direct and indirect hazardous materials and health and safety effects would likely be less than those of the Proposed Action.

3.16.2.3.2 Wyoming

3.16.2.3.2.1 Direct/Indirect Effects

Route Modification 3a (Fiddler) would have similar direct and indirect hazardous materials and health and safety effects as the corresponding segment of the Proposed Action.

3.17 AIR QUALITY

3.17.1 Existing Conditions

Various factors influence the air quality of any region, including the magnitude and distribution of pollutant emissions, the regional climate (including prevailing wind direction), and the local topography. Air quality conditions in rural areas, such as the project area, often are better than in large urban/industrial centers. Rural areas typically have a smaller number of emission sources and favorable atmospheric dispersion conditions which can result in relatively low air pollutant concentrations.

3.17.1.1 SOUTH DAKOTA

The existing air quality in the region is very good. The general project area outside the Rapid City metro area has limited air pollution emissions sources and good atmospheric dispersion conditions. Fugitive dust particles (particulate emissions) are generated from a variety of sources including wind erosion of disturbed areas that can affect rural and urban areas alike. Types of air pollutant emission sources within the project area include:

- Carbon monoxide, nitrogen oxides, particulates, sulfur dioxide, and volatile organic compounds
    - from gasoline and diesel vehicle tailpipe emissions
    - from industries (in the Rapid City area);
- Particulate matter (dust) generated by vehicle travel on unpaved graded roads, agricultural activities, and paved road sanding during the winter months; and
- Windblown dust and air pollutants transported from emission sources located outside the Project Area.

3.17.1.2 WYOMING

The existing air quality in the Wyoming portion of the analysis areas is also very good. Like the majority of the South Dakota portion of the analysis area, air quality is generally good because in rural areas there are limited air pollution emission sources (few industrial facilities and residential emissions) and good atmospheric dispersion conditions result in relatively low air pollutant concentrations. Occasional high concentrations of CO and particulate matter may occur in more urbanized areas (like New Castle) and near industrial facilities such as mining projects, oil and gas facilities

3.17.2 Environmental Consequences

3.17.2.1 ALTERNATIVE 1- NO ACTION

3.17.2.1.1 South Dakota and Wyoming

3.17.2.1.1.1 Direct/Indirect Effects

Under the No Action alternative, the T-O-RC Project would not be constructed. The No Action alternative will have no effect on air quality and related factors in the project area.

3.17.2.1.1.2 Cumulative Effects

The No Action Alternative would not add to the cumulative air quality and GHG/climate change effects of other past, present, and reasonably foreseeable future actions in the Analysis Area.

3.17.2.2 ALTERNATIVE 2- PROPOSED ACTION

3.17.2.2.1 South Dakota and Wyoming

3.17.2.2.1.1 Direct/Indirect Effects

The Proposed Action will directly impact air quality within the project area through increased vehicular traffic during construction. . Construction will generate fugitive dust particulates and gaseous tailpipe emissions from construction equipment Specifically, activities such as construction of new or expanded access roads, pole hole excavation, ROW clearing for , and wind erosion of disturbed areas produce fugitive dust. These impacts will be short-term and will end once construction is complete.

Dust control, monitoring, and reclamation standards required by state and federal permits will be applied during and after construction, which will minimize potentially harmful emissions and particulates and their impacts on visibility in the project area and surrounding lands. The Proposed Action will comply with National Ambient Air Quality Standards (NAAQS) and state standards. USFS Standards and Guidelines also will apply.

3.17.2.2.1.1.1 Greenhouse Gas (GHG) Emissions and Global Climate Change

Climate change refers to any distinct change in measures of climate lasting for a long period of time. In other words, “climate change” means major changes in temperature, rainfall, snow, or wind patterns lasting for decades or longer. Climate change can result from:

- natural factors, such as changes in the sun’s energy or slow changes in the earth’s orbit around the sun;
- natural processes within the climate system (e.g., changes in ocean circulation); and/or

- human activities that change the atmosphere's make-up (e.g., burning fossil fuels) and the land surface (e.g., cutting down forests, planting trees, building developments in cities and suburbs, etc.) http://www.epa.gov/climatechange/downloads/Climate_Basics.pdf, EPA-430-R08-016).

Climatic change analyses are comprised of several factors, including greenhouse gas (GHG) emissions, land use management practices, and other variables. Many GHGs occur naturally in the atmosphere, such as CO_2, methane (including CBNG), water vapor, ozone, and N_2O.

Other GHGs are synthetic (i.e., man-made), such as chlorofluorocarbons, hydrofluorocarbons and perfluorocarbons, as well as sulfur hexafluoride. These GHGs are released into the atmosphere and prevent the escape of reflected solar radiation and heat from the earth's surface.

The EPA states, "Emissions of greenhouse gases are typically expressed in a common metric so that their impacts can be directly compared, as some gases are more potent (have a higher global warming potential) than others. The international standard practice is to express greenhouse gases in carbon dioxide (CO_2) equivalents, or CO_2e. Emissions of gases other than CO_2 are translated into CO_2e using global warming potentials" (EPA 2005). GHGs are not currently regulated for emissions from minor sources such as construction related activities.

Any increased capacity provided by the new line could facilitate future development of new generation or upgrades to existing generation. This generation could be of any type (renewable or non-renewable) so coal extraction or increased coal use is not expected to indirectly or directly result from the proposed project. Therefore, the Proposed Action is not expected to indirectly impact CO_2 emissions, GHGs, and climate change. The potential carbon sink capacity within the project area would be temporarily diminished by the relatively small amount of new surface disturbance under the Proposed Action. Following construction, reclaimed areas could potentially have less effectiveness as a carbon sink than prior to disturbance.

3.17.2.2.1.2 Cumulative Effects

The Proposed Action will result in short-term surface disturbance during construction, and permanent disturbance. Surface disturbance outside the proposed project area, but in the vicinity, will result mainly from timber sales, subdivision developments for residential purposes, a proposed quarry operation, range developments for cattle grazing, permit holders collecting firewood and cutting Christmas trees, and on-going activities on non-USFS lands. The application of Forest Service Standard and Guidelines, appropriate project design criterion, and monitoring and mitigation measures in the cumulative impact analysis area will effectively protect existing air quality resources.

3.17.2.3 ALTERNATIVE 3 – PROPOSED ACTION WITH ROUTE MODIFICATIONS

Implementation of Alternative 3 (Proposed Action with Route Modifications) would result in similar direct and indirect air quality effects as the Proposed Action.

3.18 IRREVERSIBE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a road rights-of-way or power lines. For further discussion of the effects on the specific resources, see the discussion of the respective resource topics.

The Proposed Action would result in the removal of approximately 563 acres of trees within the project area that would not be replaced. In addition, soils would be permanently disturbed at each transmission line pole. There would be two poles per structure, with each pole diameter measuring two to four feet. These losses would be an irreversible commitment of resources.

There would be a temporary loss of resources from removal of approximately 1,294 acres of vegetation. There would be temporary impacts to soils including soil compaction from the traffic of construction equipment; the removal of a portion of the existing topsoil resource from excavation for structure installation and blading for road construction; and erosion from disturbed soils that have not be stabilized. Most of the soils that would disturbed have a high restoration potential and mitigation measures would be implemented to revegetate these areas. These temporary losses would result in a short term irretrievable commitment of resources.

