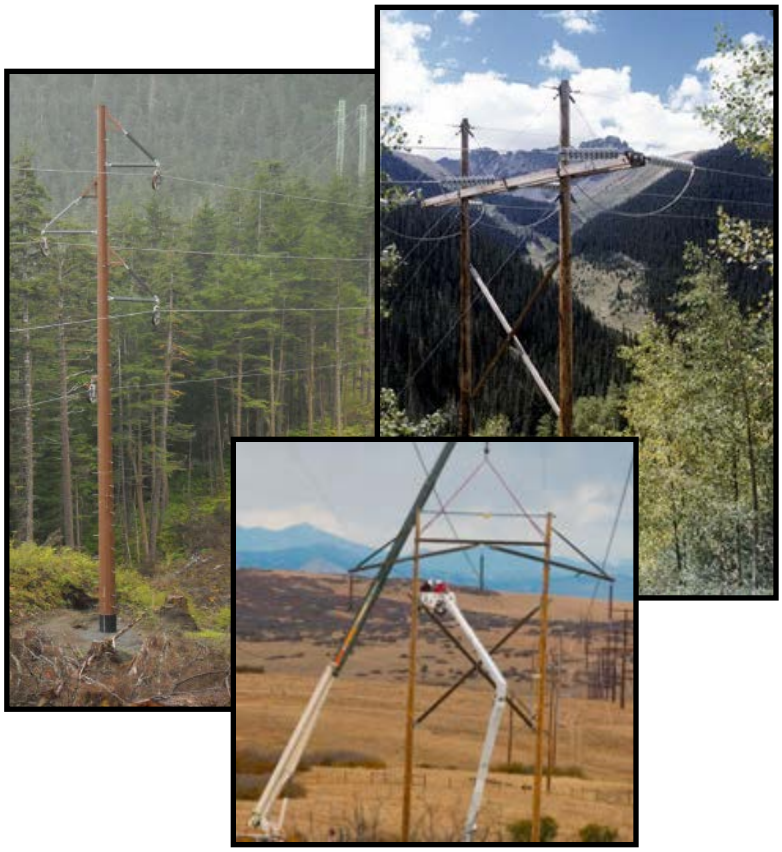
Volume 1

Teckla-Osage-Rapid City
230 kV Transmission Line Project

Final Environmental Impact Statement



Bureau of Land Management

High Plains District

USDA Forest Service

Black Hills National Forest
Thunder Basin National Grassland

November 2014

Teckla-Osage-Rapid City (T-O-RC) 230 kV Transmission Line Project
Final Environmental Impact Statement
Pennington County, South Dakota
Black Hills National Forest, Mystic Ranger District
and
Weston and Campbell Counties, Wyoming
Thunder Basin National Grasslands
and
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COMMONLY USED ACRONYMS AND ABBREVIATIONS

BHNF - Black Hills National Forest

BHP - Black Hills Power

BLM - Bureau of Land Management

BMP - Best Management Practices

CEQ - Council on Environmental Quality

CF - Cubic Feet

CFR - Code of Federal Regulations

DEIS - Draft Environmental Impact Statement

EIS - Environmental Impact Statement

EPA - Environmental Protection Agency

FEIS - Final Environmental Impact Statement

FLMPA - Federal Land Management Policy Act

FS - Forest Service

ID - Team Interdisciplinary Team

MA - Management Area

NEPA - National Environmental Policy Act

NFS - National Forest System

OHV – Off-Highway Vehicle

RMP - Resource Management Plan

ROD - Record of Decision

ROW - Right of way

S&G - Standard(s) and Guideline(s)

SHPO - State Historic Preservation Officer

SD - South Dakota

SOLC - Species of Local Concern

T&E - Threatened and Endangered

TBNG - Thunder Basin National Grassland

T-O-RC - Teckla-Osage-Rapid City Transmission Project

USDA - United States Department of Agriculture

USFWS - United States Fish and Wildlife Service

WY - Wyoming

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Abstract: The Black Hills National Forest in cooperation with the Thunder Basin National Grasslands and the Bureau of Land Management (BLM) has prepared this Final Environmental Impact Statement (FEIS) in compliance with the National Environmental Policy Act (NEPA), and other relevant Federal and State laws and regulations.

Black Hills Power (BHP) has applied for permits to construct and operate a 230 kV transmission line from northeastern Wyoming to the Rapid City area in South Dakota. It would connect the Teckla Substation in Campbell County, Wyoming to the Osage Substation in Weston County, Wyoming and the Lange Substation located in Pennington County near Rapid City, South Dakota. This transmission line is being developed to strengthen the transmission network, improve transmission system reliability, and to help meet future demand for electricity and economic development in the region.

The project proposes to cross private, state and public lands, including the Black Hills National Forest and Thunder Basin National Grasslands, as well as lands managed by the Bureau of Land Management (BLM), and State of Wyoming. As such, this project is subject to the NEPA process which requires federal agencies to evaluate the environmental effects of a proposed project prior to deciding whether to allow the proposed project to be built on federally-managed land.

Three alternatives are considered in detail. Alternative 1 is the No Action Alternative, Alternative 2 is the Proposed Action, and Alternative 3 is the Proposed Action with Route Modifications. This FEIS discloses the direct, indirect, and cumulative environmental effects resulting from the proposed action and alternatives.

EXECUTIVE SUMMARY

The Black Hills National Forest, Thunder Basin National Grasslands, and the Bureau of Land Management are responding to a proposal by the project proponent, Black Hills Power (BHP) to construct and operate a 230 kV transmission line from northeastern Wyoming to the Rapid City area in South Dakota. This proposal is guided by the National Forest and National Grasslands Land and Resource Management Plans (Forest Plans) and the BLM Resource Management Plans (RMPs) that cover the federal lands crossed by the Project and is evaluated in accordance with the National Environmental Policy Act (NEPA) and other agency direction.

The transmission line route proposed by BHP would connect the Teckla Substation in Campbell County, Wyoming to the Osage Substation in Weston County, Wyoming and the Lange Substation located in Pennington County near Rapid City, South Dakota. The route would be approximately 144 miles long and would cross private lands, National Forest System (NFS) lands, Bureau of Land Management (BLM) lands (in Wyoming), and state lands (in Wyoming). The National Forest System lands involved in the Project are managed by the BHNF in South Dakota and TBNG in Wyoming.

The USFS and BLM have identified a need to authorize BHP for construction, installation and operation of a 230kV transmission line to:

- Strengthen the regional transmission network
- Improve the reliability of the transmission system
- Provide additional transmission capacity to help meet the growing demand for electricity and development in the region.

The need for this project has been established and approved through the appropriate planning and oversight criteria--described in Chapter 1 of this document.

The USFS announced the project scoping period through various means, held public scoping meetings, and invited the public to comment and ask questions. The scoping period and public meetings were announced in the *Federal Register* on August 26, 2011. In the fall of 2011, over 3,000 scoping notification letters produced by the USFS were sent to government agencies, tribes, elected officials, property owners near the proposed project, various non-governmental organizations and other interested stakeholders. In addition, news releases about the project and public meetings were published in three local newspapers: News Letter Journal (WY), Hill City Prevailer (SD), and Rapid City Journal (SD).

Comments received during the scoping process were used to help in defining issues, develop alternatives and mitigation measures, and analyze effects. Through review and analysis of the scoping comments and input, the Interdisciplinary Team (ID Team) identified seven (7) prevailing or key issues related to the proposed activities. The seven key issues include effects of the Proposed Project on:

- Wildlife including Sensitive Species such as sage grouse, goshawks, and other raptors
- Wetlands and Vegetation Communities
- Scenic Integrity, Visual Resources and Visibility from a Nearby American Indian Religious Site
- Private Property including Property Values and Electricity Rates
- Existing and Future ATV/OHV/Snowmobile Trails

- Tree Removal
- Health resulting from Electromagnetic Fields (EMF)

These issues led the ID Team to develop alternatives to the proposed action. The alternatives analyzed in detail in this FEIS are briefly described as follows:

Alternative 1 (No Action)

NEPA requires the study of the No Action Alternative and to use it as a basis for comparing the effects of the Proposed Action and other alternatives. The No Action Alternative assumes that no implementation of any elements of the Proposed Action (no authorization of ROWs and no construction of the transmission line) would occur in the Project area within the next 10 to 15 years. This alternative does not actively respond to the purpose and need for action or address the issues, concerns, or comments identified during scoping for this Project.

Alternative 2 (Proposed Action)

The Proposed Action was developed as a response to the purpose and need for action. The Proposed Action is a single-circuit 230 kV transmission line that would connect the existing Teckla Substation (located approximately 67 miles north of Douglas, Wyoming in Campbell County, Wyoming); to the existing Osage Substation (located in Weston County, Wyoming about 13 miles northwest of Newcastle); to the existing Lange Substation (located in Rapid City, South Dakota). From the Teckla Substation the line would travel west approximately three miles along an existing transmission line route, then north approximately 19 miles. Here it would turn east and follow county roads and section lines before turning northeast for approximately six miles. The route would then turn east to parallel an existing electrical distribution line before heading straight east along section lines to Wyoming State Highway 116 where it would parallel highway ROW north for approximately seven miles. At this point, the route would generally travel east on section lines to the existing Osage Substation. From the substation, the Proposed Action would travel east and north into Pennington County, South Dakota using approximately 47 miles of currently unused transmission line ROW to the existing Pactola Substation west of Rapid City. In this portion of the line (from Osage to Pactola) the currently unused ROW has a cleared width of approximately 40 to 50 feet which would be widened to 100 feet to accommodate the needed ROW for the new transmission line. From the Pactola Substation, the route would continue east paralleling an existing transmission line for approximately five and one-half miles, and then north and east approximately ten miles to terminate at the Lange substation in Rapid City, South Dakota.

Alternative 3 (Proposed Action with Route Modifications)

Alternative 3 is defined as the Proposed Action with modifications to the proposed route in specific locations to respond to issues identified during scoping and other public comment opportunities. The seven key issues are presented above. The route modifications are identified as 3a through 3j and each are located within one mile of the proposed route.

The transmission line specifications, construction methods, and operations and maintenance procedures would be the same as those for the Proposed Action. The route modifications and key issues they responded to are described below.

- Modification 3a - The Fiddler Modification is approximately 7.5 miles south of Upton and nine miles west of Osage, Wyoming. It would be approximately one mile north of the proposed route for a distance of about five miles and was developed to avoid the Upton Fairview and Jessee Greater Sage-Grouse Leks.
- Modification 3b - The Mountain View Modification is south of Deerfield Road between Williams Draw Road and Gillette Prairie Road in South Dakota. It would be approximately 500 feet north of the proposed route for a distance of about one mile and was developed to avoid existing residences. This responds to issues 4 and 7.
- Modification 3c - The Clinton Modification is north of McVey and Deerfield Roads and crosses Slate Prairie Road in South Dakota. It would be approximately 1,000 feet north of the proposed route for about one mile and was developed to avoid existing residences.
- Modification 3d - The Edelweiss Modification is located north of Edelweiss Mountain Road and west of U.S. Route 385 in South Dakota. It would be about 1,000 feet north of the proposed route for less than one mile and was developed to avoid a sensitive wildlife area.
- Modification 3e - The Pactola Modification is east of U.S. Route 385 near the Pactola Reservoir in South Dakota. It would be about 1,500 feet south of the proposed route and would require clearing for the new ROW for approximately one-half mile. This Modification was developed to move the transmission line farther from the Pactola Reservoir, a visually sensitive area identified in the Forest Plan.
- Modification 3f – The Pactola South Modification is also east of U.S. Route 385 near the Pactola Reservoir in South Dakota. It was also developed to avoid the Pactola Reservoir area. It would be located about one mile south of the proposed route and would follow approximately two miles of previously cleared ROW.
- Modification 3g - The Hidden Valley Modification is approximately four miles west of Rapid City, South Dakota. It would be approximately 2,500 feet south of the proposed route for about one and one-half mile and was developed to avoid planned future quarry operations.
- Modification 3h – The Deerfield Road Modification is a second route option developed in the Mountain View area in response to comments received on the Draft EIS. It is located on National Forest land south of Deerfield Road between Williams Draw Road and Deerfield Cove Road in South Dakota. At the widest point, it would be approximately 2,200 feet north of the proposed route and about 1,700 feet north of Route Modification 3b. It would cover a distance of nearly 1.9 miles and was developed to move the line farther from existing residences.
- Modification 3i – The Deerfield Road 2 Modification is a third route option on National Forest land in the Mountain View area in South Dakota and was developed to reduce the Project's potential visibility from a nearby American Indian religious use site. The eastern portion of this modification is coincident with the portion of Modification 3h that is located south of Deerfield Road. Where Modification 3h turns south to reconnect with the proposed route, this modification (3i) would continue west for an additional 1.2 miles before turning south to reconnect with the proposed route. At the widest point, it would be approximately 2,500 feet north of the proposed route. It would cover a distance of nearly 2.9 miles and was developed to take advantage of intervening topography. Like Modification 3h, it would also move the line farther from existing residences in the Mt. View area.
- Modification 3j - This route modification (Ponderosa Ridge) is a second route option developed in the general area of Route Modification 3g in response to comments received on the Draft EIS and comments received from public review of another route suggested in comments received on the Draft EIS. It is located between Hidden Valley Road and an area southwest of Sun Ridge Road. It would be located on the northern and western portions of a National Forest System (NFS) parcel in Section 30 for approximately 1.5 miles. The transmission line would then cross private lands to

the south, and re-enter NFS lands at a point along the northern boundary of Section 36. The exact path along which the line would cross private lands is subject to negotiations between the proponent and land owners, and is not a decision the Forest Service can make.

Relative comparison between the alternative effects on the key issues are summarized in Chapter 2 and discussed in detail in Chapter 3. The Purpose and Need of the Project discussed in Chapter 1 provides the focus and scope of the proposal as related to National Forest and BLM level policy.

Given the purpose and need, the Responsible Officials (BHNF Forest Supervisor, TBNG Forest Supervisor, and BLM High Plains District Manager) will review the project record and analysis, the Proposed Action, the issues identified during scoping, the alternatives, the environmental consequences of implementing the proposal and alternatives disclosed in this EIS. This forms the basis for the Responsible Officials to make the following determinations for their respective jurisdictions:

- Whether the proposed activities and alternatives address the issues, are responsive to laws, regulations, and management direction, and meet the purpose of and need for action in the T-O-RC Project area
- Whether the information in this analysis is sufficient to make a reasoned decision
- Which action, if any, to approve (decide which alternative or combination of alternatives to implement).
- Which if any mitigation measures and monitoring requirements will be applied.

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VOLUME 2

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CHAPTER 1
PURPOSE AND NEED FOR ACTION

1.1 DOCUMENT STRUCTURE

The United States Department of Agriculture Forest Service (USFS), the lead agency, with the Bureau of Land Management (BLM), cooperating agency, has prepared this Final Environmental Impact Statement (FEIS) in compliance with the National Environmental Policy Act (NEPA), and other relevant federal and state laws and regulations. This FEIS discloses the direct, indirect, and cumulative environmental impacts that would result from No Action (Alternative 1), the Proposed Action (Alternative 2), and the Proposed Action with route modifications (Alternative 3). The document is organized into six chapters (contained in Volume 1) followed by Appendices A-F (contained in Volume 2).

- ***Chapter 1: Proposed Action and Purpose and Need for Action***: The chapter includes information on the background of the project proposal, the purpose of and need for the project, and the proposal for achieving that purpose and need. This section also details how the USFS involved the public in the project proposal, how the public responded and what issues were generated regarding the proposal.

- ***Chapter 2: Alternatives, including the Proposed Action***: This chapter provides a more detailed description of the Proposed Action. The Proposed Action was developed based on addressing the purpose and need. Comments and issues raised by the public, other agencies and internally during scoping and review of the Draft EIS are the basis for the modifications to the Proposed Action that resulted in Alternative 3. Finally, this section includes summary tables of the environmental consequences and a comparison of effects associated with the Proposed Action, Proposed Action with route modifications, and No Action alternatives.

- ***Chapter 3: Affected Environment and Environmental Consequences***: This chapter describes the current environmental conditions in the project analysis area and the environmental effects of implementing the Proposed Action, Alternative 3, and No Action alternatives. This chapter is organized by resource area, e.g., Visual, Wildlife, Recreation and Socioeconomics, etc.

- ***Chapter 4. Bibliography/References***: The bibliography provides a list of references supporting the documentation in the FEIS.

- ***Chapter 5. Glossary***: The glossary provides a list and explanation of key words, acronyms, and terminology used throughout the FEIS.

- ***Chapter 6. List of Preparers***: This chapter provides a list of preparers involved during the development of the FEIS.

- ***Appendices***: The appendices provide more detailed information to support the analyses presented in the FEIS.

Additional documentation, including more detailed analyses of project-area resources, may be found in the Project file located at Mystic Ranger District office in Rapid City, South Dakota; the Douglas Ranger District Office in Douglas, the High Plains BLM District Office in Casper, and the Newcastle BLM Field Office in Newcastle in Wyoming.

1.2 BACKGROUND

Black Hills Power (BHP) proposes to construct and operate a 230 kV transmission line from northeastern Wyoming to the Rapid City area in South Dakota. It would connect the Teckla Substation in Campbell County, Wyoming to the Osage Substation in Weston County, Wyoming and the Lange Substation located in Pennington County near Rapid City, South Dakota. This transmission line is being developed to strengthen the transmission network, improve transmission system reliability, and to help meet future demand for electricity and economic development in the region. **Figure 1-1** shows the project area.

The Teckla-Osage-Rapid City (T-O-RC) 230 kV Transmission Line Project (the Project) would be approximately 144 miles long and would cross private lands, National Forest System (NFS) lands, Bureau of Land Management (BLM) lands (in Wyoming), and state lands (in Wyoming). The NFS lands crossed by the proposed Project are managed by the Black Hills National Forest (BHNF) in South Dakota and Thunder Basin National Grassland (TBNG) in Wyoming. Pending final design, the Proposed Action crosses the following jurisdictions:

Table 1-1 - Land Ownership / Jurisdiction Crossed by Proposed Action

Ownership/Jurisdiction	Approximate Mileage
Black Hills National Forest (BHNF)	36.3 miles
Thunder Basin National Grassland (TBNG)	4.7 miles
Bureau of Land Management	2.6 miles
State of Wyoming	10.3 miles
Privately Owned Lands	90.0 miles

Project construction would occur in two phases: the Teckla-to-Osage, and the Osage-to-Rapid City phases. Construction would begin between Teckla and Osage in 2015 and construction between Osage and Rapid City would begin in late 2015. BHP intends to have the entire line between Teckla and Rapid City energized by 2016.

1.3 MANAGEMENT DIRECTION

The following sections provide an overview of the management direction on NFS and BLM lands that are within the T-O-RC Project area.

1.3.1 National Forest

1.3.1.1 FOREST PLAN DIRECTION

1.3.1.1.1 Black Hills National Forest

The BHNF programmatic management direction is the 1997 Revised Land and Resource Management Plan (LRMP or Forest Plan), as amended by the Phase II Amendment (October 2005), and supported by the Final Environmental Impact Statement (FEIS) for the Phase II Amendment to the 1997 LRMP. The Forest Plan is required by the rules implementing the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA).

The Forest Plan as amended, provides revised and new goals, objectives, and standards and guidelines focused on protecting communities, property, and forest values by reducing severe insect infestations and fire hazards; conserving viable plant and animal species and habitats for the long-term supported by the best available science; and designating and managing research natural areas.

The purpose of the Forest Plan is to provide management direction for multiple use and sustained yield of goods and services from NFS lands in an environmentally sound manner. Moreover, the Forest Plan provides overall management allocations, goals and objectives (FP Chapter I), as well as associated standards and guidelines (FP Chapter II) for management.

1.3.1.3.2 Thunder Basin National Grassland

The USFS manages TBNG per its 2001Revised LRMP, which includes goals, objectives, standards, and guidelines for managing resources. The LRMP includes direction for TBNG's six geographic areas. The project analysis area includes five of the six areas - Broken Hills, Cellers Rosecrans, Fairview Clareton, Hilight Bill, and Upton Osage.

The Revised LRMP provides guidance for all resource management activities on the TBNG. It establishes management standards and guidelines, and describes resource management practices, levels of resource production, people-carrying capacities, and the availability and suitability of lands for resource management activities.

The Revised LRMP embodies the provisions of the NFMA, the implementing regulations and other guiding documents. Land-use determinations, management area prescriptions, and standards and guidelines are statements of the management direction. Projected outputs, services, and rates of implementation are dependent on the annual budgeting process.

1.3.1.2 MANAGEMENT AREAS

The LRMPs set management allocations for specific uses of land (Management Areas) within the BHNF and TBNG to meet multiple use objectives (FP Chapter III). The T-O-RC Project Interdisciplinary (ID) Team reviewed Management Area (MA) direction and confirmed that no new information existed that would require reconsideration of Forest Plan resource allocations.

The MAs designated in the Forest Plans crossed by the T-O-RC Project are in **Tables 1-2** and **1-3**.

Table 1-2 - Management Area Designations in the BHNF 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

Table 1-3 - Management Area Designations in the TBNG crossed by the Project	
Management Area	**Miles**
5.12 – General Forest & Rangelands Range Vegetation Emphasis	3.2
6.1 – Rangeland with Broad Resource Emphasis	1.0
8.4 – Mineral Production & Development	0.5
Total NFS	4.7

1.3.1.3 PLAN GOALS AND OBJECTIVES

1.3.1.3.1 Black Hills National Forest

The BHNF Forest Plan establishes 11 multiple use goals and associated objectives for management of the Forest. Goals 1 to 4, 10 and 11 are directed toward natural resource objectives for multiple use management of the Forest. Goals 3 and 5 through 9 provide socio-economic emphasis for management of the Forest. The goals and objectives, applicable to specific resource management issues needing resolution, provide the basic direction for defining the purpose and need and subsequently developing the Project proposal. The 11 Forest Plan goals are discussed in Chapter I of the Forest Plan.

The Forest Plan goal that generally provides direction for the T-O-RC Project proposal is Goal 7: Emphasize cooperation with individuals, organizations and other agencies while coordinating planning and project implementation. Associated with this goal is Objective 701: Continue to cooperate with interested parties and organizations in the development of plans and projects.

The Forest Plan provides management Standards and Guidelines (S&G) that apply Forest-wide. Those specific to transmission lines on NFS lands are listed below.

8304 (Guideline). Reduce effects of utility corridors.

a. Locate new and rebuilt (greater than 33 KV) utility lines so they are not highly visible from the highways;

b. Locate new and rebuilt (greater than 33 KV) utility lines to cross at right angles to the travel corridor; and

c. Use non-reflective material in construction of overhead utility lines within travel corridors.

8305 (Guideline). Consolidate occupancy of transportation or utility corridors and sites wherever possible and compatible.

8306 (Standard). New proposals to utilize existing utility corridors will be authorized without alternative route analysis, subject to site-specific environmental analysis.

8307 (Standard). Do not authorize conflicting uses or activities within utility corridors.

8309 (Standard). For new construction of electric lines and poles, protect raptors by use of Suggested Practices for Raptor Protection on Power Lines – State of the Art in 1981 (Olendoff 1981) (or any updated version) for single-phase, dead-end, intersection, transformer configurations and under-ground takeoff poles.

8310 (Guideline). Management activities within linear corridors should be compatible, to the extent possible, with the goals of the individual management areas through which the corridors pass.

All Forest Plan S&Gs could apply depending on the resource affected by a given project. **Appendix D** contains a list of the Forest Plan S&Gs.

1.3.1.3.2 Thunder Basin National Grassland

The TBNG LRMP establishes four multiple use goals and associated objectives for management of the Grassland. Goal 1 is directed toward natural resource objectives for multiple use management of the Grassland. Goals 2, 3 and 4 provide socio-economic emphasis for management of the Grassland. The goals and objectives applicable to specific resource management issues needing resolution provide the basic direction for defining the purpose and need and subsequently developing project proposals. The four management goals are discussed in Chapter 1 of the TBNG LRMP. The LRMP goals that provide general direction for the T-O-RC Project area are Goal 1 - Ensure sustainable ecosystems and Goal 2 - Multiple benefits to people**.**

The TBNG LRMP also provides management S&Gs that apply across the TBNG. Those specific to transmission lines on the National Grassland are listed below. These S&Gs are contained in Section P Special Uses.

P. 1. (Guideline) Permit utility companies to construct new utility corridors, unless prohibited by management direction provided in Chapters 1, 2, and 3.

P. 2. (Guideline) Consolidate utility lines within existing corridors or in areas adjacent to roads wherever possible.

P. 4. (Guideline) Ensure utility corridors are consistent between adjoining NFS regions and other federal, tribal, and state land management agencies.

P. 6. (Guideline) Route new roads, pipelines, gathering lines, and technically required overhead power lines in a manner as to minimize visual impacts and conform to approved corridors. When these facilities leave corridors, they should be subordinate to the landscape.

P. 7. (Standard) Design and construct new power lines to minimize the risk of raptor electrocution by ensuring that there is an 80-inch distance between conductors and ground wire. Upon renewal of permits, retrofit to provide for 80-inch distance between conductors and ground wire or install perch-inhibitors.

P. 10. (Guideline) Act on special-use applications according to the following priorities:

- Land and land-use activity requests relating to public safety, health and welfare, e.g., highways, power lines and public service improvements.
- Land and land-use activities contributing to increased economic activity associated with Grassland NFS resources, e.g., oil and gas and energy minerals.
- Land and land-use activities that benefit only private users, e.g., road permits, rights-of-way for power lines, telephones, waterlines, etc.

P. 12. (Guideline) Don't approve any special-use applications that can reasonably be met on private or other federal lands unless it is clearly in the public interest.

All Grassland Plan Standards and Guidelines could apply depending on the resource affected by a given project.

1.3.1.4 MANAGEMENT AREA SPECIFIC GOALS AND OBJECTIVES

1.3.1.4.1 Black Hills National Forest

Management 3.7 - Late Successional Forest Landscape

Guideline 3.7-5101. "The recreation opportunity spectrum class is roaded natural, non-motorized. "

Guideline 3.7-5601. "The adopted scenic integrity objectives are:

High = 3,729 Acres

Moderate = 13,606 Acres

Low = 7,802 Acres"

Guideline 3.7-8501. "Large facilities, such as transmission corridors and electronic sites that permanently alter significant areas of vegetation, should not be permitted".

Management 4.1 - Limited Motorized Use & Forest Product Emphasis

Guideline 4.1-201. "Emphasize wood-fiber production, wildlife habitat, and visual quality".

Guideline 4.1-2502. “Locate or design structural improvements to meet Scenery Integrity Objectives’.

Guideline 4.1-5101. “The recreation opportunity spectrum class is roaded natural non-motorized”.

Guideline 4.1-5601. “The adopted scenic integrity objectives are:

High = 6,362 Acres

Moderate = 23,742 Acres

Low = 13,539 Acres”

Management 5.1 - Resource Production Emphasis

Objective 5.1-203. “Maintain or enhance hardwood shrub communities where biologically feasible, and within management objectives”.

Guideline 5.1-5101. “The recreation opportunity spectrum is roaded natural”.

Guideline 5.1-5601. “The adopted scenic integrity objectives are:

High = 57,127 Acres

Moderate = 248,914 Acres

Low = 255,641 Acres”

Management 5.4 - Big Game Winter Range Emphasis

Guideline 5.4-5101. “Any activities may be prohibited when needed to mitigate adverse impacts on wildlife”.

Guideline 5.4-5103. “The recreation opportunity spectrum is roaded natural”.

Guideline 5.4-5601. “The adopted scenic integrity objectives are:

High = 51,224 Acres

Moderate = 166,821 Acres

Low = 176,348 Acres”

Management 8.2: Developed Recreation Complexes

Goal 8.2-201. ”Manage vegetation in high-use recreation areas to provide for public safety, to improve forest condition, or protect sensitive plants and plant species of local concern as

needed to maintain or improve the desired recreation setting(s) and conserve botanical features."

Goal 8.2-202. "Emphasize a visually appealing landscape by providing a diversity of vegetative species and size classes, vista openings featuring rock outcroppings, and park-like stands of large ponderosa pine".

Objective 8.2-203. "Maintain existing stands and acres of hardwoods".

Standard 8.2-3202. "Retain dead standing trees that do not present a safety hazard".

Guideline 8.2-5101. "The recreation opportunity spectrum class is roaded natural".

Guideline 8.2-5601. "The adopted scenic integrity objectives are:

High = 9,331 Acres

Moderate = 3,873 Acres

Low = 196 Acres"

Guideline 8.2-8500. "Permit special-uses that are complementary and compatible with the kind and development level of the associated USFS facilities within the area."

Guideline 8.2-9104. "Transportation systems, both roads and trails, should be constructed and maintained to the levels needed to support the recreational activities within the area."

1.3.1.4.2 Thunder Basin National Grassland

Management Area: 5.12 General Forest and Rangelands: Range Vegetation Emphasis

Ecological sustainability is protected, while selected biological structures and compositions which consider the range of natural variability are emphasized. These areas are managed for the sustainability of physical, biological, and scenic values associated with woody vegetation and open grassland.

Management Area: 6.1 Rangeland with Broad Resource Emphasis

Ecological conditions will be maintained while emphasizing selected biological (grasses and other vegetation) structure and composition that consider the range of natural variability.

Management Area: 8.4 Mineral Production and Development

Ecological values are protected where they affect the health and welfare of humans. These areas are managed for solid mineral operations.

Geographic Area Direction – Standards and Guidelines

Management direction is also provided for each Geographic Area on the TBNG. The Geographic Areas crossed by the Proposed Action and their respective management direction and S&Gs are described in Chapter 3 of this document.

1.3.2 Bureau of Land Management Plan Direction

1.3.2.1 NEWCASTLE FIELD OFFICE PLANNING AREA

The Newcastle Field Office (NFO) receives management direction via the Newcastle Resource Management Plan (NRMP) (2000) (with 6 changes). The NFO management area includes BLM lands in Weston, Crook, and Niobrara Counties. BLM lands in northeast Wyoming are usually small, uncontiguous, lacking names, and border private or state lands (in a “checkerboard” pattern). NRMP realty goals include: supporting the multiple-use management goals of the BLM resource programs; responding to requests for land use authorizations, sales, and exchanges; and, acquiring access for administrative and public needs (p. 10). Some management actions flowing from this goal include:

- BLM-administered public lands in the planning area are open to consideration for rights-of-way. Proposals will be addressed on a case-by-case basis with emphasis on avoiding land use or resource conflicts and sensitive areas;
- Utility/transportation systems will be adjacent to existing utility/transportation systems whenever practical. Areas to be avoided for new facility placement and routes will be identified on a case-by-case basis, rather than attempting to establish utility corridors.
- Areas within 0.25 mile of developed or semi-developed recreation sites are avoidance areas for development activities such as roads, power lines, pipelines, and well pads. However, these areas will be open to development activities specifically for the purpose of recreation site facilities.; and
- Surface-disturbing and disruptive activities associated with all types of right-of-way construction and maintenance is subject to appropriate mitigation measures determined through, but not limited to, using the Wyoming BLM Mitigation Guidelines.

The NRMP has 8 management actions for identifying, evaluating, mitigating, and/or avoiding cultural resources that support a cultural resource management goal (pp. 6-7). The NRMP’s paleontological management goal is administering those resources to enhance their informational, educational, scientific, and recreational uses (pp. 13-14). Two of the associated management actions include: if suspected fossil materials are uncovered during construction, the operator will stop work immediately and contact the NFO authorized officer. Activities will halt until the authorized officer can assess the situation and advise whether mitigating measures are appropriate before the operations continue. If fossils are found and operations are adversely affected, a suspension of operations will be granted; and whether to apply WY BLM mitigation measures.

The NRMP mineral management objective maintains or enhances mineral exploration and development (pp. 12-13). Management decisions include: a preference to develop minerals on federal as opposed to private lands. The NRMP grazing management objective maintains and improves forage and range conditions for sustainable livestock grazing (pp. 10-12). The 17 grazing management actions include: grazing via sound range management practices supporting other resource values - this supports wildlife fencing standards on BLM lands; and surface-disturbing and disruptive activities being subject to mitigation measures – in practice this protects lambing and calving. The soil management objective (p. 15) maintains soil cover and productivity through management actions reducing and mitigating erosion.

NRMP's vegetation resource management objective includes maintaining or increasing plant community diversity through management actions that include: using site-specific mitigation on surface disturbing activities and avoiding vegetation treatments during nesting seasons and in times of the year detrimental to wildlife (pp. 15-16). The NRMP's visual resource management (VRM) objective is maintaining and improving the visual resource via 3 management actions (p. 17). The NRMP's wildlife management objectives include - supporting the Wyoming Game and Fish Department (WGFD) strategic plan population objective levels to the extent practical and consistent with BLM multiple-use management requirements; and maintaining wildlife diversity and habitats which extends to conserving migratory birds. Thirteen wildlife management goals include: not disrupting animals on identified crucial winter range, generally from November 1 to March 30, unless approved by the authorized officer; and protecting raptors, Greater Sage and sharp-tailed grouse during their nesting seasons, by not allowing disruptive activity from February 1 through July 31. This limitation does not apply to maintenance and operations of existing facilities (pp. 18-19).

1.3.3 Other Direction

The USFS and BLM operate in compliance with other specific regulatory programs managed by state and other federal regulatory agencies. Below is a partial list of other federal laws and executive orders that may be applicable to project-specific planning and environmental analysis of federal lands. While most pertain to all federal lands, some of the laws are specific to South Dakota and Wyoming. Disclosures and findings required by these laws and orders are in Chapters 2 and 3 of this FEIS.

- National Environmental Policy Act (NEPA) of 1969 (as amended)
- Federal Land Management and Policy Act (FLPMA) of 1976 (as amended)
- National Forest Management Act (NFMA) of 1976 (as amended)
- Multiple-Use Sustained-Yield Act of 1960
- Forest and Rangeland Renewable Resources Planning Act of 1974 (as amended)
- Endangered Species Act (ESA) of 1973 (as amended)

- Clean Water Act of 1977 (as amended)
- Clean Air Act of 1970 (as amended)
- National Historic Preservation Act (NHPA) of 1966 (as amended)
- American Indian Religious Freedom Act of 1978 (as amended)
- Archeological Resource Protection Act of 1979 (as amended)
- Native American Graves Protection and Repatriation Act (as amended)
- Executive Order 11593 (cultural resources)
- Executive Order 11988 (floodplains)
- Executive Order 11990 (wetlands)
- Executive Order 12898 (environmental justice)
- Executive Order 12962 (aquatic systems and recreational fisheries)
- Executive Order 13007 (Indian Sacred Sites)
- Executive Order 13186 (Migratory Bird Treaty Act)
- Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments)
- South Dakota Permitting and Environmental Guide, 2007 Edition
- Wyoming Executive Order 2011-5, Greater Sage-Grouse Core Area Protection
- Bankhead-Jones Farm Tenant Act of July 22, 1937, as amended (7 U.S.C. 1010-1012).
- BLM 1986 South Dakota Resource Management Plan (RMP)
- BLM 2007 Casper, Wyoming RMP
- BLM 2000 Newcastle, Wyoming RMP

1.4 PURPOSE OF AND NEED FOR ACTION

The purpose and need provides the basis for development of the Proposed Action and any alternatives generated. The purpose and need provides fundamental rationale for the T-O-RC Project and it provides guidance to the ID team during the environmental analysis of the Project.

The USFS identified a *need* to authorize BHP for construction, installation and operation of a 230kV transmission line to:

- Strengthen the regional transmission network
- Improve the reliability of the transmission system
- Provide additional transmission capacity to help meet the growing demand for electricity and development in the region.

1.5 FEDERAL ACTIONS AND APPROVALS

The USFS and BLM will decide whether or not to authorize the ROW, and if so, under what terms and conditions. The purpose and need of the federal action is to respond to the Proponents' Special Use Permit (SUP) application to use NFS lands for a portion of the BHP transmission line pursuant to the Federal Land Policy and Management Act (FLPMA), 43 United States Code [U.S.C.] § 1701 et seq and under the Federal Power Act (FPA), 16 United States Code [U.S.C.] § 791 et seq. The purpose and need for major federal authorizing actions requested for the proposed Project to proceed are further described below.

1.5.1 USFS

The USFS has received a Special Use Permit application from BHP and must determine whether to allow the use of the NFS lands for portions of the proposed transmission line. In accordance with FLPMA, FPA and the USFS's Special Use Permit regulations, 36 CFR 251, Subpart B – Special Uses, the USFS must manage public lands for multiple uses that take into account the long-term needs for future generations of renewable and non-renewable resources. The Secretary of Agriculture is authorized to issue Special Use Permits for "systems and related facilities for generation, transmission, and distribution of electric energy" "over, upon, under, or through [public] lands" (43 U.S.C. § 1761(a)(5)). Taking into account the USFS's multiple use mandate, the USFS's purpose and need is to respond to an FLPMA Special Use Permit application submitted by BHP-to construct, operate, maintain, and decommission the transmission line and associated infrastructure on NFS lands administered by the USFS in compliance with FLPMA, USFS Special Use Permit regulations, and other applicable federal laws and policies. In making its decision, the USFS must consider the environmental impact of authorizing a Special Use Permit across the NFS lands. The USFS will decide whether to authorize, authorize with modifications, or deny the Special Use Permit application. Modifications may include authorizing only a portion of the Project, modifying the proposed use, or changing the route or location of the proposed facilities if the USFS determines such terms, conditions, and stipulations are in the public interest (43 CFR § 1701 et seq). This project analysis is being conducted under the authority of the Forest Service predecisional objection regulation at 36 CFR 218, Subparts A and B, issued in the Federal Register on March 27, 2013 (78FR18481).

The USFS must consider the existing LRMPs in the decision to issue a Special Use Permit in accordance with 43 CFR § 1701 et seq. RMPs and allocate public land resource use and establish management objectives. Applicable RMPs are discussed above.

The USFS as the lead agency has prepared this EIS to meet the disclosure requirements under NEPA, to facilitate public participation, to assist the public land agency decision-makers in determining whether to issue a Special Use Permit, and to determine under what terms and conditions the Special Use Permit would be issued. The Forest Supervisors of the Black Hills National Forest and the Medicine Bow-Routt National Forests and Thunder Basin National Grassland Forest Supervisors are the agency officials responsible for making the decisions on this Project.

Based on the environmental analysis in this Final EIS, the Forest Supervisors will each decide whether and how to approve all or a portion of this Project. Their decisions will be documented in separate Records of Decision (RODs) and may include phased decisions for the Project, in which case a separate ROD would be issued for each phase.

Analysis in the EIS covers the entire Project and discloses the associated environmental effects. The USFS is considering several factors, including the proposed construction schedule, other authorizing entities' preferred routes, environmental effects of the analyzed routes, and opportunities to reach complementary siting decisions with other authorizing entities in deciding whether or not to authorize the Project on public land and if all or only a portion of the Project should be authorized at this time.

If the USFS chooses to issue a Special Use Permit for only a portion of the Project, that decision will not preclude the USFS's ability to choose the "No Action" alternative for the remainder of the Project. The USFS may take this approach where the phase(s) that are approved cover portion(s) of the Project that, if constructed, could be operated without waiting for the rest of the Project to be approved.

A phased decision could provide additional time to allow the various federal, state, and local permitting agencies to potentially reach consensus regarding the siting of the route for one or more segments of the Project. In a phased decision process, the USFS would issue a Special Use Permit for certain segments with independent utility. The ROD would provide the agencies' rationale for a phased decision. The USFS could authorize the start of construction for the approved route for the first phase covered in the ROD via a Notice-to-Proceed when all issues and regulatory requirements are met.

1.5.2 BLM

In accordance with FLPMA and the BLM's ROW regulations in 43 CFR Part 2800, the BLM must manage public lands for multiple uses that take into account the long-term needs for future generations of renewable and non-renewable resources. The Secretary of the Interior is authorized to grant ROWs for "systems for generation, transmission, and distribution of electric energy" "over, upon, under, or through [public] lands" (43 U.S.C. § 1761(a)(5)). Taking into account the BLM's multiple use mandate, the BLM's purpose and need is to respond to an FLPMA ROW application submitted by BHP to construct, operate, maintain, and decommission the transmission line and associated infrastructure on public lands administered by the BLM in compliance with FLPMA, BLM ROW regulations, and other applicable federal laws and policies. In making its decision, the BLM must consider the environmental impact of granting a ROW

across the National System of Public Lands. The BLM will decide whether to grant, grant with modifications, or deny the application. Modifications may include granting only a portion of the Project, modifying the proposed use, or changing the route or location of the proposed facilities if the BLM determines such terms, conditions, and stipulations are in the public interest (43 CFR § 2805.10(a)(1)).

The BLM must consider the existing RMPs that allocate public land resource use and establish management objectives in the decision to issue a ROW grant in accordance with 43 CFR § 1610.0-5(b). Applicable RMPs are discussed above.

1.6 PROPOSED ACTION

The USFS and BLM propose to authorize BHP to construct, install and operate a 230kV transmission line which would strengthen the regional transmission network, improve the reliability of the transmission system and provide additional transmission capacity to help meet the growing demand for electricity and development in the region. The National Energy Reliability Council (NERC) Transmission Planning Reliability Standards require BHP to plan the transmission system to supply projected customer demands (customer load) and firm transmission services (bulk energy transfers) under Category C outage conditions (loss of any two transmission elements). Transmission studies have consistently demonstrated that the Teckla–Osage-Lange 230kV line is the best long-term option to meeting required reliability criteria. In addition to the reliability drivers for this project, BHP has a commitment to provide 130MW of firm transmission service beginning in 2016.The description below is a synopsis of the more detailed project description included in Chapter 2.

The T-O-RC Project would be constructed mainly of wood or steel H-frame transmission structures, with the possibility of some tubular steel self-supporting towers in the Rapid City area. The transmission structures would have an average height of 65 to 75 feet and would have a span length of approximately 800 to 900 feet between structures. The ROW for the line would be approximately 100 feet wide (i.e., 50 feet on either side of the center line) and access along the ROW would be provided by existing improved roads, existing roads that require improvement, and new roads as necessary. All merchantable trees to be removed from the ROW would need to be cruised and paid for prior to removal. In addition, during construction of the transmission line, there would be temporary pulling and tensioning sites, decking yards and construction/material staging sites along and near the ROW.

The Proposed Action begins at the existing Teckla Substation, approximately 67 miles north of Douglas, Wyoming, and travels west approximately three miles along an existing transmission line route, then north approximately 19 miles. Here it turns east and follows county road and section lines before turning northeast approximately six miles. The route would then angle east to parallel a three phase electrical distribution line before heading straight east along section lines to Wyoming State Highway 116 where it would parallel highway ROW north approximately seven miles. At this point, the route would generally travel east on section lines to the existing Osage substation. From the Osage substation, the proposed powerline travels east and north into South Dakota, using approximately 47 miles of currently unused transmission line ROW, to

the existing Pactola substation. The currently unused BHP ROW has a cleared width of 40 to 50 feet, which would be widened to 100 feet. From the Pactola substation, the route continues east approximately five and one-half miles and then travels north and east approximately ten miles to terminate at the Lange substation in Rapid City, South Dakota.

1.7 DECISION FRAMEWORK

BHP submitted an application for a ROW to construct, operate, and maintain those portions of the T-O-RC Project located on federal lands. Given the purpose and need, the Responsible Officials (BHNF Forest Supervisor, TBNG Forest Supervisor, and BLM's High Plains District Manager for each of the separate units) will review the Proposed Action, the issues identified during scoping, the alternatives, the environmental consequences of implementing the proposal and alternatives, and public comments on the Draft Environmental Impact Statement. This forms the basis for the Responsible Officials to make the following determinations for their respective jurisdictions:

- Whether the proposed activities and alternatives address the issues, are responsive to laws, regulations, and management direction, and meet the purpose of and need for action in the T-O-RC Project area
- Whether the information in this analysis is sufficient to make a reasoned decision
- Which action, if any, to approve (decide which alternative or combination of alternatives to implement).
- Which if any mitigation measures and monitoring requirements would be applied.

In addition, each Forest Supervisor must decide whether a Forest Plan amendment is required for their respective management plans. The BLM, as a cooperating agency, may use this EIS to make their analyses, findings and decisions on the Project for the portions that cross BLM lands.

1.8 PUBLIC INVOLVEMENT

During the project development and analysis period, collaborative efforts were made to involve, interact, and cooperate with individuals and groups interested in the T-O-RC Project.