3.19 SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). For further discussion of the effects on the resources listed below, see the discussion of respective resource topics.

As provided for by the Forest and BLM plans, management requirements guide implementation of the Proposed Project on federal lands. Adherence to these requirements ensures that long-term productivity of the land is not impaired by short-term uses. There would be short-term use effects for the Proposed Project from removal of trees and vegetation, but mitigation should ensure long-term productivity of the project area. In addition, monitoring of the effectiveness of mitigation is specified in the EIS.

3.20 UNAVOIDABLE AND ADVERSE EFFECTS

The following is a description of adverse effects that are unavoidable with implementation of the Proposed Project. Short term effects would include removal of vegetation, changes in wildlife habitat and use, alterations in the soil composition, increased dust, increased road traffic, and disruptions in recreation use. Long-term effects would include the removal of trees from the ROW and associated changes in scenic quality in the immediate vicinity. For further discussion of the effects, see the discussion of respective resource topics.

Lawrence County
Meade County
Pennington County
Custer County
South Dakota
Wyoming
Lange Substation
Pactola Substation
Old Clinton Sub
Rapid City, SD
Black Hills
National Forest
Black Elk
Wilderness
Mount Rushmore
National Memorial
85
385
90
190
79
44
16
244
87
40

Legend

- Substation
- Proposed Action
- Site-Specific Design Modification
- Analysis Area
- Interstate
- US/State Highway
- Railroad
- City or Town
- State Boundary
- County Boundary
- Federal Wilderness Area

Jurisdictional Land Ownership

- Bureau of Land Management Land
- U.S. Forest Service Land
- National Park Service Land
- State Land

N

0 2 4 6 8
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 3-1
JURISDICTIONAL LAND OWNERSHIP SOUTH DAKOTA

Map Extent: Lawrence, Pennington, and Custer Counties, South Dakota

Date:06-28-13 | Author: djb

I:\SD-WY\Figure 3-1 Jurisdictional Land Ownership South Dakota 11x17_062813.mxd

Reno Substation
Hilight Substation
Osage Substation
Newcastle, WY
Campbell County
Weston County
Teckla Substation
Thunder Basin National Grassland
Wyoming
South Dakota
59
387
16
85
451
116
450

Legend

- Substation
- Proposed Action
- Site-Specific Design Modification
- Analysis Area
- US/State Highway
- Secondary Road
- Railroad
- State Boundary
- County Boundary
- City or Town

Jurisdictional Land Ownership

- Bureau of Land Management Land
- U.S. Forest Service Land
- Thunder Basin National Grassland
- State Land

N

0 2 4 6 8 10
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 3-2
JURISDICTIONAL LAND OWNERSHIP
WYOMING

Map Extent: Campbell, Weston, Converse and Niobrara Counties, Wyoming

Date: 06-28-13 | Author: djb

I:\SD-WY\Figure 3-2 Jurisdictional Land Ownership 11x17_062813.mxd

Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-3
EXISTING VIEW NEAR HISEGA RESIDENTIAL AREA
SOUTH DAKOTA

Location: HISEGA RESIDENTIAL AREA

Date: 051613		Author: rnc

H:\Projects\EIS Figure 3-3 Existing Conditions 051613.mxd

DATE: 07/09/2012 TIME: 3:18 PM LENS LENGTH: 33 mm DIRECTION: NORTH

Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-4
EXISTING VIEW ON GILLETTE PRARIE ROAD
SOUTH DAKOTA

Location: GILLETTE PRAIRIE ROAD

Date: 051613		Author: rnc

H:\Projects\EIS Figure 3-4 Existing Conditions 051613.mxd

DATE: 07/10/2012 TIME: 11:41 AM LENS LENGTH: 33 mm DIRECTION: SOUTHWEST

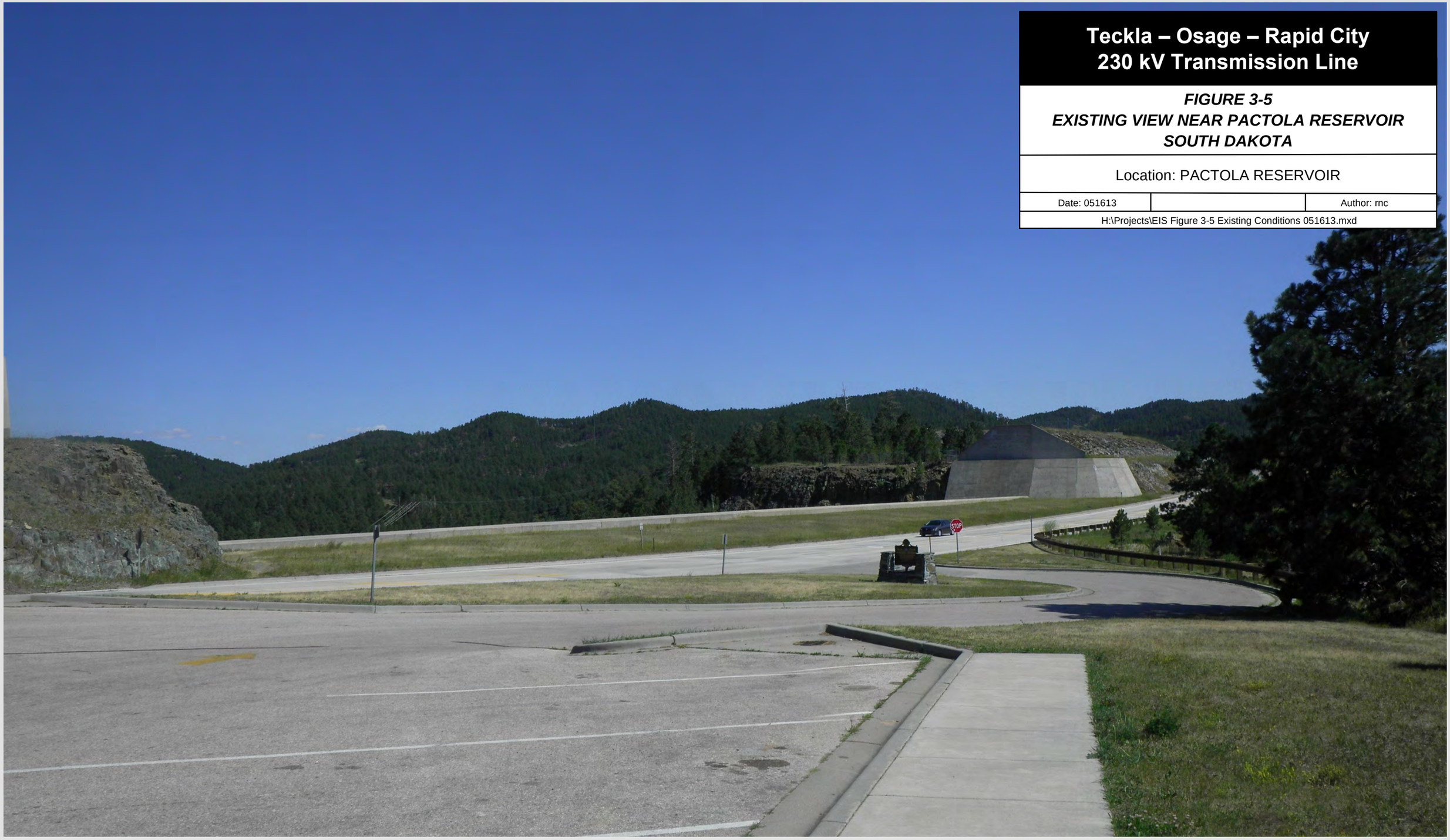
Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-5
EXISTING VIEW NEAR PACTOLA RESERVOIR
SOUTH DAKOTA

Location: PACTOLA RESERVOIR

Date: 051613		Author: rnc

H:\Projects\EIS Figure 3-5 Existing Conditions 051613.mxd



DATE: 07/09/2012 TIME: 4:34 PM LENS LENGTH: 33 mm DIRECTION: SOUTHEAST

Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 3-6
EXISTING VIEW NEAR MICKELSON TRAIL
SOUTH DAKOTA

Location: MICKELSON TRAIL

Date: 051613		Author: rnc

H:\Projects\EIS Figure 3-6 Existing Conditions 051613.mxd

DATE: 07/11/2012 TIME: 2:16 PM LENS LENGTH: 33 mm DIRECTION: SOUTH

Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 3-7
REPRESENTATIVE VIEW OF WYOMING LANDSCAPE - ROLLING PLAINS

Location: WYOMING

Date: 062813		Author: djb

t:\Projects\Figure 3-7 Representative View of Wyoming Landscape Rolling Plains 11x17_062813.mxd

REPRESENTATIVE VIEW OF WYOMING LANDSCAPE - ROLLING PLAINS

Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 3-8
REPRESENTATIVE VIEW OF WYOMING LANDSCAPE - MINNELUSA FOOTHILLS

Location: WYOMING

Date: 062813		Author: djb

t:\Projects\Figure 3-8 Representative View of Wyoming Landscape Minnelusa Foothills 11x17_062813.mxd

REPRESENTATIVE VIEW OF WYOMING LANDSCAPE - MINNELUSA FOOTHILS

Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 3-9
REPRESENTATIVE VIEW OF WYOMING LANDSCAPE - RED VALLEY

Location: WYOMING

Date: 062813		Author: djb

I:\Projects\Figure 3-9 Representative View of Wyoming Landscape Red Valley 11x17_062813.mxd

REPRESENTATIVE VIEW OF WYOMING LANDSCAPE - RED VALLEY

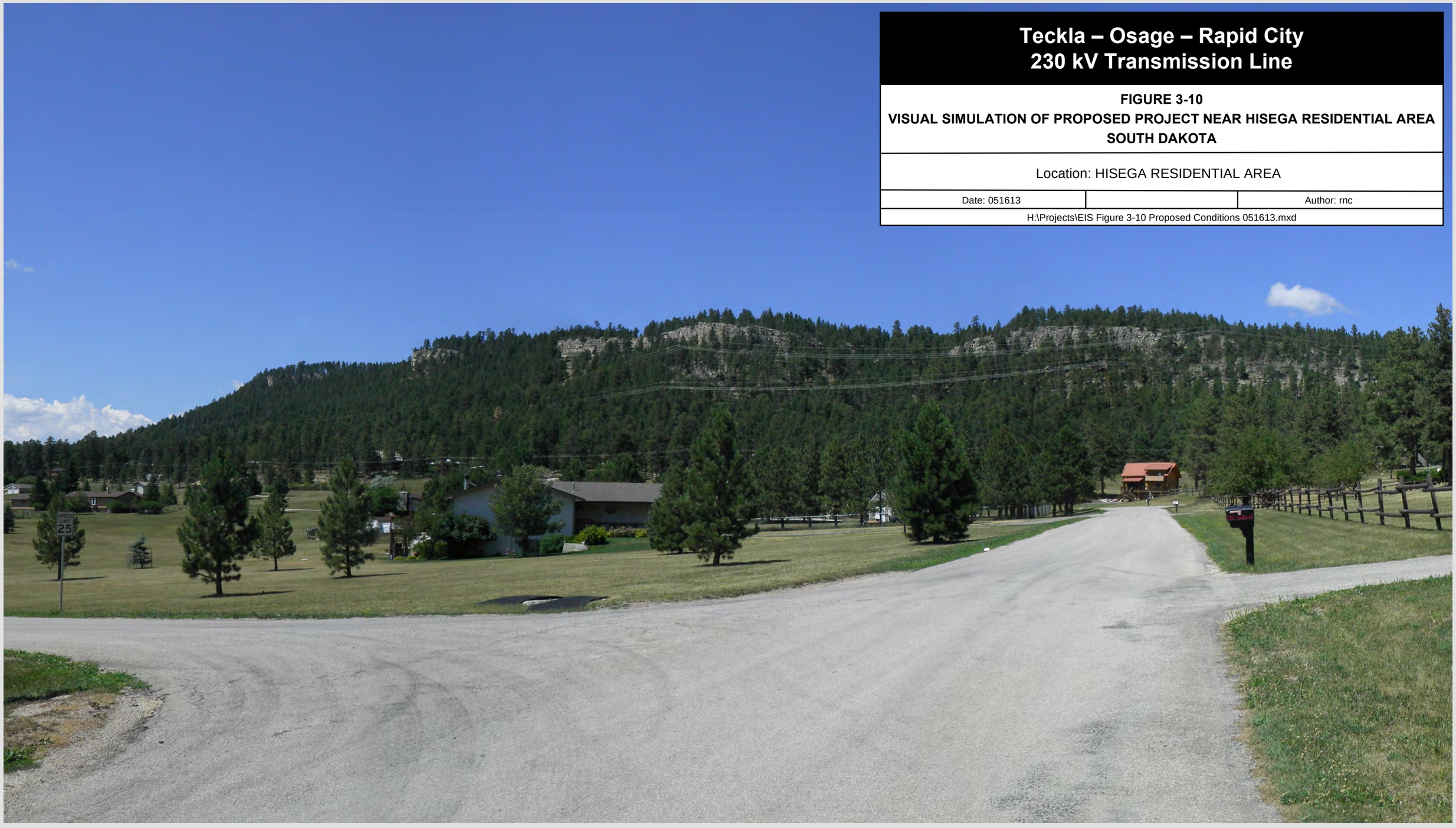
Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-10
VISUAL SIMULATION OF PROPOSED PROJECT NEAR HISEGA RESIDENTIAL AREA
SOUTH DAKOTA