1.8.1 Scoping

Scoping is the process of obtaining comments about proposed federal actions to inform the public and determine the breadth of addressed issues. Comments on the proposed action, potential concerns, and opportunities for managing the Project area were solicited from members of the public, American Indian Tribes, other public agencies, adjacent property owners, organizations, and government specialists.

The Project was entered into the USFS's Schedule of Proposed Actions (SOPA) in April 2011. The SOPA contains a list of USFS proposed actions that could soon begin or are undergoing environmental analysis and documentation. It provides information so the public can become aware of and indicate interest in specific proposals see www.fs.fed.us/sopa/.

A scoping notification letter was mailed in the fall of 2011 to over 3,000 interested parties, including property owners near the proposed project and other interested stakeholders. The scoping letter briefly explained the Project, the NEPA process, and announced the scoping period and the public meetings. Included with the scoping notification letter was a project overview map and comment form.

During the public scoping period and throughout the project development and analysis period, a collaborative effort was made to involve and interact with individuals and groups interested in the Project. The USFS hosted public information and scoping meetings in Wyoming and South Dakota to gather public comment and provide NEPA process and proposed Project information.

The Wyoming public scoping meeting was held on September 13, 2011 at the Hell Canyon Ranger District office in Newcastle, Wyoming and was designed as an open house. The South Dakota meeting was held on September 20, 2011 at the Mystic Ranger District office in Rapid City, South Dakota and consisted of an open house along with a presentation. The open house portion featured information stations throughout the room staffed by the appropriate subject matter experts from the USFS and consultants. BHP also had a station with staff on hand to answer questions about the proposed project. In addition, an interactive Geographic Information System (GIS) computer station with a projection system was available for landowners to view images of their individual properties and to receive a color printout of their property. Handouts were available for the public to take and large-scale maps were available for viewing.

Agencies consulted with included the South Dakota Department of Game, Fish and Parks, Wyoming Game and Fish Department, South Dakota State Historic Preservation Officer, Wyoming State Historic Preservation Officer, Advisory Council for Historic Preservation, Wyoming State Forestry, Wyoming Department of Transportation, South Dakota Department of Transportation, Weston and Campbell Counties in Wyoming, and Pennington County in South Dakota. A concerted effort was made to engage in consultation regarding the Project with Tribal contacts known to have interest in management of the TBNG, BHNF, and BLM-administered lands.

A news release was sent to media outlets on August 25, 2011, announcing the T-O-RC Project, requesting comments on the proposal and noting the time and place for the public meetings. Publications of news releases in the Rapid City Journal and Newcastle News Letter Journal occurred on September 1, 2011, and in the Hill City Prevailer News on August 31, 2011.

The Notice of Intent (NOI) to prepare an EIS was published in the Federal Register on August 26, 2011. This provided official notification that the public comment period for the T-O-RC Project would conclude on October 28, 2011. The NOI requested public comment on the proposal and included the date and place of the scheduled public meetings. During the scoping period, 104 individuals, groups, or agencies submitted comment letters.

In advance of the scoping process conducted for this EIS, BHP also sponsored several additional public outreach efforts associated with their routing process to identify potentially viable routes for the Project.

1.8.2 Review of the DEIS

A Notice of Availability (NOA) for the T-O-RC Project DEIS was published in the Federal Register on December 27, 2013. This initiated the official 45-day comment period on the DEIS. A legal notice was also published in the Laramie Boomerang on December 29, 2013 and the Rapid City Journal and the Casper Star Tribune on January 4, 2014 announcing the 'Opportunity to Comment' on the DEIS. A public open house was held in Rapid City on January 13, 2014 and Newcastle, Wyoming on January 14, 2014. Because of poor weather on January 14, a second public open house was held in Newcastle on January 29, 2014 to accommodate interested parties who may not have been able to attend the January 14 meeting.

During the DEIS comment period, 37 individuals, groups, or agencies submitted comment letters. Included in the comments were suggestions for additional route modifications in three specific areas in South Dakota. To assist in the determination of the viability of these suggested modifications and because they could potentially affect interested parties differently in these areas, the BHNF solicited additional input from landowners in these areas. Letters were sent on April 3, 2014 along with maps showing the potential new route moficiations to solicit additional public comment. A meeting of a local homeowners group on May 1, 2014 was also attended by Forest Service personnel. A total of 27 individuals, groups, or agencies submitted comments during this process. Following this additional public input, two of the potential route modifications were updated and one was dropped from additional consideration.

Additional input was solicited from the entire scoping list on the updated route modifications in the Deerfield Road area and the Sun Ridge Road area on the BHNF. A letter dated June 27, 2014 and associated maps were sent to the entire mailing list requesting additional comments by July 16, 2014.

Forty-four additional comment letters were received in response to the June 27 letter. Most of these comments were specific to the potential route modifcations at the two locations identified above in the South Dakota portion of the Project area.

All public input received during this period was evaluated using a content analysis process. Responses were identified and responded to by the Project ID Team. These comments and associated responses are located in **Appendix A** of the FEIS. Additional discussions and/or factual and clarifying information have been incorporated into the FEIS to respond to these comments where needed.

1.9 ISSUES

This section provides a summary of issues identified during the public and internal scoping period and review of the DEIS for the T-O-RC Project. Comments received during scoping were used to help in defining issues, develop alternatives and mitigation measures, and analyze effects. A total of 104 separate comments were received via letters, faxes, public meetings, personal-delivery, or email during the formal scoping process. The comments expressed various issues and concerns associated with the Project and some were supportive of the overall project.

Issues were separated into two groups: key and non-key issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-key issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…".

A list of non-key issues and reasons regarding their categorization as non-key is contained in the Project file located at the Mystic Ranger District office in Rapid City, South Dakota and at the Douglas Ranger District Office in Douglas, Wyoming.

A brief description of the key issues identified during scoping follows below:

1. Effects of the Proposal on Wildlife including Sensitive Species such as Greater Sage-Grouse, goshawks, and other raptors

Many respondents were concerned with wildlife habitat removal or fragmentation. Some of these concerns were specifically focused on sensitive species such as Greater Sage-Grouse or goshawk. There were also concerns for raptor collisions with powerlines with the suggestion that construction should be in accordance with raptor-safe design criteria.

Measurement Indicator for Wildlife including Sensitive Species:

- Determination of effect made in the Biological Assessment and Biological Evaluation

2. Effects of the Proposal on Wetlands and Vegetation Communities

Scoping comments received indicate that there is internal and external support for revegetation/reclamation of disturbed areas. In addition, one suggestion was to avoid spanning large wetlands and to not place transmission towers between wetlands.

Measurement Indicator for Wetlands and Vegetation Communities:

- Acres of wetland filled or vegetation removed.

3. Effects of the Proposal on Scenic Integrity, Visual Resources and Visibility from a Nearby American Indian Religious Site

Many respondents commented on their support to maintain scenic integrity and limit changes to visual resources and views. Suggestions included minimizing the ROW, using taller towers and running the powerline over the trees.

Measurement Indicator for Scenic Integrity, Visual Resourcesand Visibility from a Nearby American Indian Religious Site:

- Effects of the alternatives on Scenic Integrity Objectives (SIOs) for the BHNF and TBNG, Visual Resource Management (VRM) objectives for the NFS lands, and visibility from a nearby American Indian religious site.

4. Effects of the Proposal on Private Property including Property Values and Electricity Rates

Some commenters are concerned with a lowering of their property values with a transmission line nearby. Many comments also suggested locating the transmission line on public versus private lands. Other commenters question whether the proposed transmission line will lead to an increase in electricity rates. Comments were also received regarding the potential increased wildfire risk from having a transmission line on or near their property.

Measurement Indicator for effects to private property:

- Proximity to residential dwellings.

5. Effects of the Proposal on Existing and Future All-Terrain Vehicle (ATV), Off-Highway Vehicle (OHV), and Snowmobile Trails

Comments and feedback during scoping indicate there is support for not closing existing ATV/OHV/snowmobile trails. There was also support for the transmission line ROW to be available as an ATV trail. One suggestion was to coordinate transmission line construction timelines with the Black Hills snowmobile season.

Measurement Indicator for trails:

- Miles of trails closed and miles of trails kept open.

6. Effects of the Proposal on Tree Removal

Many respondents commented on their support to minimize the amount of tree clearing. Generally the emphasis of these comments was to leave the maximum amount of trees, especially large conifers intact and to avoid clear-cutting. One commenter noted that enough

Black Hills timber has been lost to fire/beetles and more timber should not be lost to power lines.

Measurement Indicator for Tree Removal:

- Number of acres of tree clearing needed.

7. Effects of the Proposal on Health resulting from Electromagnetic Fields (EMF)

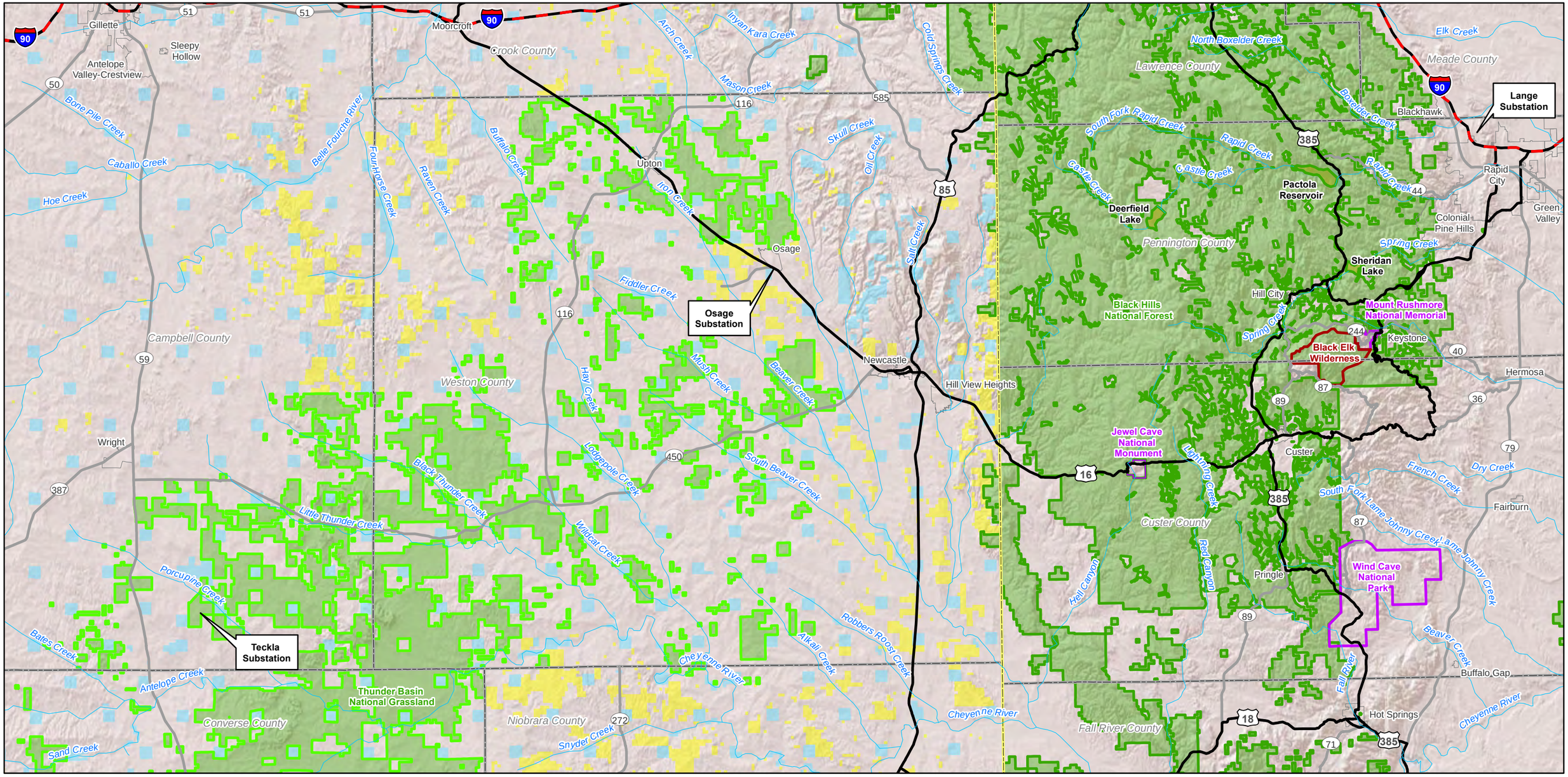
Concerns include the health effects associated with EMF associated with the line.

Measurement Indicator for EMF health effects:

- Proximity to residential dwellings.

Each of these issues was addressed within the DEIS analysis.

A brief description of the key issues and comments identified during review of the DEIS and in response to potential additional route modifications is included in **Appendix A** of this FEIS. In addition, this appendix includes the responses to those comments and how they were addressed in the FEIS.



Legend

Interstate	City or Town	Jurisdictional Land Ownership
US Highway	Major Water Body	Bureau of Land Management Land
State Highway	Federal Wilderness Area	Bureau of Reclamation Land
Stream	National Park Boundary	U.S. Forest Service Land
State Boundary	National Grassland Boundary	National Park Service Land
County Boundary	National Forest Boundary	State Land

0 3 6 9 12 15

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 1-1
PROJECT AREA

Map Extent: South Dakota and Wyoming

Date: 112613 | Author: rnc

I:\SD-WY\Figure 1-1 Project Area_112613.mxd

CHAPTER 2
ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This chapter provides a detailed description of the alternatives considered to meet the objectives for the T-O-RC 230 kV Transmission Project. The alternatives evaluated in detail include 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 locations which modify the Proposed Action route to address identified issues in these specific areas. The ten route modifications in these seven areas include the Fiddler route (Modification 3a), the Mountain View route (Modification 3b), the Clinton route (Modification 3c), the Edelweiss route (Modification 3d), the Pactola route (Modification 3e), the Pactola South route (Modification 3f), the Hidden Valley route (Modification 3g), the Deerfield Road route (Modification 3h), the Deerfield Road 2 route (Modification 3i), and the Ponderosa Ridge route (Modification 3j). Descriptions and maps of the route modifications are provided below and detailed maps of the alternatives are in **Appendix F** of this document.

This chapter presents each alternative comparatively by both describing and displaying the quantitative and qualitative differences between each alternative. The intent of Chapter 2 is to provide the public and decision maker a basis for choice among management options when considering the environmental consequences (effects) of implementing each alternative as disclosed in Chapter 3 of this EIS.

Following the descriptions of the three alternatives considered in detail in this EIS, a brief overview of those alternatives that were considered but eliminated from detailed development and study is presented. The last section of this chapter contains comparative tabular summaries that describe each alternative and displays the quantitative and/or qualitative effects of implementing each alternative relative to the key issues presented in Chapter 1.

2.2 ALTERNATIVES CONSIDERED IN DETAIL

This chapter describes and compares the alternatives considered for the T-O-RC Project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the environmental, social and economic effects of implementing each alternative.

2.2.1 Alternative 1 – No Action

NEPA requires the study of the No Action Alternative and to use it as a basis for comparing the effects of the Proposed Action and other alternatives. The No Action Alternative assumes that no implementation of any elements of the Proposed Action (no authorization of ROWs and no construction of the transmission line) would occur in the Project area within the next 10 to 15 years. This alternative does not actively respond to the purpose and need for action or address the issues, concerns, or comments identified during scoping for this Project.

The purpose of the T-O-RC Project described in Chapter 1 would not be met with the No Action Alternative.

2.2.2 Alternative 2 – Proposed Action

The Proposed Action was developed as a response to the purpose and need for action and it represents the USFS Proposed Action (see description of the purpose and need plus the Proposed Action in Chapter 1 of this EIS). The USFS developed and released the proposal for public review and comment in August 2011.

The Proposed Action is a single-circuit 230 kV transmission line that begins at the existing Teckla substation, approximately 67 miles north of Douglas, Wyoming in Campbell County, Wyoming and travels west approximately three miles along an existing transmission line route, then north approximately 19 miles. Here it turns east and follows county road and section lines before turning northeast for approximately six miles. The route then angles east to parallel an existing three phase electrical distribution line before heading straight east along section lines to Wyoming State Highway 116 where it would parallel highway ROW north for approximately seven miles. At this point, the route would generally travel east on section lines to the existing Osage substation located in Weston County, Wyoming about 13 miles northwest of Newcastle. From the Osage substation, the Proposed Action travels east and north into Pennington County, South Dakota, using approximately 47 miles of currently unused transmission line ROW to the Pactola substation west of Rapid City. The currently unused ROW has a cleared width of approximately 40 to 50 feet, which would be widened to 100 feet to accommodate the needed ROW for the new transmission line. From the Pactola substation area, the route continues east paralleling an existing transmission line for approximately five and one-half miles, and then travels north and east approximately ten miles to terminate at the Lange substation in Rapid City, South Dakota.

Figure 2-1 provides an overview of the Proposed Action.

Pending final design, the Proposed Action would cross the land ownership and jurisdictions shown in **Table 2-1**.

Table 2-1 Land Ownership / **Jurisdiction** Crossed by Proposed Action	
Ownership/Jurisdiction	**Approximate Mileage**
Black Hills National Forest	36.3 miles
Thunder Basin National Grassland	4.7 miles
Bureau of Land Management	2.6 miles
State of Wyoming	10.3 miles
Privately Owned Lands	90 miles
TOTAL	143.9 miles

The Proposed Action would be approximately 144 miles long. For planning purposes, existing environmental conditions were described within a project analysis area centered on the proposed route for the transmission line. The width of this project analysis area varies from one mile to six miles depending on the resource and the geographic extent where direct and indirect 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 transmission 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. A 100-foot ROW width for the proposed transmission line route was used to develop the analysis of impacts that would result from the construction and operation of the new transmission line.

As discussed above, the proposed route for the transmission line would use approximately 47 miles of a currently unused transmission line ROW, reducing the amount of tree clearing and associated disturbance required for construction. This cleared ROW once accommodated a BHP 69 kV transmission line that has been removed and BHP maintains rights to the easement / ROW. Where the proposed route would be located within the existing unused transmission ROW, the ROW would be expanded and cleared to a 100-foot width from the existing 40-50 feet to accommodate the new higher voltage line.

The design, construction, operation and maintenance of the Project would meet or exceed the requirements of the National Electrical Safety Code (NESC), U.S. Department of Labor, Occupational Safety and Health Standards, Western Electricity Coordinating Council (WECC) Transmission System Performance and Reliability Criteria, and Black Hill Power's (BHP) requirements. Transmission line design would also be consistent with recommendations for reducing negative impacts of power lines on birds found in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* by Edison Electric Institute and the Avian Power Line Interaction Committee (APLIC, 2006) and *Reducing Avian Collisions with Power Lines* by the U.S. Fish and Wildlife Service and the APLIC (APLIC, 2012).

Typical characteristics of the Proposed Action including the overhead 230 kV transmission line and related facilities are described below. The typical design characteristics of the Proposed Action are listed in **Table 2-2** below. The specifications and activities common to all action alternatives are described in the following sections. The general design criteria and mitigation measures that would be applied to all action alternatives are described in **Appendix B**.

2.2.2.1 TRANSMISSION LINE SPECIFICATIONS COMMON TO ALL ACTION ALTERNATIVES

The discussion below describes the technical components of the Proposed Action with respect to the transmission line and transmission line construction.

2.2.2.1.1 Structures

Three main types of structures would be used for the transmission line. The most common type would consist of wood H-frame structures placed approximately 800-900 feet apart (average ruling span), with a nominal pole height above ground of approximately 65-75 feet. In some areas where guyed wood H-frames would not work due to obstructions or steep terrain, where water and canyon crossings require a longer span length and/or areas where the transmission line changes direction resulting in a greater angle, the transmission line could be supported by steel H-frame structures. For areas where narrow ROW requires that permanent land disturbance and overall land required be minimized, tubular steel single pole structures may be used. Tubular steel single poles would typically have a nominal pole height above ground of approximately 80-90 feet. Examples of this could be in the Rapid City area. Poles would typically be about two feet to four feet in diameter at ground line depending on design criteria.

Table 2-2 Typical Design Characteristics of the 230 kV Transmission Line

FEATURE	DESCRIPTION
Line length (approximate miles)	144 miles
Types of structures	Wood or Steel H-Frame, Single-pole steel
Structure height	H-Frame – 65-75 feet, Single-pole steel – 80 to 90 feet
Span length	800-900 feet
Structures per mile on NFS lands	Five to seven
Right-of-way width	100 feet on NFS and BLM lands, 125 feet on private property
LAND TEMPORARILY DISTURBED	
Structure work area	100 x 100 feet per structure
Wire-pulling/tensioning/splicing sites	100 x 300 feet per 2 to 4 miles
Construction yard	Approximately one 20-acre site on NFS lands (BHNF)
Decking yards	Approximately 44 one-half to five-acre sites on NFS lands in SD; none in WY
Access Roads (drive and crush, improve existing, spur, and new) on NFS lands	Improved existing, spur and new roads would be a minimum of 14 feet wide
LAND PERMANENTLY DISTURBED	
Structure base – assume two poles per structure	Typically three and one-half feet per pole
ELECTRICAL PROPERTIES	
Nominal voltage	230 kV AC (alternating current) line to line
Capacity	400 MW
Circuit configuration	Horizontal (most locations)
Minimum ground clearance of conductor	23 feet

Typical pole heights would be approximately 65 to 75 feet above ground, depending on terrain. The poles would be direct embedded into the soil or, if needed, installed on drilled pier concrete foundations to a depth of approximately ten to 25 feet depending on load and soil characteristics. In areas where sloughing or steep rocky slopes exist, underground corrugated steel culverts or Sona Tubes (cylindrical paper forms) may be used to hold excavated walls.

Figure 2-2 shows typical diagrams of the proposed structures.

2.2.2.1.2 Conductors and Associated Hardware

Selection of the conductor's mechanical strength is primarily dictated by the ice and wind loading that can be expected to occur in the territory where the transmission line is built. The conductor's strength in a steel reinforced stranding is a function of the percentage of steel within the conductor area. The aluminum carries most of the electrical current, and the steel provides tensile strength to support the aluminum strands. There is a risk of extreme icing events and severe weather in Wyoming and South Dakota. Because of this risk, the conductor would be Aluminum Conductor Steel Reinforced (ACSR), which is common for many power lines in these states. The conductor that is being considered for the Project is a 1.068-inch diameter, single conductor (ACSR 45/7 1272 kcmil "Bittern" conductor); which is 45 strands of aluminum and seven strands of steel.

The conductor system would consist of three electrical phases, with a single conductor for each phase. Minimum conductor height above the ground would be approximately 23 feet, based on NESC and BHP's standards. Greater clearances may be required in areas accessible to vehicles or near buildings. Minimum conductor clearance would dictate the exact height of each structure based on topography and safety clearance requirements. Minimum conductor clearances in some instances may be greater based on specific NESC requirements (e.g., minimum clearance above a roadway, trees in forested areas or above farm equipment in agricultural areas).

2.2.2.1.3 Fiber Optics

Either fiber optic ground wire cable (OPGW) for substation-to-substation communication or a 3/8-inch steel static wire for lightning protection would be installed near the top of each structure. If OPGW is used, it would be 48 fibers.

2.2.2.1.4 Right-of-Way

ROW width would be 100 feet on NFS and BLM lands, and 125 feet on private land. In areas where the alignment changes direction, structures may require guying. The guy-wires would increase the structure support where line tension is great on structures. Guy-wires may extend beyond the typical 100 or 125 foot ROW and, if so, would result in a small area of disturbance where the guy wire is anchored to the ground and would require additional ROW. If needed, these areas would be identified during final design.

2.2.2.1.5 Access Roads

The Proposed Action would require some new access roads for access to the ROW and structure locations. However, existing roads and trails would be used wherever feasible for access to minimize new ground disturbance. Portions of existing access roads located outside of the ROW would require improvements. The Proposed Action would use overland access to the greatest extent possible. Overland access would be conducted with tracked or rubber tired equipment and would access a site without substantially modifying the landscape. Vegetation is driven over but not cropped. Soil is compacted, but no surface soil is removed. Even though vegetation may be damaged, this creates vertical mulch upon the surface soil and leaves the seed bank in place. Crushed vegetation provides easier re-vegetation because it typically re-sprouts after temporary use is stopped. To minimize ground disturbance and/or reduce scarring (visual contrast) of the landscape, the alignment of any new access roads or overland routes would follow the landform contours in designated areas where practicable, providing that such alignment does not impact other resource values additionally.

2.2.2.1.6 Construction Yards/Staging Areas

Temporary construction yards/staging areas, would be required for materials and equipment storage and staging for construction activities. These areas would be located on NFS lands in South Dakota, and would not be located on Federal lands in Wyoming. Vegetation would be disturbed from overland travel and placement of materials on the ground would likely occur, and some cutting may be required based on vegetation type. In areas where soils would not support the all-weather use for staging areas, it may be necessary to strip and stockpile topsoil and lay down gravel to create an all-weather surface. Upon completion of use, these areas would have the gravel removed, be ripped to relieve compaction, top soiled and re-vegetated to the landowners specifications. The construction yards would serve as field offices, reporting locations for workers, parking space for vehicles and equipment or sites for temporary marshaling of construction materials.

2.2.2.1.7 Decking Yards

In areas where trees would need to be removed from the ROW, trees would be skidded and decked at designated decking yards or laydown areas for processing and loading onto trucks for transportation to a sawmill. These areas would be accessible by existing roads or allow for overland travel and are in forested areas.

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-administered lands and on previously disturbed areas, if possible. Logs and/or trees removed from the ROW would be transported to the decking yards by mechanical skidders or helicopter.

2.2.2.1.8 Pulling/Tensioning Sites

Conductors and ground wires would be strung using powered pulling equipment at one end and powered tensioning equipment at the other end of a conductor segment. Sites for tensioning

equipment and pulling equipment would be approximately three miles apart. The tensioning site would be an area approximately 100 by 300 feet. Tensioners, line trucks, wire trailers, and tractors needed for stringing and anchoring the ground wire or conductor would be located at this site. The pulling site would require approximately half the area of the tension site. A puller, line trucks, and tractors needed for pulling and temporarily anchoring the counterpoise, ground wire, and conductors would be located at this site.

2.2.2.2 TRANSMISSION LINE CONSTRUCTION ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Construction of the 230 kV transmission line on NFS-administered lands would likely start in 2015. The yearly construction window for the majority of the work on the 230 kV transmission line would be limited by climate conditions. Most construction activities would likely occur from early spring to late fall each year over a two year period. Construction completion and electrification would likely occur in 2016.

The construction of the Proposed Action would follow the sequence of: 1) centerline surveyed and staked; 2) environmental clearance surveys; 3) identifying and constructing access roads; 4) work areas cleared as needed; 5) materials distributed along centerline; 6) pole holes and/or foundations installed, and poles framed and erected; 7) clearing of pulling, tensioning, and splicing sites; 8) OPGW ground wire or static wire and phase conductors installed; and 9) the site would be cleaned-up and reclaimed. Various phases of construction may occur at different locations throughout the construction process. This may require several crews operating at the same time at different locations.

Figure 2-3 shows a graphic of the typical transmission line construction sequence.

2.2.2.2.1 Surveying and Staking

Construction survey work for the Proposed Action consists of determining or refining the centerline location through updated electronic and aerial survey techniques, specific pole locations (also called structure spotting), ROW boundaries, construction work area (storage yard, construction yard) boundaries, and in some areas, access to work areas. Centerline and final alignment design and staking would adhere to the conditions outlined in the USFS SUP, BLM ROW grant, and NESC and BHP policies and specifications.

2.2.2.2.2 Environmental Clearance Surveys

After surveying and staking is completed, needed environmental clearance surveys would be conducted of all areas where disturbance is planned.

2.2.2.2.3 ROW Clearing

Clearing of some vegetation within the ROW would be required. Removal of mature vegetation, under or near the conductors, would be done to provide adequate electrical clearance as required by the NESC and BHP standards and maintain reliability. On federal lands, the ROW would be 100 feet, while it would be 125 feet on private lands. In the portions of the Proposed

Action where the proposed route would use the existing unused transmission ROW, the ROW for the new transmission line would be expanded and cleared to a 100foot width from the existing 40-50 feet.

After the ROW boundaries are staked and pole locations are marked, trees within the ROW zone that have 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 cut down. Dead, dying, or otherwise dangerous 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 general design criteria and mitigation measures that would be applied to the Proposed Action are described in **Appendix B**.

"Danger trees" are trees or tree limbs, although located off of the transmission line ROW (and thus outside of normal clearing limits), 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.

The primary method of ROW clearing in steep terrain is manual removal. Manual vegetation removal is defined as application of 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 other vegetation is not disturbed. The manual vegetation removal techniques employed by BHP are described in detail in the ROW Clearing Plan that would be part of the Project Construction Operation and Maintenance (COM) Plan developed during final design.

The primary method of ROW clearing on gentle to moderately steep terrain would include the use of a mechanized feller/buncher and a grapple skidder or similar equipment. The trees are cut down and bunched with a mechanized feller/buncher, and then a grapple skidder transports to a decking area, where further mechanized delimbers process the logs.

2.2.2.2.4 Access Roads

The area where the Proposed Action would be located has many existing trails and roads in the vicinity of the proposed ROW. However, the existing road network may require upgrading in some locations to allow access of construction equipment to the transmission line ROW. This may involve clearing vegetation, adding additional fill, and overland travel in areas with slopes of less than five percent. Access roads would be developed to the minimum standard that would allow safe use for construction and operation of the transmission line. In construction areas where recontouring is not required, disturbance would be limited to overland travel with tracked or rubber tired equipment, where feasible, to minimize changes in the original contours. Large rocks and vegetation may be moved within these areas to allow vehicle access.

Equipment to build new or improve access roads would include tracked bladed equipment, backhoes, dump trucks, and crew-haul vehicles. Specific best management practices (BMPs)

would be implemented to reduce construction impacts. Measures would be taken to minimize impacts such as rutting and soil compaction in specific locations and during certain periods of the year. These impacts could arise during heavy rains.

2.2.2.2.5 Pole Hole Excavation

Excavation for pole holes for the transmission structures would generally be made with power auger or backhoe equipment. If rocky areas are encountered, pole holes may require drilling and blasting. The poles would be direct embedded or installed on drilled pier concrete foundations to a depth of approximately ten to 25 feet depending on load and soil characteristics. For guyed structures such as large angle dead ends for H-frame structures, anchor plates for the supporting guys would be buried underground within the ROW.

Pole holes left open or unguarded would be covered and/or fenced where needed to protect the public, livestock, and wildlife. Soil removed from pole holes would be stockpiled at the localized work site and used to backfill holes. All remaining soil not used for backfilling would be spread on the disturbed work site.

If blasting is required, it would be conducted in strict compliance with safety orders or rules enforced where the operations are required. Appropriate notice of blasting activities would be provided to nearby occupants/landowners. All employees engaged in any operation related to the handling and use of explosives would obtain all certifications required by federal, state, and county management agencies. Accurate accounting for all explosives would be maintained, and any shortages would be reported immediately to the construction manager and public law enforcement authorities. No explosives would be stored on the proposed Project site. Safeguards such as blasting mats would be employed when needed to protect the adjacent property.

At heavy angles and dead-end structures where guying is not permitted or feasible, cast-in-place concrete footings may be installed to support self-supporting structure types designed to bear heavy tension loads. Cast-in-place footings would be installed by placing reinforced steel in excavated foundation holes and encasing it in concrete. Concrete would be delivered to the site in concrete trucks. Concrete trucks would wash their chute debris into a depression in the permanent disturbance area at the pole site and soil from the foundation excavation would be used to cover the chute debris.

2.2.2.2.6 Pole Framing and Assembly

Pole associated hardware would be shipped to each site by truck or carried by helicopter to sites where access is not permitted. Generally poles would be assembled and framed at the work area. Areas need to be large enough to accommodate laying down the entire length of the poles while insulators and cross-arms are mounted. Typically, insulators strings and stringing sheaves are then installed at each conductor and ground wire position while the pole is on the ground. Stringing sheaves are used to guide the conductor during the stringing process for attachment onto the insulator strings. The assembled pole would then be erected into place by a crane or line truck.

2.2.2.2.7 Conductor Installation

Once poles are in place, a “sock-line” would be pulled (strung) from pole to pole and threaded through the stringing sheaves on each pole using all-terrain vehicles or stringing the sock line by hand. A helicopter may be required along more rugged sections of the transmission line to position the sock-line in the stringing sheaves or where it is more efficient. If necessary in longer, high tension stringing sections, a second larger diameter and stronger line would be attached to the sock-line and strung prior to the attachment of the conductor and the ground wires. This process would be repeated until the ground wire and conductor is pulled through all sheaves.

Conductor splicing would be required at the end of a conductor spool during stringing. The work would occur on work areas for the poles or pulling/tensioning sites.

Conductor would be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end. For public protection during wire installation, temporary guard structures would be erected over roadways, powerlines, structures, and other obstacles where needed as determined during final design. Guard structures would typically consist of single-pole or wood H-frame poles with cross-arms placed on either side of an obstacle. These structures prevent ground wire, conductor, or equipment from falling on an obstacle. Equipment for erecting guard structures includes augers, line trucks, pole trailers, and cranes. Guard structures may not be required for small roads. On such occasions, other safety measures such as barriers, flagmen, or other traffic control would be used.

Sites for pulling and tensioning equipment are typically areas approximately 100 feet by 300 feet. These sites would be required approximately every two to four miles.

2.2.2.2.8 Construction Waste Disposal

Construction sites, material storage yards, and access roads would be kept in an orderly condition throughout the construction period. Refuse and trash would be removed from the sites and disposed in an approved manner. Oils and fuels would not be dumped along the transmission line route. Oils or chemicals would be hauled to an approved site for disposal. No open burning of construction trash would occur.

2.2.2.2.9 Site Reclamation

Work sites would be reclaimed using: excess material, approved native vegetation and seed mixtures, and topsoil stockpiled for that purpose. The contractor would remove and dispose of excess soil materials, rock, and other objectionable materials that cannot be used in reclamation work in an approved location.

Disturbed areas, with the exception of existing access roads, would be restored, as nearly as possible, to their original contour and reseeded with landowner/ agency approved native seed mixtures where appropriate. Ripping and other surface scarification on existing construction roads or other areas would be done as necessary. In some cases the amount of soil compaction

and vegetation destruction may not warrant ripping and reclamation. This would be decided on a case-by-case basis in coordination with the landowner.

2.2.2.3 OPERATION AND MAINTENANCE COMMON TO ALL ACTION ALTERNATIVES

2.2.2.3.1 Permitted Uses

After the transmission line has been energized, land uses compatible with safety regulations, operation, and maintenance would be allowed. BHP would not have exclusive use of the permitted area on federal lands.

2.2.2.3.2 Safety

Safety is a primary concern in the design of this ROW and transmission line. An alternating current (AC) transmission line would be protected with power circuit breakers and related line relay protection equipment. If conductor failure or grounding (tree contact) occurs, power would be automatically removed from the line. Lightning protection would be provided by overhead ground wires along the line. Electrical equipment and fencing at the substation would be grounded. All fences, metal gates, pipelines, etc. that cross or are within the transmission line ROW would be grounded to prevent electrical shock. If applicable, grounding outside the ROW may also occur.

2.2.2.3.3 ROW Maintenance

BHP would maintain the ROW in accordance with federal, state, and private land managers' stipulations. Maintenance would be performed per those stipulations or as needed in the absence of stipulations. When access is required for non-emergency maintenance and repairs, BHP would adhere to the same precautions taken during the original construction and coordinated with the landowners and the federal land management agencies as applicable. Emergency maintenance would involve prompt movement of crews to repair or replace any damage. Crews would be instructed to protect plants, wildlife and other environmental resources.

2.2.3 Alternative 3 – Proposed Action with Route Modifications

Alternative 3 is defined as the Proposed Action with modifications to the proposed route in specific locations to respond to issues identified during scoping. The seven key issues are presented in Chapter 1. The route modifications are labeled 3a through 3j and each are located within one mile either side of the proposed route. The general location of the route modifications are shown in **Figure 2-4**. The specific locations of these Modifications are shown in more detail in **Figures 2-5** through **2-10**.

The transmission line specifications, construction methods, and operations and maintenance procedures would be the same as those described above for the Proposed Action. The route modifications and key issues they responded to are described below.

Modification 3a - The Fiddler Modification is approximately 7.5 miles south of Upton and nine miles west of Osage, Wyoming. It would be approximately one mile north of the proposed route for a distance of about five miles and was developed to avoid the Upton Fairview and Jessee Greater Sage-Grouse Leks. This responds to issue number 1.

Modification 3b - The Mountain View Modification is south of Deerfield Road between Williams Draw Road and Gillette Prairie Road in South Dakota. It would be approximately 500 feet north of the proposed route for a distance of about one mile and was developed to avoid existing residences. This responds to issues 4 and 7.

Modification 3c - The Clinton Modification is north of McVey and Deerfield Roads and crosses Slate Prairie Road in South Dakota. It would be approximately 1,000 feet north of the proposed route for about one mile and was developed to avoid existing residences. This responds to issues 4 and 7.

Modification 3d - The Edelweiss Modification is located north of Edelweiss Mountain Road and west of U.S. Route 385 in South Dakota. It would be about 1,000 feet north of the proposed route for less than one mile and was developed to avoid a sensitive wildlife area. This responds to issue number 1.

Modification 3e - The Pactola Modification is east of U.S. Route 385 near the Pactola Reservoir in South Dakota. It would be about 1,500 feet south of the proposed route and would require clearing for the new ROW for approximately one-half mile. This Modification was developed to move the transmission line farther from the Pactola Reservoir, a visually sensitive area identified in the Forest Plan. This responds to issue number 3.

Modification 3f – The Pactola South Modification is also east of U.S. Route 385 near the Pactola Reservoir in South Dakota. It was also developed to avoid the Pactola Reservoir area. It would be located about one mile south of the proposed route and would follow approximately two miles of previously cleared ROW. This responds to issue number 3.

Modification 3g - The Hidden Valley Modification is approximately four miles west of Rapid City, South Dakota. It would be approximately 2,500 feet south of the proposed route for about one and one-half mile and was developed to avoid planned future quarry operations. This responds to issue number 4.

Modification 3h – This route modification (Deerfield Road) is a second route option developed in the Mountain View area in response to comments received on the Draft EIS. It is located on National Forest land south of Deerfield Road between Williams Draw Road and Deerfield Cove Road in South Dakota. At the widest point, it would be approximately 2,200 feet north of the proposed route and about 1,700 feet north of Route Modification 3b. It would cover a distance of nearly 1.9 miles and was developed to move the line farther from existing residences. This route responds to issues 4 and 7.

Modification 3i – This route modification (Deerfield Road 2) is a third route option on National Forest land developed in the Mountain View area in South Dakota and was developed in response to comments regarding the Project's potential visibility from a nearby American Indian

religious-use site. The eastern portion of this modification is coincident with the portion of Modification 3h that is located south of Deerfield Road. Where Modification 3h turns south to reconnect with the proposed route, this modification (3i) would continue west for an additional 1.2 miles before turning south to reconnect with the proposed route. At the widest point, it would be approximately 2,500 feet north of the proposed route. It would cover a distance of nearly 2.9 miles and was developed to potentially make the line less visible from the American Indian religious-use site by taking advantage of intervening topography. Like Modification 3h, it would also move the line farther from existing residences in the Mt. View area. This route responds to issues 3, 4 and 7.

Modification 3j - This route modification (Ponderosa Ridge) is a second route option developed in the general area of Route Modification 3g in response to comments received on the Draft EIS and comments received from public review of another route suggested in response to comments received on the Draft EIS. It is located between Hidden Valley Road and an area southwest of Sun Ridge Road. It would be located on the northern and western portions of a National Forest System (NFS) parcel in Section 30 for approximately 1.5 miles. The transmission line would then cross private lands to the south, and re-enter NFS lands at a point along the northern boundary of Section 36. The exact path along which the line would cross private lands is subject to negotiations between the proponent and land owners, and is not a decision the Forest Service can make. The private land portion of Modification 3j shown on the **Figure 2-10** is simply one illustration of a number of possible routes the line might eventually take between the endpoints on NFS lands. This route responds to issues 4 and 7.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all potential alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). In developing the proposal, a number of routing options were considered, data was collected, major ground features were evaluated, and agencies and landowners were consulted to identify ways to minimize issues and effects related to implementing the ROW and power line. The process used in identifying and evaluating alternatives while developing the Project is documented in the Teckla-Osage-Rapid City 230kV Transmission Line Routing Report (January, 2011), incorporated here by reference (see administrative record (AR)). Two potential alternative routes were identified and considered by the analysis team (the Northern and Southern Alternatives) prior to scoping and were eliminated from detailed study as described below. Other potential alternatives identified during scoping are also described below.

Additional potential alternatives to the Proposed Action were considered to address issues and concerns expressed during the scoping period and alternative alignments previously studied by BHP. Many scoping comments were supportive of the Proposed Action, but some had recommendations to consider alternative actions as part of the NEPA analysis. Some of the comments recommended actions that were outside the scope of the purpose and need, some

were actions that could be incorporated into design and mitigation measures included in the Proposed Action, or determined to be components that would cause unnecessary environmental harm. The following provides an overview of alternatives that were considered, but eliminated from detailed study. Route distances have been rounded and are therefore described as approximate.

2.3.1 Northern Alternative

This alternative was considered by the analysis team as a northerly alternative to the original proposed route and was referred to as “Alternative A” in early public outreach efforts prior to initiation of the NEPA process. This alternative would be approximately 143 miles long and generally located north of the Proposed Action. From the Teckla substation, this route is the same as the Proposed Action traveling west approximately three miles along an existing transmission line, then north approximately 19 miles. Here it angles northeast for approximately 15 miles. The route then travels east and follows county road and section lines approximately 57 miles to Wyoming State Highway 16 where it parallels highway ROW south three miles to the Osage substation. From Osage substation, the route travels northeast paralleling an existing transmission line ROW for 26 miles. At this point, the route continues in an easterly direction south of the Pennington County line to the Lange Substation.

The Northern Alternative was eliminated from detailed study because as compared with the Proposed Action it**:**

- Crossed approximately 15 more acres of Greater Sage-Grouse habitat;
- Followed no currently unused transmission line ROW (compared with 47 miles of currently unused transmission ROW followed by the Proposed Action); and
- Had 12 fewer miles of existing access roads available so more new access would have been required.

2.3.2 Southern Alternative

This alternative was considered by the analysis team as a southerly alternative to the original Proposed Route and was referred to as “Alternative C” in early public outreach efforts prior to initiation of the NEPA process. This alternative is 157 miles long and is generally located south of the Proposed Action. From the Teckla substation, this route is the same as the Proposed Action traveling west approximately three miles along an existing transmission line, then north 19 miles. Here it angles northeast for 15 miles. The route then travels east and follows county road and section lines for approximately 57 miles to Wyoming State Highway 16 where it parallels the highway ROW south for three miles to the Osage substation. From Osage substation, the route would travel southeast approximately 7.5 miles paralleling an existing transmission line ROW. At this point, the route continues east and north approximately 50 miles to the Pactola Substation and then would travel north and east approximately 10 miles to the Lange Substation.

The Southern Alternative was eliminated from detailed study because as compared with the Proposed Action it:

- Was approximately 13 miles longer;
- Crossed 14 more acres of Greater Sage-Grouse habitat;
- Crossed seven more miles of mining operations;
- Crossed 68 more forested acres;
- Followed no currently unused transmission line ROW (compared with 47 miles of currently unused transmission ROW followed by the Proposed Action); and
- Had 15 fewer miles of existing access roads available.

2.3.3 Alternative Following Existing Highways

An alternative that would follow major highway ROWs was suggested by members of the public during the scoping process. This alternative would be approximately 190 miles long and from the Teckla Substation would follow Wyoming Highway 59 for approximately 49 miles north to I-90 at Gillette. It would then follow I-90 east for approximately 141 miles to Rapid City.

This alternative was eliminated from detailed study because as compared with the Proposed Action it:

- Is approximately 46 miles longer and therefore would result in greater environmental impacts and would be more costly to construct;
- Would have greater surface disturbance impacts due to the increased route length;
- Would require a longer construction period resulting in greater air quality emissions and potential disruptions to the transportation network; and
- Would add to existing visual impacts along the highways, as it would be more visible to motorists on the highways followed by the transmission line.