Location: HISEGA RESIDENTIAL AREA

Date: 051613		Author: rnc

H:\Projects\EIS Figure 3-10 Proposed Conditions 051613.mxd



DATE: 07/09/2012 TIME: 3:18 PM LENS LENGTH: 33 mm DIRECTION: NORTH

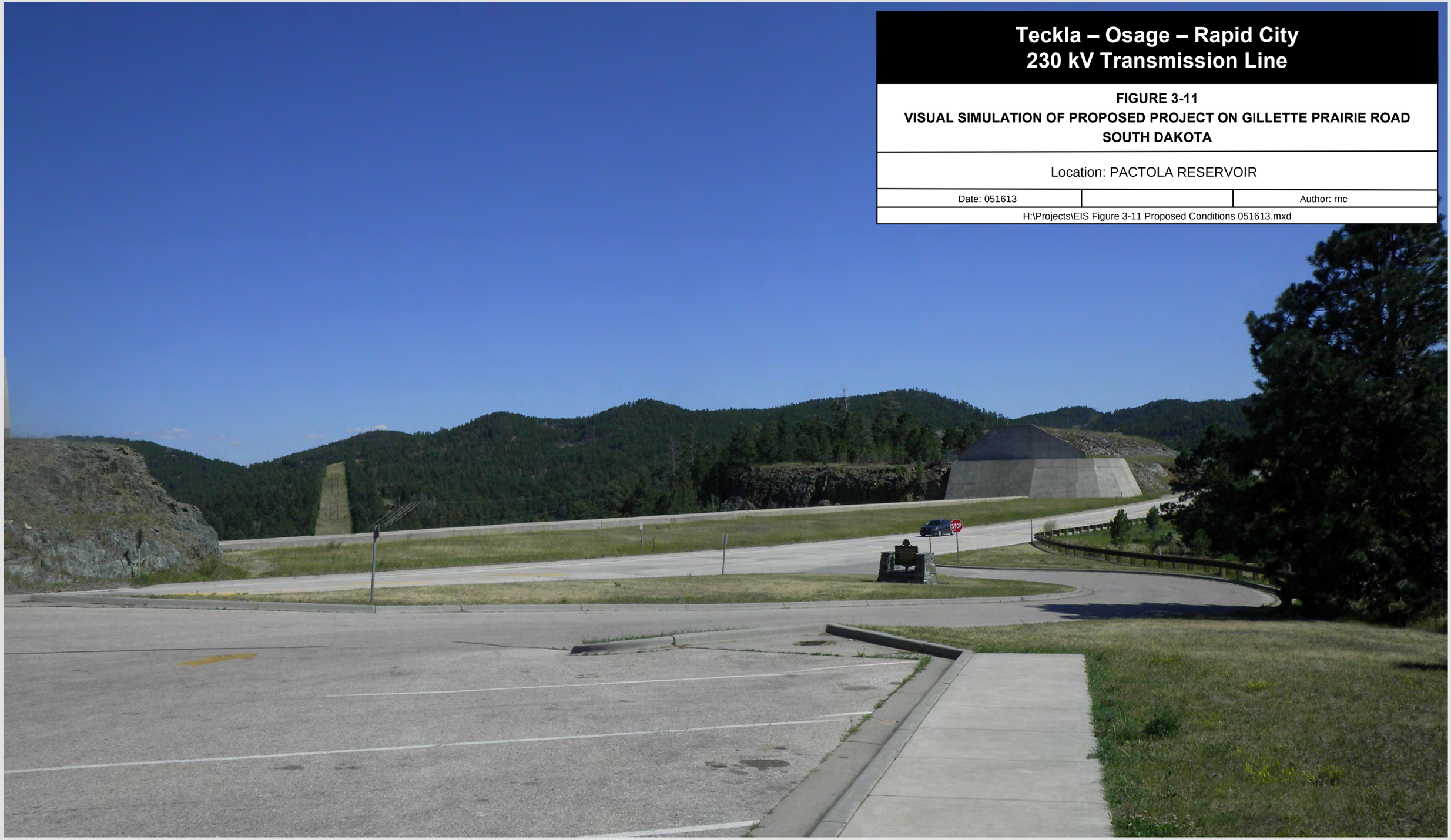
Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-11
VISUAL SIMULATION OF PROPOSED PROJECT ON GILLETTE PRAIRIE ROAD
SOUTH DAKOTA

Location: PACTOLA RESERVOIR

Date: 051613		Author: rnc

H:\Projects\EIS Figure 3-11 Proposed Conditions 051613.mxd



DATE: 07/09/2012 TIME: 4:34 PM LENS LENGTH: 33 mm DIRECTION: SOUTHEAST

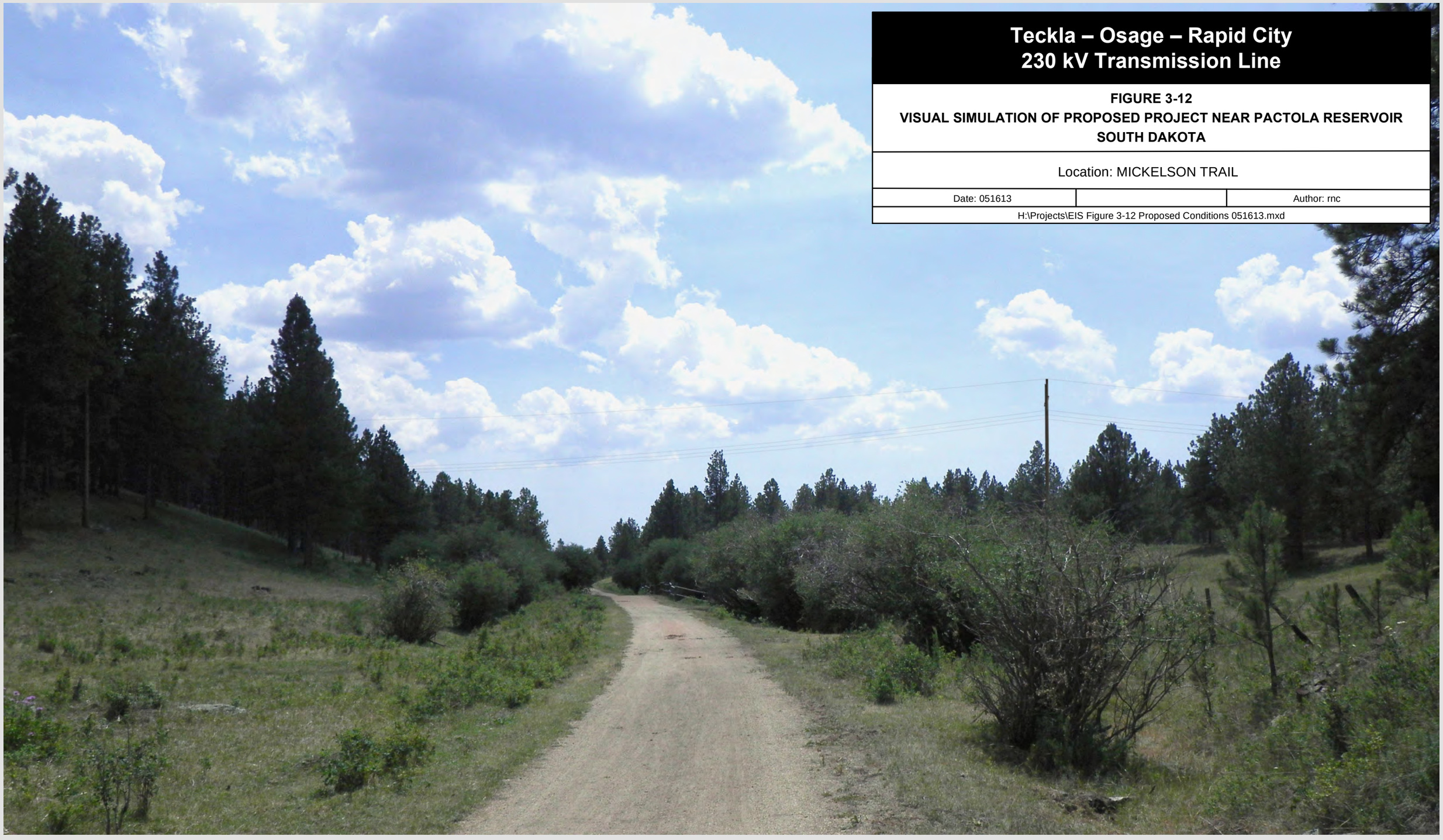
Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-12
VISUAL SIMULATION OF PROPOSED PROJECT NEAR PACTOLA RESERVOIR
SOUTH DAKOTA

Location: MICKELSON TRAIL

Date: 051613		Author: rnc

H:\Projects\EIS Figure 3-12 Proposed Conditions 051613.mxd



DATE: 07/11/2012 TIME: 2:16 PM LENS LENGTH: 33 mm DIRECTION: SOUTH

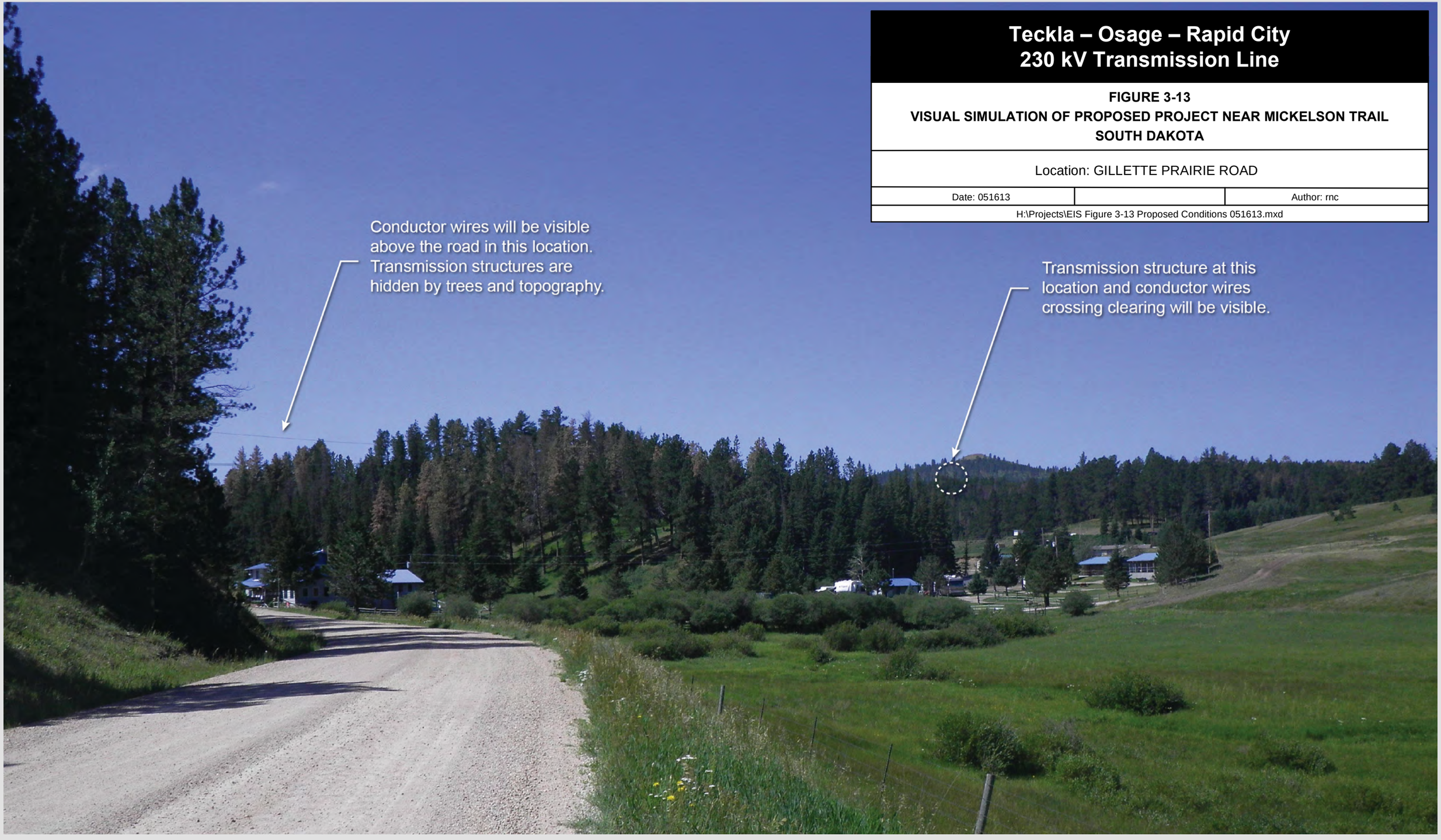
Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-13
VISUAL SIMULATION OF PROPOSED PROJECT NEAR MICKELSON TRAIL
SOUTH DAKOTA