2.3.4 Straight-Line Alternative Between Teckla and Osage

This alternative was suggested by the public during the scoping process. This routing option would proceed diagonally in a straight line approximately 58 miles from the Teckla substation to the Osage substation across the TBNG and private property.

This alternative was not considered for detailed study because as compared with the Proposed Action it:

- Does not take into account other existing uses (such as ranching, recreation, and mining) along this route;
- Would affect a greater amount of Greater Sage-Grouse habitat and other sensitive resources such as cultural resources, goshawks and other raptors because it does not actively avoid sensitive areas and does not follow existing roads or transmission line ROWs; and
- Would cross a greater amount of undisturbed lands because it does not follow existing roads or transmission line ROWs.

2.3.5 Alternative Following Existing Transmission Lines

This alternative was suggested by members of the public during the scoping process to follow existing transmission line ROWs.

This alternative was eliminated from detailed study because as compared with the Proposed Action it:

- Would not meet the purpose and need of the Project: By placing multiple transmission lines in the same corridor, the needed system reliability objectives, including the industry standard separation criteria from existing high-voltage transmission lines would not be realized because the possibility of failure of both lines is increased by being collocated.;
- Would not meet a part of the Project's purpose and need for increasing system reliability;
- Would be much longer and therefore would have greater surface disturbance; and
- Would require a longer construction period resulting in greater air emissions.

2.3.6 Alternatives Suggested in Post-DEIS Comment Periods

A few alternatives that were suggested after release of the DEIS were evaluated for potential feasibility and not carried forward in the analysis either because they were found to be not feasible or were similar to other proposed routes. These are discussed below.

2.3.6.1 ALTERNATIVE AT HIGHWAY 44 CROSSING

This alternative was developed by BHP and provided as a comment on the Draft EIS. It was suggested to move the line out of the unused ROW where it crossed the residential area along Highway 44. This proposed route modification would move the line out of the existing unused ROW on private lands at the Highway 44 crossing and onto NFS lands. The Forest Service solicited comments from local landowners near the originally proposed route and the newly suggested route modification location. Based on the input received, the Forest Service decided that the newly proposed modification was less viable than the originally proposed route and to not carry it forward for additional analysis.

2.3.6.2 ROUTES IN PONDEROSA RIDGE AREA

Route modifications were proposed in the Ponderosa Ridge area by members of the public. Most of these suggested modifications pertained to potential route locations on private land. Two specific routes were referred to as the Riemenschnieder route and the Jay Way Route. While not carried forward as stand-alone alternatives, portions of both of these suggested routes were incorporated into Route Modification 3j.

2.4 COMPARISON OF ALTERNATIVES

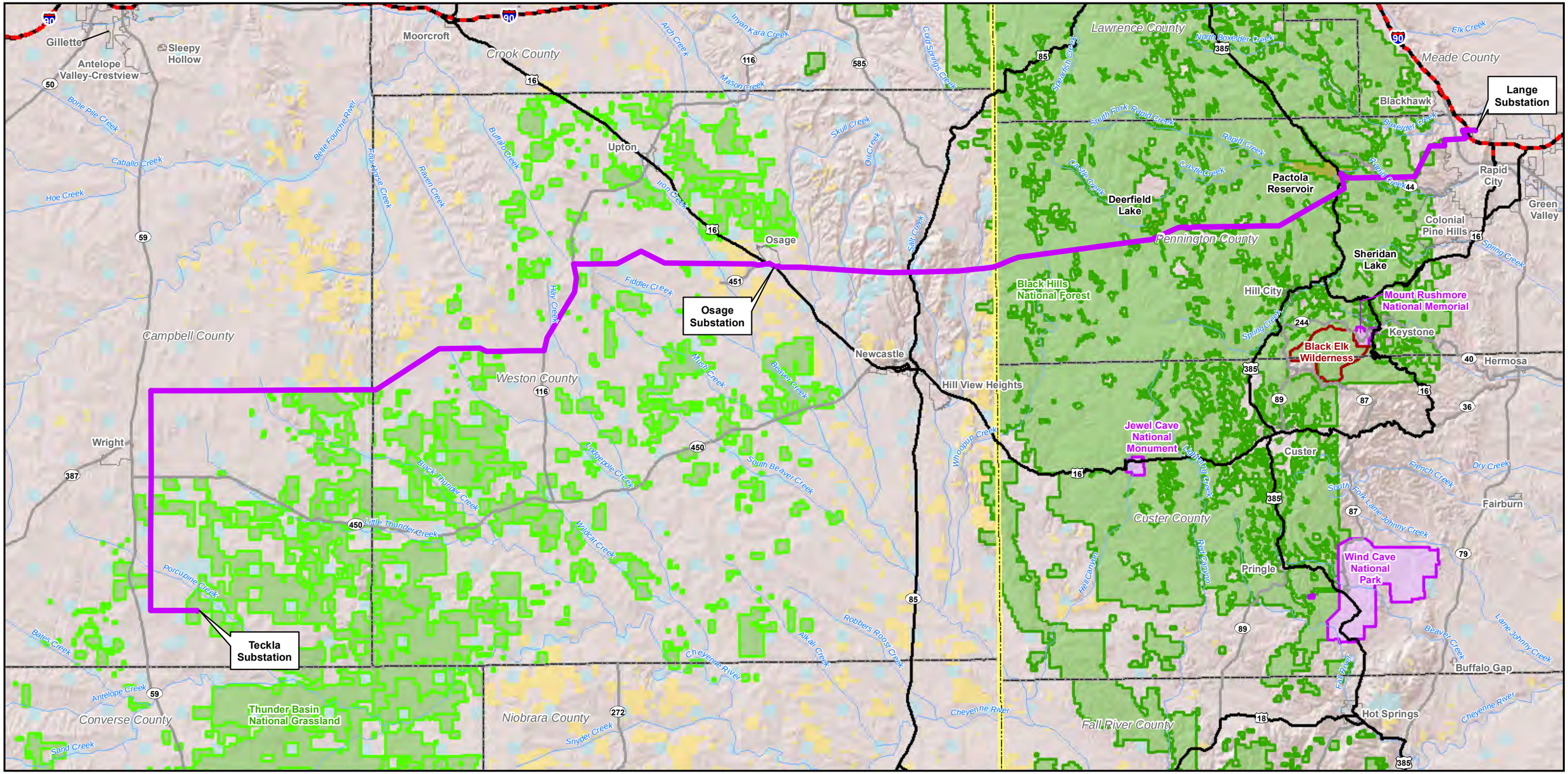
This section presents a brief comparison of the nine alternatives given detailed study in this EIS. The alternatives are described and compared in **Table 2-3** relative to the effects each alternative has on key issues described in Chapter 1. The environmental consequences to the

resources in the T-O-RC Project analysis area that would result from implementation of the alternatives are more completely described in Chapter 3 of this EIS and information contained in the Administrative Record (AR).

Table 2-3 Effects to Key Issues by Alternative				
Key Issue	**Alternative 1 No Action**	**Alternative 2 Proposed Action**	**Alternative 3 Proposed Action with Route Modifications**	**Indicators**
Wildlife including sensitive species such as Greater Sage-Grouse, goshawks, and other raptors	No Impact	BA SD: "No effect" for all federally-listed species that may occur in Pennington County, SD, except for the northern long-eared bat. "Not likely to jeopardize the continued existence" of the northern long-eared bat. BA WY: "Not likely to jeopardize the continued existence" of the greater sage-grouse. BE SD: "May adversely impact individuals but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for 22 species. BE WY: "May adversely impact individuals but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for 22 species; "No impact" for six species.	Similar to the Proposed Action with the following exceptions: Modification 3a would have less impacts to Greater Sage-Grouse because it would avoid two leks (Upton Fairview and Jessee leks) Modifications 3c, 3d, 3h and 3j would have potentially greater impacts because of the greater number of northern long-eared bat foraging habitat acres disturbed within the ROW (0.7 more acres for 3c, 0.8 more acres for 3d, 0.8 more acres for 3h, and two more acres for 3j) Modifications 3b, 3e, 3f, 3g, and 3h would have potentially less impacts because of the fewer number of northern long-eared bat foraging habitat acres disturbed within the ROW (four fewer acres for 3b, six fewer acres for 3e, 14 fewer acres for 3f, 0.5 fewer acres for 3g, and two fewer acres for 3h.	Determination of effect made in the biological assessment (BA) and biological evaluation (BE)
Wetlands and Vegetation Communities	No Impact	0 wetlands filled 1,294 acres vegetation within the ROW: 1,156 in SD; 138 in WY	Similar to the Proposed Action with the following exceptions: Modifications 3a,3c, 3h and 3i would have potentially greater impacts because of the greater number of wetland acres within the ROW (approximately 4 more acres for 3a, less than 1 acre more for 3c, approximately 1 more acre for 3h and approximately 1.18 more acre for 3i)	Acres of wetland filled or vegetation removed. Acres subject to increased proliferation of noxious weeds
Scenic Integrity, Visual Resources and Visibility from a Nearby American Indian Religious Site	No Impact	SD: 10.5 miles of high SIO, 14.4 miles of moderate SIO, and 11.4 miles of low SIO. WY: 3.6 miles of low SIO, and 2.6 miles of VRM Class III areas managed by the Newcastle BLM Field Office	Similar to the Proposed Action with the following exceptions: Modification 3e and 3f would result in less visual impacts than the Proposed Action because the line would be further from Pactola Reservoir (approximately 0.15 miles for 3e and 1.0 miles for 3f) Modifications 3h and 3i would be less visible from residences near Mt. Meadow Resort. Modification 3i would be less visible from an American Indian religious-use site than the Proposed Action or Modifications 3b or 3i. Modification 3j would be less visible from most residences in the Ponderosa Ridge area than the Proposed Action or Modification 3g.	Scenic Integrity Objectives (SIOs). Visual Resource Management (VRM) Objectives.

Table 2-3 Effects to Key Issues by Alternative				
Key Issue	**Alternative 1 No Action**	**Alternative 2 Proposed Action**	**Alternative 3 Proposed Action with Route Modifications**	**Indicators**
Private Property including Property Values and Electricity Rates	No Impact	15 residences within 150 feet either side of transmission line: 14 in SD; 1 in WY. Electric rates would not be affected.	Similar to the Proposed Action with the following exceptions: Modification 3a, 3dand 3f would have no residences within 150 feet either side of transmission line (compared to no residences along the comparable portion of the PA); Modification 3b would have two residences within 150 feet either side of transmission line (compared to 8 residences along the comparable portion of the PA), Modifications 3h and 3i would have 0 residences within 150 feet of the ROW compared to 8 for the PA comparable portions; Modifications 3c, 3e and 3g would each have one residence within 150 feet either side of transmission line (compared to 1, 0 and 0 residences along the comparable portion of the PA, respectively) Modification 3j would have 0 residences within 150 feet either side of transmission line compared to 1 residence along the comparable portion of the PA	Proximity to residential dwellings
Existing and Future ATV/OHV/ Snowmobile Trails	No Impact	SD: ATV and hiking trails crossed 16 times WY: No trails crossed	Similar to PA with the following exceptions: Modifications 3a, 3c, 3d, 3e-3 g and3j: No trails crossed compared with no trails crossed for the corresponding section of the Proposed Alternative. Modification 3b: One snowmobile trail crossed compared with one snowmobile trail crossed by the Proposed Action. Modification 3f: Two trails crossed: one hiking; one ATV compared with one trail crossed by the Proposed Action. Modification 3h: Three snowmobile trails crossed compared with one snowmobile trail crossed by the Proposed Action. Modification 3i: Five snowmobile trails crossed compared with one snowmobile trail crossed by the Proposed Action.	Miles of trails closed and miles of trails kept open

Table 2-3 Effects to Key Issues by Alternative				
Key Issue	**Alternative 1 No Action**	**Alternative 2 Proposed Action**	**Alternative 3 Proposed Action with Route Modifications**	**Indicators**
Tree Removal	No Impact	563 acres: 559 in SD; 4 in WY	Similar to PA with the following exceptions: Modification 3b requires 0.3 acres of additional tree clearing; Modification 3c requires 0.7 acres of additional tree clearing; Modification 3d requires 0.8 acres of additional tree clearing; Modification 3h requires 1.5 acres of additional tree clearing; Modification 3i requires 0.8 acres of additional tree clearing; and Modification 3j requires 5.9 acres of additional tree clearing as compared with the comparable section of the Proposed Action. Modification 3e requires six fewer acres of tree clearing; Modification 3f requires 13.8 fewer acres of tree clearing; Modification 3g requires 0.4 fewer acres of tree clearing as compared with the comparable section of the Proposed Action.	Number of acres of tree clearing needed
Health resulting from Electromagnetic Fields (EMF)	No Impact	112 residences within 500 feet either side of transmission line: 102 in SD; 10 in WY	Similar to PA with the following exceptions: Modification 3a, 3d, 3f: Would have no residences within 500 feet either side of transmission line (compared to 0, 0, and 1 residences along the comparable portion of the PA, respectively); Modification 3b: would have nine residences within 500 feet either side of transmission line (compared to 10 residences along the comparable portion of the PA), Modification 3c: would have two residences within 500 feet either side of transmission line (compared to 5 residences along the comparable portion of the PA); Modification 3e, 3h and 3i: would have 0.1.and 1 residence within 500 feet either side of transmission line (compared to 1, 10, and 10 residences along the comparable portion of the PA); Modification 3g: would have 14 residences within 500 feet either side of transmission line (compared to 1 residence along the comparable portion of the PA); Modification 3j; would have 1 residence within 500 feet either side of transmission line (compared to 1 residence along the comparable portion of the PA and 13 residences on 3g)	Proximity to residential dwellings



Legend

- Proposed Action
- Interstate
- US Highway
- State Highway
- Stream
- State Boundary
- County Boundary
- City or Town
- Major Water Body
- Federal Wilderness Area
- National Park Boundary
- National Grassland Boundary
- National Forest Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Bureau of Reclamation Land
- U.S. Forest Service Land
- National Park Service Land
- State Land

0 3 6 9 12 15
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 2-1
PROPOSED ACTION

Map Extent: South Dakota and Wyoming

Date: 11-24-13 | Author: djb

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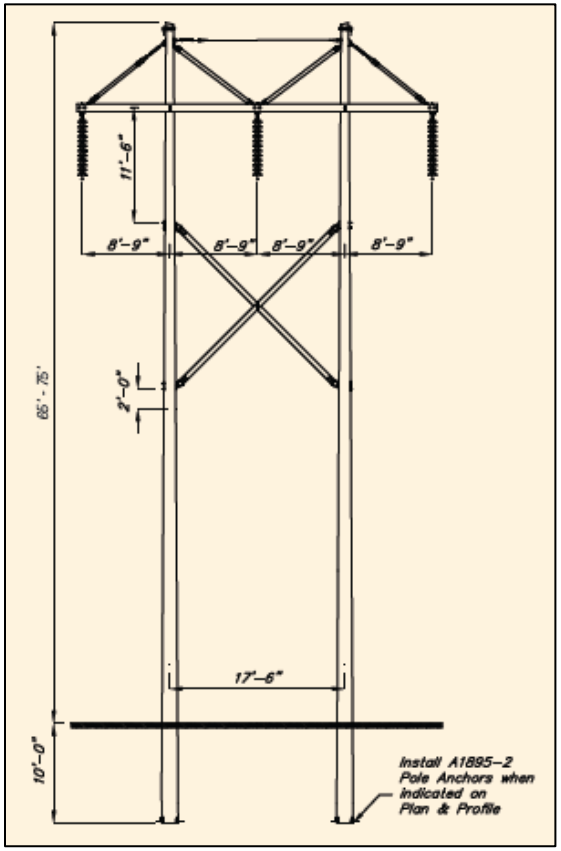
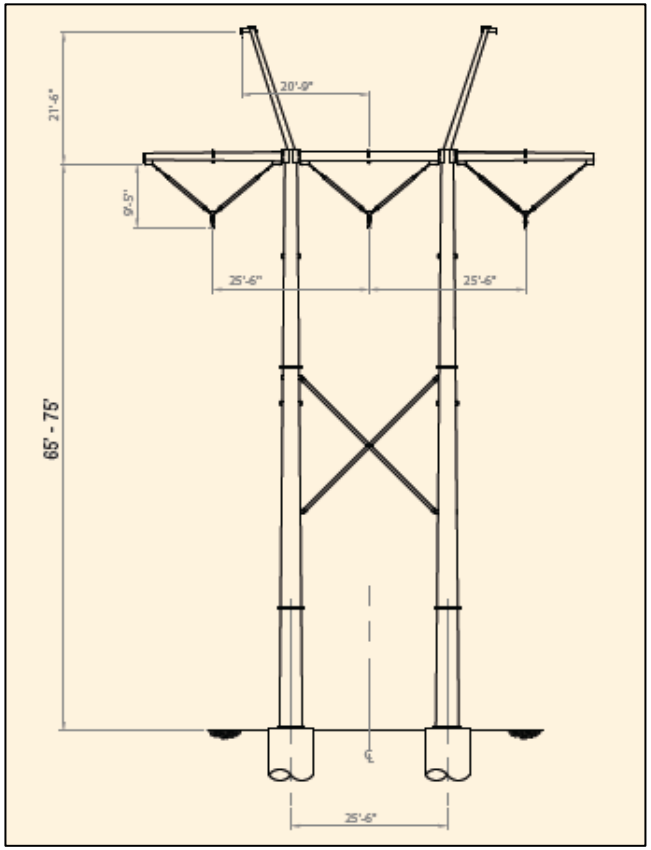
Figure 2-2

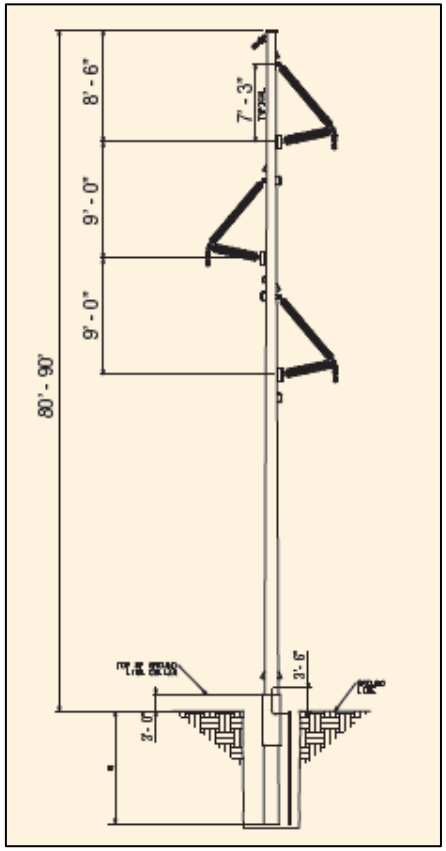
Typical Structure Designs



Wooden H-Frame



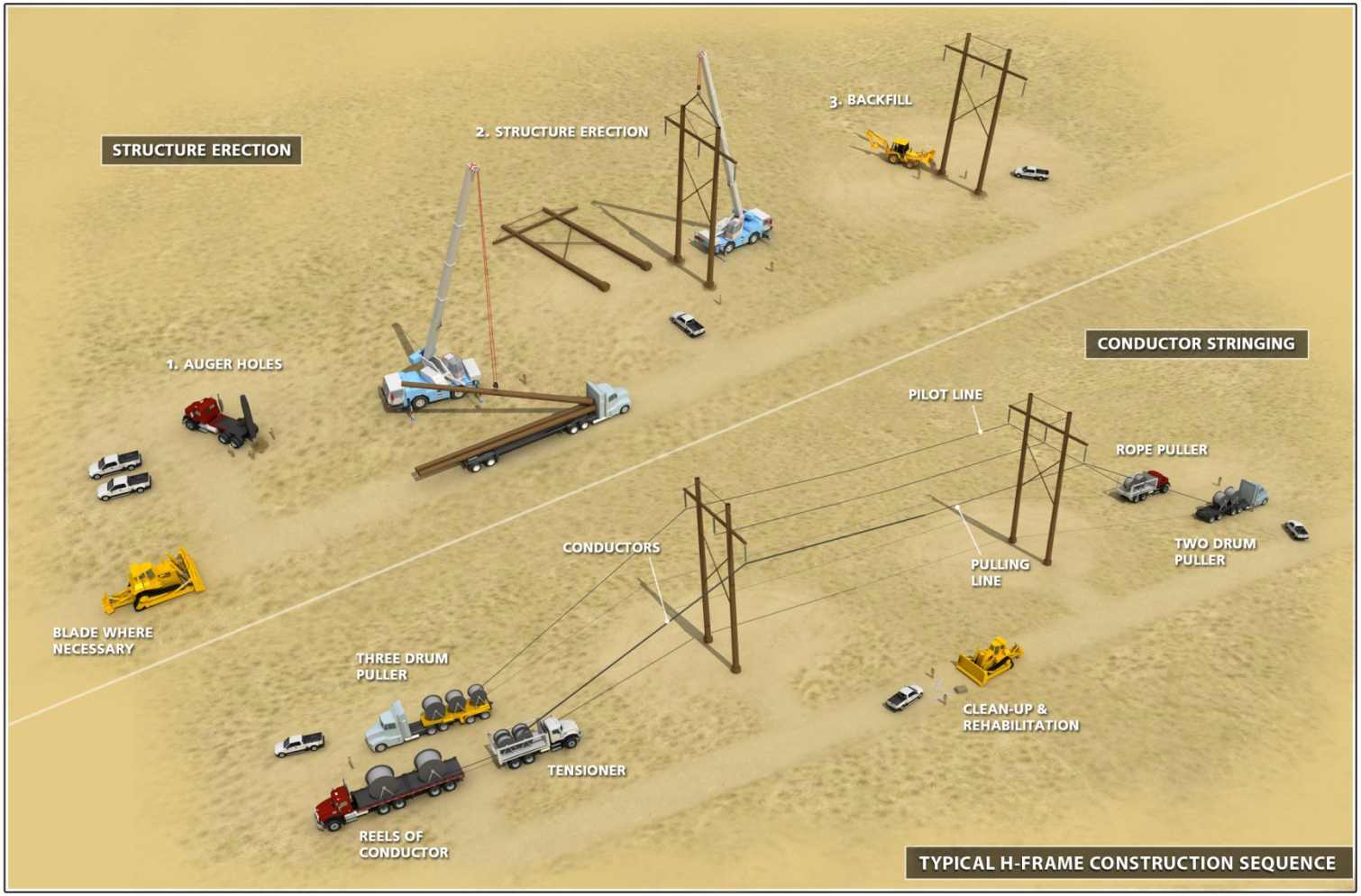
Steel H-Frame



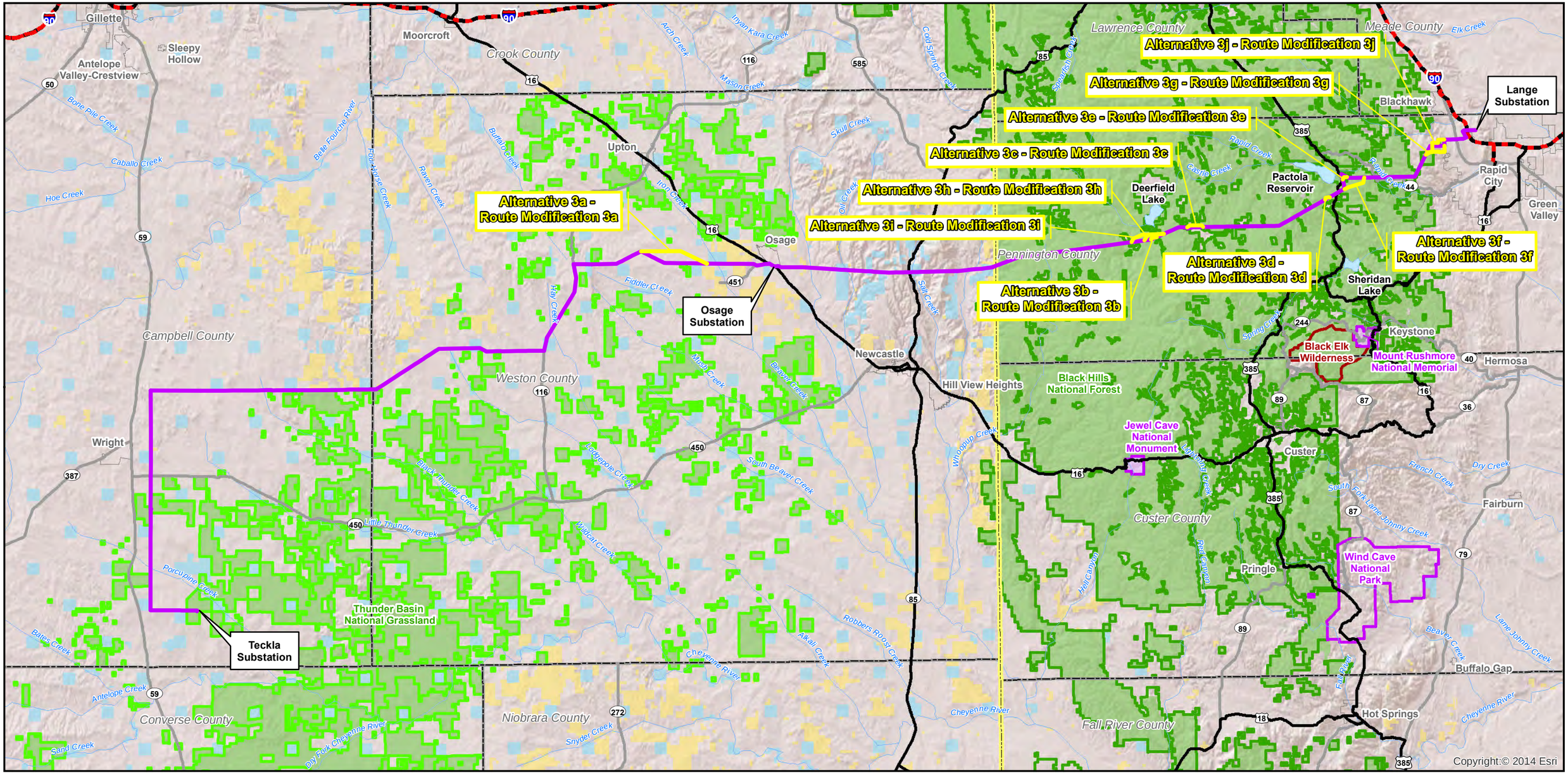
Tubular Steel Single Pole

Figure 2-3

Transmission Construction Process



Source: Power Engineers



Legend

- Proposed Action
- Site-Specific Design Modification
- Interstate
- US Highway
- State Highway
- Stream
- State Boundary
- County Boundary
- City or Town
- Major Water Body
- Federal Wilderness Area
- National Park Boundary
- National Grassland Boundary
- National Forest Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Bureau of Reclamation Land
- U.S. Forest Service Land
- National Park Service Land
- State Land

0 3 6 9 12 15
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

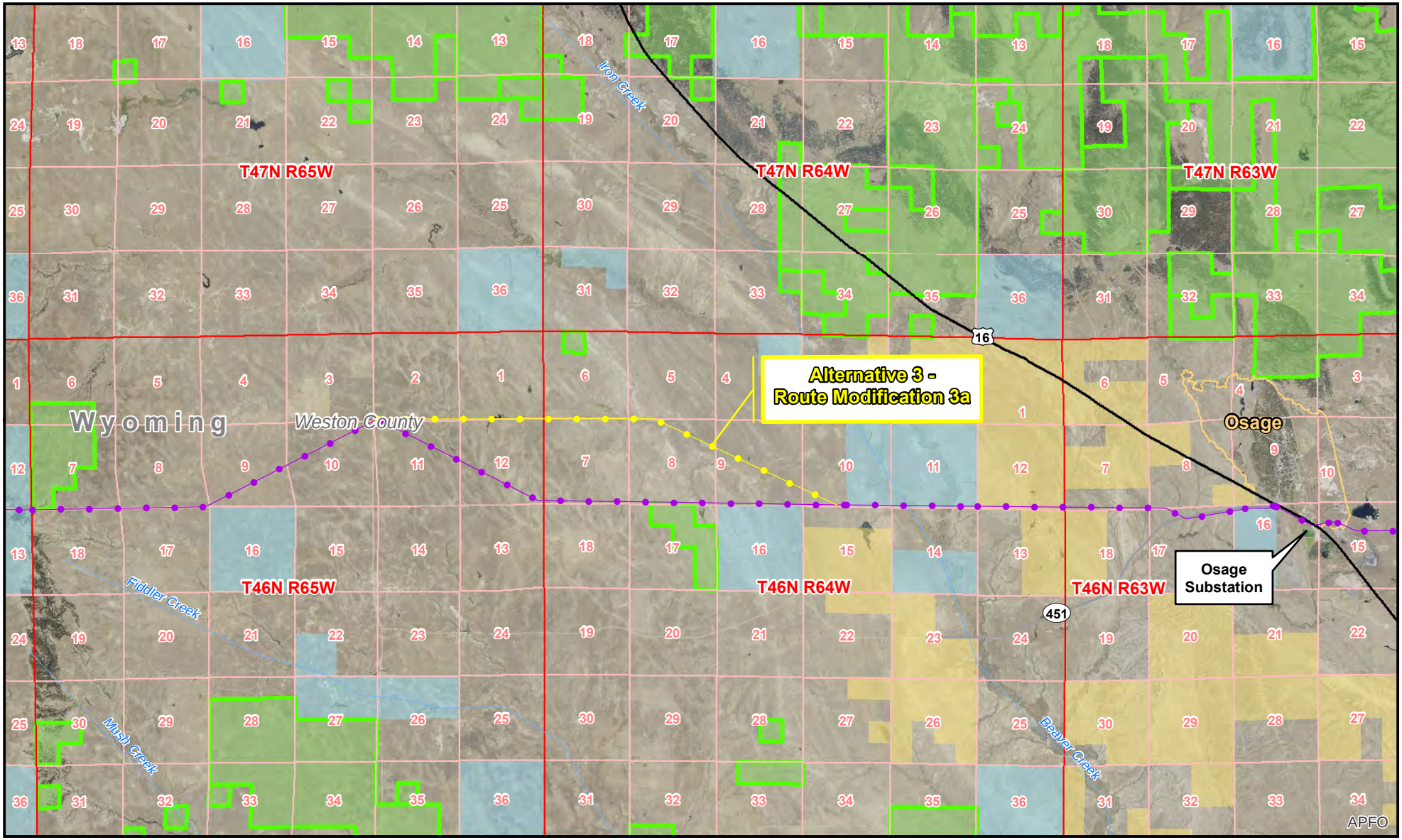
Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 2-4
ALTERNATIVE 3
LOCATIONS OF PROPOSED ROUTE MODIFICATIONS

Map Extent: South Dakota and Wyoming

Date: 11-07-14 | Author: rnc

I:\SD-WY\Figure 2-4 Alternative 3 Proposed Route Modifications_110714.mxd



Legend

- Proposed Action
- Site-Specific Design Modification
- Interstate
- US Highway
- State Highway
- Stream
- State Boundary
- County Boundary
- City or Town
- Township/Range Boundary
- Section Line
- Major Water Body
- Federal Wilderness Area
- National Park Boundary
- National Grassland Boundary
- National Forest Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Bureau of Reclamation Land
- U.S. Forest Service Land
- National Park Service Land
- State Land

0 0.5 1 1.5 2
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

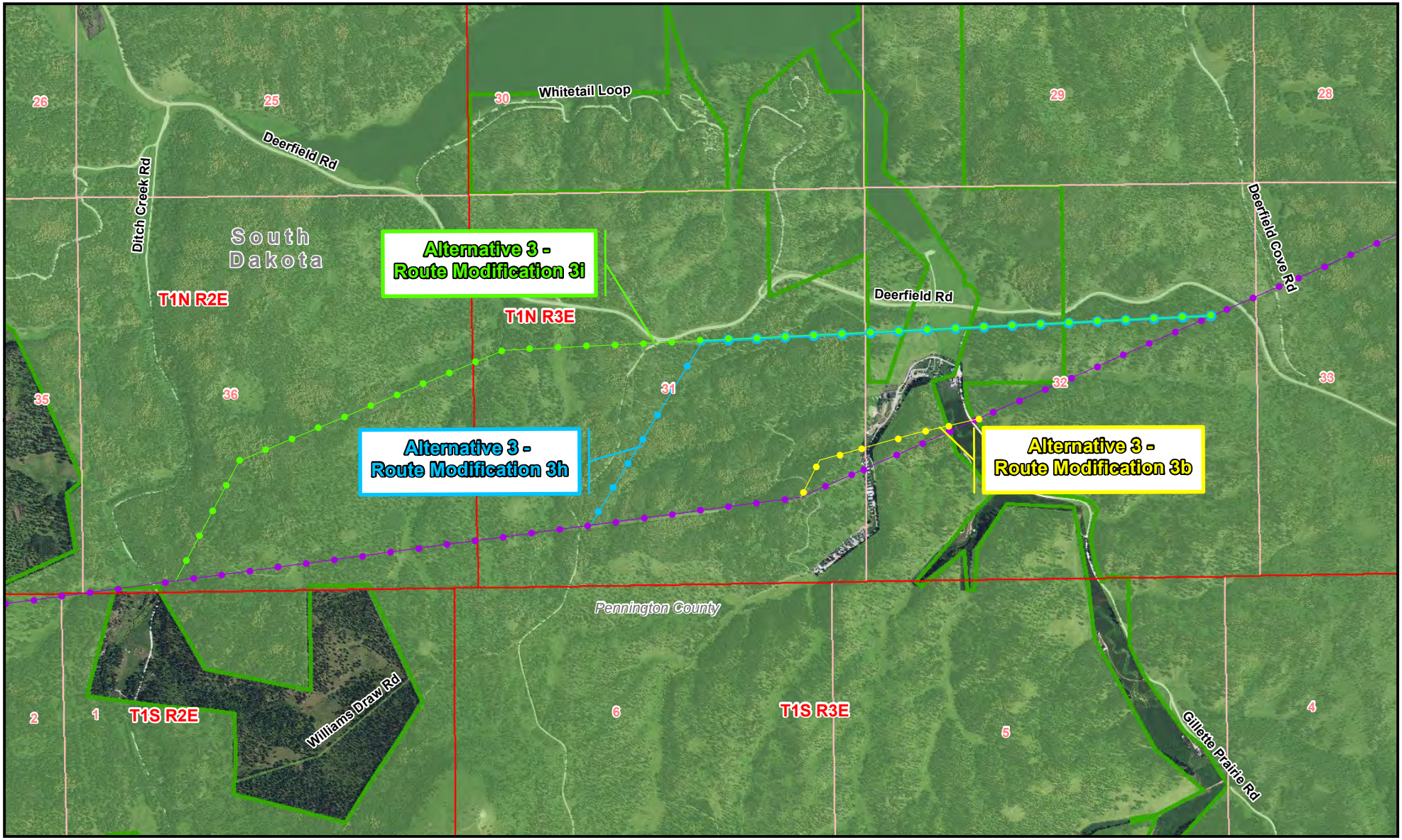
Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 2-5
ALTERNATIVE 3
ROUTE MODIFICATION 3A

Map Extent: Weston County, Wyoming

Date: 10-23-14 | Author: djb

I:\SD-WY\ Figure 2-5 Alternative _3_Route Mod_3a_8.5x11_102314.mxd



Legend

- Proposed Action
- Site-Specific Design Modification 3b
- Site-Specific Design Modification 3i
- Site-Specific Design Modification 3j
- Interstate
- US Highway
- State Highway
- Stream
- State Boundary
- County Boundary
- City or Town
- Township/Range Boundary
- Section Line
- Major Water Body
- Federal Wilderness Area
- National Park Boundary
- National Forest Boundary
- National Grassland Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Bureau of Reclamation Land
- U.S. Forest Service Land
- National Park Service Land
- State Land

0 500 1,000 1,500
Feet

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 2-6
ALTERNATIVE 3
ROUTE MODIFICATION 3B, 3H & 3I

Map Extent: Pennington County, South Dakota

Date: 10-27-14 | Author: rnc

I:\SD-WY\Figure 2-6 Alternative_3_Route_Mod_3b3h3i_8.5x11_102714.mxd

Legend

- Proposed Action
- Site-Specific Design Modification
- Interstate
- US Highway
- State Highway
- Stream
- State Boundary
- County Boundary
- City or Town
- Township/Range Boundary
- Section Line
- Major Water Body
- Federal Wilderness Area
- National Park Boundary
- National Grassland Boundary
- National Forest Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Bureau of Reclamation Land
- U.S. Forest Service Land
- National Park Service Land
- State Land

0 1,000 2,000 3,000
Feet

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

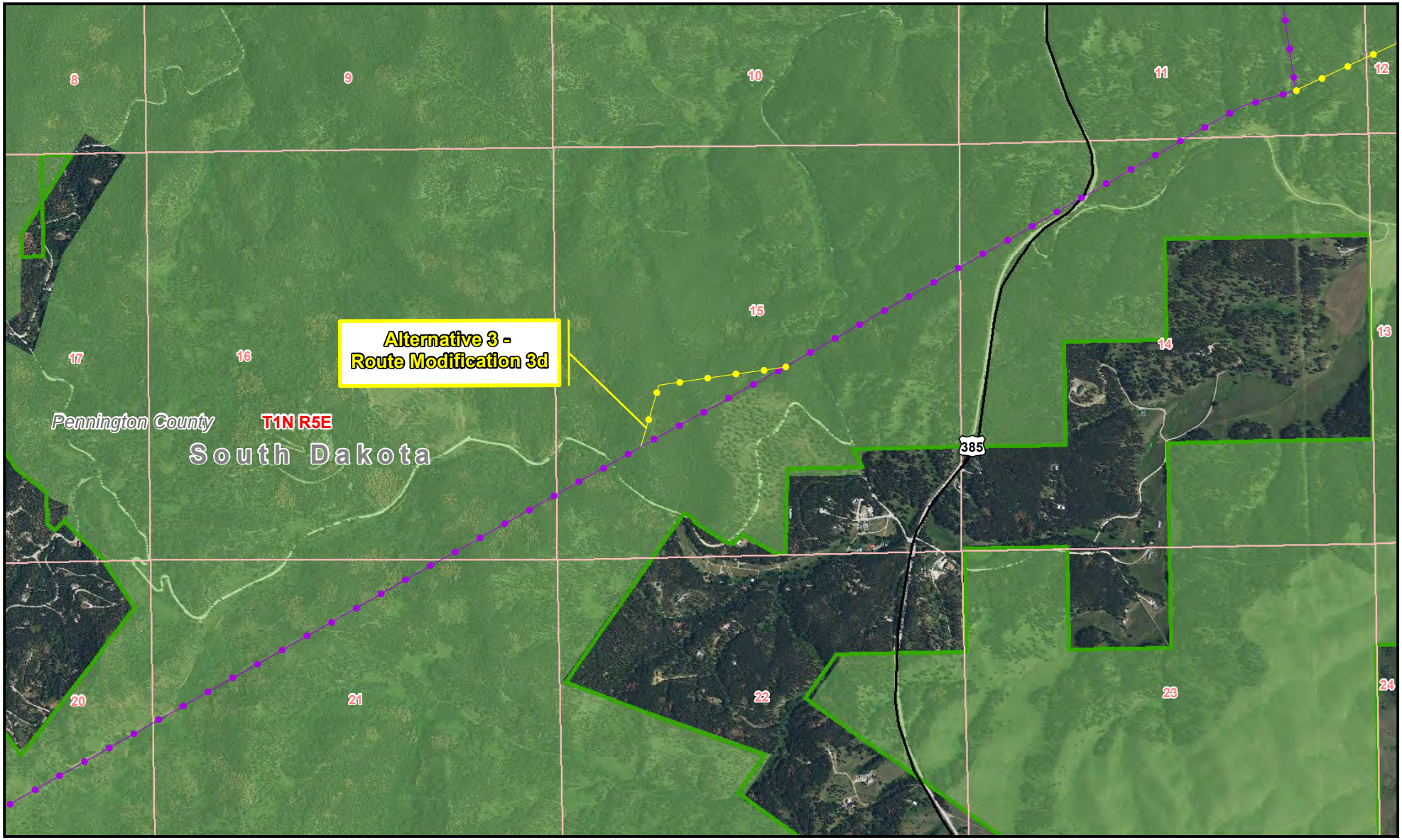
Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 2-7
ALTERNATIVE 3
ROUTE MODIFICATION 3C

Map Extent: Pennington County, South Dakota

Date: 10-23-14 | Author: rnc

I:\SD-WY\Figure 2-7 Alternative_3_Route_Mod_3c_8.5x11_102314.mxd



Legend

- Proposed Action
- Site-Specific Design Modification
- Interstate
- US Highway
- State Highway
- Stream
- State Boundary
- County Boundary
- City or Town
- Township/Range Boundary
- Section Line
- Major Water Body
- Federal Wilderness Area
- National Park Boundary
- National Grassland Boundary
- National Forest Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Bureau of Reclamation Land
- U.S. Forest Service Land
- National Park Service Land
- State Land

0 1,000 2,000
Feet

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

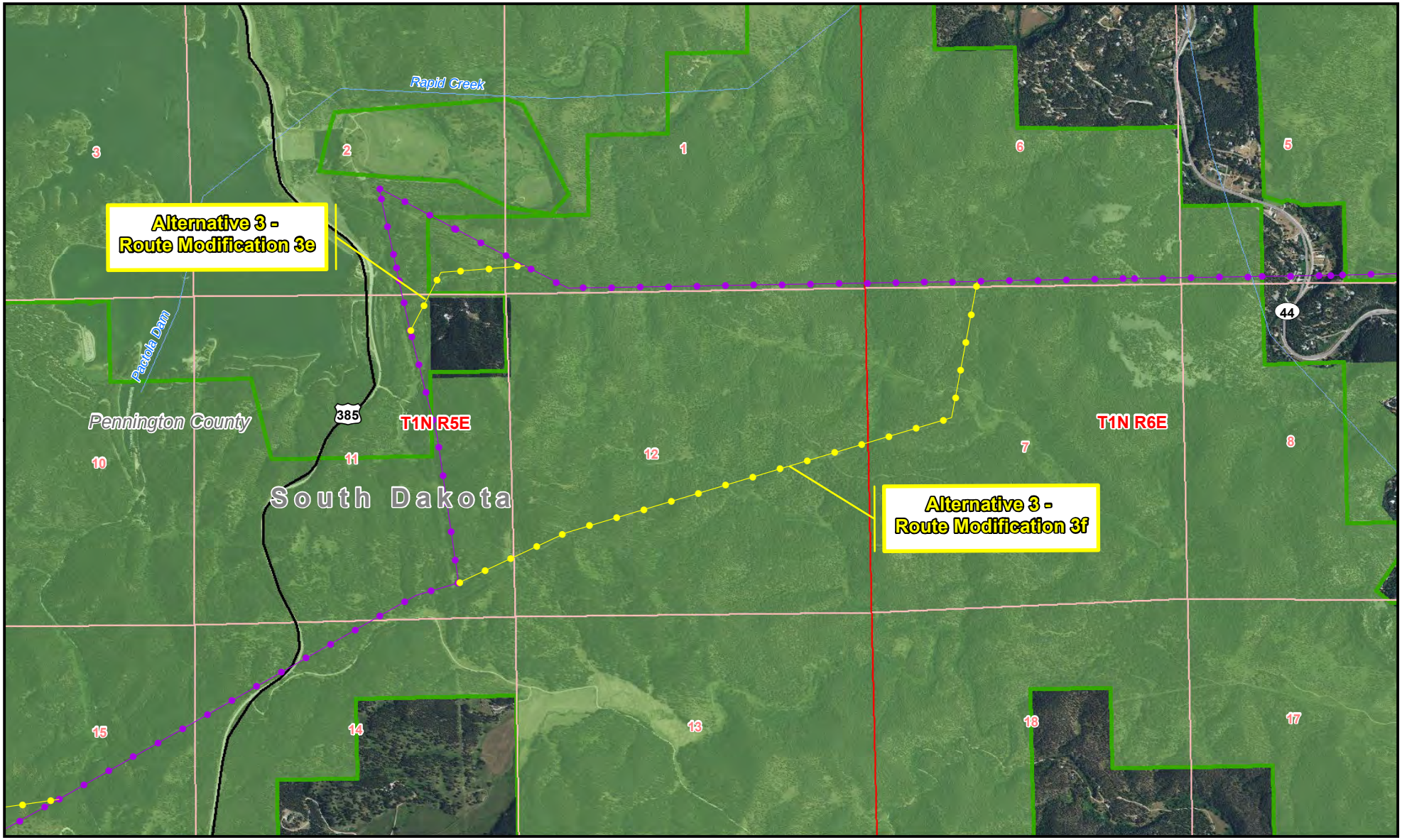
Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 2-8
ALTERNATIVE 3
ROUTE MODIFICATION 3D

Map Extent: Pennington County, South Dakota

Date: 10-23-14 | Author: rnc

I:\SD-WY\Figure 2-8 Alternative_3_Route_Mod_3d_8.5x11_102314.mxd



Legend

- Proposed Action
- Site-Specific Design Modification
- Interstate
- US Highway
- State Highway
- Stream
- State Boundary
- County Boundary
- City or Town
- Township/Range Boundary
- Section Line
- Major Water Body
- Federal Wilderness Area
- National Park Boundary
- National Grassland Boundary
- National Forest Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Bureau of Reclamation Land
- U.S. Forest Service Land
- National Park Service Land
- State Land

0 1,000 2,000 3,000
Feet

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

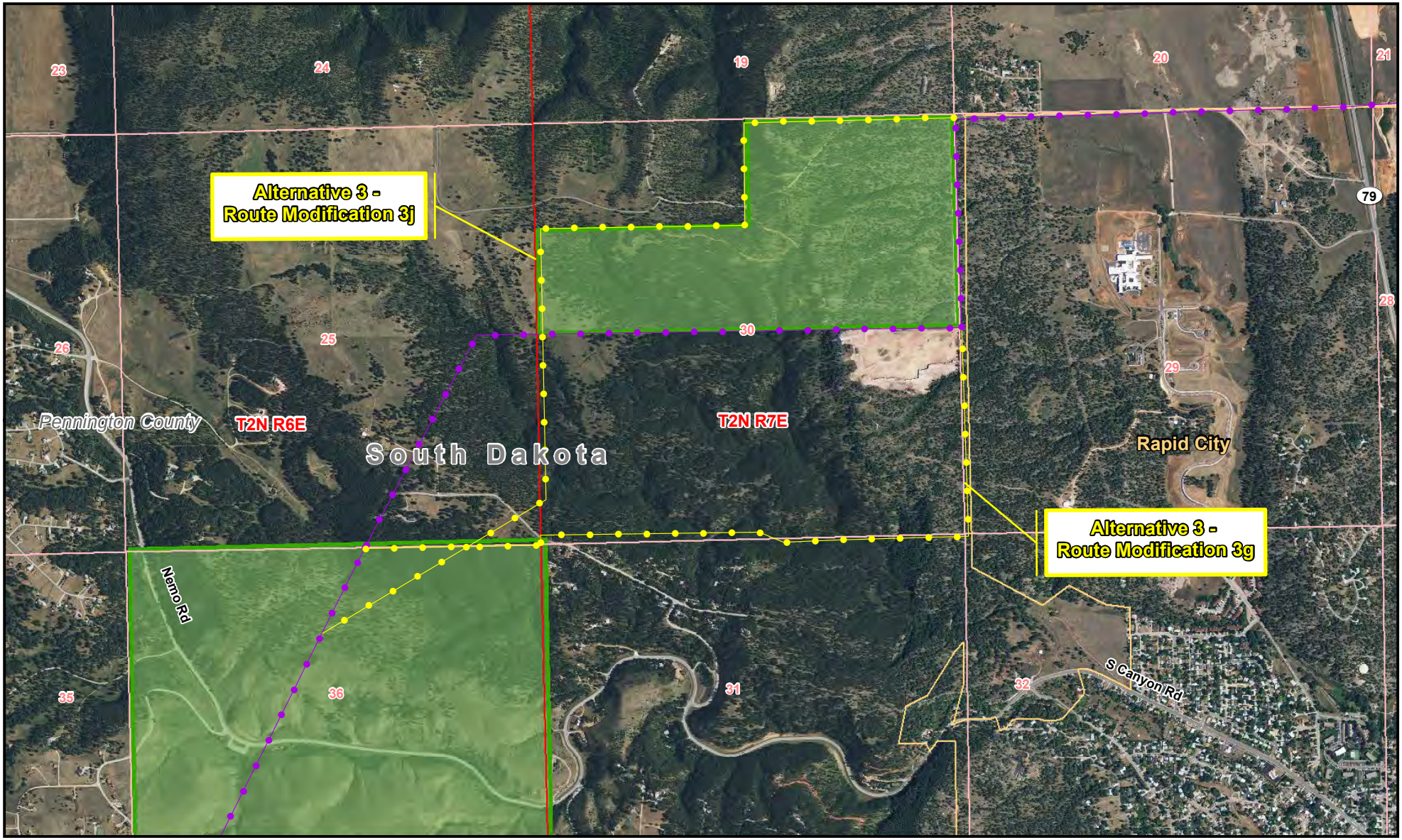
Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 2-9
ALTERNATIVE 3
ROUTE MODIFICATIONS 3E & 3F

Map Extent: Pennington County, South Dakota

Date: 10-23-14 | Author: rnc

I:\SD-W\Figure2-9 Alternative_3_Route_Mods_3e&3f_8.5x11_102314.mxd



Legend

- Proposed Action
- Site-Specific Design Modification
- Interstate
- US Highway
- State Highway
- Stream
- State Boundary
- County Boundary
- City or Town
- Township/Range Boundary
- Section Line
- Major Water Body
- Federal Wilderness Area
- National Park Boundary
- National Grassland Boundary
- National Forest Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Bureau of Reclamation Land
- U.S. Forest Service Land
- National Park Service Land
- State Land

0 500 1,000 1,500 2,000
Feet

Universal Transverse Mercator
North American Datum 1983
Zone 13 North, Meters

Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 2-10
ALTERNATIVE 3
ROUTE MODIFICATIONS 3G & 3J

Map Extent: Pennington County, South Dakota

Date: 10-23-14 | Author: rnc

I:\SD-WY\Figure 2-10 Alternative_3_Route_Mod_SR_8.5x11_102314.mxd

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, Mystic Ranger District, 8221 South Hwy 16, Rapid City, 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

The geographic analysis area for land use/land management is two-miles wide centered on the proposed route for the line.