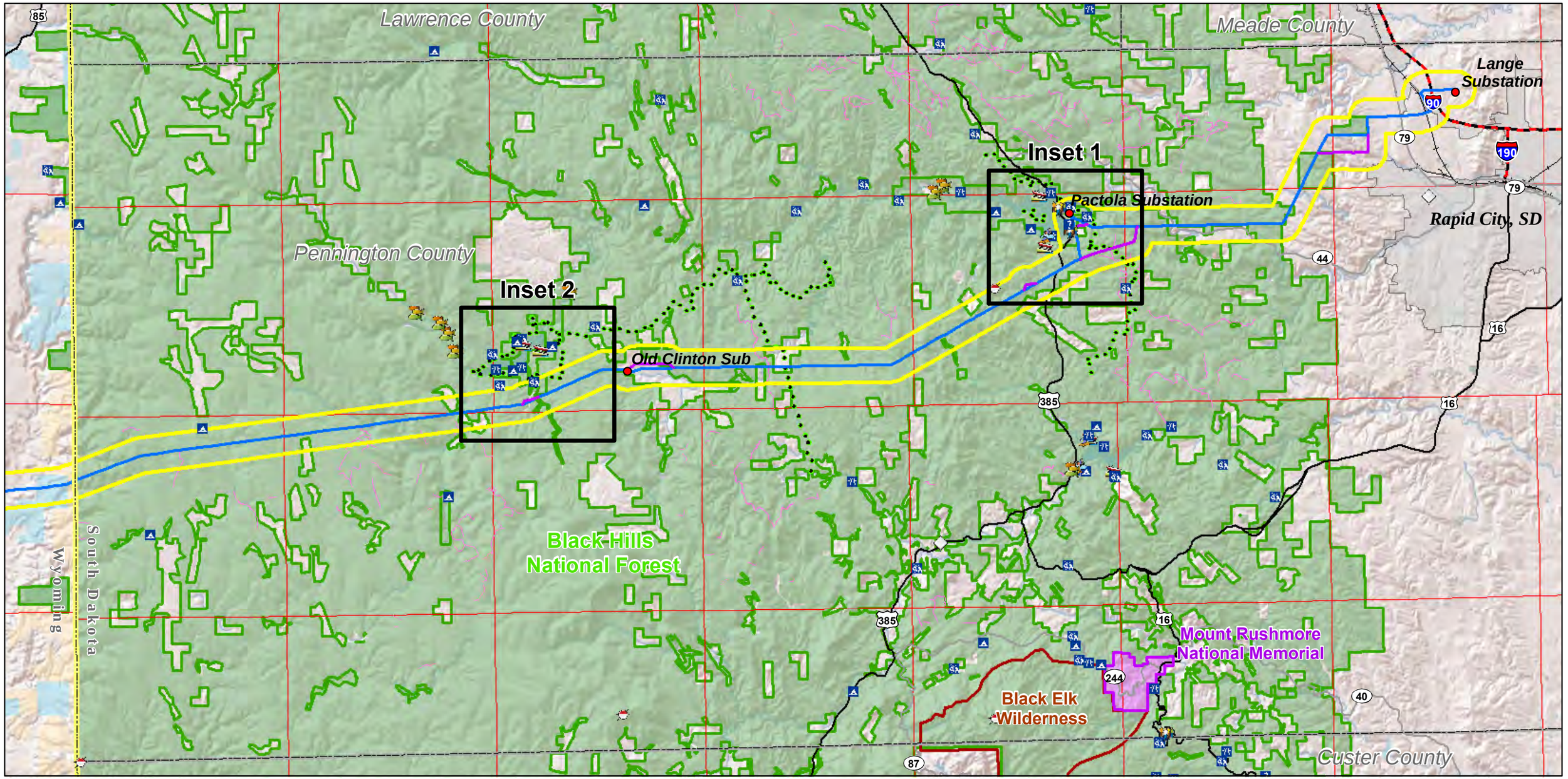
Location: GILLETTE PRAIRIE ROAD

Date: 051613		Author: rnc

H:\Projects\EIS Figure 3-13 Proposed Conditions 051613.mxd



DATE: 07/10/2012 TIME: 11:41 AM LENS LENGTH: 33 mm DIRECTION: SOUTHWEST



Legend

Recreation Resources
- Administrative Site
- Boating Site
- Campground
- District Office
- Fishing Site
- Forest Office
- Interpretive Site
- Lookout
- Observation Site
- Picnic Site
- Special Use Area
- Trailhead
- Flying V Cambria Inn RV Park and Campground
- Hiking Trail
- ATV Trail

- Substation
- Proposed Action
- Site-Specific Design Modification
- Analysis Area
- Interstate
- US Highway
- State Highway
- Railroad
- State Boundary
- County Boundary
- City or Town
- Township/Range Line
- Federal Wilderness Area

Jurisdictional Land Ownership
- Bureau of Land Management Land
- U.S. Forest Service Land
- National Park Service Land
- State Land

N

0 2 4 6 8
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

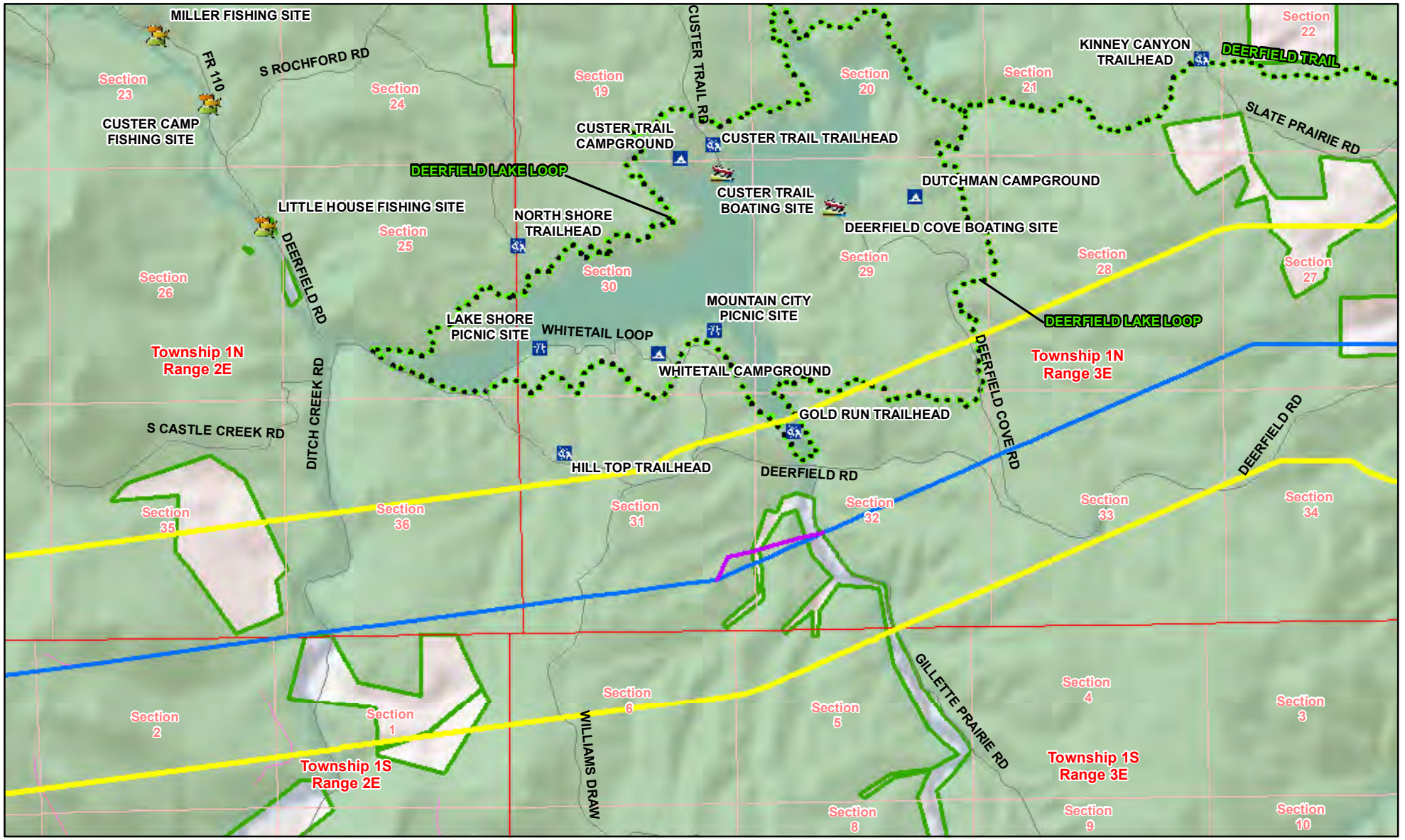
Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 3-14
RECREATION RESOURCES IN SOUTH DAKOTA

Map Extent: Lawrence, Pennington, and Custer Counties, South Dakota

Date: 06-28-13 | Author: djb

I:\SD-WY\Figure 3-14 Recreational Resources in South Dakota 11x17_062813.mxd



Legend

Recreation Resources
- Boating Site
- Campground
- Fishing Site
- Picnic Site
- Trailhead
- Hiking Trail
- ATV Trail

- Proposed Action
- Site-Specific Design Modification
- Analysis Area
- Local Road
- Township/Range Line
- Section Line

Jurisdictional Land Ownership
- U.S. Forest Service Land

N

0 0.25 0.5 0.75 1

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

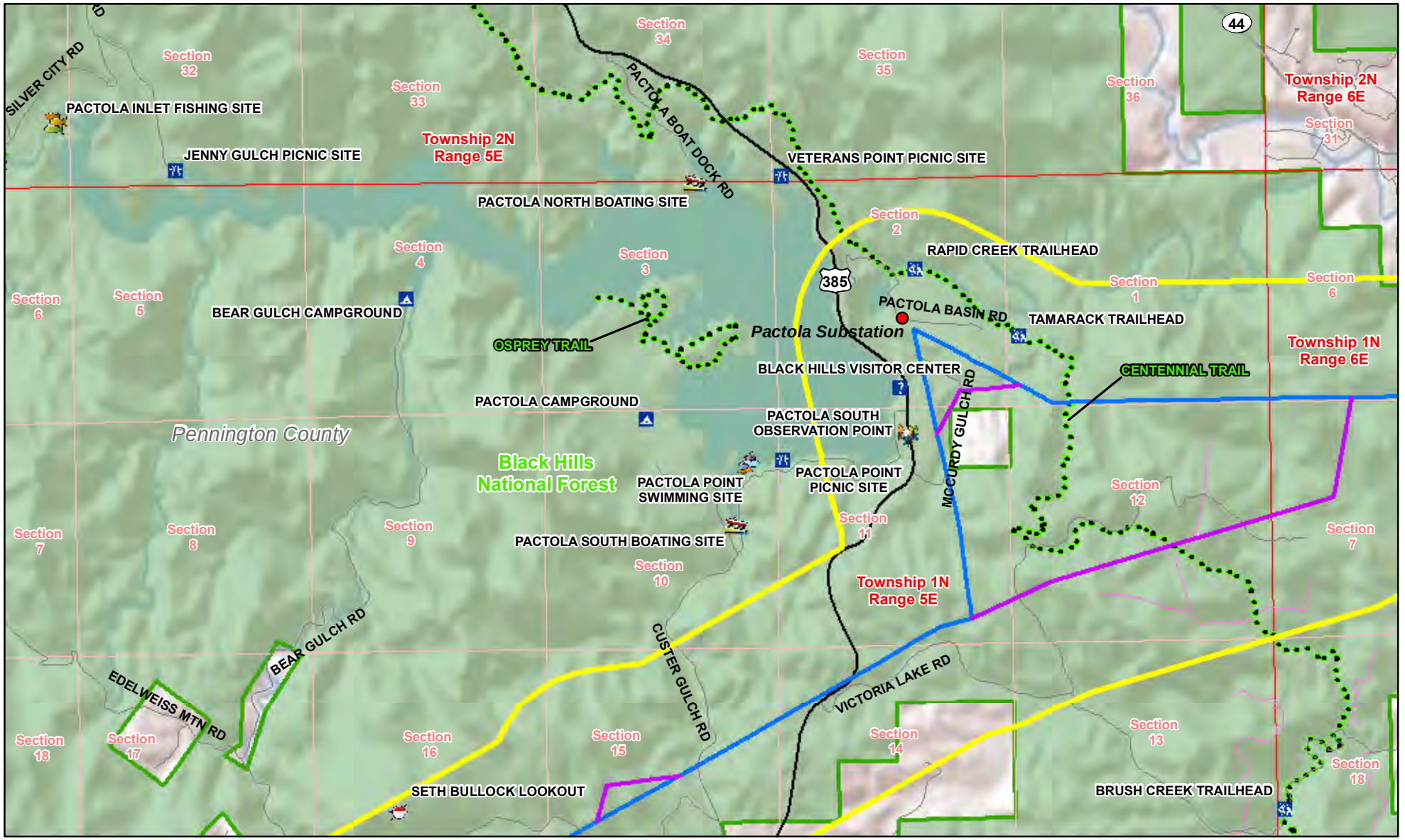
Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 3-15
RECREATION RESOURCES NEAR DEERFIELD RESERVOIR IN SOUTH DAKOTA

Map Extent: Pennington County, South Dakota

Date: 06-28-13 | Author: djb

I:\SD-WY\Figure 3-15 Recreational Resources Near Deerfield Reservoir in South Dakota.mxd



Legend

Recreation Resources

- Boating Site
- Campground
- Fishing Site
- Interpretive Site
- Lookout
- Observation Site
- Picnic Site
- Trailhead
- Swimming Site
- Hiking Trail
- ATV Trail
- Substation
- Proposed Action
- Site-Specific Design Modification
- Analysis Area
- US Highway
- State Highway
- Township/Range Line
- Section Line
- Local Road

Jurisdictional Land Ownership

- U.S. Forest Service Land

N

0 0.25 0.5 0.75 1

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

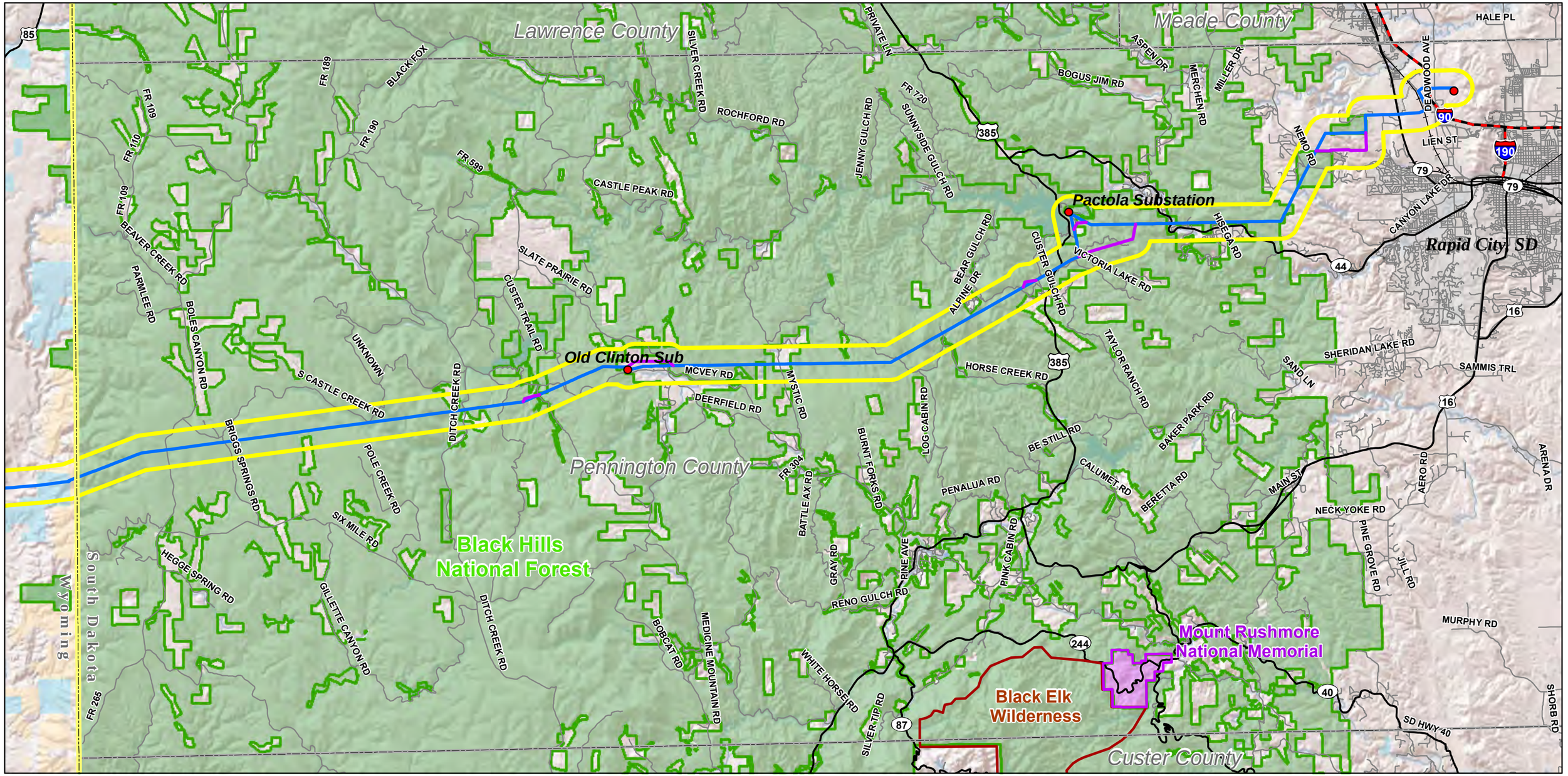
Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 3-16
RECREATION RESOURCES NEAR PACTOLA RESERVOIR IN SOUTH DAKOTA