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

Most of 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 the existing special use permit area. For both alternatives, this former 69 kV transmission line ROW would be extended from a 40-50 foot ROW to a 100 foot wide ROW on USFS land and 125 foot ROW on private land. 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, adjacent to Hidden Valley Road, and along South Canyon Road/Nemo Road. The Terra Sancta Retreat Center, a Catholic retreat center, St. Elizabeth Seton Catholic Elementary School, and Good Samaritan Society – St. Martin Village Senior Living 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 10 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, portions of which may need to be widened to 16 feet in

some locations, 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. Most of the decking yard, wire-pulling, tensioning and splicing sites are located within or near the Proposed Action ROW.

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 on private lands 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 and Mountain Pine Beetle infestation 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 Society – St. Martin Village senior living 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

Route Modification 3b: Route Modification 3b would cross 0.42 miles of BHNF land, 0.11 miles of private lands and 0.4 miles of Management Area 5.1 Resource Production Emphasis. The corresponding section of the Proposed Action would cross 0.39 miles of BHNF land, 0.10 miles of private lands and 0.4 miles of Management Area 5.1 Resource Production Emphasis. Because the total mileage of this modification is longer than the Proposed Action, Modification 3b would result in greater land use impacts on BHNF and private lands than the Proposed Action. However, the mileage crossed on Management Area 5.1 is the same, resulting in similar impacts. Modification 3b would have two residences within 150 feet either side of transmission line (compared to 8 residences along the comparable portion of the Proposed Action).

Route Modification 3c: Route Modification 3c would cross 0.45 miles of BHNF land, 0.96 miles of private lands and 0.4 miles of Management Area 5.4 Big Game Winter Emphasis. The corresponding section of the Proposed Action would cross 1.26 miles of BHNF land, 0.15 miles of private lands and 0.1 miles of Management Area 5.4 Big Game Winter Emphasis. Modification 3c would have fewer land use impacts on BHNF lands, greater impacts on private lands and greater impacts on Management Area 5.4 than the corresponding section of the Proposed Action. Modification 3c would have one residence within 150 feet either side of transmission line (compared to one residence along the comparable portion of the Proposed Action).

Route Modification 3d: Route Modification 3d would cross 0.47 miles of BHNF land, no private lands and 0.5 miles of Management Area 5.4 Big Game Winter Emphasis. The corresponding section of the Proposed Action would cross 0.4 miles of BHNF land, no private lands and 0.4 miles of Management Area 5.4 Big Game Winter Emphasis. Because the total mileage of this modification is longer than the Proposed Action, Modification 3d would result in greater land use impacts on BHNF lands and Management Area 5.4 than the Proposed Action. However, no private lands are crossed and are therefore not impacted by either option. Modification 3d would have no residences within 150 feet either side of transmission line (compared to no residences along the comparable portion of the Proposed Action).

Route Modification 3e: Route Modification 3e would cross 0.47 miles of BHNF land, no private lands and 0.5 miles of Management Area 5.4 Big Game Winter Emphasis. The corresponding section of the Proposed Action would cross 0.98 miles of BHNF land, no private lands, 0.4 miles of Management Area 5.4 Big Game Winter Emphasis and 0.6 miles of Management Area 4.1 Limited Motorized Use and Forest Products. Modification 3e would have fewer land use impacts on BHNF lands, and greater impacts on Management Area 5.4 than the corresponding section of the Proposed Action. In addition, just over one-half of a mile of the Proposed Action section

would be located in Management Area 4.1 while Route Modification 3e is not located in this Management Area. No private lands are crossed and are therefore not impacted by either option. Modification 3e would have one residence within 150 feet either side of transmission line (compared to no residences along the comparable portion of the Proposed Action).

Route Modification 3f: Route Modification 3f would cross 2.05 miles of BHNF land, no private lands and 2.1 miles of Management Area 5.4 Big Game Winter Emphasis. The corresponding section of the Proposed Action would cross 3.18 miles of BHNF land, no private lands, 2.6 miles of Management Area 5.4 Big Game Winter Emphasis and 0.6 miles of Management Area 4.1 Limited Motorized Use and Forest Products. Because the total mileage of the Proposed Action is longer than this modification, the Proposed Action would result in greater land use impacts on BHNF lands and Management Areas 5.4 and 4.1 than Modification 3f. However, no private lands are crossed and are therefore not impacted by either option. Modification 3f would have no residences within 150 feet either side of transmission line (compared to no residences along the comparable portion of the Proposed Action).

Route Modification 3g: Route Modification 3g would cross 0.42 miles of BHNF land, 1.55 miles of private lands and 0.4 miles of Management Area 5.4 Big Game Winter Emphasis. The corresponding section of the Proposed Action would cross 0.50 miles of BHNF land, 1.23 miles of private lands and 0.2 miles of Management Area 5.4 Big Game Winter Emphasis. Modification 3g would have fewer land use impacts on BHNF lands, greater impacts on private lands and greater impacts on Management Area 5.4 than the corresponding section of the Proposed Action. Modification 3g would have one residence within 150 feet either side of transmission line (compared to no residences along the comparable portion of the Proposed Action).

Route Modification 3h: Route Modification 3h would cross 1.84 miles of BHNF land, no private lands and 1.8 miles of Management Area 5.1 Resource Production Emphasis. The corresponding section of the Proposed Action would cross 1.58 miles of BHNF land, 0.10 miles of private lands and 1.6 miles of Management Area 5.1 Resource Production Emphasis. Modification 3h would have greater land use impacts on BHNF lands, fewer impacts on private lands and greater impacts on Management Area 5.1 than the corresponding section of the Proposed Action. Modification 3h would have no residences within 150 feet either side of transmission line (compared to 8 residences along the comparable portion of the Proposed Action).

Route Modification 3i: Route Modification 3i would cross 2.91 miles of BHNF land, no private lands, 2.9 miles of Management Area 5.1 Resource Production Emphasis and 0.1 miles of Management Area 8.2 Developed Recreational Complexes. The corresponding section of the Proposed Action would cross 2.65 miles of BHNF land, 0.10 miles of private lands and 2.7 miles of Management Area 5.1 Resource Production Emphasis. Because the total mileage of this modification is longer than the Proposed Action, Modification 3i would result in greater land use impacts on BHNF and private lands and Management Area 5.1 than the Proposed Action section it would replace. In addition, less than one tenth of a mile of Modification 3i would be located in Management Area 8.2 (assigned a high sensitivity land area), while the

corresponding section of the Proposed Action route is not located in this Management Area. Thus, Modification 3i would result in slightly higher land use impacts than the corresponding section of the Proposed Action. Modification 3i would have no residences within 150 feet either side of transmission line (compared to 8 residences along the comparable portion of the Proposed Action).

Route Modification 3j: Route Modification 3j would cross 1.93 miles of BHNF land, 0.58 miles of private lands and 1.5 miles of Management Area 5.4 Big Game Winter Emphasis. The corresponding section of the Proposed Action would cross 0.24 miles of BHNF land, 2.22 miles of private lands and 0.4 miles of Management Area 5.4 Big Game Winter Emphasis. Modification 3j would have greater land use impacts on BHNF lands, fewer impacts on private lands and greater impacts on Management Area 5.4 than the corresponding section of the Proposed Action. Modification 3j would have no residences within 150 feet either side of transmission line (compared to one residence along the comparable portion of the Proposed Action).

Summary: There are three Modifications (Modifications b, h and i) in the Mountain View area. Modification 3b, just west of Gillette Prairie Road would move the transmission ROW further from private residences than the Proposed Action. Modification 3h would move the line about 1,700 feet farther north from existing residences than Modification 3b and off of private lands onto National Forest. Like Modification 3h, Modification 3i would also move the line a similar distance farther from existing residences, off of private lands onto National Forest, and would be about 1 mile longer than Modification 3h.

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 miles 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. Modification 3j is also located in the general area of Route Modification 3g between Hidden Valley Road and an area southwest of Sun Ridge Road. It would completely avoid the proposed quarry operation described for Modification 3g and would move the line away from residences along Sun Ridge Road.

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

Route Modification 3a: 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 includes a variety of wildlife habitats that may be used by threatened, endangered and sensitive species; Management Indicator Species (MIS); and Species of Local Concern. The geographic analysis area for wildlife is one-mile wide centered on the proposed route for the line. The ROW is defined as 50 feet on either side of the centerline of the proposed route, for a total of 100 feet wide. The impact area is defined as the proposed ROW and certain areas outside the ROW such as 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.

3.2.1 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 include grassland, aspen, 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 on the BHNF in the South Dakota analysis area.

Table 3-5 - Existing Habitat Types on the BHNF Within the Analysis Area and ROW

Habitat Type	Analysis Area	Alternative 2 ROW
Grassland	1,913 acres	35 acres
Aspen	592 acres	11
Wetland/meadow/riparian*	1,424 acres	12 acres
Ponderosa Pine forest	19,426 acres	434 acres
Spruce forest	316 acres	9 acres
Aquatic*	Eleven named perennial streams, 17 named intermittent water bodies, two named reservoirs	Six named perennial streams, 14 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. Six 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 would be spanned by conductors and would not be impacted by the action alternatives.

The Analysis Area is the same for both Project alternatives as all potential route modifications are within one-half mile of the proposed route and the habitats within the analysis area are presented in **Table 3-5**.

Table 3-6 presents acres of existing forest stand classifications in the analysis area, impact area, and proposed ROW for Alternative 2.

Table 3-6 – Habitat Structural Stage Affected by Alternative 2

Habitat Structural Stage (HSS)	Acres in Analysis Area	Acres in Impact Area on NFS	Acres in ROW
1 - Grasses and Forbs	588	63	3
2 - Seedlings and Saplings	863	44	11
3A - Sapling/pole Cover <40%	1,508	50	42
3B - Sapling/pole Cover 40-70%	905	21	17
3C - Sapling/pole Cover >70%	297	7	6
4A - Mature Trees Cover <40%	9,490	240	195
4B - Mature Trees Cover 40-70%	6,224	174	148
4C – Mature Trees Cover >70%	1,106	32	29
5 – Late Successional	0	0	0
Other – Not categorized	0	3	0
TOTAL		634	451

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. 2600-2013-1, dated August 24, 2014). 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 (October 24, 2013), six species protected or proposed for protection under the ESA may occur in Pennington County including: whooping crane (*Grus americana*), least tern (*Sterna antillarum*), rufa red knot (*Calidris canutus rufa*), Sprague's pipit (*Anthus spragueii*), northern long-eared bat (*Myotis septentrionalis*) 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. The rufa red knot is a long distance migrant, nesting in the arctic tundra and wintering as far south as the southern tip of South America. In South Dakota, this species may use beaches and mudflats as stopover and feeding areas during migration. Sprague's pipit is a small songbird that nests in open prairies and grasslands with little to no tree and shrub cover. No black-footed ferrets populations are known to occur on the BHNF. Except for the northern long-eared bat, none of these species are known to occur within the BHNF; therefore these species will not be analyzed further. In October of 2013, the USFWS proposed to list the northern long-eared bat as an endangered species (USFWS 2013). Based on the potential for this species to occur in the South Dakota Analysis Area, the northern long-eared bat will be analyzed.

3.2.1.1.2 Northern Long-eared Bat

Status and Listing History

On October 2, 2013, the USFWS proposed to list the northern long-eared bat as endangered (USFWS 2013). This species is also a Species of Local Concern (SOLC) on the BHNF. An SOLC is defined as a species that does not meet the criteria for sensitive species status but shows a decline in a portion of Region 2, or a species that is an important component of diversity in a local area. The USFWS's proposed rule from October 2, 2013 and the included references, was used to prepare the following sections regarding the northern long-eared bat.

Life History and Ecology

Description

The northern long-eared bat belongs to the order Chiroptera, family Vesperitilionidae, genus Myotis, subgenus Myotis (Caceres and Barclay 2000). It has been known by several common names including Keen's bat, northern myotis bat, and the northern bat (USFWS 2013).

It is a medium-sized bat with typical adult body weights ranging between 5 and 8 grams (g). Fur color ranges between medium to dark brown on its back; dark brown ears and wing membranes; and tawny to pale-brown on the ventral side. It has relatively long ears when compared to other myotis species. Ears of the northern long-eared bat, when laid forward, extend beyond the nose (Nagorsen and Brigham 1993; Whitaker and Munford 2009).

Distribution and Abundance

The range of the northern long-eared bat includes much of the eastern and north central United States and all of the Canadian provinces (Nagorsen and Brigham 1993; Caceres and Pybus 1997). In the U.S., its range extends from Maine to Montana, including South Dakota, and south to eastern Kansas, eastern Oklahoma, Arkansas, and the panhandle of Florida (Caceres and Barclay 2000; Amelon and Burhans 2006). This species has been most frequently observed in the northeastern and Canadian provinces, with its distribution in the western and southern portions of its range described as patchy (USFWS 2013). The U.S. portion of this bat's range is often described by regional populations, including the eastern population, midwestern population, southern population and western population. Bats occurring in South Dakota are considered part of the western population.

The northern long-eared bat is typically less common in the western portion of its range than in the northern portions (Amelon and Burhans 2006). The Black Hills region of South Dakota is described as one region of this bat's western range where it is considered common (Caceres and Barclay 2000). As summarized in "*Conservation Assessment for the Northern Myotis in the Black Hills National Forest South Dakota and Wyoming*" (Schmidt 2003a), studies conducted on the Black Hills National Forest in the 1980's and 1990's characterized northern long-eared bat occurrence as common and abundant (Jones et al. 1983; Tigner 1997).

Habitat

The northern long-eared bat typically winters in hibernacula associated with caves and mines (USFWS 2013). During summer months, this species is known to roost singly or in small groups underneath loose bark or in cavities of live trees and snags (USFWS 2013). This species has been observed using a variety of tree species as roosting habitat, suggesting that roost selection is more likely dependent upon the availability of suitable bark crevices and tree cavities and less on tree species. In the western portion of this species' range, including South Dakota, typical dominant habitat associations include wooded riparian zones in badlands and prairies, and coniferous (often ponderosa pine) and deciduous woodlands at higher elevations

(Barclay 1993, Czaplewski et al. 1979, Clark and Stromberg 1987, Nagorsen and Brigham 1993).

Reproduction

Mating occurs in late summer and early fall. Females store sperm until spring when ovulation occurs (Racey 1979). One egg is fertilized, with young typically born in late May and early June.

Foraging and Range

This species has a diverse diet that includes moths, flies, leafhoppers, and beetles (Nagorsen and Brigham 1993; Brack and Whitaker 2001; Griffith and Gates 1985). Northern long-eared bats collect prey by hawking (catching insects while in flight) and gleaning insects from foliage (Nagorsen and Brigham 1993). Bats emerge at dusk to forage. Unlike other bat species that are known to forage along riparian areas, this species typically forages within and below the canopy of mature forests (Nagorsen and Brigham 1993; Brack and Whitaker 2001).

Threats to the Species

As discussed in the 2013 USFWS's proposed listing of the northern long-eared bat, white-nose syndrome (WNS) is considered to be the predominant threat to the species. While there are other factors, including disturbance to hibernacula and hibernating bats, loss and alteration of summer habitats, and diseases other than WNS, that were considered in the listing of this species, the USFWS states that none of these singly or collectively would have likely warranted a proposal for listing of this species if not for the detrimental population effects that have resulted from WNS.

Since the emergence and detection of WNS in 2006, the northern long-eared bat populations have experienced a precipitous decline, particularly in the northeast. In the northeastern portion of its range, WNS has been identified in nearly every hibernaculum, making the northern long-eared bat one of the most impacted bat species. Wildlife experts believe that WNS will continue to spread throughout the entire range of the northern long-eared bat. Currently WNS is known in 22 of the 39 states included in the bat's range. WNS has not been reported in the western U.S., including South Dakota (USFWS 2013).

Existing Conditions

The Analysis Area has an estimated 16,820 acres (**Table 3-6**) of mature (4A, 4B, and 4C) ponderosa pine, white spruce, and aspen, which are potentially suitable habitats for the northern long-eared bat. There are seven known mines and caves in the South Dakota Analysis Area that may provide suitable hibernation habitat for this species. Tigner and Stukel (2003) identify the entire BHNF as included in the range of the northern long-eared bat. This species has been captured during mist net surveys at various locations in both the northern and southern Black Hills. Winter hibernation records exist for some suitable habitats but are scarce because of the small number of individuals that roost together with other bats. Hibernation records include

Jewel Cave and abandoned mines in the northern and southern Black Hills. Given the difficult nature of locating winter hibernacula, it is possible unidentified colonies occur in the project Analysis Area. This species has the potential to occur in suitable habitats in the Analysis Area.

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, FY 2009, or FY2012 Forest Plan Monitoring and Evaluation Reports (FPMER) (USFS 2009, 2010, 2013), unless otherwise indicated. Viability analysis has been completed at the Forest Plan level (USFS 2005a), and therefore is 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 detailed 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 ROW. The temporal boundary analyzed for BHNF MIS includes the period of active construction and generally for the life of the transmission line. **Table 3-7** 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 affected by the action alternatives.

Table 3-7 - 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 ages.	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 3-7**). Goals and Objectives which may be applicable to the proposed project 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 project and are in **Appendix D**

3.2.1.1.2.1.1 Black-backed Woodpecker

The black-backed woodpecker is also a Region 2 sensitive species. In 2013, the USFWS announced a 90- day finding that listing of the Black Hills and Oregon Cascades-California distinct population segments of the black-backed Woodpecker may be warranted (USFWS 2013).

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 (Dixon and Saab 2010; USFS 2000) and areas infested with mountain pine beetles (Bonnot 2006; Rota 2013; Rota et al 2014) are most preferred by this species in the Black Hills. 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 some burned forests showed negative population growth probably because the season of the burn and the extent of high and moderately burned forest (Rota 2013).

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 'irruptive" as they follow outbreaks of woodboring beetles. Rota (2013) noted that populations peaked and were typically at their highest densities within two years after summer wildfires, higher than prescribed fires conducted in the fall and for habitats affected by mountain pine beetle infestation. Research in the Black Hills indicates that overall nesting success and recruitment into the population can be low mostly in areas infested with mountain pine beetles and some areas where prescribed fire resulted in less extensive, moderate, and severely burned forest (Rota 2013). 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 in burned habitats (USDA 2013).

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 the BHNF, 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.

During the course of surveys in July 2012, black-backed woodpeckers were regularly observed throughout the analysis area 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).

According to Forest Plan Monitoring and Reports (FPMERs), 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 slightly declining over the past five years due to mountain pine beetle. 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 2013).

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. More recent events, not accounted for in the FPMER, include wildfires and mountain pine beetle infestation. An active fire season in 2012 may have reduced brown creeper habitat across the 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). 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. The relative density has since dropped to approximately 22 birds per square kilometer of suitable habitat (USFS 2013).

Forest-wide monitoring data suggests in the short-term, the golden-crowned kinglet relative density in 2011 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. 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 (USFS 2013).

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). Golden-crowned kinglets were observed by field personnel performing surveys within the analysis area.

3.2.1.1.2.1.4 Grasshopper Sparrow

The Grasshopper Sparrow is also a Region 2 sensitive species.

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 through 2010. 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 2013). 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. 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 2012 occupied 45,185 acres of the entire BHNF. This represents approximately a six percent decrease 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. Grouse population monitoring has been sporadic and insufficient to determine overall trends. Additional funding is needed to implement occupancy monitoring protocol (USFS 2013).

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.

Ruffed grouse were not observed in the South Dakota MIS Analysis Area by biologists conducting various project-related surveys.

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 continued a general upward trend through 2010. 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). The Forest is conserving habitat for song sparrows, therefore meeting Objective 238a (USFS 2013).

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 several named

perennial streams that may support song sparrow including South Fork of Castle Creek, Gold Run, Dutchman Creek, Slate Creek, and Rapid Creek. Named intermittent streams occurring in the analysis area include Antelope Draw, Redbird Draw, South Fork of Castle Creek, Dutchman Spring, Haystack Spring West, Redfern Creek, Friday Creek, California Gulch Tributary, Skull Gulch, Spruce Gulch, Prairie Creek, Wild Irishman Gulch, and South Canyon seep/spring.. 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.

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 0.0189 cache/km and 42.3% occupancy. The most recent beaver survey was completed October 29-November 2, 2012. The food cache density was 0.0373 cache/km and 51.9% occupancy. 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 2013).

3.2.1.1.2.1.7.2 Analysis Area

The analysis area includes several named and unnamed perennial streams that may support beavers, including: South Fork of Castle Creek, Gold Run, Dutchman Creek, Slate Creek, and Rapid Creek. Intermittent named streams occurring in the analysis area include Antelope Draw, Redbird Draw, South Fork of Castle Creek, Dutchman Spring, Haystack Spring West, Redfern Creek, Friday Creek, California Gulch Tributary, Skull Gulch, Spruce Gulch, Prairie Creek, Wild Irishman Gulch, and South Canyon seep/spring. 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 that 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 37,800 deer (Huxoll 2011). Population estimates show a decline since 2007. Forest Plan Objective 217 supports habitat for management of 60,000 deer in the Black Hills (South Dakota and Wyoming), 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 likely declining. The Forest is meeting Objective 217 and Objective 238 for white-tailed deer (USFS 2013).

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 that would likely support white-tailed deer. White-tailed deer have been observed during surveys within the analysis area and are expected to occur in the area.

3.2.1.1.2.1.9 Mountain Sucker

The mountain sucker is also a Region 2 sensitive species.

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 2013). The South Dakota Game, Fish and Parks and Wyoming Game and Fish Department surveyed 23 of 26 MIS abundant sites for mountain sucker from 2008-2012. Three sites (headwaters of Castle Creek, mid Box Elder, and south Box Elder) were not surveyed. Only ten sites surveyed contained mountain suckers (USFS 2013). This monitoring provides further evidence of the declining population trend and range contraction of the mountain sucker (USFS 2013).

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 that 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 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 Antelope Draw, Redbird Draw, South Fork of Castle Creek, Dutchman Spring, Haystack Spring West, Redfern Creek, Friday Creek, California Gulch Tributary, Skull Gulch, Spruce Gulch, Pairie Creek, Wild Irishman Gulch, and South Canyon seep/spring 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 sufficiently long hydro period 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 ROW. 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. 2600-2013-1. 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.

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 3-8** 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 affected by the action alternatives. 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 Alternative 2 is provided in **Table 3-16**.

Table 3-8 - Forest Service Sensitive Species on BHNF

SPECIES	HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE IN THE ANALYSIS AREA[1]	FURTHER ANALYSIS WARRANTED
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).	High	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).	High	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

Table 3-8 - Forest Service Sensitive Species on BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN THE ANALYSIS AREA[1]**	**FURTHER ANALYSIS WARRANTED**
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).	High	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
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

Table 3-8 - Forest Service Sensitive Species on BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN THE ANALYSIS AREA[1]**	**FURTHER ANALYSIS WARRANTED**
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*) (eastern only)	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
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

Table 3-8 - Forest Service Sensitive Species on BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN THE ANALYSIS AREA[1]**	**FURTHER ANALYSIS WARRANTED**
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).	Low	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).	High	Yes
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
Plains Topminnow (*Funulus sciadicus*)	Typically occurs in shallow, slow water and clear streams with heavy vegetation and sand or gravel substrates (Rahel and Thel 2004).	No	No
Northern Redbelly Dace (*Phoxinus eos*)	Uncommon species found in small, localized areas of clear, cool water such as springs, seeps, beaver ponds, and spring-fed lakes (Stasiak 2006)	No	No
Sturgeon chub (*Macrybopsis gelida*)	Uncommon species found in small, localized areas of clear, cool water such as springs, seeps, beaver ponds, and spring-fed lakes (Stasiak 2006)	No	No

Table 3-8 - Forest Service Sensitive Species on BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN THE ANALYSIS AREA[1]**	**FURTHER ANALYSIS WARRANTED**
Molluscs			
Cooper's Rocky Mountainsnail (*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).	High	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
Ottoe Skipper (*Hesperia ottoe*)	Requires relatively non-degraded, native mixed prairie and tall grass prairie. Usually associated with purple coneflower, little bluestem, big bluestem, and side-oats gramma (Selby 2005)	No	No

[1] High: suitable habitat present and species known to occur in analysis area 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 Action Alternatives 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 American 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 nine documented prairie dog towns are located on the Forest, most of which are found in the

Southern Black Hills (USFS 2013). The Forest appears to be conserving habitat for the BTPD (USFS 2013).

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 of the analysis area. This species was not observed by personnel conducting various field surveys on NFS lands.

3.2.1.1.3.2.2 Grasshopper Sparrow

Grasshopper sparrow is an MIS and is discussed in the MIS section.

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 of the analysis area. 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). As reported in the Black Hills National Forest FY 2012 Monitoring Report, this species has not been detected on the Forest in recent years (USFS 2013).

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). Several intermittent and permanent 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 include South Fork of Castle Creek, Gold Run, Dutchman Creek, Slate Creek, and Rapid Creek. Named intermittent streams that occur in the analysis area and may provide aquatic habitat include Antelope Draw, Redbird Draw, South Fork of Castle Creek, Dutchman Spring, Haystack Spring West, Redfern Creek, Friday Creek, California Gulch Tributary, Skull Gulch, Spruce Gulch, Pairie Creek, Wild Irishman Gulch, and South Canyon seep/spring.. 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 the BHNF. The first nesting attempt on the 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 2013).

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 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 the Black Hills red-bellied snake 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 2013).

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 (USFWS 2011). They found that the listing was not warranted because this species was still common in the eastern United States and Canada. Limited data suggest that the Forest is conserving habitat for the northern leopard frog (USFS 2013).

Project Review: Northern leopard frog occurrences were documented within the analysis area by the Natural Resource Information Service data, which was provided by BHNF. Additionally, a large population of northern leopard frogs was observed during surveys on proposed 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 downward based on water quality conditions (USFS 2013). No lake chub were captured during SDGFP department survey efforts on Deerfield Reservoir in 2007 or 2012 (USFS 2013). The downward trend in population numbers may be due to non-habitat related issues such as competition with other native and non-native species (USFS 2013).

Project Review: Portions of Deerfield Reservoir and Castle Creek occur in the analysis area and may support this species.

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 Mountainsnail. 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 19,742 acres of the analysis area, which includes 316 acres of white spruce and 19,426 acres of ponderosa pine (USFS 2009a). See **Tables 3-14**, and **3-15** for habitats affected by the action alternatives.

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.

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 disjunctive 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 2013).

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 2012, 5 of 9historical goshawk nesting territories monitored 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 2013).

Project Review: Goshawks are known to occur within the analysis area. Natural Resource Information System (NRIS 2012) data, provided by the 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 ROW in July 2012. Based on these survey results and results from subsequent surveys, as many as four active territories were detected, with evidence of nesting in two territories.

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). 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 2013).

Project Review: While no Lewis's woodpecker historical occurrences were identified in 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 was observed in the analysis area during surveys.

3.2.1.1.3.4.5 Black-backed Woodpecker

The black-backed woodpecker is an MIS and is discussed under MIS section.

3.2.1.1.3.4.6 Flammulated Owl

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 772onsidered 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. The Forest is conserving habitat for the flammulated owl (USFS 2013).

Project Review: No flammulated owls have been identified in the analysis area, according to 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: Mountain snails (*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 Rocky 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 disjunctive 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 2013).

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. The proposed ROW 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.

Five known mines which may provide roosting habitat for bat species occur within the analysis area: Dexter Mine, Poisoned Ox Mine, McCurdy Gulch Mine, Sunbeam Mine, and one unnamed mine. 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 and geologic features such as limestone outcrops, 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 2013).

Project Review: None of the known hibernacula, maternity roosts, or nursery roosts occur in the analysis area. However, given the extensive mining history and geologic features in the Black Hills, there is a high potential for unknown roost habitat to occur in the analysis area.

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 2003b; 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 2003b). 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 species is found in the western United States, Canada and Mexico. The subspecies of fringed-tailed myotis (*Myotis thysanodes pahasapa*) 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 fringed-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 2013).

Project Review: While no known hibernacula, maternity roosts, or nursery roosts have been identified within the analysis area to date, the small groups and their use of cracks in rocky surfaces make locating these important habitats difficult. 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 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 declined to 180-230 sheep in the Black Hills (SDGFP 2013) as the result of disease. The USFS is conserving habitat for the bighorn sheep consistent with Objective 221 (USFS 2013).

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). American peregrine falcons may also nest and forage in urban settings, using tall buildings as nesting substrate. 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 2013).

Project Review: Rocky Mountain Bird Observatory (RMBO 2009) data and Natural Resource Information System (NRIS 2012) data do not have records of American peregrine falcon occurrences within the analysis area. Potential nesting habitat occurs on limestone cliff habitat in the analysis area. In addition to these potentially suitable natural nesting habitats, American peregrine falcons are now nesting in downtown Rapid City, South Dakota. In

2011, The SDGFP initiated a three-year peregrine falcon reintroduction program (2011-2013). Approximately 60 individual falcons were released in downtown Rapid City (SDGFP 2013). As the result of this re-introduction, nesting is expected to continue in Rapid City, as well as the surrounding habitats, including areas of the Black Hills that may be associated with the proposed transmission line. Buildings used as nesting sites are within three miles of the Lange Substation, where the proposed transmission line would connect.

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 3-9** for each SOLC. SOLC are grouped by habitat type to facilitate the affects analysis and reduce redundancy.

Table 3-9 - Species of Local Concern on BHNF

SPECIES	HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE IN PROJECT AREA[1]	FURTHER ANALYSIS WARRANTED IN PROJECT AREA
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). See Section 3.2.1.1.2 under Federal Endangered Species Act Protected Species for further discussion.	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*)	Commonly referred to as the western long-eared myotis, found in 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

Table 3-9 - Species of Local Concern on BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN PROJECT AREA[1]**	**FURTHER ANALYSIS WARRANTED IN PROJECT AREA**
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).	High	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
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

Table 3-9 - Species of Local Concern on BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN PROJECT AREA[1]**	**FURTHER ANALYSIS WARRANTED IN PROJECT AREA**
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).	High	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).	High	Yes
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).	High	Yes

Table 3-9 - Species of Local Concern on BHNF			
SPECIES	**HABITAT REQUIREMENTS**	**LIKELIHOOD OF OCCURRENCE IN PROJECT AREA[1]**	**FURTHER ANALYSIS WARRANTED IN PROJECT AREA**
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).	High	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).	High	Yes
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).	High	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 for SOLC species 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 require 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. 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 2013). 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 2013).

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 analysis area.

3.2.1.1.4.1.2.2 Black-and-white Warbler

The 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 2013). 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 analysis 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. 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, 2013).

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 Tawny 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 disjunctive 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. 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, 2013).

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 occurred in 2011. Callused vertigo was found at 12 of 20 sites visited. 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 2013).

Natural Resource Information System (NRIS 2012) data, provided by the 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 occurred in 2011. The mystery vertigo was found at 12 of 20 sites visited. 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 2013).

Natural Resource Information System (NRIS 2012) data provided by the 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, but have not been monitored since then (USFS 2013). 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) support 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 3-14,** and **3-15** for habitats affected by the action alternatives.

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 (USFS 2013). 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 2013).

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 no records of the 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 (USFS 2013). 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 2013). 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 2013).

Natural Resource Information System (NRIS 2012) data, provided by the BHNF, identified five historical occurrence of the 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 hawks 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 (USFS 2013). Two were observed in 2010 and one in 2012 (USFS 2013). 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 2013).

Cooper's hawks are known to occur in 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 (USFS 2013). 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 2013).

Drilling (2010) identified 35 individual northern saw-whet owls during their surveys, and 93 percent of routes surveyed contained this species. Drillling (2010) identified this owl species on two transects completed in the analysis area, including Ditch Creek and Pairie Creek. 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, this species is rare (typically found in low numbers) but is a regular and widespread resident of the Black Hills. Several have been observed during bird monitoring in the last three years (USFS 2013) 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 2013).

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 13 observations 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 occurred in 2010. Succinidae species were found in 17 of 22 sites visited. 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 2013).

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 conducted in 2010. Striate disc were found at 12 of 15 sites visited. 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 2013).

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 (*Myotis evotis),* commonly referred to as the western long-eared myotis, primarily inhabitants coniferous forest and woodland, including juniper, ponderosa pine, and spruce-fir, and is typically found near water and rock outcrops or cliffs (Schmidt 2003). 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 (Schmidt 2003). This species feed on flying insects. Disturbance at roosting habitat, loss of roosting habitat, pesticides, and wind energy development are the main threats to the long-eared myotis. The global population of long-eared myotis is secure, but rare in parts of its range. In South Dakota, this species 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 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 of the Forest near Sturgis, South Dakota, and in Wyoming.

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 2013c). 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 the 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, caves and limestone formations.

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 (NatureServe 2013). Small-footed myotis is a widespread year-round resident of the Black Hills, hibernating in caves and mines (Tigner and Stukel 2003).

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 2013). 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 ROW. 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.

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).

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 2013). 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. This MOU is currently being revised to reflect new information, and is focused on managing for populations and habitats long term.

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 3-10** provides a list of Partners in Flight Priority Bird Species for the Black Hills (SDGFP 2005)

Table 3-10 - 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

Table 3-10 - Partners in Flight Priority Bird Species for BHNF		
SPECIES	**HABITAT**	**PROJECT DISPOSITION**
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
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

Many species of migratory birds are of international concern due to naturally small ranges, loss of habitat, observed population declines and other factors. The BHNF recognizes the ecological and economic importance of birds, and approaches bird conservation at several levels by implementing: (1) Forest Plan objectives, standards and guidelines, (2) a Forest-wide bird monitoring program, and (3) site-specific mitigation and effects analyses for identified species of concern (R2, MIS and SOLC).

Bird monitoring is conducted at the Forest-level to determine species distribution, abundance, and trend (Rocky Mountain Bird Observatory 2001-2010). The monitoring is designed and conducted by the Rocky Mountain Bird Observatory to provide statistically rigorous population trend data for at least 61 species that breed in the Black Hills. Data collected assists the Forest in determining whether additional conservation measures are necessary.

Migratory birds of concern are identified by many sources, including the Endangered Species Act, the Regional Forester's Sensitive species list, the BHNF MIS and SOLC lists, the USFWS list of Birds of Conservation Concern (BCC, USDI Fish and Wildlife Service 2008), South Dakota Heritage Program (South Dakota Game, Fish and Parks Department 2011a) and the South Dakota All Bird Conservation Plan (South Dakota Department of Game, Fish, and Parks 2005). All of these sources and their respective species of concern except for the BCC and South Dakota lists have been examined elsewhere in this document and/or the T-O-RC 230 kV Transmission Line Project Biological Assessment/Biological Evaluation (BA/BE) report.

The BCC 2008 publication lists 24 species in the BRC 17 conservation region that includes the Black Hills. However, not all of these species are found in the Black Hills National Forest. The South Dakota All Bird Conservation Plan developed priority bird species list within specific habitats in the state. For the Black Hills, Level I and II priority species have not been identified. Nineteen Level III species may be affected by either of the T-O-RC 230 kV Transmission Line Project action alternatives (South Dakota Department of Game, Fish, and Parks 2005), especially if they are riparian dependent. The South Dakota Heritage Program has identified several bird species as being rare or threatened in the state that were not included in the Black Hills list in the All Bird Conservation Plan. Two of these species could be affected by the proposed project and are discussed below.

3.2.1.1.5.1 Osprey (*Pandion haliaetus*)

The osprey is a fish-eating bird of prey that is listed as a state threatened species in South Dakota (South Dakota Game, Fish, and Parks 2005). A small breeding population occurs in the Black Hills, but they are very rare elsewhere in the state. Ospreys range throughout much of the world and are common in many parts of North America. This species responded well to the ban on DDT, which had caused eggshell thinning and led to population declines. Ospreys live in both freshwater and saltwater areas, including coastlines, inland lakes, and rivers. They prey on fish that they capture in shallow water or near the surface. Ospreys select nest sites that are higher than surrounding vegetation, safe from predators and allow easy access to nests due to poor maneuvering flight capabilities. Ospreys traditionally use large trees on or near water bodies as nest sites but have adapted to artificial sites such as power lines, channel markers and nesting platforms (Nature Serve 2013).

Ospreys tend to be poor nesting pioneers, and do not typically nest in new areas far from an existing population therefore their population has been slow to recover and expand. Ospreys were first documented in the Black Hills in the Pactola Basin nesting on a power line structure. Currently there are approximately 9 known nest locations in the Black Hills, mostly increasing in the last five years. Most nest locations are close to ponds or lakes, initially utilizing power line structures for nesting. All nests have been moved from the power line structure to an artificial nest platform through coordination with utility companies, the Forest Service and the SDGF&P. The osprey nest in Pactola Basin has been occupied since 1991. Due to recent sightings near Deerfield Reservoir, it is likely that undiscovered

nest(s) are within 1 mile of this lake. Natural nest sites (e.g. snags) could be lost to MPB mortality and or treatments.

3.2.1.1.5.2 Great Blue Heron (Ardea herodias)

This species is found across North America and is the most abundant of heron species. The South Dakota All Bird Action plan lists this species as a bird of conservation concern (Priority Level II) because their population is suspected to be in decline (South Dakota Game Fish and Parks 2005). Prey items are mostly small fish but have been known to eat amphibians, reptiles, small mammals, and birds. Foraging habitat is along streams and lake edges where water is calm or slow moving. This species usually nests in colonies (rookeries) but may have a single nest. Nesting habitat selection is predator driven, usually in trees located on islands or oxbows in close proximity to foraging sites. The heron is susceptible to human disturbance, especially in the early nesting season where adults may abandon eggs. Nest abandonment and colony abandonments increase as human visits increase. Road building and logging operations have been known to cause abandonment. However, this species would eventually habituate to non-threatening disturbance (Nature Serve 2013, Butler 1992).

In the Black Hills, the number of great blue heron rookeries has increased, mostly in the last 5 years. Several colonies are located adjacent to streams in high areas where predators could be observed. Currently there are no known heron rookeries in or adjacent to Deerfield or Pactola Reservoirs but due to sightings and suitable habitat found in the T-O-RC 230 kV Transmission Line analysis area, it is highly probable that a rookery may exist or appear in the future. This species does not have specific Forest Plan direction that would protect colonies from disturbance.

3.2.1.1.6 Big Game

Big game species are addressed in this EIS based on public interest, state agency management objectives, and the demand they hold with the public. 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). Big game species addressed in this section include the elk and mule deer. The white-tailed deer is an MIS species and is discussed in the MIS section.