Map Extent: Pennington County, South Dakota

Date: 06-28-13 | Author: djb

I:\SD-WY\Figure 3-16 Recreation Resources Near Pactola Reservoir South Dakota.mxd



Legend

- Substation
- Proposed Action
- Site-Specific Design Modification
- Analysis Area
- Interstate
- US/State Highway
- Secondary/Local Road
- Railroad
- City or Town
- State Boundary
- County Boundary
- Federal Wilderness Area

Jurisdictional Land Ownership

- Bureau of Land Management Land
- U.S. Forest Service Land
- National Park Service Land
- State Land

N

0 2 4 6 8

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

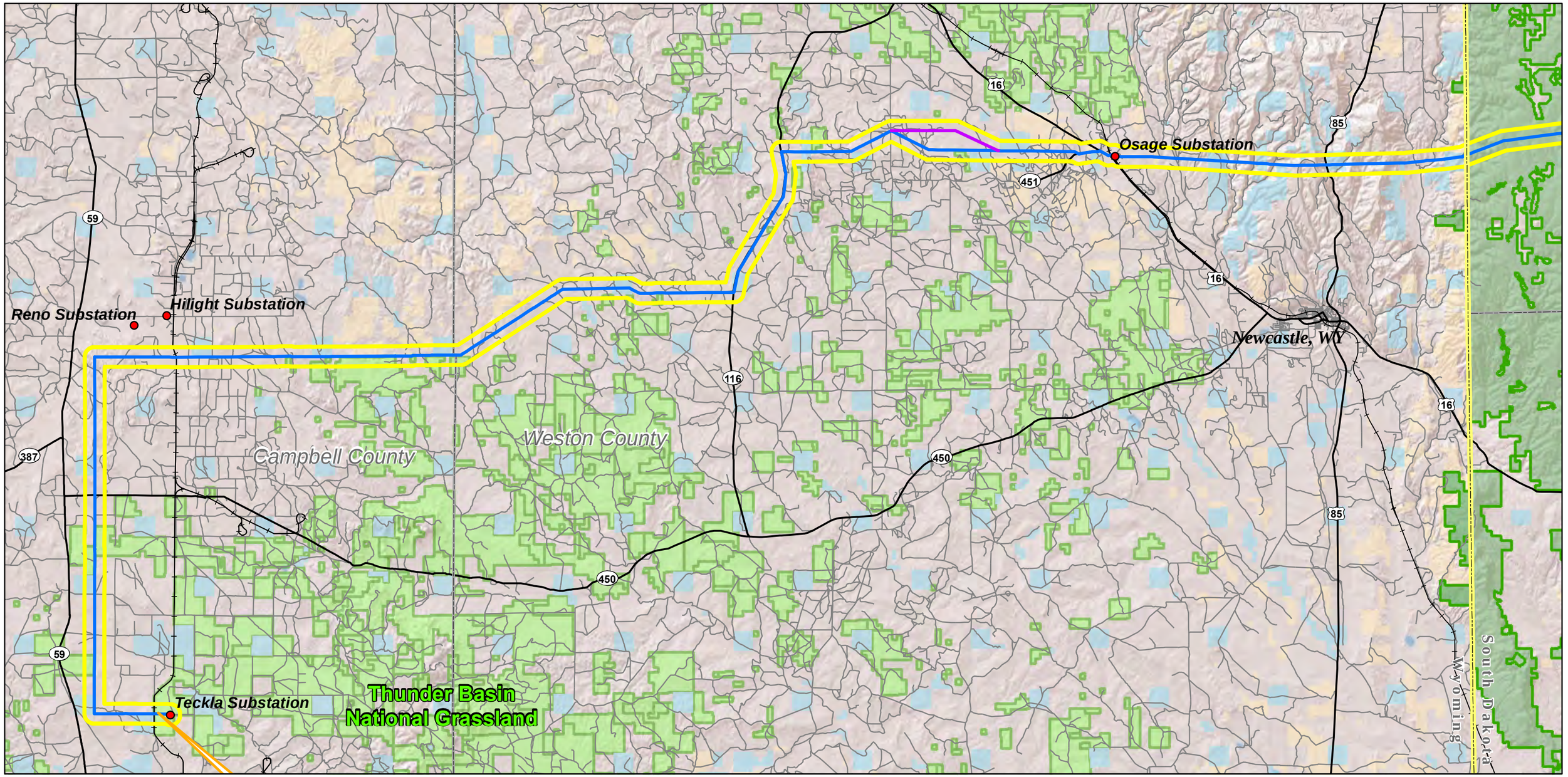
Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 3-17 TRANSPORTATION SYSTEM SOUTH DAKOTA

Map Extent: Lawrence, Pennington, and Custer Counties, South Dakota

Date: 06-28-13 | Author: djb

I:\SD-WY\Figure 3-17 Transportation System South Dakota 11x17_062813.mxd



Legend

- Substation
- Proposed Action
- Site-Specific Design Modification
- Analysis Area
- US/State Highway
- Secondary/Local Road
- Railroad
- State Boundary
- County Boundary
- City or Town

Jurisdictional Land Ownership

- Bureau of Land Management Land
- U.S. Forest Service Land
- Thunder Basin National Grassland
- State Land

N

0 2 4 6 8 10

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 3-18 TRANSPORTATION SYSTEM WYOMING

Map Extent: Campbell, Weston, Converse and Niobrara Counties, Wyoming

Date: 06-28-13 | Author: djb

I:\SD-WY\Figure 3-18 Transportation System Wyoming 11x17_062813.mxd