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 3-11**. The following sections summarize the existing conditions for each of these major habitat types and the associated sensitive species.

Table 3-11 - Habitat Types Included Within the Wyoming 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*), Ute ladies'-tresses

(*Spiranthes diluvialis*), and northern long-eared bat (*Myotis septentrionalis*) (USFWS 2014). Black-footed ferret (*Mustella nigripes*) and blowout penstemon (*Penstemon haydenii*) were on previous versions of this list, but have been since removed and are thus not considered in this document.

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.

Northern Long-eared Bat (same heading level of GSG, above)

On October 2, 2013, the USFWS proposed to list the northern long-eared bat as endangered (USFWS 2013). The TBNG bases its Species of Local Concern (SOLC) list on the Wyoming Game and Fish Department's Species of Greatest Conservation Need (SGCN) list. The northern long-eared bat is listed by the WGFD as a SGCN, and is thereby also a SOLC on the TBNG. The northern long-eared bat typically winters in hibernacula associated

with mines and caves (USFWS 2013). During the summer months, this species is known to roost singly or in small groups underneath loose bark or in cavities of live trees and snags (USFWS 2013). Suitable habitat, including hibernacula and summer forested habitats are absent within the Wyoming portions of the proposed Project Area (Painter pers. comm.). Based on the lack of suitable habitats in the proposed Project Area and the lack of potential effects to this species, implementation of the Proposed Action (Alternative 3) would have **No Effect** on the northern long-eared bat. This species will not be evaluated further.

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 American 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 3-12** 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 3-12** 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 3-12 - 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 3-13 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 3-13**. 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 3-13 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 3-13 - USFS R2 Sensitive Wildlife Species for TBNG

Species Name	Habitat Requirements	Occurrence in Analysis Area[1]	Suitable Habitat in Wyoming 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
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]

Table 3-13 - USFS R2 Sensitive Wildlife Species for TBNG				
Species Name	**Habitat Requirements**	**Occurrence in Analysis Area[1]**	**Suitable Habitat in Wyoming Wildlife Analysis Area**	**Rationale if Not Carried Forward for Analysis**
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.
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

Table 3-13 - USFS R2 Sensitive Wildlife Species for TBNG				
Species Name	**Habitat Requirements**	**Occurrence in Analysis Area[1]**	**Suitable Habitat in Wyoming Wildlife Analysis Area**	**Rationale if Not Carried Forward for Analysis**
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]
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.

Table 3-13 - USFS R2 Sensitive Wildlife Species for TBNG				
Species Name	**Habitat Requirements**	**Occurrence in Analysis Area[1]**	**Suitable Habitat in Wyoming Wildlife Analysis Area**	**Rationale if Not Carried Forward for Analysis**
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
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

Table 3-13 - USFS R2 Sensitive Wildlife Species for TBNG				
Species Name	**Habitat Requirements**	**Occurrence in Analysis Area[1]**	**Suitable Habitat in Wyoming Wildlife Analysis Area**	**Rationale if Not Carried Forward for Analysis**
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
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

Table 3-13 - USFS R2 Sensitive Wildlife Species for TBNG				
Species Name	**Habitat Requirements**	**Occurrence in Analysis Area[1]**	**Suitable Habitat in Wyoming Wildlife Analysis Area**	**Rationale if Not Carried Forward for Analysis**
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

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 longspur 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

The 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 Eagle

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 Frog

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 -3.3, 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 seven displaying male greater sage-grouse in 2014. 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 Alternative 2 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 Alternative 2, 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 Alternative 2, 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. Under Alternative 2, 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.

Habitat Loss**:** Implementation of Alternative 2 could result in the permanent and temporary alteration and removal of habitats that support special status wildlife species. Permanent habitat loss resulting from implementation 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 3-16**, 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. Alternative 2 include 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 Alternative 2is 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

None of the federally-protected species with the potential to occur in Pennington County, South Dakota are known to occur on the BHNF, except for the northern long-eared bat. Therefore, implementation of Alternative 2 would have "**no effect**" on the whooping crane, least tern, rufa red knot, Sprague's pipit, and black-footed ferret, excluding the northern long-eared bat. The following sections describe the potential effects associated with implementation of Alternative 2 on northern long-eared bat. Refer to the BA/BE located in the project file for further information and analysis.

3.2.2.2.1.1.1.1 Northern Long-eared Bat

Direct Effects

Under Alternative 2, vegetation removal activities could injure or kill individual bats if present in affected habitats. Injuries and mortalities could result from collisions with transmission lines and guy wires, but this is expected to be unlikely based on the species' in-flight agility and the typical foraging behaviors of the species that includes foraging among and within mature forest canopy.

Implementation of Alternative 2 would remove an estimated 372 acres (**Table 3-14**) of mature ponderosa pine, white spruce, and aspen, which is potentially suitable habitat for the northern long-eared bat. This represents less than one percent of the potentially suitable habitat in the South Dakota Analysis Area, and a much smaller proportion of the potentially

suitable habitat that exists on the Black Hills National Forest. Project-related construction activities would not impact known caves or mines, but could impact unknown hibernation roosts.

Mature forest habitats, those typically used by the species for foraging and roosting, could experience edge effects associated with the creation of the proposed ROW and the differences this habitat would have with the existing, undisturbed habitats associated with mature forests. This edge effect could locally alter the type and number of preferred insect prey species. The potential for this type of effect to have measurable or discernable impacts on the local populations is low. Disturbance and human activity in has the potential to introduce or spread noxious weeds. The spread and occurrence of noxious weeds can alter the suitability of other unaffected habitats by changing the plant species composition and the associated insect prey species. Potential impacts associated with noxious weeds are not expected to be measurable or to have detectable effects on individual bats or the local population.

As described previously, other noteworthy threats to this species include disturbance to caves and mines that may be used during hibernation, disturbance of hibernating bats, removal of suitable summer roosting and foraging habitats, and disease, including WNS and others. Implementation of Alternative 2 would not impact caves and mines, or hibernating bats and would have no effect on the spread or introduction of disease to locally occurring bats.

Mitigation

Project design features (PDFs) and mitigation measures are presented in **Appendix B** of this document.

Cumulative Impacts

Habitat loss of potentially suitable summer and foraging habitats would contribute, although at a very small scale, to habitat loss for this species across the Black Hills National Forest and its entire range. As indicated by the USFWS, while continued habitat loss and degradation could eventually reach levels that have measurable impacts on the northern long-eared bat, the most important issue impacting the status of this species is WNS. Implementation of Alternative 2 is not expected to influence the occurrence or spread of WNS.

Effects Determination

Implementation of Alternative 2 is "**not likely to jeopardize the continued existence"** of the northern-long eared bat. No critical habitat has yet been identified, so none would be affected. This determination considers the potential for injury or death to foraging or roosting bats, as well as, the lack of disturbance to known caves or mines in the analysis area that may support hibernating bats, and the unlikelihood that implementation would introduce or exacerbate diseases within the local population, including WNS. This species

is likely to persist because Alternative 2 is consistent with Forest Plan direction (US Forest Service 2006). If the project is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may affect the northern long-eared bat in a manner or to an extent not previously considered, and new or revised BA/BE would be required.

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 Alternative 2 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 project 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

Implementation of Alternative 2 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, 29 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 remove 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 Alternative 2 would result in the loss of an estimated 131 acres of potentially suitable black-backed woodpecker habitat. See **Tables 3-14** and **3-15** for a summary of forest stand types impacted by the action alternatives.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 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; therefore the effects to the black-backed woodpecker are negligible.

Collision with transmission lines or associated guy-wires

Implementation of Alternative 2 would result in an increase in collision risk between black-backed woodpeckers and infrastructure associated with the proposed project. 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 transmission line is minimal.

Table 3-14 - BHNF 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 3-15 - Land Area (Acres) of Vegetation Types on BHNF Lands that Would be Disturbed by the Proposed Project

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 implementation of Alternative 2. 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, implementation of Alternative 2 would reduce habitat loss to black-backed woodpecker and retain the maximum amount of habitat possible. This would ensure that implementation of Alternative 2 complies with Goal 2, Objective 238b, Standard 3.7-2101, and Standard 5.4-3201.

Closing most access roads to public use would ensure implementation of Alternative 2 complies with Standard 8.2-2104 in Management Area 8.2, and would reduce associated impacts throughout the project area.

Conclusions

Impacts to the black-backed woodpecker from implementation of Alternative 2 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 ROW and associated facilities may impact individual black-backed woodpeckers, implementation of Alternative 2 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 Alternative 2 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 implementation of Alternative 2 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

Implementation of Alternative 2 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 Alternative 2, 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 Alternative 2 would result in the loss of 85 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 Alternative 2 would damage or remove 114 acres of potentially suitable brown creeper habitat in the analysis area. See **Tables 3-14** and **3-15** for a summary of forest stand types impacted by the action alternatives.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 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 Alternative 2, therefore the effects to the brown creeper are negligible.

Collision with transmission lines or associated guy-wires

Implementation of Alternative 2 would result in an increase in collision risk between brown creepers and infrastructure associated with the Project. 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 Project 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 and effective implementation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds. 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, implementation of Alternative 2 would reduce habitat loss to the brown creeper and retain the maximum amount of habitat possible. This would ensure that Alternative 2 complies with Goal 2, Objective 238a, Standard 3.7-2101, and Standard 5.4-3201.

Closing most access roads to public use would reduce impacts from recreational motorists ensure Alternative 2 complies with Standard 8.2-2104.

Conclusions

Impacts to the brown creeper resulting from implementation of Alternative 2 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 2013). While implementation of Alternative 2 may impact individual brown creepers, implementation of Alternative 2 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

Implementation of Alternative 2 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 transmission line 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

Implementation of Alternative 2 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 Alternative 2 and construction of the associated ROW would result in the loss of nine acres of mature white spruce habitat, and 29 acres of late-successional ponderosa pine forests. Access roads associated with the Alternative 2 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 Alternative 2 would result in 42 acres of disturbance or removal of potentially suitable golden-crowned kinglet habitat in the analysis area. See **Tables 3-14** and **3-15** for a summary of forest stand types impacted by the action alternatives.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 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 implementation of Alternative 2; therefore the effects to the golden-crowned kinglet are negligible.

Collision with transmission lines or associated guy-wires

Implementation of Alternative 2 would result in an increase in the collision risk between golden-crowned kinglets and infrastructure associated with the proposed transmission line. 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 transmission line 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 and effective implementation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds. 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 ROWs to the greatest extent possible, implementation of Alternative 2 would reduce the loss of golden-crowned kinglet habitats and retain the maximum amount of habitat possible. This would ensure that implementation of Alternative 2 complies with Goal 2, Objective 238c, Standard 3.7-2101, and Standard 5.4-3201.

Closing most access roads to public use would reduce impacts from recreational motorists ensure the Alternative 2 complies with Standard 8.2-2104.

Conclusions

Impacts to golden-crowned kinglets from implementation of Alternative 2 may include loss of habitat, disturbance from construction related activities, direct mortality and increased noxious weeds. While construction of the proposed transmission line may impact individual golden-crowned kinglets, implementation of Alternative 2 would not likely impact population trends observed on the BHNF. The combination of these effects would have a negligible effect on the Forest-wide population and habitat trends 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 Alternative 2 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 Alternative 2 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 35 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 four acres. Permanent habitat loss from these seven structures would be negligible. Temporary overland access and timber decking areas would temporarily impact 19 acres of potential grasshopper sparrow habitat. See **Tables 3-14** and **3-15** for a summary of habitat types affected by the action alternatives Alternative 2.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 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 project 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, therefore the effects to the grasshopper sparrow are negligible.

Collision with transmission lines or associated guy-wires

Implementation of Alternative 2 would result in an increase in collision risk between grasshopper sparrows and infrastructure associated with the proposed project. 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 transmission line 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 and effective implementation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds. 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 Alternative 2 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 ROWs to the greatest extent possible, loss of suitable grasshopper sparrow habitat would be minimized. This would ensure that implementation of Alternative 2 complies with Goal 2, Objective 238a, Standard 3.7-2101, and Standard 5.4-3201.

Closing most access roads to public use would reduce impacts from recreational motorists ensure Alternative 2 complies with Standard 8.2-2104.

Conclusions

Impacts to grasshopper sparrows from implementation of Alternative 2 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 2013). While construction of the proposed transmission line may impact individual grasshopper sparrows, implementation of Alternative 2 would not likely impact population trends observed on the BHNF. These impacts would likely combine to have a negligible effect on the Forest-wide population and habitat trends 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 Alternative 2 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 limit these 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 activities 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 after 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 Alternative 2 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 11 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. The construction and use of project access roads would result in the permanent loss of seven 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 as revegetation occurs.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 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 the ROW, access roads, and construction areas could potentially kill nesting ruffed grouse and non-nesting ruffed grouse that are unable to avoid vehicles and construction equipment. Implementation of project mitigation measures would reduce or eliminate potential short-term impacts to individuals during the breeding season, therefore the effects to the ruffed grouse are negligible.

Collision with transmission lines or associated guy-wires

Implementation of Alternative 2 would result in an increase in collision risk between ruffed grouse and infrastructure associated with the proposed transmission line. 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 by the establishment and spread of noxious weeds, 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 and effective implementation of a Noxious and Invasive Weed Management Plan would limit the establishment and spread of noxious weeds.

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

Implementation of Alternative 2 may provide additional perches for raptors that 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 transmission line support structures as hunting perches, which could lead to increased predation on ruffed grouse. However, the increase in available perches 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 ROWs to the greatest extent possible, implementation of Alternative 2 would reduce habitat loss to ruffed grouse and retain the maximum amount of undisturbed habitat possible. This would ensure that Alternative 2 complies with Goal 2, Objective 238a, Standard 3.7-2101, and Standard 5.4-3201.

Closing most access roads to public use would reduce impacts from recreational motorists ensure Alternative 2 complies with Standard 8.2-2104.

Conclusions

Impacts to ruffed grouse from implementation of Alternative 2 may include loss of habitat, disturbance from construction related activities, direct mortality, increased noxious weeds, and increased predation. While implementation may impact individual ruffed grouse, implementation would not likely impact population trends observed on the BHNF. These impacts would present a negligible effect on the Forest-wide population and habitat trends 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 Alternative 2 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 that occupy riparian areas within the analysis area, especially occupied habitats proximal to proposed construction areas. However, given the small amount of potentially suitable riparian habitat in the analysis area and the small amount of habitat that may be crossed by the ROW or access roads, the likelihood of disturbing song sparrows and/or beavers is low. Disturbance from construction activities would be localized to the area of active construction and limited to the duration of construction. Beavers and song sparrow habitat use and behaviors if disrupted, 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

Implementation of Alternative 2 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 transmission line 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 that would be permanently removed in support of new access roads located outside of the ROW. BMPs to be described in the Stormwater Pollution Prevention Plan (SWPPP), which is included as part of Alternatives 2 and 3 and described in **Appendix B**, 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 would be constructed according to Standard 1203 to allow fish and other aquatic species to pass. See **Tables 3-14** and **3-15** for a comparison of habitat types within the analysis area and what may be affected by the action alternatives.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 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 or crushing of individuals occupying habitats that are being disturbed. Because a

majority of wetland and riparian vegetation would be spanned and avoided, the likelihood that nesting song sparrows would be killed by construction equipment is low. It is unlikely that implementation of Alternative 2 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 Alternative 2 would result in an increase in collision risk between song sparrows and infrastructure associated with the proposed transmission line. Song sparrows may be susceptible to collision during low light levels or inclement weather; however, because song sparrows are agile fliers that do not have the high wing loading and low aspect values that make a species more prone to collision. The risk of song sparrows colliding with the proposed transmission line 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 and effective implementation of a noxious and invasive weed management plan, as part of the action alternatives, would limit the establishment and spread of noxious weeds. 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 ROWs to the greatest extent possible, implementation of Alternative 2 would reduce habitat loss to song sparrow and beaver and retain the maximum amount of undisturbed habitat possible. This would ensure that implementation of Alternative 2 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 use would reduce impacts from recreational motorists ensuring Alternative 2 complies with Standard 8.2-2104.

Conclusions

Impacts to beavers and song sparrows from implementation of Alternative 2 may include habitat degradation, disturbance from construction related activities, direct mortality, and increased

noxious weeds. Song sparrow populations have increased slightly since monitoring was started in 2001, but data have not been sufficient to establish discernable trends (USFS 2013). Beaver abundance and distribution are monitored through food cache surveys, but not enough data has been collected to date to determine a discernable trend. While construction of the proposed transmission line may impact individual beavers and song sparrows, implementation of Alternative 2 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 Alternative 2 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 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. The abundance and suitability of other habitats throughout the analysis area would support displaced individuals and would likely reduce the intensity of potential disturbance on deer. 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 on 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 normal behavior and movement patterns. The prevalence of potential white-tailed deer habitat within the analysis area when compared to the relatively small amount of habitat to be altered (**Tables 3-15** and **3-16**) 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 than other times of the year because of 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 Alternative 2 would likely reduce the structural stages of forested stands that would provide cover for white-tailed deer during construction and maintenance activities (**Table 3-16**).

Table 3-16 - White-tailed Deer Habitat Impacts within ROW

HABITAT TYPE	ACRES WITHIN ROW
Grasslands	35 acres
Aspen	11 acres
3A forest stands	42 acres*
4A forest stands	195 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.

Construction of new and improvement of existing 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. The 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 Alternative 2 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 and effective implementation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds. 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 measure would also be employed to reduce potential impacts associated with implementation of Alternative 2 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 ROWs to the greatest extent possible, implementation of Alternative 2 would reduce habitat loss to white-tailed deer and retain the maximum amount of undisturbed habitat possible. This would ensure that Alternative 2 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 use would reduce impacts from recreational motorists ensure Alternative 2 complies with Standard 8.2-2104 and Objective 5.4-207.

Conclusions

Impacts to white-tailed deer may include disturbance, habitat loss, direct mortality, and habitat degradation from noxious weeds. White-tailed deer populations on BHNF have decreased since 2006 (USFS 2013). While implementation of Alternative 2 may impact individual white-tailed deer, implementation 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 that would be crossed by the proposed ROW. All mountain sucker habitat would be spanned by the proposed transmission line 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 transmission line and no in-water work would occur.

Access to the proposed ROW 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 project-specific 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. Based on the avoidance of all potential mountain sucker habitat, application of BMPs to protect aquatic areas, and implementation of a Noxious Weed Reclamation and Revegetation Plan, implementation of Alternative 2 would 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. Implementation of Alternative 2 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. Creation and effective implementation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds. 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 Alternative 2 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 ROWs to the greatest extent possible, implementation of Alternative 2 would minimize habitat loss and disturbance and would retain the maximum amount of

undisturbed mountain sucker habitat. This would ensure that implementation of Alternative 2 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 use would reduce impacts from recreational motorists ensure Alternative 2 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 implementation of Alternative 2 complies with Standard 1203.

Conclusions

Impacts to mountain sucker from implementation of Alternative 2 may include disturbance, habitat loss through degradation of water quality, and habitat degradation from noxious weeds. However, because the proposed transmission line would span all streams and associated riparian areas and several BMPs would be implemented that would reduce impacts to water bodies, implementation of Alternative 2 would result in a negligible effect on the Forest-wide population and habitat trend for mountain sucker. Alternative 2 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 Alternative 2 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 nesting and foraging activities 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 for 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 in grasslands, soils could be compacted, but limited surface soils would be 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 has stopped. The other prominent 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. Disturbed habitats 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 Alternative 2 would result in a permanent loss of habitat for Region 2 Sensitive grassland/meadow dependent species. The proposed ROW would occupy 35 acres of potential habitat for grassland/meadow dependent species. Grassland habitats within the ROW would continue to provide suitable habitat after construction is completed. Approximately seven structures would be placed in grassland habitat on the BHNF. Temporary disturbance associated with construction areas for these seven structures would be approximately four acres. Permanent habitat loss from these seven structures would be negligible. Construction of access roads would result in the permanent loss of 13 acres of potential grassland/meadow habitat. Temporary overland access and timber decking areas would temporarily impact 19 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 56 acres. See **Tables 3-5** and **3-15** for a summary of habitat types affected by the action alternatives.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 has the potential to result in direct injury or mortality of grassland/meadow dependent species. Direct mortality may be caused by collisions with vehicles, and/or collision with or crushing by construction equipment. Grading and removal of grassland habitats for access roads and construction areas 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; 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 Alternative 2 would result in an increase in transmission line collision risk for grassland/meadow dependent bird species. 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 transmission line 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 and effective implementation of a noxious and invasive weed management plan, as part of the proposed project, would limit the establishment and spread of noxious weeds.

The establishment of nonnative or invasive vegetation would limit the potential suitability of nesting habitat for smaller grassland birds that nest in 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 and effective implementation of a Noxious and Invasive Weed Management Plan, as part of the proposed project, would reduce the establishment and spread of noxious weeds. 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 Alternative 2 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 as the spread of noxious weed and mortality during the breeding season.

Compliance with Applicable Regulations

Alternative 2 complies with the BHNF LRMP Goal 2, Objective 221. Implementation of Alternative 2 would comply with Standards and Guidelines of the BHNF LRMP when all mitigation measures are applied.

Implementation of Alternative 2 does not include insecticide applications. As such, Alternative 2 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 that created open grasslands. Effective fire suppression efforts have allowed open grassland patches to be recolonized by conifer forests throughout the 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 the BHNF, but natural succession and fire suppression will continue. The proposed ROW 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 the 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 life cycles 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 federal lands has 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. Implementation of Alternative 2 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 are not expected to impact the health or status of BTPD, grasshopper sparrow, burrowing owl, northern harrier, loggerhead shrike, and regal fritillary populations within the analysis area.

Grassland Species Determination and Rationale

Under Alternative 2, 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***" for 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 and indirect effects to the bald eagle, Black Hills red-bellied snake, northern leopard frog, lake chub, and mountain sucker are described in this section.

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of Alternative 2 has the potential to temporarily disturb the 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). The 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, the likelihood of disturbing the Black Hills red-bellied snake and Northern leopard frog is low. Disturbance from construction activities 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 the 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. New and improved access roads and overland access paths for construction, operation and maintenance of the proposed transmission line 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 transmission line and no in-water work would occur. BMPs to be described in the project-specific 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 would 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 affected by the action alternatives.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 has the potential to result in direct injury or mortality to the 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, electrocution as the result of contacting the transmission line, and collisions with the transmission line, which are discussed in the following section. 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 to the greatest extent practicable. There would be no direct disturbance to wetland and riparian habitats, as these habitats would be spanned by the proposed transmission line. 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 Alternative 2 would result in an increase in collision risk between bald eagles and proposed infrastructure. 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 considered low. 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. Implementation of Alternative 2 may result in the introduction of aquatic invasive species (plants and animals) that 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 Alternative 2. Creation and implementation of a Noxious Weed Reclamation and Revegetation Plan would limit the establishment and spread of noxious weeds. When all stipulations described in the forthcoming Noxious Weed Reclamation and Revegetation Plan are implemented, permanent impacts to the 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 Alternative 2 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, and following recommended avian protection guidelines (APLIC/USFWS) to minimize effects. Refer to **Appendix B** for these buffers.

Compliance with Applicable Regulations

Implementation of Alternative 2 complies with the BHNF LRMP Goal 2, Objective 221. Implementation Alternative 2 would comply with Standards and Guidelines of the BHNF LRMP when all mitigation measures are applied.

Alternative 2 does not include insecticide applications. As such, the implementation of Alternative 2 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 transmission line would avoid or span all wetland, riparian, and aquatic habitat which may occur in the proposed ROW. All wetland, riparian, and aquatic habitat would be protected by BMPs to be described in the SWPPP. Because all wetland, riparian, and aquatic habitat would be protected, implementation of Alternative 2 would 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.

Implementation of Alternative 2 may produce a cumulative disturbance impact on bald eagles if other disturbances are coincident and proximal to proposed construction activities. Any bald eagle nests or winter roosts would be avoided by the prescribed avoidance buffers. This would limit the potential 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 Alternatives 2 are not expected to impact the health or status 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 Alternative 2, 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.

3.2.2.2.1.1.3.3 Conifer Forest Dependent Species

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of Alternative 2 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 activities 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**). At least one northern goshawk nesting territory is known to areas proposed for ROW construction, under Alternative 2. Implementation of Alternative 2 has a higher potential for disturbing northern goshawks than under Alternative 3 based on the proximity of the Alternative 2 proposed ROW to the known northern goshawk nesting territory. Alternative 3 includes a route modification that would avoid this known nesting territory and thereby decrease the potential for disturbing northern goshawks.

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. Alternative 2 would avoid, to the greatest extent possible, 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. Implementation of Alternative 2 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 by 1,030 acres. 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 3-5, 3-14 and 3-15**).

Northern goshawks hunt in a variety of open or closed forest types, but for nesting they depend on mature, closed canopy forests 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 ROW.

Implementation of Alternative 2, and the associated vegetation clearing required for the ROW, would result in more disturbance to occupied northern goshawk territories than under Alternative 3. The proposed ROW associated with Alternative 2 is associated with a known northern goshawk territory. Implementation of Alternative 2 would violate the Forest Plan standard 3108 for the northern goshawk.

A hoary bat maternity roost consists of a single female selecting specific microclimates in forest foliage to raise pups. ROW clearing could have long-term reductions in the availability of suitable female roosting sites. ROW clearing could result in solar, wind, and other forest microclimates changes that would not be suitable for raising pups.

Implementation of the proposed ROW under Alternative 2 would result in the loss of 434 acres of ponderosa pine forest and 9 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, 29 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 remove another 493 acres of potentially suitable conifer forest habitat. While implementation of the proposed ROW under Alternative 2 may disturb 434 acres of ponderosa pine and 9 acres of white spruce, not all of these acres provide optimal habitat for hoary bat, American marten, northern goshawk, Lewis's woodpecker, black-backed woodpecker, flammulated owl and Cooper's Rocky Mountainsnail. Implementation would result in the loss of an estimated 148 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. However, the expansion of this unoccupied ROW would alter the condition of mature stands that exist immediately adjacent to the ROW. This could result in changes to the suitability of these stands to support these species.

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. For some snail species paved and unpaved roads have been shown to limit dispersal. It is likely that the proposed ROW and associated roads would influence snail dispersal if snails are present in the area. The proposed ROW does not cross any currently known snail colonies. Loss of ground level vegetative cover under the ROW caused by disturbance and construction would be temporary; therefore, effects of ROW clearing to snails would be low.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 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 transmission line. The Cooper's Rocky Mountainsnail could be crushed by machinery or by dislodged rocks in construction areas. Bats could be killed by removal of roost trees, crushed by machinery, or by dislodged rocks. 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 Alternative 2, 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 is negligible.

Collision with transmission lines or associated guy-wires

Implementation of Alternative 2 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. Construction of the transmission line would result in an increase in collision risk 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-backed woodpecker 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 transmission line is low. There would be no collision risk for the American marten or Cooper's Rocky Mountainsnail.

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 and effective implementation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds. 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 Alternative 2 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

Alternative 2 complies with the BHNF LRMP Goal 2, Objective 221. Implementation of Alternative 2 would comply with Standards and Guidelines of the BHNF LRMP when all mitigation measures are applied.

No application of insecticides is planned in Alternative 2, and therefore 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, 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. Fuel 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.

Alternative 2 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 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 transmission line. 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. Implementation of Alternative 2 would include 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 implementation of Alternative 2 are not expected to impact the health or status 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 Alternative 2, 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 transmission line, 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 transmission line 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 nest abandonment that could result in death and or reduced reproductive rates. However, once construction is complete, individuals would be able to reoccupy the area of construction. With the exception for maintenance activities and emergency responses, after the project is constructed, there would likely be little disturbance to these species associated with cliff and cave habitats. Routine maintenance activities would be scheduled outside sensitive periods, nesting and roosting, when possible to further reduce disturbance on these species. Emergency responses are unplanned and unscheduled, by nature, thereby creating the potential to disturb these cliff and cave associated species. 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 affect 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** would ensure that no cliff or cave type habitat, which is likely to be these species most limiting habitat component, would be removed as part of the proposed project. However, vegetation clearing and construction of the transmission line could cause a loss of potential foraging habitat for cliff/cave dependent habitat. See **Tables 3-5** and **3-15** for summary of habitat types impacted by the action alternatives. 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 transmission line. 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. 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 transmission line.

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 areas where certain 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). The Townsend's big-eared bat, fringed myotis and peregrine falcon are adept flyers, usually avoiding transmission lines or associated guy wire if they are observed. However, since these species are aerial hunters, collisions with transmission lines and guy wire occur when they are focused on prey. The amount of mortality caused by collisions with transmission lines is unknown for these species. However, these species demonstrate relatively high flight maneuverability, which has been shown to reduce collision potential for some species (Bevanger 1994, 1998; Savereno et al. 1996) Implementation of project mitigation measures, that include developing an Avian and Bat Protection Plan that when implemented would reduce the potential effects on these species. As for the peregrine falcon, which typically forages and hunts for prey while in flight, the presence of new transmission lines in occupied habitats could lead to an increase in collisions that may injure or kill falcons. Peregrine falcons typically forage and hunt in open habitats. If new

transmission lines occur in suitable hunting and foraging habitats, falcons that are focused on potential prey may not detect the transmission line, which could lead to collisions.

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 and effective implementation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of the proposed project. 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

Alternative 2 complies with the BHNF LRMP Goal 2, Objective 221 and with Standards and Guidelines of the BHNF LRMP when all mitigation measures are applied.

No application of insecticides is planned in Alternative 2, and therefore 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 hibernation and maternity roosts, and cliffs with known American peregrine falcon aeries have helped reduce disturbance to these species during critical life history periods. Alternative 2 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.

Recent American peregrine falcon reintroduction efforts by the SDGFP in Rapid City South Dakota could result in more individual falcons encountering project-related disturbances and increased potential for collisions with power lines as more birds potentially emigrate and use habitats associated with the proposed transmission line. This reintroduction effort may also have beneficial effects for non-urban occurrences of the species by creating an emigration source.

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. Alternative 2 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 improved the amount of suitable habitat for these species. Alternative 2 would not fill or collapse caves or mines, or remove steep and cliff type terrain, and therefore 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 Alternatives 2 are not expected to impact the health or status 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

For cliff/cave-dependent R2 sensitive wildlife species, Alternative 2 "***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***". 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

Under Alternatives 2 or 3, mitigation measures, described in **Appendix B**, would be implemented to reduce or eliminate impacts to BHNF Region 2 Sensitive Species. The following mitigation measures would also be employed to reduce potential impacts under Alternatives 2 or 3 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) would not be used. Seed would 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 BHNF and 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 that are identified by the SDGFP department. Timing restrictions are required to reduce the negative effects of bighorn sheep movement. Coordinate with the BHNF and 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 2011). 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.

Prior to construction, coordinate with SDGFP and FS biologist to identify known raptor nests in the Analysis Area. Nests would be avoided while active. Timing and disturbance buffers would be maintained around identified nests using USFWS-recommended spatial and temporal buffers from construction 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 species analysis. Similarly, timing and disturbance buffers would be maintained around bald eagle winter roosts areas, in season (Table D1). Consultation with SDGFP and FS biologist is required prior to implementing changes in timing and disturbance buffers. New nests, signs of nest building, or where raptors are defensive (attacking) would be immediately reported to the FS wildlife biologist prior to commencement of work. BHP would work with the SDGFP and FS biologist to help mitigate effects on species. Similarly, timing and disturbance buffers would be maintained, in coordination with a Forest Service biologist, around bald eagle winter roost areas, in season (**Table 3-17**).

Permanently avoid known bald eagle nests by 660 feet if structures would be visible from existing nest, and 330 feet if structures would not be visible from existing nest, per the USFWS National Bald Eagle Management Guidelines (USFWS 2007c).

No structures, access roads, or overland travel access paths would be placed through BTPD colonies. Perch discouragers would be placed on structures when adjacent to BTPD colonies.

A USFS Sensitive Species located after contract or permit issuance would 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 would be avoided unless topography or other features protect the openings from disturbance. Any new cave or mine entrances discovered during implementation would be reported immediately to BHNF biologists and work should cease until a determination of bat habitat suitability can be made. Report locations of any dead bats discovered to BHNF biologists.

Table 3-17 - Disturbance Buffers and Timing Restrictions on Raptor and other 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		
Osprey[3]	0.25	3/25-8/31		
Great Blue Heron[4]	0.25	3/1 – 8/1		

[1]Source: USFS 2005 [2]Source: USFWS 2012 [3]Source: SDGFP [4] Source: Vermont Fish and Wildlife Department 2002.*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 Action Alternatives would comply with current recommended raptor and bat protection guidelines (APLIC/USFWS) to reduce the potential for raptor collision and electrocution.

Compliance with Applicable Regulations

Alternatives 2 or 3 complies with Goal 2 Objective 221. Alternatives 2 or 3 would 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 would ensure Alternatives 2 or 3 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 Alternatives 2 or 3 complies with Standard 3101 and the BGEPA.

Avoidance of known USFS Sensitive bat maternity colonies, including caves and mines would ensure Alternatives 2 or 3 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 would ensure Alternatives 2 or 3 complies with Standard 3103.

Spanning of all wetland habitat by the proposed transmission line, and access road avoidance of wetland habitat to the greatest extent possible would ensure Alternatives 2 or 3 complies with Standard 3104.

Implementation of a Stormwater Pollution Prevention Plan (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 would ensure Alternatives 2 or 3 complies with Standard 3106.

Species specific mitigation measures to protect nesting northern goshawks, including retaining at least 180 acres of suitable nesting habitat around historically active nests, and avoidance of construction activities within one-half mile of active northern goshawk nests from April 1 through August 15. No roads or temporary roads should be constructed, converted, reconstructed within an active goshawk nest stand (e.g., 30-40 acres). Use of roads or skidding may occur outside of timing restrictions using existing trails/roads. Prohibit decking of logs or large slash piles within known goshawk nest stand (30-40 acres). Route modifications are to avoid northern goshawk historic and current nesting areas. Timing restrictions would apply to all management activities (e.g., layout, road use, skidding) unless determined otherwise by a BHNF wildlife biologist. These measures would ensure Alternative 2 or3 complies with Standard 3108 and Standard 3111.

Continued communication between the project proponent and BHNF personnel would ensure Alternatives 2 or 3 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, Alternatives 2 or 3 would comply with Standard 3116. Should a previously unidentified hibernacula be identified, the project proponent would communicate with the appropriate BHNF personnel to reduce potential impacts to Black Hills red-bellied snake and continue to comply with Standard 3116.

Alternative 2 does not cross any known BTPD colonies. As such, implementation of Alternatives 2 and 3 would comply with Standard 3121.

Implementation of raptor nest buffers described in **Table 3-17** would ensure Alternatives 2 or 3 complies with Standard 3204.

Alternative 2 would avoid vegetation changes within 500 feet of known bat nurseries or hibernacula to ensure Alternatives 2 or 3 complies with Standard 3207.

Alternative 2 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 Alternatives 2 or 3 complies with Guidelines 4111 and 9204.

Alternative 2 would comply with current raptor protection guidelines (APLIC/USFWS) to reduce the potential for raptor collision and electrocution to ensure that Alternatives 2 or 3 complies with Standards 8308 and 8309.

Monitoring

- BHP would be responsible for monitoring of the effectiveness of the transmission line design in preventing bird and bat mortality, as part of the T-O-RC Transmission Line Project's Avian and Bat Protection Plan. This includes training field personnel on bird identification, procedures for reporting mortalities, recognizing potential avian and bat hazards, and company procedures to prevent additional bird and mortalities. Reporting under the Bird and Bat Conservation Strategy should include contacting both the USFWS and the SDGFP permit offices.
- BHP would be responsible for annual surveys of their line. Any raptor nest found on the line would be reported to the SDGFP permit office and FS biologist prior to taking actions to correct any power line issues. Coordinate with the FS and the SDGFP to determine appropriate actions to ensure the protection of the affected wildlife species while providing power to the public.
- Monitoring of specific wildlife use sites (e.g., nests, hibernacula) would be coordinated between the USFWS, SDGFP, and FS, where applicable.
- During other non-project related field surveys, any wildlife species found dead or injured as a result of the transmission line would be reported to the appropriate agency and to BHP, as soon as possible. This would allow BHP to rectify any power line hazards that may have caused the mortality.

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 transmission line may impact individual animals, it would not likely have measurable long term impacts on population trends of USFS Sensitive Species within the analysis area. **Table 3-18** provides an individual impact determination for all USFS Sensitive Species which may occur within the analysis area.

Table 3-18 - 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 3i)	Similar to Alternative 2 Refer to Tables 3-23b through 3-23j for a summary of Alt. 3 effects to habitats.	Same as 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 3j)	Similar to Alternative 2 Refer to Tables 3-23b through 3-23j for a summary of Alt. 3 effects to habitats.	Same as Alternative 2

Table 3-18 - 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 3j)	Similar to Alternative 2 Refer to Tables 3-23b through 3-23j for a summary of Alt. 3 effects to habitats.	Same as 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 3j)	Same as Alternative 2 No proposed route modifications include known prairie dog colonies and no colonies are known to occur near proposed route modifications. Portions of the proposed ROW that may be near known colonies are common to both Alternative 2 and Alternative 3.	Same as 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 3j)	Similar to Alternative 2 White spruce does not occur within Route Mods 3b, 3c, 3d, 3e, 3f, 3g, 3h, and 3j. Effects associated with these route modifications would be the same as those under Alternative 2. Effects on this species under Route Mod 3i would be slightly more than, but similar, to those described under Alternative 2.	Same as Alternative 2

Table 3-18 - 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 3j)	Similar to Alternative 2 Highly suitable habitats for this species are not associated with any of the proposed route modifications.	Same as Alternative 2
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. Forest Plan standard would not be met.	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 3j)	Similar to Alternative 2, but would result in less disturbance to individual goshawks, and less direct disturbance to occupied territories based on implementation of Modification 3d, which avoids known territories..	Same as 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 3j)	Similar to Alternative 2 Implementation of Route Modifications 3d, 3e, and 3f would have the same effects on this species as under Alternative 2 based on the lack of grassland habitats associated with these route modifications. Refer to Tables 3-23b through 3-23j for a summary of Alt. 3 effects to habitats.	Same as Alternative 2

Table 3-18 - 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 3j)	Same Alternative 2 There are no known prairie dog colonies, preferred nesting and foraging habitats for this species associated with any of the proposed route modifications. Potentially suitable habitats for this species, including prairie dog colonies, are associated with portions of the ROW that are common to Alternative 2 and 3.	Same as Alternative 2
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 3j)	Similar to Alternative 2 Implementation of Route Modifications 3d, 3e, and 3f would have the same effects on this species as under Alternative 2 based on the lack of grassland habitats associated with these route modifications. Refer to Tables 3-23b through 3-23j for a summary of Alt. 3 effects to habitats.	Same as Alternative 2

Table 3-18 - 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 3j)	Same as Alternative 2 No highly suitable foraging (open habitats) and nesting sites (cliffs) are associated with any of the proposed route modifications. Potentially suitable nesting and foraging habitats are associated with portions of the proposed ROW that are common to Alternative 2 and 3.	Same as 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 3j)	Same as Alternative 2 No highly suitable nesting or foraging habitats are associated with the proposed route modifications. Potentially suitable nesting and foraging habitats associated with the proposed ROW are common to Alternatives 2 and 3.	Same as 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. 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 3j)	Same as Alternative 2 No highly suitable nesting or foraging habitats are associated with the proposed route modifications. Potentially suitable nesting and foraging habitats associated with the proposed ROW are common to Alternatives 2 and 3.	Same as Alternative 2

Table 3-18 - BHNF USFS Sensitive Species Effects Determinations			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
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. 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 3j)	Similar to Alternative 2 Refer to Tables 3-23b through 3-23j for a summary of Alt. 3 effects to habitats.	Same as Alternative 2
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 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 3j)	Similar to Alternative 2 Refer to Tables 3-23b through 3-23j for a summary of Alt. 3 effects to habitats.	Same as 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. 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 3j)	Similar to Alternative 2 Refer to Tables 3-23b through 3-23j for a summary of Alt. 3 effects to habitats.	Same as 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 3j)	Similar to Alternative 2 Refer to Tables 3-23b through 3-23j for a summary of Alt. 3 stream crossings as compared to Alt. 2.	Same as Alternative 2

Table 3-18 - 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 3j)	Similar to Alternative 2	Same as 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 3j)	Similar to Alternative 2 Refer to Tables 3-23b through 3-23j for a summary of Alt. 3 stream crossings as compared to Alt. 2	Same as 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 3j)	Similar to Alternative 2 Refer to Tables 3-23b through 3-23j for a summary of Alt. 3 stream crossings as compared to Alt. 2	Same as Alternative 2

Table 3-18 - BHNF USFS Sensitive Species Effects Determinations			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
Molluscs			
Cooper's Rocky Mountainsnail (*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 3j)	Similar to Alternative 2 Refer to Tables 3-23b through 3-23j for a summary of Alt. 3 effects to habitats.	Same as 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 3j)	Same as Alternative 2 Implementation of any of the route modifications or corresponding segments of the Alternative 2 proposed ROW would not directly impact highly suitable prairie grasslands	Same as 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. Alternative 2 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 Alternative 2, the likelihood of disturbing the black-and-white warbler and meadow jumping mouse are low. Disturbance from construction of the proposed transmission line 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

Implementation of Alternative 2 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 crossings would occur on private lands. Access paths for construction, operation and maintenance 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 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 would 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 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 3-14** and **3-15** for a summary of habitat types impacted under the action alternatives.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 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 transmission line. 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 Alternative 2 would result in an increase in collision risk between black-and-white warbler, Atlantis fritillary, and tawny crescent and infrastructure associated with the proposed transmission line. The 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 and effective implementation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds as part of Alternative 2. 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 Alternative 2 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 transmission line may impact individual animals, it 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. Alternatives 2 and 3 would be consistent with Objective 221; therefore, these species are likely to persist under implementation of either Action Alternative.

3.2.2.2.1.1.4.3 Aquatic Dependent Species

Direct Effects

Disturbance from construction, operations, and maintenance activities

Implementation of Alternative 2 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, the likelihood of disturbing American dippers is low. Disturbance from construction of the proposed transmission line 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-disturbing activities cause erosion and siltation into streams, lakes, and ponds during the construction phase. American dippers may occur in three named streams within the analysis area. All aquatic habitats would be spanned by the proposed transmission line, and access routes 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 transmission line, and no in-water work would occur. BMPs to be described in the 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 3-14** and **3-15** for a summary of habitat types affected by the action alternatives.

Because the proposed ROW 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, implementation of Alternative 2 would have a negligible effect on the Forest-wide population and habitat trend for American dipper.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 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 project. 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 Alternative 2 could result in an increase in collision risk of the American dipper and transmission line infrastructure. 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. Alternative 2 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 effective implementation of a noxious and invasive weed management plan would limit the establishment and spread of invasive species. 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 Alternative 2 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 American dipper. 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 implementation of Alternative 2 may impact individual animals, it 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. Alternative 2 would be consistent with Objective 221; therefore, the American dipper is 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 Alternative 2 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 transmission line 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. Implementation of Alternative 2 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 ROW 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 3-5**).

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, 29 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 avoid to the extent possible 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 ROW under Alternative 2 would result in the loss of an estimated 148 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 in Alternative 2 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 in the ROW due to disturbance and construction would temporary. Therefore, effects of ROW clearing to snails would be low. See **Tables 3-14** through **3-15** for a summary of forest stand types impacted by the action alternatives.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 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. 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, 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

Implementation of Alternative 2 would result in an increase in collision risk with infrastructure 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, broad-winged hawk, Cooper's hawk, sharp-shinned hawk, northern saw-whet owl, and pygmy nuthatch 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 collision 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. 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 and effective implementation of a noxious and invasive weed management plan would limit the establishment and spread of noxious weeds. 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 Alternative 2 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 transmission line may impact individual animals, it 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 Alternative 2 may temporarily disturb small-footed myotis, western 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 proposed transmission line 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 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 3-14** thru **3-15** for summary of habitats types affected by the action alternatives. 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 of the proposed ROW in Alternative 2. Forage would increase by reducing forested structural stages 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; therefore the effects on SOLC species dependent on cliff/cave habitat would be negligible for Alternative 2.

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 proposed transmission line in Alternative 2.

Bat species could be crushed by cutting down roost trees, 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 and effective implementation of a noxious and invasive weed management plan would limit the

establishment and spread of noxious weeds. 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 Alternative 2 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-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 transmission line may impact individual animals, Alternative 2 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, western long-eared 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

Alternative 2 would comply with the following Standards and Guidelines of the BHNF LRMP when all mitigation measures are applied. None of the alternatives would notably decrease the amount of SOLC habitat at the Forest-wide scale. Alternative 2 is consistent with Objective 221, therefore SOLC species would persist.

Avoidance of known SOLC bat maternity and hibernation sites, including caves and mines, would ensure Alternative 2 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 would ensure Alternative 2 complies with Standard 3103.

Spanning of all wetland habitats by the proposed transmission line and access road avoidance of wetland habitat to the greatest extent possible would ensure Alternative 2 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 would ensure Alternative 2 complies with Standard 3106.

Implementation of raptor nest buffers described in **Table 3-17** would ensure Alternative 2 complies with Standard 3204.

Alternative 2 would not locate new access roads or logging decks or slash piles in meadows and within riparian area buffer zones/water influence zones, thereby ensuring compliance with Guidelines 4111 and 9204.

Alternative 2 would comply with current raptor protection guidelines (APLIC/USFWS) to reduce the potential for raptor collision and electrocution, ensuring that Alternative 2 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

implementation of a Noxious Weed Reclamation and Revegetation Plan would reduce impacts to all wildlife. While construction activities under Alternative 2 may impact individual animals, it would not likely have measurable long term impacts on habitat trends of SOLC within the analysis area. Implementation of Alternative 2 would not notably decrease the amount of suitable habitat at the Forest-wide scale for SOLC. Implementation of Alternative 2 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.

3.2.2.2.1.1.4.9 SDGFP Species of Greatest Conservation Need

The black-backed woodpecker, American peregrine falcon, osprey, and northern long-eared bat are SDGFP SGCN. Life histories, occurrence information, and impacts analyses are presented for these species. The northern long-eared bat is addressed under the Federal Endangered Species Act Protected Species section; the black-backed woodpecker is addressed under the BHNF Management Indicator Species section; the peregrine falcon is addressed under BHNF Cliff/Cave Dependent Species section: and the osprey and great blue heron are addressed under the Migratory Bird section.

3.2.2.2.1.1.5 Migratory Birds

Direct Effects

Disturbance from construction, operations, and maintenance activities.

Implementation of Alternative 2 may temporarily disturb osprey and great blue heron and other migratory bird species. The presence of construction personnel, the use of construction equipment, and noise generated from construction may disturb nesting and foraging of these species that occur near the proposed construction areas. Disturbance from construction of the proposed transmission line would be localized to the area of active construction and limited to the duration of construction. The osprey, great blue heron and other migratory bird species 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 these species. Disturbance to individuals may occur as a result of construction and maintenance activities; however, impacts to these species would be low relative to Forest-wide populations.

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 the osprey, great blue heron, and other migratory bird species. Construction activities under Alternative 2 could remove habitats that may be suitable for the osprey, great blue heron, and other migratory bird species. Known nesting sites for these species would be avoided during the active nesting period. Habitat loss for migratory birds would be minimal relative to habitat available Forest-wide.

Direct mortality from construction, operations, and maintenance equipment

Implementation of Alternative 2 could result in direct mortality to the osprey, great blue heron, and other migratory bird species. The highest risk of injury or mortality would occur during the operations and maintenance phases of the transmission line. Ospreys tend to build nests on power line structures, increasing the potential for electrocution. Osprey tend to perch on high structures, including transmission support structures, thereby increasing their risk of electrocution. Birds could collide with construction equipment and vehicles causing injury or death. Under Alternative 2 loss of individuals may occur but would be minimal relative to Forest-wide populations, therefore the effects to these species would be low.

Collision with transmission lines or associated guy-wires

Implementation of Alternative 2 would result in an increase in collision risk between infrastructure associated with the proposed transmission line for the osprey, great blue heron, and other migratory bird species. Osprey and great blue herons have long wing spans, and relatively large bodies that increase wing-loading, making them less maneuverable in flight. Implementation of mitigation measures described in **Appendix B**, that include APLIC guidelines for raptor protection would reduce or eliminate potential short-term impacts to individuals under Alternative 2, therefore the effects to these species would be low.

Indirect Effects

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

Osprey and great blue heron 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 these South Dakota special emphasis species. Mitigation measures, described in **Appendix B**, would reduce or eliminate impacts to the osprey, great blue heron, and other migratory bird species.

3.2.2.2.1.1.6 Big Game

3.2.2.2.1.1.6.1 Elk

Alternative 2 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). Alternative 2 has the potential to alter or remove an estimated 1,156 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

Alternative 2 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. Alternative 2 could alter or remove a conservatively estimated 1,156 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, 2013). Projects such as the T-O-RC Project, contribute to forest-wide cumulative effects on the landscape scale.

Cumulative effects under Alternative 2 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 may have an additive effect on wildlife when other projects are ongoing 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 associated with implementation of Alternative 2 and other activities would have to occur in relatively close proximity to one another to impact wildlife. In instances where disturbance from Alternative 2 and other activities do occur in close proximity, the abundance of suitable unaffected habitat should provide ample escape habitat to lessen the degree of disturbance. The majority of disturbance effects under Alternative 2 would occur during the construction phase. This

disturbance would be relatively short in duration and would occur on isolated areas along the proposed ROW.

Loss of habitat under Alternative 2 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 would 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. Implementation of Alternative 2 would result in a small loss of wildlife habitat when compared to that of timber harvest operations and unchecked wildfires. The cleared ROW could act as a fire break to reduce the loss of habitat in the event of a wildfire.

Direct mortality under Alternative 2 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 construction of the proposed transmission line. 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 that may be killed by construction equipment associated with the proposed transmission line would be minimal. Implementation of Alternative 2 would contribute relatively small numbers of direct mortality when combined to other projects considered in this section. There is potential for direct mortality due to electrocution of perching birds, although numbers would be small compared to total species populations.

Collision risk associated with the construction and operation the proposed transmission line would have additive effects on wildlife species, but effects would be minimal. A new transmission line would add to other distribution and transmission lines that currently occur on the 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 ROW would 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 ROW 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 transmission line.

Alternative 2 along with all projects and actions listed in **Appendix C** have the potential to spread noxious weeds and invasive species. Alternative 2 includes 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 included in the design of the proposed transmission line 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 3-19 summarizes the acres of disturbance by vegetation type on federal lands in Wyoming. **Table 3-20** provides acres of disturbance by vegetation type and disturbance type for federal lands in Wyoming.

Table 3-19 - 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 3-20 - 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
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	Total	0	<1	0	0	00	<1	0	0	<1

Table 3-20 - 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
area of structure bases[2]	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 Alternative 2, 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 Alternative 2. 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 proposed ROW 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 3-21** 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 3-21**, 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 3-21** 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 3-21 - 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 would 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 would 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 Alternative 2 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 Alternative 2 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 Alternative 2 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

Implementation of Alternative 2, including the creation of the proposed 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 Alternative 2 has 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 Alternative 2 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 would 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 would 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 implementation of Alternative 2 does not affect the overall viability of the species on NFS lands.

Impacts to greater sage-grouse as the result of implementation of Alternative 2 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 Alternative 2 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 Alternative 2, 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 would 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 would be reduced through the use of avoidance buffers described in the TBNG LRMP. Any known swift fox dens would 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 would 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 Alternative 2 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 could be killed or injured 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 Alternative 2 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 Alternative 2 . 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 Alternative 2 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 Alternative 2 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 Alternative 2 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 under Alternative 2. 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, implementation of Alternative 2 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 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

Implementation of Alternative 2 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 that do not typically forage on fish or small amphibians. Water bodies that may be spanned by the proposed transmission 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 under Alternative 2, 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 transmission line 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 implementation of Alternative 2, 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 would 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 other 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 in 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 during construction of the proposed ROW. 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 would be permanently removed under implementation of Alternative 2. 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 under Alternative 2 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 that would be directly impacted by construction activities. Therefore, the likelihood that implementation of Alternative 2 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 Alternative 2 . However, the likelihood of a vehicle strike to Lewis's Woodpecker, hoary bat, or fringed myotis is expected 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 Alternative 2 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 transmission line.

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 and effective implementation 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 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 would 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 Alternative 2 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 Implementation of Alternative 2, 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 under implementation of Alternative 2. Construction activities may disturb nesting Brewer's sparrows within and adjacent to construction areas. Vegetation clearing activities on TBNG lands would 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 would 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 Alternative 2 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 Alternative 2 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 3-22**, 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 3-22 - 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	Same as 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	Same as Alternative 2

Table 3-22 - TBNG 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 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	Same as 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	Same as 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 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 would 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	Same as 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	Same as Alternative 2

Table 3-22 - TBNG USFS Sensitive Species Effects Determinations			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
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	Same as 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	Same as Alternative 2
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 would be placed in any occupied BTPD colony. Seasonal raptor nest buffers described in TBNG LRMP would 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	Same as 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 would 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	Same as Alternative 2

Table 3-22 - TBNG USFS Sensitive Species Effects Determinations			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
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	Same as 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	Same as Alternative 2
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	Same as Alternative 2

Table 3-22 - TBNG USFS Sensitive Species Effects Determinations			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
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	Same as Alternative 2
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 would 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	Same as Alternative 2
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 would 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	Same as 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 would 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	Same as Alternative 2

Table 3-22 - TBNG USFS Sensitive Species Effects Determinations			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
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	Same as 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	Same as Alternative 2
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	Same as Alternative 2
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	Same as Alternative 2

Table 3-22 - TBNG USFS Sensitive Species Effects Determinations			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
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	Same as Alternative 2
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	Same as 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	Same as Alternative 2

Table 3-22 - TBNG USFS Sensitive Species Effects Determinations			
SPECIES	**ALTERNATIVE**	**EFFECTS SUMMARY**	**DETERMINATION**
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	Same as Alternative 2
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	Same as 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	Same as 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 Alternative 2, 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 would be limited across the entire length of the Proposed Action and would be consistent with BHP's Operations and Maintenance Procedures for its entire infrastructure. Surveys would 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 would 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 Alternative 2 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 would 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 Alternative 2 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. 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 implementation of Alternative 2 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 would 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 would 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 Alternative 2 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 would not be impacted by the Proposed Action. Because the Proposed Action would not remove low structure grasslands from within the ROW, the Proposed Action would meet the requirements of TBNG Guidelines directed at BTPD management within the Broken Hills and Cellar Rosecrans Geographic Areas.

Conclusions

Implementation of Alternative 2 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 Alternative 2 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 would not impact BTPD habitat condition and trends.

Implementation of Alternative 2 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 would not be impacted by the Proposed Action and BTPD populations would 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 would 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 would 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 design of Alternative 2 includes numerous steps to ensure that implementation would 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 would 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 Alternative 2 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 under Alternative 2 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 would be completed in addition to applying all standards and guidelines in the LRMP that would 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 Alternative 2 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 Alternative 2. 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 Alternative 2 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 Alternative 2 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 Alternative 2 as BHNF conifer forest dependent sensitive species.

3.2.2.2.2.1.4.5 Shrubland Dependent Species

Implementation of Alternative 2 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 Alternative 2 as TBNG shrubland dependent sensitive species.

Implementation of Alternative 2 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 Need

All WGFD SGCN that could be impacted through implementation of Alternative 2 are also Forest Service Region 2 Sensitive Species or BLM Sensitive Species, and analysis of potential impacts are presented in those sections.

3.2.2.2.2.1.6 Migratory Birds

Implementation of Alternative 2 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 Alternative 2 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 Alternative 2 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 Alternative 2 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 Alternative 2 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 Alternative 2 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 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 would 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 Alternative 2 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 ROW and transmission line 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 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 would 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 ROW and transmission line 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 transmission line would avoid or span all wetland, riparian, and aquatic habitat that may occur in the proposed ROW. All wetland, riparian, and aquatic habitat would be protected by BMPs, to be described in the SWPPP. Because the Proposed Action would avoid and protect all wetland, riparian, and aquatic habitat, the Proposed Action would 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 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 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 ROW and transmission line 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

Implementation of Alternative 3 would have effects similar to those as described under Alternative 2, with some differences, as described below.

3.2.2.3.1 South Dakota

3.2.2.3.1.1 Direct/Indirect Effects

Implementation of Alternative 3 would result in impacts that are similar in type and magnitude to those described under Alternative 2 on federally-listed species, BHNF Region 2 sensitive species, BHNF MIS, BHNF SOLC, and migratory birds. Specific information comparing acres of impact to suitable habitats by each route modification and its corresponding segment of Alternative 2 that would be removed if the route modification is constructed is displayed in **Tables 3-23b through3-23j,** below. For most USFS sensitive species on the BHNF, the information demonstrates the relatively minor differences in impacts associated with Alternatives 2 and 3, and the impacts associated with Alternative 3 are appropriately described as similar. Additionally, because these impacts are similar in both type and magnitude, for all sensitive species, the associated determination is the same as presented for Alternative 2.

Potential impacts to habitats (acres) under Alternative 3 for the proposed route modifications differ slightly from those described under Alternative 2. Each of the nine Alternative 3 route modifications would be similar in length and would be located less than one-half mile from the corresponding segment of Alternative 2 that would be replaced if the route modification was constructed. The following sections summarize the differences in wildlife habitat impacts associated with each route modification under Alternative 3 compared to the corresponding segment of Alternative 2.

Refer to the project BA/BE for habitat specific comparisons for Region 2 sensitive species that were analyzed by route modification and corresponding segment of the Alternative 2 proposed ROW. The following sections for each route modification also summarize the analyses presented in the BA/BE.

The following summaries of habitat disturbance for each route modification and its corresponding segment of Alternative 2 proposed ROW are based on habitat data specific to BHNF lands.

Route Modification 3b: This route modification and the corresponding segment of Alternative 2 that would be replaced if the route modification is constructed each include two habitat types: grassland and ponderosa pine forest. They also each cross the same two named perennial streams. Refer to **Table 3-23b** for a comparison of habitats affected by Route Modification 3b and the corresponding segment of the Alternative 2 ROW, by habitat type. Due to the relatively small differences in acres affected, impacts on the BHNF from implementation of Alternative 3 with Route Modification 3b, would be similar to but slightly more than those under implementation of Alternative 2.

Based on the relatively small differences in habitat disturbance between Route Modification 3b and the corresponding segment of the Alternative 2 proposed ROW (**Table 3-23b**), potential effects described under Alternative 2 are considered similar to but slightly less than those under Alternative 3 with Route Modification 3b. All conclusions under Alternative 3 with Route Modification 3b, for species dependent upon grassland and ponderosa pine habitats would be the same as those presented under Alternative 2.

Table 3-23b. Comparison of Habitat Types and Pine Structural Stages Between Alt 2 and Alt 3 for Mountain View Route Modification 3b

Habitat Type		Alt 2. Proposed Action Segment	Alt 3. Modification 3b Segment	Change in Habitat From Alt 2
Grassland		1	<1	-1
Stream Crossings		2	2	0
Ponderosa Pine	HSS 3A	1	1	-
	HSS 4A	2	1	-1
	HSS 4B	<1	2	+2
	HSS 4C	1	2	+1
Total Acres Affected		**5**	**6**	**+2**

Route Modification 3c: This route modification and the corresponding segment of the Alternative 2 proposed ROW that would be replaced if this route modification is constructed each include three habitat types: grassland, wetland/meadow/riparian, and ponderosa pine forest. This route modification and its corresponding segment of the proposed ROW do not cross any perennial or intermittent streams. Refer to **Table 3-23c** for a comparison of habitats affected by Route Modification 3b and the corresponding segment of the Alternative 2 ROW, by habitat type. Due to the relatively small differences in acres affected, impacts on the BHNF from implementation of Alternative 3 with Route Modification 3c, would be similar to but slightly more than those under implementation of Alternative 2.

Based on the relatively small differences in habitat disturbance between Route Modification 3c and the corresponding segment of the Alternative 2 proposed ROW, potential effects described under Alternative 2 are considered similar to, but slightly more than, those under Alternative 3 with Route Modification 3c. All conclusions under Alternative 3 with Route Modification 3c, for species dependent upon grassland, wetland/meadow/riparian, and ponderosa pine forest habitats would be the same as those presented under Alternative 2.

Table 3-23c. Comparison of Habitat Types and Pine Structural Stages Between Alt 2 and Alt 3 for Clinton Route Modification 3c				
Habitat Type		**Alt 2. Proposed Action Segment**	**Alt 3. Modification 3c Segment**	**Change in Habitat From Alt 2**
Grassland		<1	4	+3
Riparian		<1	<1	0
Pine	HSS 4B	1	2	+1
Total Acres Affected		**1**	**2**	**+1**

Route Modification 3d: This route modification and the corresponding segment of the Alternative 2 proposed ROW that would be replaced if the route modification is constructed each occur within ponderosa pine forest. Refer to **Table 3-23d** for a comparison of ponderosa pine habitats affected by Route Modification 3d and the corresponding segment of the Alternative 2 ROW. Implementation of this route alternative is expected to have similar impacts on species analyzed under Alternative 2 and to have the same conclusions for species that are dependent upon ponderosa pine forest habitats.

This route modification was specifically designed to avoid known northern goshawk territories that would not be avoided by the proposed ROW segment as part of Alternative 2. Implementation of this route modification, as designed and shown, would violate Forest Plan standard 3108. However, if the proposed transmission line is located outside designated nesting areas (identified in project record) during implementation, Forest Plan standard 3108 would be met. This route modification, if located outside designated nesting areas during implementation, would result in less disturbance to individual goshawks. While implementation of this route modification may impact slightly more acres of ponderosa pine forest, it would impact fewer acres of occupied northern goshawk territories. Implementation of Alternative 3, with Route Modification 3d "**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**" for the northern goshawk. This is the same determination provided for implementation of Alternative 2.

Table 3-23d. Comparison of Pine Structural Stages Between Alt 2 and Alt 3 for Edelweiss Route Modification 3d				
Habitat Type		**Alt 2. Proposed Action Segment**	**Alt 3. Modification 3d Segment**	**Change in Habitat From Alt 2**
Ponderosa Pine	HSS 3A	-	<1	+<1
	HSS 4B	3	3	0
	HSS 4C	2	1	-1
Total Acres Affected		**5**	**5**	**0**

Route Modification 3e: This route modification and the corresponding segment of the Alternative 2 proposed ROW that would be replaced if the route modification is constructed each occur within ponderosa pine forest. This route modification would not cross any named perennial streams and would cross three named intermittent streams. The corresponding segment of the

Alternative 2 proposed ROW would not cross any named perennial streams, and would cross one named intermittent stream. Refer to **Table 3-23e** for a comparison of habitats affected by Route Modification 3e and the corresponding segment of the Alternative 2 ROW. Due to the relatively small differences in acres affected, impacts on the BHNF from implementation of Alternative 3 with Route Modification 3e, would be similar to but slightly less than those under implementation of Alternative 2. Therefore, impacts on the BHNF from implementation of Route Modification 3e to species associated with ponderosa pine forest would be similar but slightly less than those described under Alternative 2 and impacts to species associated with aquatic habitats would be similar to but slightly more than under Alternative 2.

Based on the relatively small differences in habitat disturbance between Route Modification 3e and the corresponding segment of the Alternative 2 proposed ROW, potential effects described under Alternative 2 for species associated with ponderosa pine forests and aquatic habitats are considered similar to those under Alternative 3 with Route Modification 3e. All conclusions under Alternative 3 with Route Modification 3e, for species dependent upon ponderosa pine forest and aquatic habitats would be the same as those presented under Alternative 2.

Table 3-23e. Comparison of Stream Crossings and Pine Structural Stages Between Alt 2 and Alt 3 for Pactola Route Modification 3e

Habitat Type		Alt 2. Proposed Action Segment	Alt 3. Modification 3e Segment	Change in Habitat From Alt 2
Stream Crossings		1	3	+2
Ponderosa Pine	HSS 4A	4	4	0
	HSS 4B	7	1	-6
	HSS 4C	1	-	-1
Total Acres Affected		**12**	**5**	**-7**

Route Modification 3f: This route modification and its corresponding segment of the Alternative 2 proposed ROW that would be replaced if the route modification is constructed each include aspen and ponderosa pine forest. This route modification ROW would not cross any named perennial streams and would cross one named intermittent stream. The corresponding segment of the Alternative 2 proposed ROW would not cross any named perennial streams and would cross three named intermittent streams. Refer to **Table 3-23f** for a comparison of habitats affected by Route Modification 3f and the corresponding segment of the Alternative 2 ROW, by habitat type. Due to the relatively small differences in acres affected, impacts on the BHNF from implementation of Alternative 3 with Route Modification 3f, would be similar to but slightly less than those under implementation of Alternative 2. Therefore, impacts to species associated with aspen, ponderosa pine forest, and aquatic habitats on the BHNF under implementation of Route Modification 3f would be similar to but slightly less than those under implementation of Alternative 2.

Based on the relatively small differences in habitat disturbance between Route Modification 3f and the corresponding segment of the Alternative 2 proposed ROW, potential effects described under Alternative 2 for species that rely on aspen and ponderosa pine forests are considered

similar to the effects associated with implementation of this route modification. All conclusions under Alternative 3 with Route Modification 3f, for species dependent upon aspen and ponderosa pine forest habitats would be the same as those presented under Alternative 2.

Table 3-23f. Comparison of Habitat Types, Stream Crossings, and Pine Structural Stages Between Alt 2 and Alt 3 for Pactola South Route Modification 3f

Habitat Type		Alt 2. Proposed Action Segment	Alt 3. Modification 3f Segment	Change in Habitat From Alt 2
Aspen		1	1	0
Stream Crossings		4	1	-3
Ponderosa Pine	HSS 2	3	1	-2
	HSS 3A	2	-	-2
	HSS 4A	24	23	-1
	HSS 4B	10	-	-10
Total Acres Affected		39	24	-15

Route Modification 3g: This route modification includes ponderosa pine forest, and its corresponding segment of the Alternative 2 proposed ROW that would be replaced if the route modification is constructed include grassland, riparian, and ponderosa pine forest. This route modification would not cross any named perennial streams and would cross seven named intermittent streams. The corresponding segment of the Alternative 2 proposed ROW would not cross any named perennial streams and would cross two named intermittent streams. Refer to **Table 3-23g** for a comparison of habitats affected by Route Modification 3g and the corresponding segment of the Alternative 2 ROW, by habitat type. Due to the relatively small differences in acres affected, impacts on the BHNF from implementation of Alternative 3 with Route Modification 3g, would be similar to but slightly less than those under implementation of Alternative 2.

Based on the relatively small differences in habitat disturbance between implementation of Route Modification 3g and the corresponding segment of the Alternative 2 proposed ROW, potential effects described under Alternative 2 for species that rely on grasslands, ponderosa pine forests, and aquatic habitats are considered similar to the effects associated with implementation of this route modification. All conclusions under Alternative 3 with Route Modification 3g, for species dependent upon ponderosa pine forest and aquatic habitats would be the same as those presented under Alternative 2.

Table 3-23g. Comparison of Habitat Types, Stream Crossings, and Pine Structural Stages Between Alt 2 and Alt 3 for Hidden Valley Route Modification 3g				
Habitat Type		**Alt 2. Proposed Action Segment**	**Alt 3. Modification 3g Segment**	**Change in Habitat From Alt 2**
Grassland		1	-	-1
Riparian		1	0	-1
Stream Crossings		2	7	+5
Ponderosa Pine	HSS 4A	2	-	-2
	HSS 4B	2	-	-2
	HSS 4C	-	4	+4
Total Acres Affected		**4**	**4**	**0**

Route Modification 3h: This route modification includes grassland wetland/meadow/riparian, and ponderosa pine forest on the BHNF. The corresponding segment of the Alternative 2 proposed ROW that would be replaced if this route modification was selected includes grassland, no wetland/meadow/riparian habitats, and ponderosa pine forest on the BHNF. This route modification and its corresponding segment of the Alternative 2 proposed ROW would each cross one named perennial stream and neither would cross any named intermittent streams. Refer to **Table 3-23h** for a comparison of habitats affected by Route Modification 3g and the corresponding segment of the Alternative 2 ROW, by habitat type. Due to the relatively small differences in acres affected, impacts on the BHNF from implementation of Alternative 3 with Route Modification 3g, would be similar to but slightly more than those under implementation of Alternative 2

Based on the relatively small differences in estimated habitat disturbance between implementation of Route Modification 3h and its corresponding segment of the Alternative 2 proposed ROW, potential effects described under Alternative 2 for species that rely on grasslands, wetland/meadow/riparian, ponderosa pine forests, and aquatic habitats are considered similar to the effects associated with implementation of this route modification. All conclusions under Alternative 3 with Route Modification 3h, for species dependent upon grassland, wetland/meadow/riparian, ponderosa pine forest and aquatic habitats would be the same as those presented under Alternative 2.

Table 3-23h. Comparison of Habitat Types, Stream Crossings, and Pine Structural Stages Between Alt 2 and Alt 3 for Deerfield Road 1 Route Modification 3h				
Habitat Type		**Alt 2. Proposed Action Segment**	**Alt 3. Modification 3h Segment**	**Change in Habitat From Alt 2**
Grassland		1	2	+1
Riparian		0	1	+1
Stream Crossings		1	1	0
Ponderosa Pine	HSS 3A	1	-	-1
	HSS 4A	8	3	-5
	HSS 4B	7	15	+8
	HSS 4C	1	-	-1
Total Acres Affected		**17**	**18**	**+1**

Route Modification 3i: This route modification includes grasslands, ponderosa pine forest, and spruce on the BHNF. The corresponding segment of the Alternative 2 proposed ROW that would be replaced if this route modification is selected would result in 1.4 acres of grassland disturbance and 31.4 acres of ponderosa pine forest disturbance on the BHNF. This route modification and its corresponding segment of the Alternative 2 proposed ROW would each cross one named perennial stream. Refer to **Table 3-23i** for a comparison of habitats affected by Route Modification 3g and the corresponding segment of the Alternative 2 ROW, by habitat type. Due to the relatively small differences in acres affected, impacts under implementation of Route Modification 3i would be similar to but slightly more than under Alternative 2.

Based on the relatively small differences in estimated habitat disturbance between implementation of Route Modification 3i and its corresponding segment of the Alternative 2 proposed ROW, potential effects described under Alternative 2 for species that rely on grasslands, wetland/meadow/riparian, ponderosa pine forests, and spruce are considered similar to the effects associated with implementation of this route modification. All conclusions under Alternative 3 with Route Modification 3i for species dependent upon grassland, wetland/meadow/riparian, ponderosa pine forest and spruce habitats would be the same as those presented under Alternative 2.

Table 3-23i. Comparison of Habitat Types, Stream Crossings, and Pine Structural Stages Between Alt 2 and Alt 3 for Deerfield Road 2 Route Modification 3i				
Habitat Type		**Alt 2. Proposed Action Segment**	**Alt 3. Modification 3i Segment**	**Change in Habitat**
Grassland		1	2	+1
Riparian		-	1	+1
Spruce		-	2	+2
Stream Crossing		1	1	0
Ponderosa Pine	HSS 2	2	-	-2
	HSS 3A	3	-	-3
	HSS 4A	15	4	-9
	HSS 4B	10	24	+14
	HSS 4C	1	-	-1
Total Acres Affected		**31**	**28**	**-3**

Route Modification 3j: This route modification and its corresponding segment of the Alternative 2 proposed ROW that would be replaced if the route modification is constructed each include grassland and ponderosa pine forest. This route modification and its corresponding segment of the Alternative 2 proposed ROW would not cross any named perennial or intermittent streams. Refer to **Table 3-23j** for a comparison of habitats affected by Route Modification 3j and the corresponding segment of the Alternative 2 ROW, by habitat type. Due to the relatively small differences in acres affected, impacts under implementation of Route Modification 3i would be similar to but slightly more than under Alternative 2

Based on the relatively small differences in estimated habitat disturbance between implementation of Route Modification 3j and its corresponding segment of the Alternative 2 proposed ROW, potential effects described under Alternative 2 for species that rely on grasslands and ponderosa pine forests are considered similar to the effects associated with implementation of this route modification. All conclusions under Alternative 3, with Route Modification 3j, for species dependent upon grassland and ponderosa pine forest habitats would be the same as those presented under Alternative 2.

Table 3-23j. Comparison of Grassland and Pine Structural Stages Between Alt 2 and Alt 3 for Ponderosa Ridge Route Modification 3j				
Habitat Type		**Alt 2. Proposed Action Segment**	**Alt 3. Modification 3j Segment**	**Change in Habitat**
Grassland		1	2	+1
Ponderosa Pine	HSS 3B	1	3	+2
	HSS 4A	4	4	0
	HSS 4B	2	5	+3
	HSS 4C	1	2	+1
Total Acres Affected		**8**	**14**	**+6**

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. Implementation of Alternative 3, and the included 3a route modification would have fewer impacts on the greater sage-grouse and its habitats, than under implementation of Alternative 2, which does not include this modification.

3.3 FIRE AND FUELS

The geographic analysis area for fire and fuels is one-mile wide centered on the proposed route for the line.

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 one mile wide analysis area since 1911. Fire history data for the analysis area is presented in **Table 3-24**.

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 3-24 South Dakota Fire History Data for the Proposed Project (1994-2014) for Fires 100 Acres or Larger		
Fire Name	**Year**	**Size (Acres)**
Chilson	1996	203
Dewey2	1997	4,336
Dugout	1999	255
Wildcat***	1999	105
Flagpole Mtn	2000	7,386
Jasper	2000	83,511
Sundance	2000	282
Yellow Butte	2000	762
Elk Mtn II	2001	13,195
Rogers Shack	2001	11,896
Sutherland	2001	178
West Hell***	2001	10,547
Grizzly Gulch	2002	11,589
Red Bird	2002	129
Battle Creek***	2002	13,495
Beaver Dam	2002	138
Harding	2002	108
Sheldon	2002	690
Little Elk	2002	663
Red Point	2003	17,639
Cement	2005	2,933
Ricco	2005	3,959
Camp Five	2005	776
West Pass Creek	2006	619
Boxelder	2007	319
Freeland Well	2008	184
WhoopUp	2011	7,456
Coal Canyon	2011	5,177
Barrel	2011	3,177
Buck	2011	2,48
Fork***	2012	353
Kinney	2012	1,503
Dakota	2012	346
Myrtle	2012	9,886
Apple	2012	545
White Draw	2012	8,991
Parker Peak	2012	649
Crow Peak	2012	141
Falls	2012	273
*** Fires caused by powerlines.		

The evaluation period was from 1994 to 2014. There were no large fires in 1994, 1995, 2013, or 2014.

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 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 3-25**.

Table 3-25 - 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 Land Fire 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 3-26**). 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 3-26 - 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 3-27**.

Table 3-27 - 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 3-28**).

Table 3-28 - 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 3-27**) 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 one mile wide 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 26

fires have occurred within five miles of the analysis area since 1996. Fire history data for the analysis area is presented in **Table 3-29**.

Table 3-29 - Wyoming Fire History Data for the Proposed Project (1996-2012)

Fire Name	Year	Fire Size (Acres)
Hilight	1996	3,949
Hilight	1996	444
Unknown	1996	81
Power Line Fire	2002	35
Railroad Fire	2002	46
Sheldon Canyon Fire	2002	643
Small Road Fire	2003	43
Teckla Fire	2003	173
Turner Reservoir Fire	2003	12
Keeline Fire	2006	32
Poison Creek Fire	2006	28
Thompson	2007	11
North Antelope	2011	250
Plum	2011	31
Tracy	2012	60
Unnamed Campbell11	2011	50
Unnamed Weston 1	2011	60
Unnamed Weston 2	2011	799
Unnamed Campbell10	2011	200
Weston #12	2011	75
Weston #13	2011	30
Weston #2	2011	300
Weston #4	2011	800
Jacobs	2012	26
South Hilight	2012	15
Oil Creek	2012	62,318

As indicated in the table above, one of these fires, the Oil Creek fire that occurred in late June 2012 burned a large number of acres. An analysis of this fire indicated it to have been caused by failure of a transmission pole structure on a 69kV power line in the area causing the line to come in contact with a tree.

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 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.

3.3.1.2.2.3 Private Lands

As identified above, the vegetation types on private lands within the Wyoming portion of the analysis area are primarily grassland and shrub steppe. Other vegetation types include agricultural, developed areas and ponderosa pine Forested areas occur primarily in the eastern portions of the area near the state line with shrub steppe and grasslands more common in the majority of the area. Refer to the Botany section, **Table 3-41** for more information on vegetation on private lands in the analysis area.

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 Land Fire data (2010), the majority of the Wyoming 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 Wyoming 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 the majority of the Wyoming analysis area which is dominated by 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). In the eastern portion of the Wyoming

analysis area where forested cover types occur, the fire hazard is similar to what is described for the South Dakota forested areas.

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) as is evidenced by the Oil Creek fire discussed previously. 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) as was the case of the Oil Creek fire.

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 primarily in the eastern portion of the Wyoming analysis area. 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 3-30** 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” would be identified during routine inspection and trimmed or removed as needed (again accessed from the ROW).

Table 3-30 - 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 would be described in detail in the ROW Clearing Plan that would 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 create a break in the continuity of aerial fuels. Creating openings in the canopy may help fighting a fire. **Table 3-31** 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 3-28**). Tree removal would decrease the potential for insect infestations on a local scale. 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 3-31 - 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.

Since 2006, approximately 55 wildland fire starts have been specifically attributed to powerlines on the Black Hills, for a total of 661.5 acres affected. In 2012, 25 wildland fires were attributed to powerlines for a total of 552 acres, the largest fire being the Fork Fire at 353 acres. Powerline-caused wildland fires occur when conditions cause lines to snap or to arc. Trees or branches may fall across lines during wind events or because of insect or disease damage. Generally, wildland fires associated with powerlines are suppressed before getting larger than an acre in size, but do heighten the risk to firefighters because of proximity to live wires, regardless of the size (BHNF, Black Hills Electric Cooperative, Rockerville Electric Transmission Project, Final Environmental Assessment, July, 2013).

The proposed project would not be expected to significantly increase fire hazard or risk. However, there could be smaller or larger fires that could occur and also a greater value at risk if the power line is negatively impacted by fire. This could have a significant impact on BHP and

consumers of the power. After it is constructed, this project would become a value at risk that would be considered in fire fighter and line officer decision-making.

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 would 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.

3.3.2.2.1.1.4 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 Action would also contribute a small portion of hazard reduction to the large acreage of hazard reduction underway by the BHNF timber program.

It is expected that this additional powerline could result in an increased likelihood of powerline-caused fires and would have the potential to contribute to wildfires on a local scale.

Deerfield Lake Reservoir and Pactola Lake Reservoir have been identified as water sources for aerial firefighting resources.

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 and private lands are similar also being dominated by sagebrush/grassland types. 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 and private lands. **Table 3-41** 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 (such as trees) would be cleared. It is assumed that trees would be cleared for the full ROW width (100 feet on federal lands and 125 feet on private lands) even though the full width may not be cleared in all locations. 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 federal lands within 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 on federal lands would remove only 60 acres of vegetation. Likewise, clearing on private lands in the Wyoming portion of the analysis area is also expected to be minimal because of the relatively small amount of forested cover types. Therefore 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 on federal and private lands in Wyoming 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, in forested areas, the ROW could also be used as a fire break and access for fire fighting vehicles.

Transmission lines have a potential to ignite or exacerbate fires from arcing, flashovers, lightning, and maintenance activities during operation. As indicated above, wildland fires have been caused by power lines in the forested areas of the Wyoming analysis area. 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, and lightning contact). However, project design features implemented as standard practice for the Proposed Action would reduce this potential including 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. It would be unlikely the Project facilities would cause fires in the majority of the Wyoming portion of the analysis area where shrublands and grasslands are the common cover type except in the rare case of arcing from the power line to the ground or nearby vegetation. Although this is unlikely, such an event could cause property damage and losses. 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 in the eastern parts of the Wyoming analysis area 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 and on private lands would include damages from the Oil Creek fire and other fires, land clearing for oil and gas, mining and other development, livestock grazing and hunting . 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**:** This route modification 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**:** This route modification 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**:** This route modification 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: This route modification 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: This route modification 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: This route modification 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. Both the proposed ROW would cross a similar amount of NFS lands dominated by ponderosa pine. The proposed ROW would also impact less than an acre of prairie grassland habitat.

Modification 3h**:** This route modification is a second route option developed in the Mountain View area. It is located on National Forest land south of Deerfield Road between Williams Draw Road and Deerfield Cove Road in South Dakota. At the widest point, it would be approximately 2,200 feet north of the proposed route and about 1,700 feet north of Route Modification 3b. It would cover a distance of nearly 1.9 miles. Route Modification 3h and the Proposed Action have only minor differences in the amount of ponderosa pine and grasslands habitat impacted and thus would have similar impacts to fire potential and available fuel.

Modification 3i: This route modification is a third route option on National Forest land developed in the Mountain View area The eastern portion of this modification is coincident with the portion of Modification 3h that is located south of Deerfield Road. Where Modification 3h turns south to reconnect with the proposed route, this modification (3i) would continue west for an additional 1.2 miles before turning south to reconnect with the proposed route. Route Modification 3i would impact approximately 1.8 acres of white spruce habitat, while the Proposed Action route would not impact this tree species. Route Modification 3i and the Proposed Action have minor differences in the amount of ponderosa pine and grasslands habitat impacted and overall would have similar impacts to fire potential and available fuel.

Modification 3j: This route modification is a second route option developed in the Route Modification 3g area located between Hidden Valley Road and an area southwest of Sun Ridge Road. It would be located on the northern and western portions of a National Forest parcel in Section 30 for approximately 1.5 miles and then follow the section line between Sections 30 and 25 for about 0.4 miles across private lands to a point north of Sun Ridge Road where it would turn southwest for about 0.6 miles to reconnect with the Proposed Action route in Section 36 on National Forest land. There are marginal differences in impacts to fire potential and available fuel between the proposed ROW and Route Modification 3j, with Route Modification 3j containing slightly more grasslands and nearly two acres more ponderosa pine.

3.3.2.3.2 Wyoming

3.3.2.3.2.1 Direct/Indirect Effects

Route Modification 3a: This modification and the corresponding portion of the Proposed Action would not be located on TBNG or BLM managed lands but would be on private lands. This route modification is the same length as the segment of the Proposed Action that it replaces and generally occurs with the same vegetation types. Therefore, it would have no different identified impacts to fire potential and available fuel.

3.4 SOILS

The geographic analysis area for soils is two-miles wide centered on the proposed route for the line.

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 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 Complex and the Pactola-Rock Outcrop-Virkula Complex.

The Stovho-Trebor Complex 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 from 2 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 Complex 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 2011). 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 acres (or 23 percent) of NFS land and 663 acres (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 2011). 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 2011).In the analysis area, soil map units with severe rutting hazard cover 21,128 acres (or 94 percent) of NFS land and 5,776 acres (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 2011). 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 acres (37 percent) of NFS land and 2,525 acres (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 2011). 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 2011).

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 2011). 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 2011). 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 2011). 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 2011). 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 2011). 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 2011). 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 2011). 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 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 would 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 would 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**.

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 would 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 would 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 would 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 would be used if necessary.

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 been 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 would 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 would be employed to minimize these soils impacts.

The locations of wire-pulling/ tensioning/splicing sites are not currently known. However, they would be addressed, along with all other soil disturbing activities, with the appropriate design criteria and mitigation measures. All new or improved access roads in Wyoming would occur on private lands. Approximately four acres of vegetation would be disturbed by overland access within the ROW. No construction or decking yards would be located on federal land in Wyoming.

Soils disturbance would occur from construction of 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 would 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 would be permanently disturbed would be the structure base at ten square feet per pole.

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 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.

3.4.2.2.2.1.2 Private Land

Impacts on private land would be similar to those described above for TBNG and BLM land. The potential impacts would be addressed through implementation of the appropriate design criteria and mitigation measures described in **Appendix B**.

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 would 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: 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: 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.

Route Modification 3d: 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 Modification 3e: Route Modification 3e covers five acres of BHNF land and the Proposed Action covers 12 acres. 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: 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: Route Modification 3g covers five acres of BHNF land and the Proposed Action covers four. This modification would have slightly greater soils impacts since it disturbs one more acre of soils 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.

Route Modification 3h: Route Modification 3h covers 21 acres - with approximately one and one-quarter acres on private land and the remaining acreage on BHNF lands, while the Proposed Action covers 21 acres entirely within BHNF lands. Route Modification 3h would have slightly less soils impacts since it disturbs fewer acres of soil with similar soil characteristics.

Route Modification 3i: Route Modification 3i covers 42.5 acres, with approximately one and one-quarter acres on private land and the remaining acreage on BHNF lands. The Proposed Action covers 34 acres entirely on BHNF lands. The soil types associated with both routes are relatively equivalent; however, because the total acreage of Route Modification 3i is larger than the Proposed Action, this modification would result in greater soils impacts overall than the Proposed Action.

Route Modification 3j: The total acreage and soils types associated with Route Modification 3j are approximately equal to those of the Proposed Action. Therefore, impacts to soils from the Proposed Action and this modification would be similar.

3.4.2.3.2 Wyoming

3.4.2.3.2.1 Direct/Indirect Effects

Route Modification 3a: 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 WATER RESOURCES

The geographic analysis area for water resources is one-mile wide centered on the proposed route for the line.

3.5.1 Existing Conditions

3.5.1.1 SOUTH DAKOTA

Snowmelt, rainfall, and ground water discharge are the main sources of water to streams and rivers in the South Dakota portion of the analysis area (USGS). 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 Creek watershed spans both Wyoming and South Dakota. The Rapid Creek 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.

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 2014). 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 2014). 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 2014).

There is one stream section, Castle Creek, from Deerfield Reservoir to Rapid Creek, identified as impaired for Total Suspended Solids 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 (SDDENR 2014). The Proposed Action crosses Dutchman Creek which is a tributary to Castle Creek.

The unique surface water interaction with groundwater within the Black Hills geologic uplift, as well as the presence of groundwater dependent ecosystems (i.e. springs, wetlands, fens, etc.). Black Hills groundwater and surface water are highly interconnected, and thus the quality of groundwater can affect the quality of surface water, and vice versa. The potential for groundwater contamination in the Black Hills can be high, especially where aquifer recharge zones (outcrops) or stream loss zones occur. Groundwater recharge/outcrop areas are present on both the west and east sides of the Black Hills and crossed by the project. Stream loss zones (direct groundwater recharge) are crossed by the Proposed Action ROW for a total of 6.7 miles.

Most springs and wetlands found in the Black Hills are dependent upon groundwater, in whole or in part. Therefore, the project has the potential to affect groundwater dependent ecosystems (GDEs) including springs, wetlands, and peat-forming wetlands (such as fens and bogs). See the Wetlands and Botany sections for more detail on these resources.

3.5.1.2 WYOMING

Snowmelt, rainfall, and ground water discharge are the main sources of water 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 surface water flows or quantity impacts would occur. Surface water quantities 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 surface water flows 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 surface water flows 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 surface water flows 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 have 63 water course crossings in South Dakota on public and private lands. There are 53 water course crossings located on BHNF lands and 10 water course crossings located on private land as shown in **Table 3-32**. Of the 12 perennial streams crossed by the Proposed Action, eight are on BHNF lands including South Fork Castle Creek (crossed twice),Dutchman Creek, Slate Creek, and four unnamed streams. Four are on private lands (Slate Creek (crossed twice), Gold Run and Rapid Creek).

Table 3-32 - 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	8	4	12
Intermittent streams	23	5	28
Ephemeral streams	22	1	23
Total	53	10	63

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. However, cutting of vegetation within the stream corridors would be the exception since pole structures would be placed on ridge tops and thus span stream corridors.

In the event that some vegetation within a stream corridor needs to be cut, it would be limited to conifer species (ponderosa pine and spruce) that will attain tree height that might threaten power lines. Hardwoods such as birch, aspen, oak would be less likely to be removed due to the fact they do not grow as tall. Riparian shrubs (willows, birch, etc.) generally would not be cut, since these shrubs have a low height at maturity. In the event that riparian vegetation would need to be cut, site specific consultation with the affected unit hydrologist, botanist, and wildlife biologist should occur prior to vegetation removal to develop site specific requirements and/or mitigation measures.

When approved, cutting within riparian corridors should be limited to hand-felling, unless equipment use is site specifically approved by the hydrologist.

Structures would not be placed in streams and construction work would 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. Consultation with the BHNF Mystic Ranger District hydrologist and botanist would take place prior to any and all stream crossings and/or improvements to identify site-specific design requirements, and/or mitigation measures and to limit number of stream crossings, identify roads and trails that are candidates for use as access roads due to prior disturbance, or location in less sensitive areas.

Implementation of environmental design criteria/mitigation and best management practices (BMPs) described above and in **Appendix B** would reduce impacts to negligible levels.

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 soil disturbances such as compaction and rutting of soils resulting in potential risks of increased runoff, erosion, and subsequent sediment delivery to surface waters 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 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 would 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, USFS National Best Management Practices (BMPs) and Region 2 Watershed Conservation Practices (WCPs) would be followed which would, in combination with the above actions and design criteria/mitigation, reduce impacts to surface water and water quality impacts to negligible levels.

Although the Project would not directly impact groundwater found in aquifers, the Project does have the potential to indirectly affect both deeper groundwater aquifers and shallow groundwater (i.e. water table and alluvium), primarily through chemical and petroleum leaks associated with equipment fueling, servicing, and maintenance. However, WCP and BMP measures and SWPPP design features would be used to minimize this.

3.5.2.2.1.2 Cumulative Effects

The contribution of the Proposed Action to cumulative effects on surface water 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. Surface water and surface water quality impacts would likely be avoided or reduced to negligible or minor impact levels through avoidance of activities in stream corridors, riparian areas and wetlands, 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 3-33**. 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 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 3-33 - 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 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.

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.

3.5.2.2.2.1.2 Private Land

The Proposed Action would result in 361 crossings of streams and flow lines (flow line designation includes intermittent streams and all major and minor drainage paths) in Wyoming as shown in **Table 3-33**. Only 30 of the total crossings on private lands are named streams. As discussed above, these water courses and associated riparian vegetation would be spanned by the proposed line and not directly affected by construction. Potential impacts to water resources from erosion and accidental spills/leaks would be the same as described above and would be mitigated by the mitigation measures identified in **Appendix B**.

3.5.2.2.2.2 Cumulative Effects

The contribution of the Proposed Action to cumulative effects on surface water 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 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

Route Modification 3b: Both Route Modification 3b and the corresponding section of the Proposed Action would have the same number of stream crossings. They would both have two perennially flowing stream crossings (Gold Run on the east along Gillette Prairie Road and the un-named tributary to it on the west, fed by Hobart Spring) and would not cross very severe or severe erosion hazard soils. Therefore, the impacts to surface water and water quality would be similar.

Route Modification 3c: Both Route Modification 3c and the corresponding section of the Proposed Action would have the same number of stream crossings. They both would cross three intermittent streams all three of which are on un-named tributaries at the headwaters of Slate Creek and would not cross very severe or severe erosion hazard soils. Impacts to surface water and water quality would be similar.

Route Modification 3d: Route Modification 3d would have one more stream crossing than the corresponding section of the Proposed Action. Route Modification 3d crosses Custer Gulch, an ephemeral stream tributary to Pactola Reservoir, where it ties back into the Proposed Action. The corresponding section of the Proposed Action would not have stream crossings. Both would cross three acres of very severe and severe erosion hazard soils. Therefore, impacts to surface water and water quality would be potentially greater with Route Modification 3d than the Proposed Action.

Route Modification 3e: Route Modification 3e would have two more stream crossings than the corresponding section of the Proposed Action. The Route Modification would cross four streams including three intermittent stream crossings on McCurdy Gulch, and one intermittent crossing on an un-named tributary to Rapid Creek below Pactola dam. The corresponding section of the Proposed Action would have two intermittent stream crossings, one on McCurdy Gulch and the other on an un-named tributary to Rapid Creek below Pactola Dam. 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 surface water and water quality would potentially be greater for the Proposed Action than Route Modification 3e.

Route Modification 3f: Route Modification 3f would have five less stream crossings than the corresponding section of the Proposed Action. Modification 3f would cross Gold Standard Gulch, an intermittent stream. The corresponding section of the Proposed Action would have six intermittent stream crossings including three intermittent stream crossings on McCurdy Gulch; one on un-named intermittent tributary to Rapid Creek below Pactola dam; one intermittent crossing on Tamarack Gulch, and one ephemeral crossing on un-named tributary to Rapid Creek, located east of Tamarack Gulch. 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 surface water and water quality would be greater for the Proposed Action than Route Modification 3f.

Route Modification 3g: Modification 3g would have seven more stream crossings than the corresponding section of the Proposed Action. The Route Modification would cross nine intermittent streams seven of which would occur on an intermittent stream/canyon tributary to South Canyon; the other two would span ephemeral streams/canyons that flow eastward in the vicinity of the Terra Sancta Catholic campus on Hidden Valley Road. 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 surface water and water quality would be greater for Route Modification 3g than the corresponding section of the Proposed Action.

Route Modification 3h: Route Modification 3h would have one less stream crossing than the corresponding section of the Proposed Action. The Route Modification would cross one perennial stream (Gold Run), while the corresponding section of the Proposed Action would cross two perennial streams (Gold Run and an Unnamed Stream). Route Modification 3h would have slightly less soils impacts since it disturbs fewer acres of soil with similar soil characteristics. Therefore, impacts to surface water and water quality would be greater for the Proposed Action than Route Modification 3h.

Route Modification 3i: Route Modification 3i would have one less stream crossing than the corresponding section of the Proposed Action. Route Modification 3i would cross two perennial streams (Gold Run and an unnamed stream), and one unnamed intermittent stream, while the corresponding section of the Proposed Action would cross two perennial streams (Gold Run and an unnamed Stream) and two ephemeral streams. The soil types associated with both routes are relatively equivalent; however, because the total acreage of Route Modification 3i is larger than the Proposed Action, this modification would result in greater soils impacts overall than the Proposed Action. Therefore, impacts to surface water and water quality would be slightly greater for the Proposed Action than Route Modification 3i.

Route Modification 3j: Route Modification 3j would have two less stream crossings than the corresponding section of the Proposed Action. The Route Modification would cross two unnamed intermittent streams while the corresponding section of the Proposed Action would cross four intermittent streams (all unnamed). The total acreage and soils types associated with Route Modification 3j are approximately equal to those of the Proposed Action. Therefore, impacts to surface water and water quality would be greater for the Proposed Action than Route Modification 3h.

3.5.2.3.2 Wyoming

3.5.2.3.2.1 Direct/Indirect Effects

Route Modification 3a: 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 surface water and water quality would potentially be greater for Route Modification 3a than the Proposed Action.

3.6 WETLANDS

The geographic analysis area for wetlands is one-mile wide centered on the proposed route for the line.

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. Wetland occurrence and distribution within the Black Hills is influenced by the complex underlying geology and the associated complex groundwater networks within major aquifers, as well as smaller fractures and faults. Most of the natural wetlands present in the Black Hills are considered groundwater dependent ecosystems (GDEs), because they depend mostly or entirely upon groundwater to sustain the wetland ecosystem. Other surface water sustained wetlands do also occur in the Black Hills. These are most often associated with natural and man-made impounds upon flowing streams and adjacent linear wetlands found along streams and riparian corridors.

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 Black Hills 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.

The Cowardin system was used to describe and classify wetlands. Wetlands within the Riverine system have water that is usually, but not always flowing; and adjacent wetlands located on the floodplain and/or terraces are not part of the Riverine system, but rather the palustrine system (Cowardin et al 1979, pages 7, 8, and 10). Numerous palustrine polygons are not shown on NWI data due to the scale of imagery used for aerial interpretation and dense forest cover. Efforts to update the NWI for the Black Hills are ongoing.

Although many streams within the Black Hills are classified in the Riverine system, the majority of wetlands within the Black Hills are classified under the Palustrine system. This includes riparian and wetland areas adjacent to streams within the Riparian class, as well as other independent wetlands not located along streams (i.e. springs, fens, bogs, marshes, swamps, wet meadows, sloughs, ponds, and other similar wetland ecosystems). The Proposed project spans both riverine and palustrine wetlands. Proposed access roads are located adjacent to or

involve crossing some of these same wetlands. Lacustrine wetlands, associated with deep water wetland habitats like lakes and reservoirs, are also found in the Black Hills. The Proposed project does not span any lacustrine wetlands, but three lacustrine wetlands are present within or immediately adjacent to the Analysis Area. These include Deerfield Reservoir, Pactola Reservoir, and large pond located along Rapid Creek near Big Bend.

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.

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 peat-forming wetland that are known to occur in the Black Hills region. Fens are defined in the Region 2 WCP Handbook as “Geographically restricted wetlands where perennial ground water discharge occurs on the time scale of millennia and where little erosion or mineral sediment deposition occurs. Fens are generally characterized by their stable presence on the landscape for thousands of years and associated plant and animal communities that may be relics from historic glaciation periods” (USDA Forest Service 2006a). Fens differ from bogs in that they are sustained primarily by ground water, whereas bogs are primarily maintained by surface and atmospheric waters. Fens are peat-forming wetlands usually vegetated with mosses and sedges, but shrub and tree species may also be present. Tree species when present are typically stunted.

Black Hills fens are relatively rare and unique from other fens worldwide. Fens are typically formed in basins with impeded drainage or where springs have been present on the landscape for millennia. Peat develops due to the incomplete decomposition of dead plant material in saturated soils. Because of their water-holding capability, fens provide very stable habitats for plants and wildlife species in the long-term. For example, many of the fens of Colorado are over 10,000 years old, with organic soil accumulation rates ranging from about 4 to 16 inches per thousand years (USDA Forest Service 2002). It can take up to 10,000 years to form a fen naturally (USDA Forest Service 2007). Fens in the Black Hills are currently undergoing research, so little is known regarding ages and peat accumulation rates. However, preliminary carbon dating of samples in the Rochford area indicate that Black Hills fens are at least 3,000 years old (Grimm 2000). Because the rate of peat accumulation is so slow in fens, these ecosystems are essentially irreplaceable.

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). Plant species dependent upon and/or found in fens is discussed in the Botany section.

Peat-forming wetlands, including fens and bogs, are recognized by wetland regulating agencies (EPA and U.S. Army Corps of Engineers) as rare wetlands that cannot be replaced in-kind (U.S. Army Corps of Engineers and EPA 2008). Mitigation for loss of fens is problematic, as there are no known methods to create new functional fens. Thus avoidance and preservation of these rare wetlands is emphasized by these regulatory authorities as documented in 33 CFR Parts 325 and 332 and 40 CFR Part 230 (U.S. Army Corps of Engineers and EPA 2008). The U.S. Fish and Wildlife Service, Mountain-Prairie Region, has made conservation and protection of fens one of their wetland priorities (USDA Forest Service 2002; USDI FWS 1999a and 1999b). Furthermore, the Mountain-Prairie Region has determined that all functioning fens fall within their Resource Category 1. This means that the goal is no loss of existing habitat value, and that every reasonable effort should be made to avoid impacting these habitats. The Forest Service also recognizes the rarity and importance of such peat-forming wetlands and the unique plant and animal habitats they support and requires that land managers “avoid any loss of rare wetlands such as fens and springs” (USDA Forest Service 2002; 2006a; 2007).

One documented fen, the Dutchman Fen complex, is located on Dutchman Creek within the Analysis Area, approximately 32 feet south of the impact area. The Analysis Area contains undocumented fens associated with South Fork Castle Creek, Dutchman Spring, Haystack Spring, Friday Gulch, Skull Gulch, and California Gulch Tributary.

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 Waters of the United States (WOUS) could be filled with dredge or fill material. Wetland resources are federally protected as a WOUS under the Clean Water Act (Section 404), which is administered by the U.S. Army Corps of Engineers (USACE). Waters of the U.S. include rivers, streams, and wetlands or any channel with defined banks that is connected to a WOUS.

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 3-34** provides a summary of wetlands located within the ROW. Although power lines would span wetlands, access roads and overland equipment travel, as well as vegetation removal have potential to affect wetlands present within and near the ROW, as well adjacent to access roads proposed for use, improvement, and/or construction.

A determination has not been made as to whether any of the wetlands within the project area are “jurisdictional wetlands” according to USACE wetland definitions and classifications (USACE 1987). However, Design Criteria has been included to protect all wetlands in the project ROW

and Analysis Area (Appendix B). These measures apply to all wetlands in the Project Area, regardless of whether each individual wetland meets the regulatory definition of "jurisdictional wetland." No alteration of any wetland would take place, thus no dredging or placement of fill material would occur within any wetland. Therefore, no consultation with the USACE is necessary, and no permitting under Section 404 of the Clean Water Act (CWA) is necessary. Appropriate permits would be obtained from the State of South Dakota and/or the USACE should there be any change in proposed activities that would affect known wetlands or those discovered during project implementation.

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 3-35** 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 could 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) could temporarily or permanently involve a conversion to a different wetland type (i.e., a change to shrub or herbaceous type). However, wetland vegetation would not be cut unless conifers posed a hazard due to their height interfering with power lines. 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 could also help reduce sedimentation and erosion. However, direct impacts to wetlands are not expected due to compliance with laws, regulations, and policies protecting wetlands, inclusion of project Design Criteria, Best Management Practices (BMPs), USFS Watershed Conservation Practices (WCPs), and other measures to avoid impacts to wetlands, including vegetation removal and type conversion, and minimizing accelerated runoff, erosion and sediment transport.

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 approximately two acres of wetlands for the entire length of the Project in South Dakota. All of wetlands are located on NFS lands as indicated in **Table 3-34**. The majority of the wetlands crossed by the Proposed Action are palustrine forested and palustrine emergent wetlands, each less than one acre. There is also less than one-half acre of both palustrine aquatic bed wetlands and palustrine scrub-shrub wetlands. USFS requires that all wetlands be spanned and that no structures be placed in wetlands; otherwise USACE 404 permitting pertaining to wetland dredge and fill would be required. This should be a last-resort; after all other options for spanning and structure placement are exhausted. No structures of any kind would be allowed in peat-forming wetlands (fens) due to requirements by USACE, USFWS, and USFS. There would be little to no vegetation removal in all types of wetlands, including scrub-shrub wetlands, in order to preserve their respective wetland type characteristics and ecosystem functions. The only trees that would be removed from wetland areas are those conifers or hardwoods that pose a threat to the power line and only with site-specific consultation with the affected USFS Ranger District hydrologist, botanist, and wildlife biologist prior to vegetation removal.

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 Water Resources section provides a discussion of potential impacts to surface water and surface water quality which may cause indirect impacts to wetlands.

Table 3-34 - 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)	0.45	0	0.45	0
Scrub-Shrub (PSS)	0.33	0	0.33	0
Emergent (PEM)	0.64	0	0.64	0
Forested (PFO)	0.66		0.66	0
Total	2.08	0	2.08	0

Although power lines would span wetlands, access roads and overland equipment travel, as well as vegetation removal have potential to affect wetlands present within and near the ROW, as well adjacent to access roads proposed for use, improvement, and/or construction.

Engineering design, structure spotting (spanning of wetlands), BMPs, Watershed Conservation Practices (WCP)s (USFS 2006), and compliance with regulatory policy would ensure impacts to wetlands would be minimized or eliminated. Design Criteria, BMPs, and WCPs would be included in contracts and other guiding documents for vegetation clearing, construction of roads, pads, poles, and other equipment.

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. However, all federal management activities conducted by the USFS must also comply with wetland regulation, therefore minimizing or avoiding impacts to wetlands individually and cumulatively. All other federal, state, and non-federal entities must also comply with these same regulations set forth under E.O. 11990, Clean Water Act, and Section 404.

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 3-35**). 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 3-35 - 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 would 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 would 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 Water Resources 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.

3.6.2.2.2.1.2 Private Land

The Proposed Action ROW would cross about 8.4 acres of wetlands for its entire length in Wyoming on private lands (**Table 3-35**). No fill or vegetation removal is anticipated in the wetlands located on private lands within the transmission line ROW. As discussed above, activities on private lands must comply with these same in Section 404 of the Clean Water Act. Engineering design, structure spotting (spanning of wetlands), BMPs, and compliance with Section 404 regulatory policy would minimize or eliminate impacts to wetlands on private lands.

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: Route Modification 3b and the comparable section of the Proposed Action would have wetlands adjacent to the un-named stream tributary to Gold Run Creek in the ROW. However the power line would span this stream and no structures would be placed along the stream. Access roads in this area do avoid these wetland areas.

Route Modification 3c: Route Modification 3c would have 0.05 acres of wetlands in the ROW on BHNF lands and the comparable section of the Proposed Action would have 0.03 acres of wetlands in the ROW. Both the Proposed Action and Route Modification 3c span linear wetlands associated with the three intermittent streams. Wetlands could be directly and indirectly affected by the two new spur roads proposed for construction that cross or are very near the eastern most stream located along the Slate Prairie road. This new crossing is proposed for both the Proposed Action and Route Modification 3c. However, this could be avoided by utilizing existing trails associated with recent timber harvest in the immediate vicinity. 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: No wetlands are present within the ROW for both Route Modification 3d, and the section of the Proposed Action that it would bypass. Therefore no direct or indirect effects to wetlands would occur as a result of Route Modification 3d.

Route Modification 3e: Linear wetlands may be associated with the intermittent streams crossed by this Route Modification (McCurdy Gulch and un-named tributary to Rapid Creek below Pactola Dam). However, the power line would span these and no structures would be placed along the streams. Access routes to this Route Modification already exist and no new construction or stream crossings would be required. Therefore, no direct or indirect effects to wetlands are expected with Route Modification 3e.

Route Modification 3f: Linear wetlands may be associated with the intermittent stream crossed by this Route Modification (Gold Standard Gulch). However, the power line would span this stream drainage and no structures would be placed along the stream and/or any associated wetlands. No new construction or stream crossings would be required for this modification. Therefore, no direct or indirect effects to wetlands are expected with Route Modification 3f.

Route Modification 3g: No wetlands are present within the ROW for both Route Modification 3g, and the section of the Proposed Action that it would bypass. Therefore, no direct or indirect effects to wetlands would occur as a result of Route Modification 3g.

Route Modification 3h: Route Modification 3h would have 1.04 acres of wetlands in the ROW on BHNF lands and the comparable section of the Proposed Action would have no wetlands in the ROW. However the power line would span this wetland and no structures would be placed in any wetlands.

Route Modification 3i: Route Modification 3i would have 1.18 acres of wetlands in the ROW on BHNF lands and the comparable section of the Proposed Action would have no wetlands in the ROW. However the power line would span this wetland and no structures would be placed in any wetlands.

Route Modification 3j: No wetlands are present within the ROW for both Route Modification 3j, and the section of the Proposed Action that it would bypass. Therefore no direct or indirect effects to wetlands would occur as a result of Route Modification 3j.

3.6.2.3.2 Wyoming

3.6.2.3.2.1 Direct/Indirect Effects

Route Modification 3a: 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, and spruce trees on north facing slopes, 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 limit 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), Deerfield Road, Nemo Road, County

roads, 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.

Existing cleared transmission ROW is also readily apparent when the viewpoint is directly in-line with the cleared ROW and there are dense forested areas located on each side of the ROW. Where transmission lines and poles extend above the skyline, they can be readily apparent as well.

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 Interstate 90, US Highway 385, SD Highway 44, Deerfield Road, Nemo Road and Rochford Road. The Project would be visible in the immediate foreground and foreground from I-90 where it crosses I-90 on private land and in the middleground where it borders BNHF lands west of I-90. 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. Deerfield Road would be crossed by the Project on BHNF lands and the Project would be located in the immediate foreground distance zone of Deerfield Road for approximately 0.4 mile. Nemo Road would be crossed by the Project on BHNF lands and the Project would be located in the immediate foreground from Nemo Road for approximately 0.1 mile. 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. Below is a summary of the definition for the various SIOs:

- Very High: The characteristic landscape is intact, with only minute deviations.
- High: The characteristic landscape appears intact. Deviations may be present, but must repeat form, line, color, texture, and pattern common to the landscape character so completely and at such a scale that they are not evident.
- Moderate: The landscape appears slightly altered. Noticeable deviations are visually subordinate to the character.
- Low: The landscape appears moderately altered. Deviations may be dominant, but are shaped to borrow from the natural landform and other visual dominance elements (line, form, texture, color), and are subordinate to the characteristic landscape when viewed as background.
- Very Low: Deviations are dominant, but borrow from the natural terrain, and other elements common to the characteristic landscape.

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. Approximately 2.6 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 is 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 3-36 summarizes the impacts to views from sensitive viewpoints in South Dakota.

Table 3-36 - 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	**11.9** (1.0 mile IFG views; 10.9 miles FG views)	**11.7** (0.4 mile FG views; 11.3 miles MG views)	23.6

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. Generally, texture would not be apparent and the transmission line would appear as a uniform color in the landscape. However, when the viewpoint is in direct alignment with the cleared ROW, the textural contrast between the fine grass / shrub component in the ROW and the surrounding coarse forest would be readily apparent. During snow-covered conditions, the snow covered ROW would appear as a white line across the dark forested landscape in the middleground and background distance zones. 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.

High impacts to viewers in the foreground distance zone and Low impacts to viewers in the middleground distance zone would occur where a single 230 kV transmission line and multiple 69 kV transmission lines would be paralleled in all vegetation types, or a single 230 kV and single 69 kV transmission lines would have parallel routes in shrub land vegetation types.

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 3-36** 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 looking north from 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 and above 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 not introduce a new visual form into the area but would result in a 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 Centennial Trail

The Centennial Trail would also be crossed once by the T-O-RC Project. Views of the Project down the cleared ROW at the crossing location similar to that described above for the Mickelson Trail would occur. The visual impacts would be high and moderate as described above.

3.7.2.2.1.1.3.5 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

The proposed transmission line would be visible in the immediate foreground and foreground from I-90 where it crosses I-90 on private land and in the middleground where it borders BNHF lands west of I-90.

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 3-12**.

Deerfield Road would be crossed by the Project on BHNF lands and would have immediate foreground views of approximately 0.4 mile of the proposed Project. High and moderate impacts to views from Deerfield Road would occur.

Nemo Road would be crossed by the Project on BHNF lands and would have immediate foreground views of approximately 0.1 mile, foreground views of approximately 1.1 miles and approximately 0.2 mile of middleground views of the proposed Project. High impacts to views from Nemo Road would occur.

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 3-37 summarizes the impacts to scenic attractive classes in South Dakota.

Table 3-37 - 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	9.7	4.3	0.1	22.9
Class C (Common	1.8	3.0	0	1.6	6.4
Total Miles	13.6	17.2	4.3	1.7	36.8

*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. Overall, as the visibility of non-natural appearing elements increase in the viewed landscape, the natural appearance of that viewed landscape diminishes and ESI would be reduced.

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: 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 and approximately 0.15 miles farther from the reservoir than the Proposed Action, the overall distance of transmission line that would be viewed from sensitive viewpoints and overall mileage of high and moderate impacts would be shorter. In addition, 3e would be located within 150 feet of one residence in the area.

Route Modification 3f: Route 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. Modification 3f would not be located within 150 feet of any residences in the area and would be approximately 1.0 mile farther from the reservoir than the Proposed Action.

Route Modification 3g: Route Modification 3g (Hidden Valley) would result in greater visual impacts on private lands than the Proposed Action. Because of the proximity of this modification to some residences in the area, it was thought that it could result in high visual impacts for residences located in the immediate foreground and foreground distance zones. In order to determine the extent of visual impacts to residences closest to this route, a visual simulation was prepared from one of these residences on Wilderness Trail Road. A visual analysis of Route Modification 3g indicated that the line in this location would not be visible from these residences because it would be located well below them on the landscape in the canyon immediately north. However, the cleared 100-foot wide ROW could provide some views to the transmission line in this location. If mountain pine beetle (MPB) were to affect the trees in this

area and there is a high mortality of trees, the powerlines and/or poles along this route could create a potential High visual impact because it would be in close proximity to numerous homes. Likewise, the Proposed Action and Modification 3j would not be visible from these homes unless the MPB were to affect the intervening trees. An additional visual simulation was conducted of this route modification near the residences in the immediate vicinity and is discussed under Route Modification 3j below. This route modification (3g) would result in more extensive moderate visual impacts for travelers along SD Highway 44 in middleground views of this modification.

Route Modification 3h: Route Modification 3h (Deerfield Road) would be located completely on BHNF lands. It would result in lower visual impacts to the residences on private lands in Mountain Meadow Resort. It would result in greater visual impacts on BHNF lands than the Proposed Action. It would be visible in the foreground to travelers along Deerfield Road in some areas and would be visible in the middleground to viewers using Deerfield Road and the parking lot south of Deerfield Reservoir as shown in the visual simulation in **Figures 3-14.**

Route Modification 3i: Route Modification 3i (Deerfield Road 2) would also be located completely on BHNF lands and would have similar visual impacts to private residences, travelers on Deerfield Road, and users of the parking area at the south end of Deerfield Reservoir as those described for Modification 3h. In addition, it can be seen in the foreground along a portion of Deerfield Road west of 3h. However, it would be less visible from a nearby American Indian religious site as shown in the visual simulations in **Figure 3-15 and 3-16**. **Figure 3-15** shows the comparative visibility of the Proposed Action, Route Modification 3b, and Route Modification 3h and **Figure 3-16** shows the visibility of Route Modification 3i. The simulations show that Route Modification 3i would be more concealed by topography that the other route options in the area.

Route Modification 3j: Route Modification 3j (Ponderosa Ridge) would cross more BHNF lands than the Proposed Action. It would be more visible to travelers on the western portion of Hidden Valley Road but would have less extensive visual impacts to residences located along the western portion of Sun Ridge Road than Modification 3g. **Figure 3-17** shows the existing view from a point on Sun Ridge Road near its intersection with Echo Drive. **Figure 3-18** contains the visual simulation from this location of Modification 3g and Modification 3j. Modification 3j would not be visible from this point. As can be seen in **Figure 3-18**, the conductor (wires) associated with Route 3g would be visible high in the immediate foreground where the line would span the road. It also shows the he top of one structure associated with Modification 3g would be visible in the middleground of this view. Modification (3j) would also have less visual impacts to middleground views for travelers along SD Highway 44.

Summary As described above, in the Pactola Reservoir area, two route modifications were developed (3e and 3f) to lessen visual impacts by moving the line farther from the reservoir. Modification 3e would be approximately 0.15 miles farther from the reservoir than the Proposed Action and Modification 3f would be approximately 1.0 mile farther from the reservoir. Modification 3e would be near one residence in the area while 3f would be near no residences.

In the Deerfield area, two route modifications (3b and 3h) were developed to lessen impacts to residences in the Mountain Meadow Resort. Modification 3h would reduce the visibility of the line from the residences to a greater extent than 3b because it would be located farther from them but could be more visible to travelers on Deerfield Road because it would be closer to the road. Route Modification 3i was developed in this same area to lessen potential visual impacts of modifications 3b and 3h to a nearby American Indian religious site. It would have similar impacts to the residences in the Mountain Meadow Resort and travelers along Deerfield Road than Modification 3h, but would be less visible from the American Indian religious site.

In the area of Sun Ridge Road, Modification 3g was originally developed to lessen potential impacts to mining operations in the area. However, by moving the line to this location, the line would be close to residences on private lands along Sun Ridge Road. Modification 3j was developed to reduce the potential impacts to the residences and private landowners in the area. Modification 3j would be less visible to the viewers in this area than both the Proposed Action and modification 3g.

The Black Hills LRMP provides Guidelines for scenic resources. Due to the dynamic nature of changes to vegetation cover on the Black Hills and the permanency of a transmission line, vegetative screening is not considered when determining whether the prescribed SIOs are projected to be achieved. Form, line, color, scale and texture are the key metrics utilized to determine how well management or structures in the landscape would achieve the desired SIOs.

For US and State Highways, and Recreation areas:

- A High SIO is prescribed for the foreground, but a Low SIO is expected to be achieved in this foreground distance zone due to the scale of the structures and visibility of the transmission lines in close proximity to the viewer.
- A Moderate SIO is prescribed for the middleground, however only a Low SIO is expected to be achieved in this distance zone in areas where the line would not be screened from view by intervening topography. In some locations within the middleground distance zones where there is partial landform screening, the prescribed SIO may be achieved.

For remaining areas:

- A Moderate SIO is prescribed for the foreground, but a Low SIO is expected to be achieved in this foreground distance zone due to the scale of the structures and visibility of the transmission lines in close proximity to the viewer.

A Low SIO is prescribed for the middleground and is expected to be achieved in this distance zone.

3.8 RECREATION

The geographic analysis area for recreation includes the network of existing and proposed facilities, such as developed recreation sites (campgrounds, trailheads, picnic areas), recreation residences, trails and a visitor center 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 camping, biking, hiking, horseback riding, cross-country skiing, hunting, fishing, wildlife viewing, snowmobiling, OHV use, swimming and boating. **Figure 3-19** depicts the location of these recreation resources.

3.8.1.1.1 Campgrounds, Boat Launches, Marinas, Picnic Areas and Swim Beaches

Campgrounds, boat launches, marinas, picnic areas and swim beaches are located at the Deerfield Reservoir Complex, Pactola Reservoir Complex, Ditch Creek Campground, and Redbank Springs 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. Mallo 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 (Custer Trail, Dutchman and Whitetail), two picnic areas (Lakeshore and Mountain City) three trailheads (Custer Trails, Gold Run and North Shore) and two boat launches in the complex. Recreation opportunities include camping, picnicking, boating, fishing, hiking, biking, horseback riding, snowmobiling and wildlife-viewing. Boating speed is restricted to 5 mph on the Reservoir. 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 3-20** shows the recreation resources near Deerfield Reservoir.

3.8.1.1.1.2 Pactola Reservoir Complex

Pactola Reservoir is the largest and deepest reservoir on the Black Hills National Forest, features 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 camp, picnic, boat, fish, hike, bike, ride horse and swim. Two Centennial Trail trailheads, Rapid Creek and Tamarack Gulch, serve hikers, horseback riders, and mountain bikers (USFS 2012a). Outfitters in the area operate under special use permits to provide recreation opportunities such as guiding fly-fishing trips to individuals and groups on the BHNF. **Figure 3-21** shows the recreation resources near Pactola Reservoir.

Lake trout fishing and fly-fishing below the spillway is popular. Fly-fishing occurs along Rapid Creek in the Pactola Basin from the stilling pond to a couple of miles downstream. Reservoir facilities include a full service marina under special use permit with parking for cars and trailers, gasoline and oil, groceries and food service, showers, potable water, and a vault restroom. Forest facilities include a visitor center, campgrounds, swim beach, picnic areas, overlooks, 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).

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 Springs located just northwest of the South Castle Road-Briggs Springs Road intersection.

3.8.1.1.2 Recreation Residences and Organizational Camps

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 Hisega area approximately one mile south of Highway 44 and two lots located one half mile west of Hisega off Log Porch Road to the north of Highway 44. Eight recreation residences are located around Pactola Reservoir and one isolated recreation residence is approximately one half of a mile south of Deerfield Reservoir on Ditch Creek Road.

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 Non-motorized 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 limited to a portion near Dalton Lake (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 Non-Motorized Trails

The Deerfield Trail is 23 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. 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.

The Aspen Trail leads from the Visitor Center down a short grade approximately 250 feet to the shore of Pactola Reservoir.

3.8.1.1.4 Hunting

Visitors hunt in the BHNF for big game and small game species, including bighorn sheep, deer, elk, antelope, game birds, mountain lion, rabbits, and turkeys. Outfitters under special use permit provide guided hunting opportunities on National Forest lands. 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 Motorized Trails

Per the BHNF's January 1, 2014 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 a previously used powerline corridor. USFS Trail 3550, along with most of the other OHV trails in the Project analysis area, is only open for use from May 15 through December 15. The remaining OHV 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, hiking, horseback riding, mountain biking, 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.

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 Newcastle Field Office (NFO) is limited and thus these parcels have relatively high recreational value when compared to other non-accessible lands administered by the NFO.

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. The Proposed Action could cause crowding at Mallow Camp, Beaver Creek Campground, or other campgrounds in the vicinity if used by construction workers. 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 likely start in 2015 from early spring to late fall each year over a two year period and be completed in 2016, 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, OHV trails would be crossed 12 times and snowmobile trails would be crossed two times by the proposed transmission line. Both the Mickelson and Centennial Trails would be crossed once each.

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, 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 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.

Trail/road closure during project construction would be approved by the BHNF on a case by case basis. Trails/roads are typically not closed during project construction, unless there are health and safety concerns. If trails/roads are closed, they are only temporarily closed during specific construction times. After the construction phase of each segment, the trails and roads identified in the MVUM and/or snow mobile trail system would be open for public use, even if it is within the transmission line ROW.

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 effects to 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 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.

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.

3.8.2.2.2.1.2 Private Land

Public access to private lands is managed by the individual landowners. The impacts to land use and land management on private lands are discussed in Section 3.1.2.2.2.1.1. The proposed project would not be expected to impact recreation on private lands in Wyoming as access to these lands would continue to be managed by the landowners.

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), Route Modification 3g (Hidden Valley), or Route Modification 3j (Ponderosa Ridge) 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 OHV 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. Route Modification 3h (Deerfield Road) would have two more crossings of snowmobile trails than the Proposed Action. Route Modification 3i (Deerfield Road 2) would have four more crossings of snowmobile trails than the Proposed Action.

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 3-38 lists the weed species relevant to the Project analysis area and whether they have been documented in the analysis area in South Dakota.

Table 3-38 - Invasive and Noxious Weeds of South Dakota that Could Occur Within Alternative 2 and 3 Project Area

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. Likewise, nearly all of the BLM and private lands in Wyoming are also 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. 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. Likewise, nearly all private lands in the area are also annually grazed. The distribution of livestock grazing within the allotments and on private lands 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 3-39** lists the weed species with potential to occur on federal, state, and private lands within the analysis area in Wyoming.

Table 3-39 - 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 (giant whitetop)	Yes	TBNG, BLM	Y
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 3-20**, 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 affected during construction and maintenance activities.

Range improvement structures would be avoided or repaired as soon as possible 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 would 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, BLM lands, State lands, and private 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 and private 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 on federal, state, and private lands 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 would be developed as part of the Construction, Operation, and Maintenance (COM) Plan in consultation with the land managing agencies and private landowners 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 would be provided as part of implementation of the project-specific Weed Management Plan. The plan would include specific measures to control the type and distribution of weed species located in the proposed project area.

3.9.2.2.2.1.2 Private Lands

As mentioned above, potential impacts to range resources and the control of noxious weeds would be similar on private lands and public lands crossed by the project. The private landowners would be consulted during final design to identify the need to address specific range issues or improvements and the control of weeds on their property. Also, the revegetation plan for any disturbed areas on their property would be developed in coordination with the landowner. The project design criteria outlined in **Appendix B** for these resources would be applied to private lands as well as federal and state lands.

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 through 3j and the corresponding section of the Proposed Action they would each replace are in close proximity to one another and all within the Project analysis area. Therefore, the range resources and potential weed species would generally be the same.

Route Modification 3b: This route modification would impact five acres, including less than one acre of grasslands and nearly five acres of ponderosa pine. The corresponding section of the Proposed Action that would be replaced if this modification would be implemented would impact nearly five acres of ponderosa pine. Tree removal would be expected to increase forage production by almost five acres for both Route Modification 3b and the corresponding section of the Proposed Action.

Both Modification 3b and corresponding section of the Proposed Action would result in nearly five acres of disturbed land, and thus would have a similar potential for noxious weed infestations.

Route Modification 3c: This route modification would impact six acres including four acres of grasslands and two acres of ponderosa pine. The corresponding segment of the Proposed Action that would be replaced if this modification would be implemented would impact less than one acre of grasslands and less than one acre of ponderosa pine. Route Modification 3c would result in an expected increase of one additional acre in forage production from tree removal as compared with corresponding section of the Proposed Action.

This modification contains a water-storage pond and the proposed ROW contains no range improvement structures. The water-storage pond would be avoided and would be repaired if inadvertently impacted.

Route Modification 3c contains four more acres than the corresponding section of the Proposed Action resulting in more disturbed land, and thus more potential for noxious weed infestations.

Route Modification 3d: This route modification would impact five acres of ponderosa pine. The corresponding segment of the Proposed Action that would be replaced if this modification would be implemented would impact four acres of ponderosa pine. Route Modification 3d would result in an expected increase of one additional acre in forage production from tree removal compared with corresponding section of the Proposed Action.

Route Modification 3d contains one more acre than the corresponding section of the Proposed Action resulting in more disturbed land, and thus more potential for noxious weed infestations.

Route Modification 3e: This route modification would impact five acres of ponderosa pine. The corresponding segment of the Proposed Action that would be replaced if this modification would be implemented would impact eleven acres of ponderosa pine. Tree removal on six additional acres would be expected to increase forage production more for the corresponding section of the Proposed Action compared with Route Modification 3e.

This modification contains no range improvement structures while the corresponding portion of the Proposed Action would cross a fence two times. If the fences needed to be crossed during construction, gates would be installed and they would be repaired to landowner specification. Gates would be closed after use.

The corresponding section of the Proposed Action contains six more acres than Modification 3e resulting in more disturbed land, and thus more potential for noxious weed infestations.

Route Modification 3f: This route modification would impact 25 acres, including 24 acres of ponderosa pine and one acre of aspen/birch. The corresponding segment of the Proposed Action that would be replaced if this modification would be implemented would impact 38 acres, including 37 acres of ponderosa pine and one acre of aspen/birch. The corresponding section of the Proposed Action would result in an expected increase of 12 additional acres in forage production from tree removal as compared with Route Modification 3f.

The corresponding section of the Proposed Action contains 13 more acres than Modification 3e resulting in more disturbed land, and thus more potential for noxious weed infestations. Areas where access roads may need to be improved for this modification have more weed species than the Proposed Action and associated roads.

Route Modification 3g: Route Modification 3g contains lands dominated by ponderosa pine interspersed by small patches of prairie grassland habitat. This route modification would impact four acres of ponderosa pine. The corresponding segment of the Proposed Action that would be replaced if this modification would be implemented would impact five acres, including one acre of grasslands and four acres of ponderosa pine. Tree removal would be expected to increase forage production by four acres for both Route Modification 3g and the corresponding section of the Proposed Action.

The corresponding section of the Proposed Action contains one more acre than Modification 3g resulting in more disturbed land, and thus more potential for noxious weed infestations.

Route Modification 3h: This proposed route modification would impact 22 acres including two acres of grasslands and 20 acres of ponderosa pine. The corresponding segment of the Proposed Action that would be replaced if this modification would be implemented would impact 19 acres including one acre of grassland and 18 acres of ponderosa pine. Route Modification 3h would result in an expected increase of two additional acres in forage production from tree removal compared with the corresponding section of the Proposed Action.

Route Modification 3h would impact three more acres than the corresponding section of the Proposed Action resulting in more disturbed land, and thus more potential for noxious weed infestations.

Route Modification 3i: This proposed route modification would impact an estimated 34 acres, including two acres of grasslands, 30 acres of ponderosa pine, and two acres of white spruce. The corresponding segment of the Proposed Action that would be replaced if this modification would be implemented would impact 32 acres, including one acre of grasslands and 31 acres of ponderosa pine. Route Modification 3i would result in an expected increase of one additional acre in forage production from tree removal compared with the corresponding section of the Proposed Action.

Route Modification 3i would impact two more acres than the corresponding section of the Proposed Action resulting in more disturbed land, and thus more potential for noxious weed infestations.

Route Modification 3j: This proposed route modification would impact an estimated 16 acres, including two acres of grasslands and 14 acres of ponderosa pine. The corresponding segment of the Proposed Action that would be replaced if this modification would be implemented would impact nine acres, including nearly one acre of grasslands and eight acres of ponderosa pine. Route Modification 3j would result in an expected increase of six additional acres in forage production from tree removal as compared with the corresponding section of the Proposed Action.

Route Modification 3j contains seven more acres than the corresponding section of the Proposed Action resulting in more disturbed land, and thus more potential for noxious weed infestations.

3.9.2.3.2 Wyoming

3.9.2.3.2.1 Direct/Indirect Effects

Route Modification 3a: 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. Most of the analysis area is vegetated with upland forests and woodlands that are dominated by ponderosa pine (*Pinus ponderosa*) (**Table 3-5** in Wildlife section). 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 (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 19,426 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 1,913 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 (*Phleum pretense*), Kentucky bluegrass (*Poa pratensis*), 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. These high elevation grasslands are endemic to the Black Hills of western South Dakota and northeastern Wyoming. These grasslands are native and typically dominated by grass species but also support a variety of forb species (Marriott and Faber-Langendoen 2000).

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 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 474 (80 percent of the total 592 acres of aspen on BHNF) 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 plant surveys conducted in 2012, 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 104 wetlands. One documented fen, the Dutchman Fen complex, is located on Dutchman Creek within the Analysis Area, approximately 32 feet south of the proposed ROW.

Mountain wetlands include fens, bogs, marshes, wet meadows, and various shrub and forested wetlands (Windell et al. 1986). Fens and bogs occur on organic or organic-rich mineral soils in areas where the water table is near the surface for much of the year. Fens are common in the Rocky Mountains, Sierra Nevada, and other western mountain ranges. They 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 willows (e.g., *Salix planifolia, S. wolfii*) and dwarf birch (*Betula glandu- losa*) (Windell et al. 1986). Bogs, on the other hand, are not common in the region but may be found in Oregon, Washington, and the northern Rocky Mountains (NatureServe 2006). They are acidic and nutrient-poor, receiving much of their water from precipitation. Bogs usually support a moss layer dominated by Sphagnum and ericaceous shrubs (e.g., *Ledum spp.*) (Army Corps of Engineers, Western Mountains and Valleys Regional Supplement).

Fens are peat-forming wetlands that receive nutrients from sources other than precipitation: usually from upslope sources through drainage from surrounding mineral soils and from groundwater movement. Fens differ from bogs because they are less acidic and have higher nutrient levels. They are therefore able to support a much more diverse plant and animal community. These systems are often covered by grasses, sedges, rushes, and wildflowers. Some fens are characterized by parallel ridges of vegetation separated by less productive hollows. The ridges of these patterned fens form perpendicular to the downslope direction of water movement. Over time, peat may build up and separate the fen from its groundwater supply. When this happens, the fen receives fewer nutrients and may become a bog **(**EPA http://water.epa.gov/type/wetlands/fen.cfm).

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 or timothy 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 Region 2 Sensitive Plant Species on the BHNF

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, 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 sp.*), 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 occur at over 50 sites 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 (SDNHP 2012).

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 populations 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 forested fen (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), the willow population 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) – the Dutchman Fen complex that is located along Dutchman Creek, approximately 32 feet south of the Proposed Action ROW. 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 undocumented fens associated with South Fork Castle Creek, Dutchman Spring, Haystack Spring, Friday Gulch, Skull Gulch, and California Gulch Tributary.

Autumn willow was not located despite surveys conducted in the potentially suitable habitat of Prairie Creek. 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).

Narrowleaf sphagnum was not located despite conducting surveys in the potentially suitable habitat of Prairie Creek. 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 3-40**). No SOLC, including downy gentian, have been documented in the impact area, areas of proposed disturbance, 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 3-40**). 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 3-40 - 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

3.10.1.1.8 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. 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 3-41**). 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 3-41 - 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 3-41**). 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 3-41**). 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 3-41**). 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 3-41**). 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 3-41**.

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 large flower 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 would have "**no effect**" on federally-listed plant species.

3.10.2.2.1.1.2 Region 2 Sensitive Plant Species on the BHNF

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 Black Hills Montane Grassland and grassland/bluegrass. In the analysis area, there are 48 acres of Black Hills Montane Grassland and 1,894 acres of grassland (predominantly non-native dominated grasses). Of this, there are two acres of Black Hills Montane Grassland that would be in the proposed ROW, in or adjacent to roads that may need to be 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

or 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 592 acres of hardwoods (aspen) 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. See the Wetlands section for detailed information regarding stream crossings and wetlands related to streams. 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 would 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 Region 2 Sensitive Plant Species on the BHNF

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 temporal boundary for cumulative effects on grassland-associated sensitive plant species is two to ten years. This temporal boundary is based on the expected time required for grassland habitats in the analysis area to re-establish.

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.

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 include 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, the removal of trees in some areas could allow grasses and other desirable forage to establish, thereby providing additional grazing opportunities that may in turn lessen the impact and use on meadows, riparian areas, and wet areas.

Under the Proposed Action, there would be new surface disturbance, creating the potential for habitat degradation or loss of grassland habitats that may support R2 sensitive plant species. These potential effects would be minimized by using PDFs and mitigation measures which would be expected to be successful. The potential effects under implementation of this alternative on grassland-associated sensitive plant species combined with the effects associated with past and reasonably foreseeable actions would not be expected to result in long-term detrimental effects on these species. This determination is based on the lack of occurrence of grassland-associated sensitive species in areas proposed for disturbance and for the expected effectiveness of the PDFs and mitigation measures to avoid, reduce, and minimize effects on these species.

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. The temporal boundary for cumulative effects on white spruce/hardwood-associated sensitive plant species is 10 to 50 years. This temporal boundary is based on the expected time required for these habitats in the analysis area to re-establish.

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. The potential effects under implementation of this alternative on white spruce/hardwood-associated sensitive plant species combined with the effects associated with past and reasonably foreseeable actions would not be expected to result in long-term detrimental effects on these species. This determination is based on the lack of occurrence of Region 2 sensitive species in areas proposed for disturbance and for the expected effectiveness of the PDFs and mitigation measures to avoid, reduce, and minimize effects on these species.

Wetland/Riparian/Aquatic Associated Species

The cumulative effects for wetland/riparian associated species would be 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. The temporal boundary for cumulative effects on wetland/riparian/aquatic-associated sensitive plant species is 10 to 50 years. This temporal boundary is based on the expected time required for these habitats in the analysis area to re-establish.

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 Region 2 Sensitive Plant Species on the BHNF

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 native grassland in the impact area is dominated by non-native herbaceous species, there is habitat 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 therefore unaffected. Where surface disturbance does occur, *Botrychium sp*. may benefit 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 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 would 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 would 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 seeps. There is only one confirmed fen in the analysis area, the Dutchman Fen complex 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 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. Suitable habitat types for SOLC are similar to the habitat associations for Region 2 sensitive plant species. Therefore, design criteria and project design features would also protect habitats that may support SOLC species.

3.10.2.2.1.1.4 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 would 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 Region 2 Sensitive Plant Species on the TBNG

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 large flower 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.

3.10.2.2.2.1.6 Private Lands

As shown in **Table 3-41**, the private lands in the Project area in Wyoming contain the same cover types as the federal and state lands with grasslands being the most common type. The impacts to botanical resources on private lands would be similar to those described above and they would be mitigated through adherence to the measures identified in **Appendix B**: Design Criteria, Mitigation, and Monitoring.

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 3b: This route modification would impact five acres, including less than one acre of grasslands and nearly five acres of ponderosa pine. The corresponding segment of the proposed ROW would impact nearly five acres of ponderosa pine.

Route Modification 3c: Grassland habitats are similar between the proposed ROW and Route Modification 3c, except that Route Modification 3c has more mapped Black Hills 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. This route modification would impact six acres, including less than four acres of grasslands and nearly two acres of ponderosa pine. The corresponding segment of the proposed ROW would impact nearly two acres, including less than one acre of grasslands and less than one acre of ponderosa pine.

Route Modification 3d: This route modification would impact five acres of ponderosa pine. The corresponding segment of the proposed ROW would impact four acres of ponderosa pine.

Route Modification 3e: 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. This route modification would impact five acres of ponderosa pine. The corresponding segment of the proposed ROW would impact 11 acres of ponderosa pine.

Route Modification 3f: This route modification would impact 25 acres, including 24 acres of ponderosa pine and one acre of aspen/birch. The corresponding segment of the proposed ROW would impact 38 acres, including 37 acres of ponderosa pine and one acre of aspen/birch.

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. This route modification would impact four acres of

ponderosa pine. The corresponding segment of the proposed ROW would impact five acres, including one acre of grasslands and four acres of ponderosa pine.

Route Modification 3h: This proposed route modification would impact 22 acres including two acres of grasslands and 20 acres of ponderosa pine. The corresponding segment of the proposed ROW would impact 19 acres including one acre of grassland and 18 acres of ponderosa pine. The acres of dominant vegetation communities associated with this route modification, grasslands and ponderosa pine, differ only slightly (less than three acres) from the corresponding portion of the Proposed Route that would be avoided

Route Modification 3i: This proposed route modification would impact an estimated 34 acres, including one acre of grasslands, 30 acres of ponderosa pine, and two acres of white spruce. The corresponding segment of the proposed ROW would impact 32 acres, including one acre of grasslands and 31 acres of ponderosa pine.

Route Modification 3j: This proposed route modification would impact an estimated 16 acres, including two acres of grasslands and 14 acres of ponderosa pine. The corresponding segment of the proposed ROW would impact nine acres, including one acre of grasslands and eight acres of ponderosa pine.

3.10.2.3.2 Wyoming

3.10.2.3.2.1 Direct/Indirect Effects

Route Modification 3a: The impacts to vegetation resulting from Route Modification 3a would be the same as the Proposed Action.

3.11 TIMBER/SILVICULTURE

The geographic analysis area for timber/silviculture is one-mile wide centered on the proposed route for the line.

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 one mile wide 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 3-42**).

Table 3-42 - 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 and includes Alternative 3. 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 except in the Stateline/Stots Canyon Area and the Plum Creek area, where ponderosa pine dominates. In the Plum Creek parcels, there is a significant inclusion of Rocky Mountain juniper. In the Stateline/Stots Canyon area there is limited aspen in the lower portions of the canyon and some intermingled Rocky Mountain juniper. The Stots Canyon area is currently under development for a timber sale. Previous work here has included pre-commercial thinning/hazardous fuels reduction projects. The steep slopes of Stots Canyon (20+%) includes a stand of old growth ponderosa pine with an establishment date of the mid 1700's. The Plum Creek area is currently managed for wildlife habitat with no planned forest management projects

Timber species are a minor component of BLM lands. There are no specific BLM management actions identified for timber within the analysis area**.**

According to the Newcastle Forester, a forest inventory has just been completed in preparation for a timber sale for the BLM in the Stotts Canyon area along the stateline line and if the proposal follows the existing line trees would be impacted. The same is true for the Plum Creek area to the west of highway 16.

3.11.1.2.4 Private Land

The vegetation types on private lands within the Wyoming portion of the analysis area are primarily shrub steppe, grassland, ponderosa pine, and developed areas. Forested areas occur primarily in the eastern portions of the area near the state line with shrub steppe and grasslands more common in the majority of the area. There are no published plans for timber management on forested private lands in the 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 Proposed Action would utilize approximately 31.5 miles of an existing, currently unused ROW. Most of this ROW in South Dakota was cleared to a width of approximately 40 to 50 feet to accommodate the transmission line that was previously in this location. This old ROW would be widened to 100 feet including the removal of any regrowth that may have occurred. As this existing ROW is currently cleared of nearly all 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 would be part of the Project Construction Operation and Maintenance (COM) Plan which would 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 would 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). The overall structural stage distribution across the management areas would not be perceptibly altered with construction of the Proposed Action. **Table 3-43** 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 3-43**). Tree removal would decrease the potential for insect infestations on a local scale. Remaining trees adjacent to the Proposed Action area would have access to additional resources such as water and sunlight as a result of tree removal within the Proposed Action area. All removed timber would be decked and processed according BHNF requirements to limit the potential for mountain pine beetle infestations to the adjacent trees.

Table 3-43 - 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 NFS administered lands include weed control, fuels treatments, thinning and control, associated road construction, and fire including 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. 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. Present and foreseeable actions for NFS administered 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. . In the Stots Canyon area there is an estimated 8-10,000 MBF of commercial saw log material per acre (BLM and State lands). The Plum Creek area has an estimated 5-7,000 MBF of commercial saw log material per acre (BLM 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

Where tree clearing is needed on BLM lands, the project would be coordinated with the Newcastle Field Officer forester. As per CFR regulations any merchantable material removed from BLM lands must be paid for. The forest products would be sold to BHP using the appropriate forest product sales contract. .

3.11.2.2.2.1.3 State Land

Where tree clearing is needed on State lands crossed by the line, the Project would coordinate this activity with the Wyoming State Forestry Division.

3.11.2.2.2.1.4 Private Land

Where tree clearing is needed on private lands crossed by the line, the Project would coordinate this activity with the landowner as part of the ROW process.

3.11.2.2.2.2 Cumulative Effects

On BLM and State lands in the Stots Canyon area, there is a small timber sale currently being planned. There is only a very small area of the proposed ROW on TBNG lands that supports scattered ponderosa pine trees. 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.

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: Route Modification 3b is an approximate 500 foot deviation from the proposed route north for about one mile to avoid existing residences. This modification would result in 0.3 acres of additional tree clearing as compared with the corresponding section of the Proposed Action.

Table 3-43b - Structural Stages and Insect Hazard Ratings for NFS Lands that would be Disturbed with Modification 3b and Corresponding Proposed Action Section (acres)

Structural Stage	Structural Stage Definition	Insect Hazard Rating	Route Modification 3b	Corresponding Proposed Action Section
3A	Young forest; trees < 9 in. dbh; canopy cover < 40%	Medium	0.6	1.2
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Low	0.7	1.7
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	Medium	1.7	0.2
4C	Mature forest; trees at least 9 in. dbh; canopy cover >70%	Not Computed	1.7	1.3
Other[1]	Not categorized	Not categorized	1.0	0
TOTAL			5.7	4.4

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.

Route Modification 3c: Route Modification 3c is an approximate 1,000 foot deviation from the proposed route north for about one mile to avoid existing residences. This modification would result in 0.7 acres of additional tree clearing as compared with the corresponding section of the Proposed Action. Most of the area crossed by both this modification and the Proposed Action is composed of non-vegetated areas.

Table 3-43c - Structural Stages and Insect Hazard Ratings for NFS Lands that would be Disturbed with Modification 3c and Corresponding Proposed Action Section (acres)				
Structural Stage	**Structural Stage Definition**	**Insect Hazard Rating**	**Route Modification 3c**	**Corresponding Proposed Action Section**
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	Medium	1.6	0.9
Other[1]	Not categorized	Not categorized	18.0	19.6
TOTAL			**19.6**	**20.5**

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.

Route Modification 3d: Route Modification 3d 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 would result in 0.8 acres of additional tree clearing as compared with the corresponding section of the Proposed Action.

Table 3-43d - Structural Stages and Insect Hazard Ratings for NFS Lands that would be Disturbed with Modification 3d and Corresponding Proposed Action Section (acres)				
Structural Stage	**Structural Stage Definition**	**Insect Hazard Rating**	**Route Modification 3d**	**Corresponding Proposed Action Section**
3B	Young forest; trees < 9 in. dbh; canopy cover 40-70%	Medium	0.1	0.0
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	Medium	2.7	1.4
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	High	0.0	1.1
4C	Mature forest; trees at least 9 in. dbh; canopy cover >70%	High	2.4	1.9
TOTAL			5.2	4.4

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.

Route Modification 3e: Route Modification 3e avoids the Pactola Reservoir, a visually sensitive area identified in the LRMP. This modification would result in six fewer acres of tree clearing as compared with the corresponding section of the Proposed Action.

Table 3-43e - Structural Stages and Insect Hazard Ratings for NFS Lands that would be Disturbed with Modification 3e and Corresponding Proposed Action Section (acres)				
Structural Stage	**Structural Stage Definition**	**Insect Hazard Rating**	**Route Modification 3e**	**Corresponding Proposed Action Section**
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Low	0.3	0.3
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Medium	2.8	3.2
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Not computed	1.2	0.0
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	Medium	0.9	6.5
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	Not computed	0.1	1.3
TOTAL			5.3	11.3
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.				

Route Modification 3f: Route Modification 3f would also avoid the Pactola Reservoir area and follows approximately two miles of previously cleared ROW. This modification would result in 13.8 fewer acres of tree clearing as compared with the corresponding section of the Proposed Action..

Table 3-43f - Structural Stages and Insect Hazard Ratings for NFS Lands that would be Disturbed with Modification 3f and Corresponding Proposed Action Section (acres)				
Structural Stage	**Structural Stage Definition**	**Insect Hazard Rating**	**Route Modification 3f**	**Corresponding Proposed Action Section**
2	Seedlings and saplings	Low	1.4	2.2
2	Seedlings and saplings	Medium	0.0	0.5
3A	Young forest; trees < 9 in. dbh; canopy cover < 40%	Low	0.0	2.4
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Low	11.2	11.2
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Medium	9.2	11.3
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Not computed	2.9	1.0
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	High	0.0	1.6
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	Medium	0.0	6.5
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	Not computed	0.0	1.7
TOTAL			24.6	38.4
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.				

Route Modification 3g: Route Modification 3g 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. This modification would have 0.4 fewer acres of tree clearing as compared with the corresponding section of the Proposed Action.

Table 3-43g - Structural Stages and Insect Hazard Ratings for NFS Lands that would be Disturbed with Modification 3g and Corresponding Proposed Action Section (acres)

Structural Stage	Structural Stage Definition	Insect Hazard Rating	Route Modification 3g	Corresponding Proposed Action Section
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Medium	0.0	1.4
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Not computed	0.0	0.5
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	Medium	0.0	2.4
4C	Mature forest; trees at least 9 in. dbh; canopy cover >70%	Medium	4.0	0.0
Other[1]	Not categorized	Not categorized	0.0	0.9
TOTAL			4.0	5.3

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.

Route Modification 3h: Route Modification 3h is located on BHNF lands south of Deerfield Road between Williams Draw Road and Deerfield Cove Road. At the widest point, it would be approximately 2,200 feet north of the Proposed Action and about 1,700 feet north of Route Modification 3b. It would cover a distance of nearly 1.9 miles and was developed to move the line farther from existing residences. This modification would result in 1.5 acres of additional tree clearing as compared with the corresponding section of the Proposed Action.

Table 3-43h - Structural Stages and Insect Hazard Ratings for NFS Lands that would be Disturbed with Modification 3h and Corresponding Proposed Action Section (acres)

Structural Stage	Structural Stage Definition	Insect Hazard Rating	Route Modification 3h	Corresponding Proposed Action Section
3A	Young forest; trees < 9 in. dbh; canopy cover < 40%	Medium	0.0	1.2
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Low	1.2	8.3
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Medium	1.7	0.0
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	Medium	14.5	7.1
4C	Mature forest; trees at least 9 in. dbh; canopy cover >70%	Not Computed	0.0	1.4
Other[1]	Not categorized	Not categorized	1.7	2.6
TOTAL			21.2	20.6

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.

Route Modification 3i: Route Modification 3i, at the widest point, would be approximately 2,500 feet north of the Proposed Action. It would cover a distance of nearly 2.9 miles. This modification would result in 0.8 acres of additional tree clearing as compared with the corresponding section of the Proposed Action.

Table 3-43i - Structural Stages and Insect Hazard Ratings for NFS Lands that would be Disturbed with Modification 3i and Corresponding Proposed Action Section (acres)

Structural Stage	Structural Stage Definition	Insect Hazard Rating	Route Modification 3i	Corresponding Proposed Action Section
2	Seedlings and saplings	High	0.0	1.5
3A	Young forest; trees < 9 in. dbh; canopy cover < 40%	Low	0.0	1.9
3A	Young forest; trees < 9 in. dbh; canopy cover < 40%	Medium	0.0	1.2
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Low	0.4	8.3
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Medium	2.6	3.4
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	High	0.6	3.2
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Not computed	0.3	0.2
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	Medium	11.3	7.6
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	High	12.4	2.7
4C	Mature forest; trees at least 9 in. dbh; canopy cover >70%	Not computed	0.0	1.4
Other[1]	Not categorized	Not categorized	2.1	2.6
TOTAL			34.2	33.9

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.

Route Modification 3j: Route Modification 3j is a second route option developed in the Route Modification 3g area located between Hidden Valley Road and an area southwest of Sun Ridge Road. It would be located on the northern and western portions of a National Forest parcel in Section 30 for approximately 1.5 miles and then follow the section line between Sections 30 and 25 for about 0.4 miles across private lands to a point north of Sun Ridge Road where it would turn southwest for about 0.6 miles to reconnect with the Proposed Action route in Section 36 on National Forest land. This modification would result in 5.9 acres of additional tree clearing as compared with the corresponding section of the Proposed Action.

Table 3-43j - Structural Stages and Insect Hazard Ratings for NFS Lands that would be Disturbed with Modification 3j and Corresponding Proposed Action Section (acres)				
Structural Stage	**Structural Stage Definition**	**Insect Hazard Rating**	**Route Modification 3j**	**Corresponding Proposed Action Section**
3B	Young forest; trees < 9 in. dbh; canopy cover 40-70%	Medium	2.6	1.0
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Medium	2.4	2.5
4A	Mature forest; trees at least 9 in. dbh; canopy cover < 40%	Not Computed	1.3	1.1
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	Medium	3.1	2.4
4B	Mature forest; trees at least 9 in. dbh; canopy cover 40-70%	High	2.2	0.0
4C	Mature forest; trees at least 9 in. dbh; canopy cover >70%	Medium	1.9	0.6
Other[1]	Not categorized	Not categorized	1.3	0.9
TOTAL			14.8	8.5

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.

3.11.2.3.2 Wyoming

3.11.2.3.2.1 Direct/Indirect Effects

Route Modification 3a: Route Modification 3a 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 in the vernacular as a “Level I” or “Class I” review).

3.12.1.1 APPLICABLE LEGAL AUTHORITIES

The most relevant laws, regulations, executive orders, and agency 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 13007 and 13175
- Black Hills National Forest Land and Resource Management Plan
- Thunder Basin National Grassland 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 36 CFR §800 regulations and Section 101 of the NHPA, in addition to other authorities, address 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 authority of the NHPA.

Because TCPs are managed under 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 American Indian tribe or 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 a 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, the Advisory Council on Historic Preservation (ACHP), the South Dakota and Wyoming State Historic Preservation Officers (SHPOs), and in consultation with American Indian tribes that have historical ties to the lands in the APE, plan to execute 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)). At the time that the FEIS went to press, a final draft of the PA was being reviewed, but signatures had not yet been obtained. The Records of Decision will not be published until the PA has been signed and executed.

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 formally accepted the invitation.

Stipulations in the PA govern, in addition to other issues, the identification of potential historic properties, the determination of significance of the properties identified, the determination of effects, and, if needed, a process for resolving potential adverse effects.

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 defined in the PA as 62.5 feet either side of the right-of-way (ROW) centerline for a total width of 125 feet. The APE will also include, once specific locations are identified, 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 extends for two miles, or to the visual horizon, whichever is closer, on either side of the APE.

3.12.1.6 FIELD SURVEY

Archaeological field survey was initiated for this project in May 2014, however, it was not yet complete at the time of this publication. Field survey will be completed prior to commencement of implementation activities and according to stipulations in the PA being developed for the project (see Section 3.12.1.4)

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 directs 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 behalf, fulfilling their collective responsibilities under Section 106. The Black Hills National Forest has been designated lead agency for purposes of compliance with NHPA Section 106 mandates 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 have been invited to review the project proposal and the proposed treatments in an effort 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 the PA 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. One tribe 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.
- The Black Hills National Forest hosted a fourth tribal meeting on June 25, 2013, prior to publication of the DEIS, at which this project was summarized and questions were addressed.
- The most recent meeting was held on September 22, 2014 after the DEIS had been published and before the FEIS was complete.

Although no formal comments related to this project have been received from any tribal chair or council, comments received as a result of consultation completed for other projects suggest that tribal representatives generally do not support undertakings within the Black Hills that include ground-disturbing activities.

Consultation with tribal officials will continue as appropriate during the implementation phase.

3.12.1.7.2 Advisory Council on Historic Preservation

The Black Hills National Forest (BHNF), with a letter dated October 25, 2011, informed the ACHP of its intent, as lead agency, to develop a PA 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 and the ACHP is a signatory to the PA.

3.12.1.7.3 State Historic Preservation Officers

The BHNF, as lead agency, 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. Both SHPOs will be signatories to the PA. Consultation with the SHPOs will continue during the implementation phase pursuant to stipulations in the PA.

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 currently available data. In the vernacular of the cultural resources legal framework cited above, the affected environment will, by definition, be limited to the APE. It is important to reiterate that archaeological field survey, although underway, has not yet been completed for this project. As a result, no summary technical reports have yet been presented to the Agencies for review. The data presented in this section are derived exclusively from a review of existing literature.

The cultural resources site and survey data presented in the following discussion are significantly reduced in number from that reported in the DEIS. The variation was anticipated and predicted in the DEIS. At the time the DEIS was published, the Agencies involved in the development of the PA had not yet agreed on the specifics of the APE. Consequently, the data reported in the DEIS were based on a two-mile wide "study area", a width that was consistent with that reported for this project by some other disciplines. The Agencies have since agreed on the definition of the APE (see Section 3.12.1.5), resulting in a significant reduction in the quantity of archaeological sites and surveys reported in the FEIS.

The data presented in this section are limited to the 125-foot corridor (centered on the proposed route of the transmission line) as defined in the PA developed for this project. At the time that this FEIS was published, the results of field survey completed for the transmission line corridor, access and service roads in addition to ancillary areas such as staging areas and marshalling yards had not yet been submitted to the Agencies. Consequently, it is not currently possible to determine potential effects on all historic properties. Stipulations in the PA, however, address this issue and potential effects on historic properties will be analyzed after archaeological field survey is complete, but prior to initiation of construction activities.

Indirect effects on historic properties consider visual, audible, and atmospheric elements that could diminish the integrity of the properties for which setting, feeling, and/or association are qualifying characteristics of NRHP eligibility. The indirect APE for the Undertaking is defined in the PA as extending for two miles, or to the visual horizon, whichever is closer, on either side of the proposed ROW.

Table 3-44 provides a summary of previous archaeological investigations conducted in the 125-foot proposed corridor - centered on the proposed route of the transmission line. The data are separated by state and land manager/owner. In the State of South Dakota, 29 separate projects have been conducted within the 125-foot corridor. In Wyoming, 61 investigations have been recorded.

In South Dakota, approximately 623 acres, or 69%, of the 897-acre (125-foot) APE have been intensively surveyed in the past 20 years. In the State of Wyoming, approximately 355 acres, or 21%, of the 1,655-acre, 125-foot APE have been intensively surveyed after 1982 (when the Wyoming standards became more stringent).

Table 3-44 - Summary of Previous Cultural Resource Investigations

Agency	South Dakota	Wyoming
Black Hills National Forest	29	0
Bureau of Land Management	0	0
Thunder Basin National Grasslands	0	6
Wyoming State Lands	0	1
Private Lands	0	39
Multiple Agencies	0	15
Totals	**29**	**61**

A total of 35 cultural resource sites have been identified to date in the 125-foot APE corridor (**Table 3-45**). Of that number, 10 cultural resources qualify as—or have the potential to qualify as—historic properties. The remaining 25 resources have been determined not eligible for the NRHP pursuant to criteria found at 36 CFR §60.4. The total excludes all isolated finds (not eligible for the NRHP by definition).

Table 3-45 - Summary of all Previously Identified Cultural Resources

State	NRHP Eligible	NRHP Unevaluated	NRHP Not Eligible	Totals
South Dakota	5	2	18	**25**
Wyoming	1	2	7	**10**
Totals	**6**	**4**	**25**	**35**

Of the 35 cultural resources identified to date, 22 are located on lands managed by the BHNF, 11 on private lands, one on BLM-managed lands, and one that overlaps multiple jurisdictions (BHNF and private)(**Table 3-46**).

Table 3-46 - Land Ownership of Previously Identified Cultural Resources

Jurisdiction	South Dakota	Wyoming
Black Hills National Forest	22	0
Bureau of Land Management	0	1
Thunder Basin National Grasslands	0	0
Wyoming State Lands	0	0
Private Lands	2	9
Multiple Jurisdiction	1[1]	0
Totals	**25**	**10**

[1] One South Dakota site has boundaries that overlap two landowner jurisdictions.

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 125-foot APE. Two NRHP-listed properties are located within two-miles of the proposed corridor, neither of which is located in the 125-foot corridor. Both NRHP-listed properties are located in the State of South Dakota.

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 APE 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 nine Alternative 3 route modifications). In South Dakota, the proposed route 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 29 cultural resources investigations have been conducted within the 125-foot corridor since 1994 on the South Dakota side of the project (**Table 3-44**). All of the 29 investigations consisted of intensive surveys conducted on some portion of the BHNF; no field investigations have yet been reported on private lands. An intensive survey typically consists of pedestrian transects spaced no greater than 30 meters (100 feet) apart. Earlier surveys (1970s-1980s) sometimes employed transects spaced at greater intervals.

Alternative 3 addresses issues at 10 locations throughout the proposed ROW. A significant percentage of the proposed modifications have been inventoried for cultural resources. A cultural resources summary of the nine South Dakota modifications is provided in **Table 3-47**.

Table 3-47 - Previous Cultural Resources Investigations in Alternative Routes

Alt.	Name	Description	Percent Inventoried	Land Owner
3b	Mountain View	Deviation 500 foot north of Proposed Action 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	Deviation 2,500 foot deviation south of Proposed Action for about one 1.5 miles to avoid planned quarry operations	0	BHNF/Private
3h	Deerfield Road	Deviation 2,200 foot north of the Proposed Action route for about 1.9 miles to locate further from existing residences	85	BHNF
3i	Deerfield Lake 2	Deviation 2,500 foot north of the Proposed Action for about 2.9 miles to minimize visual effects the transmission line may have on a nearby American Indian religious-use site.	61	BHNF
3j	Ponderosa Ridge	Deviation 2,600 foot north of the Proposed Action for about one mile in response to public comments	43	BHNF/Private

3.12.2.1.2 Cultural Sites

A total of 25 cultural resources have been documented in the State of South Dakota within the 125-foot corridor. Of these, two are located on private property and a third straddles federal/private lands. The remaining 22 cultural resources are located on lands administered by the BHNF.

Table 3-48 enumerates previously identified cultural sites in the 125-foot corridor delineated according to chronological framework and NRHP eligibility. Of the 25 resources recorded in the South Dakota APE, 17 are limited to historic-era components consisting of structural remains or foundations, a 1930s era logging camp, mining sites with adits, prospect pits, or mine shafts, a deteriorating cabin, segments of historic railroads, segments of stone retaining walls, stone culverts dating to the CCC period, a section of flume, and a small portion of the Cheyenne to Deadwood Stage Road.

Table 3-48 - Cultural Resources Previously Identified in South Dakota

Site Type	NRHP Eligible	NRHP Unevaluated	NRHP Not Eligible	Totals
Historic Sites	1	0	16	**17**
Prehistoric Sites	4	1	2	**7**
Multicomponent Sites	0	1	0	**1**
Totals	**9**	**3**	**13**	**25**

One historic resource has been determined eligible for listing on the NRHP. The remaining 16 historic-era resources have been determined not eligible for the NRHP.

Seven prehistoric sites have been documented to date within the South Dakota APE. Site types include lithic scatters, tool assemblages, and one campsite. Four of the prehistoric sites have been determined eligible for listing on the NRHP. One site remains unevaluated and the other two sites have been determined not eligible.

A single site is composed of both prehistoric and historic components (termed multicomponent). The NRHP significance of that site has not yet been determined.

In addition to the sites categorized in this section, one prehistoric isolated find has been identified in the 125' APE, but the single artifact does not qualify as a site under State of South Dakota standards and guidelines (South Dakota State Historical Society 2012).

3.12.2.2 WYOMING

The APE 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 3a 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 61 cultural resources investigations have been conducted completely, or partially, within the 125-foot corridor. All but two of the investigations were intensive (Class III) surveys. One was a sample (Class II) survey. The remaining project was limited to testing and NRHP significance evaluations.

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.

Of 61 cultural resources studies conducted in the State of Wyoming, 39 investigations were on private lands, six on TBNG lands, one on State of Wyoming lands, and 15 investigations consisted of field survey that crossed multiple landowner boundaries. (**Table 3-49**).

Alternative 3a addresses issues at a single location along the Wyoming segment of the proposed ROW. The Alternative 3a Fiddler modification, 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 3-49 - Previous Cultural Resources Investigations in Wyoming

Jurisdiction	Number of Investigations
Bureau of Land Management	0
Thunder Basin National Grasslands	6
Wyoming State Lands	1
Private Landowners	39
Multiple Agencies	15
Total	**61**

3.12.2.2.2 Cultural Sites

A total of 10 cultural resources have been documented in the State of Wyoming within the 125-foot corridor. Of the 10 cultural sites located to date, nine are located on private property and one is on lands managed by the BLM. No isolated finds have yet been identified in the Wyoming APE of this project.

Table 3-50 tallies previously identified cultural resources delineated according to chronological framework and NRHP eligibility. Of the 10 sites previously recorded in the study area, five represent historic-era activities, three indicate prehistoric sites, and two sites exhibit evidence of both historic and prehistoric components.

Table 3-50 - Cultural Resources Previously Identified in Wyoming				
Site Type	**NRHP Eligible**	**NRHP Unevaluated**	**NRHP Not Eligible**	**Totals**
Historic Sites	1	2	2	**5**
Prehistoric Sites	0	0	3	**3**
Multicomponent Sites	0	0	2	**2**
Totals	**1**	**2**	**7**	**10**

Of the 10 cultural sites identified to date, one has been determined eligible to the NRHP, two have not yet been evaluated for NRHP significance, and seven have been determined 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 significance 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, and setting is not a contributing aspect of integrity, 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 geographic corridors for each alternative have not yet been fully inventoried for cultural resources, a uniform and accurate method to calculate the quantity and nature of historic properties will have to wait until field survey has been completed as per stipulations in the PA and 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

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.

Twenty-nine intensive surveys have been conducted since 1994 on South Dakota lands in the 125-foot corridor. Collectively, these investigations (all of which are considered methodologically adequate) represent roughly 69% of the study area. The discussion above states that 25 cultural resources have been documented to date in the South Dakota corridor. Twelve 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. Other cultural resources are likely to be identified in the APE once field survey has 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.

The APE for visual (indirect) effects may be significantly expanded beyond the 125-foot corridor. To date, one American Indian religious-use site has been identified from which the viewshed could be adversely affected by construction of the transmission line as routed in the Proposed Action. Modification 3i has been added to Alternative 3 to provide an option that would minimize visual effects of the transmission line from that location.

Two NRHP-listed properties are located within two-miles of the Alternative 2 corridor. The two consist of Johnson Siding, House and Sawmill District (Reference Number 82003938), and the Madison Ranch west of Rapid City just off Nemo Road (Reference Number 3000767). The transmission line as routed in the Proposed Action is not visible from either property due to topographic constraints.

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 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 355 acres, or 21%, of the 1,655-acre corridor 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 10 cultural sites identified in the Wyoming APE to date, only one has been determined eligible to the NRHP. Two sites have not been evaluated for NRHP significance, for a total of three *potential* historic properties identified to date. 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, seven cultural resources sites have been determined not eligible to the NRHP.

As was stated above for the South Dakota segment, it is important to recognize that these numbers reflect known properties identified in the 125-foot proposed corridor. Other cultural resources will most likely be identified in the large segment of the Wyoming 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. To date, no historic properties have been identified outside the 125-foot corridor from which the viewshed might be impacted. Analysis of potential indirect effects will continue 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 in nature within the Wyoming segment of the Proposed Action. If the site is used ceremonially to maintain the

identity of a group or community and, if it is eligible for, or listed in, the NRHP, then it may be designated a TCP. 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 Action 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 10 locations along the proposed route. Each of the modifications is located within one mile either side of the Proposed Action route. Nine modifications are located in the State of South Dakota (**Table 3-47**) 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 66% of the nine Alternative 3 modifications proposed in the State of South Dakota have been surveyed for the purpose of identifying cultural resources. Five of the nine modifications are located exclusively on lands managed by the BHNF; the remaining four modifications may 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 3-47**).

To date, two historic properties have been identified within the nine 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.

To date, one American Indian religious-use site has been identified from which the viewshed could be adversely affected by construction of the transmission line. Since publication of the DEIS, Modification 3i has been added to the alternatives to provide an option that would minimize visual effects from that location.

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 (66%) 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 paleontological sensitive geologic units that could potentially be subject to ground disturbance

resulting from project activities within 63 feet either side of the ROW centerline for a total width of 125 feet. 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 bentonite 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. Areas on private lands crossed by the Project would have a similar potential occurrence of paleontological resources. Paleontological resources, whether on federal, state, or private lands, could be impacted by the ground disturbing activities identified above but impacts would be expected to be minor because disturbance associated with construction of the line would be relatively shallow and would not be expected to directly impact the sensitive geologic strata.

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

The geographic analysis area for transportation and travel management is two-miles wide centered on the proposed route for the line.

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 3-22 shows the major roads and **Table 3-51** 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 3-51 - 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 3-51**, 111 miles are USFS roads. **Table 3-52** lists the USFS roads and trails in the BHNF portion of the analysis area that are open yearlong or seasonally. Additionally, **Table 3-53** lists the USFS miles per management area in the BHNF portion of the analysis area. The information in **Tables 3-51, 3-52 and 3-53** is based on BHNF's 2012 MVUM. **Figure 3-22** depicts the existing transportation system in the South Dakota portion of the analysis area.

Table 3-52 - 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 3-53 - 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 for vehicles 62 inches or less in width (BHNF Travel Management Plan ROD, March 2010). 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 3-23** 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 would 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 Private Land

The existing transportation system affecting private lands is similar to that described above for the federal lands in Wyoming. Access to private lands is provided via U.S. Highways 16 and 85, Wyoming Highways 59, 116, 450, and 451, and various county roads, and private roads. The State and counties manage the primary public roads in the area and private roads are managed by the respective landowners.

3.14.1.2.5 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 would 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.

3.14.2.2.2.1.2 Private Land

The direct and indirect effects associated with the Proposed Action on private land would be similar to those described above for other lands in Wyoming. BHP would coordinate construction activities with each private landowner crossed by the Project. At entrances to private land from public roads, BHP would install signs if requested by the land owner indicating that the roads on private lands are closed to public access. After construction, BHP would revegetate overland travel routes to landowner specification – leaving roads for landowner use or reclaiming as indicated. Fences and other improvements disturbed by construction would be restored.

After construction, the presence of the line could potentially create a hazard to small aircraft particularly during takeoff and landing where the line would be close to air strips. There has been a previous aircraft collision with a transmission line in the Wyoming portion of the Project area. There are no public airports near the proposed Project alignment in Wyoming but there are some private airstrips in the area. The line would meet FAA requirements for height and marking and the proponent would work with private landowners as needed to mitigate potential impacts to air traffic near these strips.

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 would 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 3j would not be expected to have significantly different impacts than the Proposed Action on transportation, travel management, and access road construction

in the BHNF. 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 are approximately the same.

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 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.

3.15.2.2 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 – 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, cattle guards, 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).

Effects to residences for the Proposed Action are discussed in detail in the following sections of this EIS: Section 3.1 Land Use/Land Management, 3.7 Visual Resources and 3.16 Hazardous Materials/Public Health and Safety.

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 3j) would result in the same socioeconomic impacts as the Proposed Action for both South Dakota and Wyoming. Effects to residences for each route modification are discussed in detail in the following sections of this EIS: Section 3.1 Land Use/Land Management, 3.7 Visual Resources and 3.16 Hazardous Materials/Public Health and Safety.

3.16 HAZARDOUS MATERIALS/PUBLIC HEALTH AND SAFETY

The geographic analysis area for hazardous materials/public health and safety is two-miles wide centered on the proposed route for the line.

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 3-54**.

Table 3-54 - 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 3-55** (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 would have similar field levels to existing, operational transmission lines.

Table 3-55 - 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).

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.

[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)

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: Route Modification 3b would locate the proposed transmission line farther from existing residences relative to the Proposed Action (9 residences within 500 feet for 3b and 10 for Proposed Action). As a result, the potential direct and indirect hazardous materials and health and safety effects would likely be slightly less than those of the Proposed Action.

Route Modification 3c: Route Modification 3c would locate the proposed transmission line farther from existing residences relative to the Proposed Action (2 residences within 500 feet for 3c and 5 for Proposed Action). Therefore, Route Modification 3c would have less potential direct and indirect hazardous materials and health and safety effects than the Proposed Action.

Route Modification 3d: 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 or Route Modification 3d, thus the potential direct and indirect hazardous materials and health and safety effects would be the same as those of the Proposed Action.

Route Modification 3e: Route Modification 3e would locate the proposed transmission line farther from the Pactola Reservoir relative to the Proposed Action. One residence is within 500 feet of either side of the Proposed Action and none within 500 feet of Route Modification 3e,

thus the potential direct and indirect hazardous materials and health and safety effects would be slightly less.

Route Modification 3f: No residences are within 500 feet of Route Modification 3f, while the comparable section of the Proposed Action contains one residence within 500 feet either side of the proposed transmission line. Therefore, Route Modification 3f would have less potential direct and indirect hazardous materials and health and safety effects than the Proposed Action..

Route Modification 3g: 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. Fourteen residences are within 500 feet of either side of this route modification, so the potential direct and indirect hazardous materials and health and safety effects would likely be more than the comparable section of the Proposed Action, which has one residence within 500 feet.

Route Modification 3h: Route Modification 3h is a second route option developed in the Mountain View area. This modification is located on National Forest System land south of Deerfield Road between Williams Draw Road and Deerfield Cove Road in South Dakota. At the widest point, Modification 3h would be approximately 2,200 feet north of the proposed route and about 1,700 feet north of Route Modification 3b. It would cover a distance of nearly 1.9 miles. One residence is within 500 feet of either side of this modification so the potential direct and indirect hazardous materials and health and safety effects would likely be less than those of the comparable section of the Proposed Action, which has ten residences within 500 feet.

Route Modification 3i: Route Modification 3i is a third route option on National Forest System land developed in the Mountain View area. The eastern portion of this modification is coincident with the portion of Modification 3h that is located south of Deerfield Road. Where Modification 3h turns south to reconnect with the proposed route, this modification (3i) would continue west for an additional 1.2 miles before turning south to reconnect with the proposed route. One residence is within 500 feet of either side of this modification, so the potential direct and indirect hazardous materials and health and safety effects would likely be less than those of the comparable section of the Proposed Action, which has ten residences within 500 feet.

Route Modification 3j: Route Modification 3j (Ponderosa Ridge) is a second route option developed in the Route Modification 3g area located between Hidden Valley Road and an area southwest of Sun Ridge Road. It would be located on the northern and western portions of a National Forest parcel in Section 30 for approximately 1.5 miles and then follow the section line between Sections 30 and 25 for about 0.4 miles across private lands to a point north of Sun Ridge Road where it would turn southwest for about 0.6 miles to reconnect with the Proposed Action route in Section 36 on National Forest System land. Route Modification 3j has no residences and the Proposed Action has one residence within 500 feet of either side of the transmission line, and Modification 3g has 14 residences within 500 feet. As a result, the potential direct and indirect hazardous materials and health and safety effects would likely be less than those of Modification 3g.

3.16.2.3.2 Wyoming

3.16.2.3.2.1 Direct/Indirect Effects

Route Modification 3a: Both Route Modification 3a (Fiddler) and the corresponding segment of the Proposed Action have no residences within 500 feet of either side of the transmission line so direct and indirect hazardous materials and health and safety effects would be the same.

3.17 AIR QUALITY

The geographic analysis area for air quality is one-mile wide centered on the proposed route for the line.

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 and 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 would 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 would directly impact air quality within the project area through increased vehicular traffic during construction. Construction would 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, and wind erosion of disturbed areas produce fugitive dust. These impacts would be short-term and would end once construction is complete.

Dust control, monitoring, and reclamation standards required by state and federal permits would be applied during and after construction, which would minimize potentially harmful emissions and particulates and their impacts on visibility in the project area and surrounding lands. The Proposed Action would comply with National Ambient Air Quality Standards (NAAQS) and state standards. USFS Standards and Guidelines also would 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 such as temperature, rainfall, snow, or wind patterns over a long period of time. Climate change can result from:

- changes in incoming solar radiation due to changes in the sun's energy or slow changes in the earth's orbit around the sun;

- changes in solar radiation reflected by the Earth's atmosphere; and/or
- Changes in the amount of longwave radiation reflected by the Earth's surface and retained by the atmosphere.

Climatic change analyses review several factors, including greenhouse gas (GHG) emissions, and land use management practices. 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. Regardless of the source, 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, it is difficult to estimate how the Proposed Action might impact CO_2 emissions, GHGs, and climate change. However, it is expected that any increased emissions resulting from this proposal would be negligible in any accounting of total national or global emissions. The potential carbon sink capacity within the project area would be temporarily diminished by tree removal to expand the corridor width 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 would result in short-term surface disturbance during construction, and permanent disturbance. Surface disturbance outside the proposed project area, but in the vicinity, would 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 would 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 IRREVERSIBLE 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.

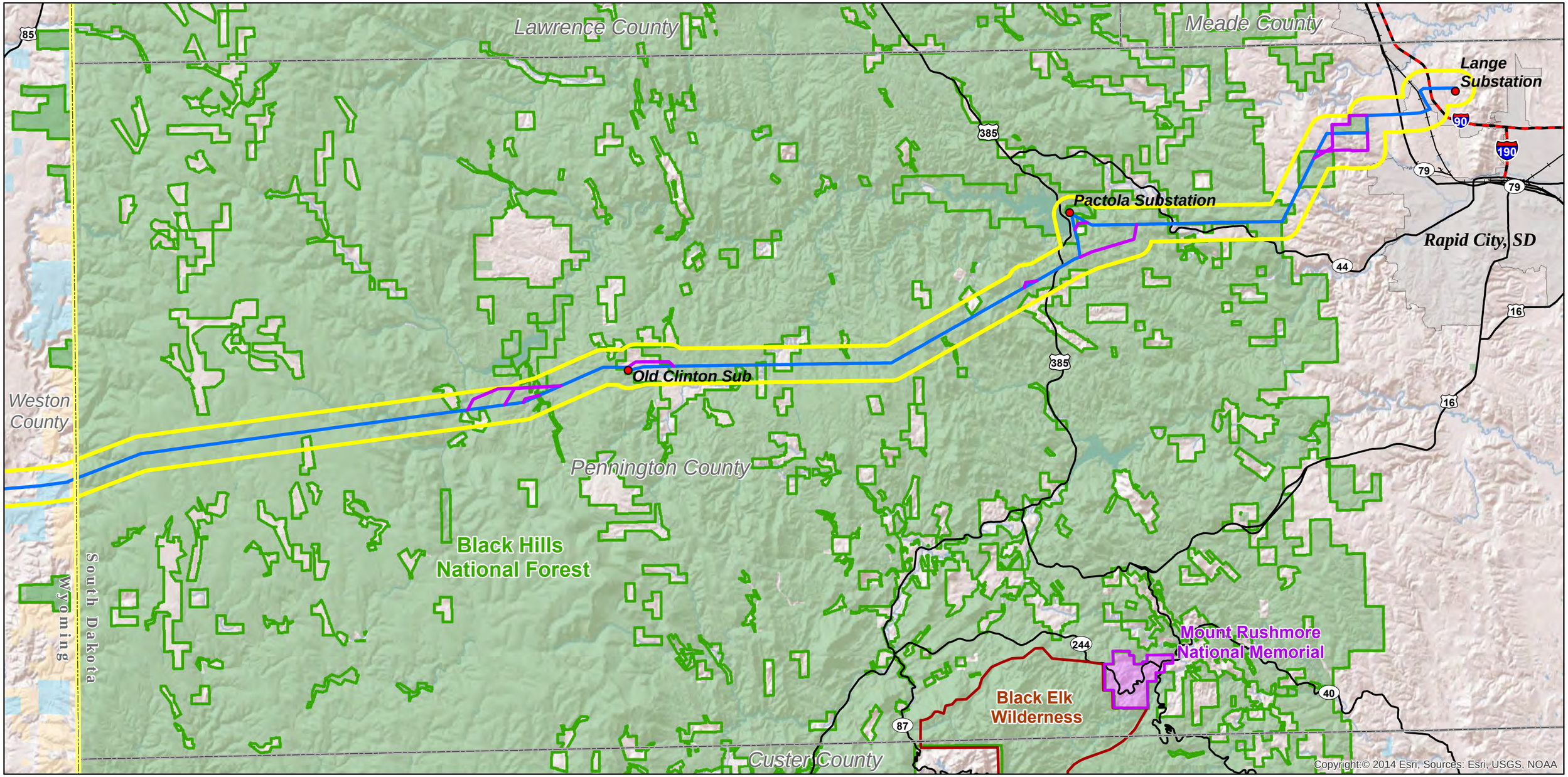
3.19 SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

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.



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

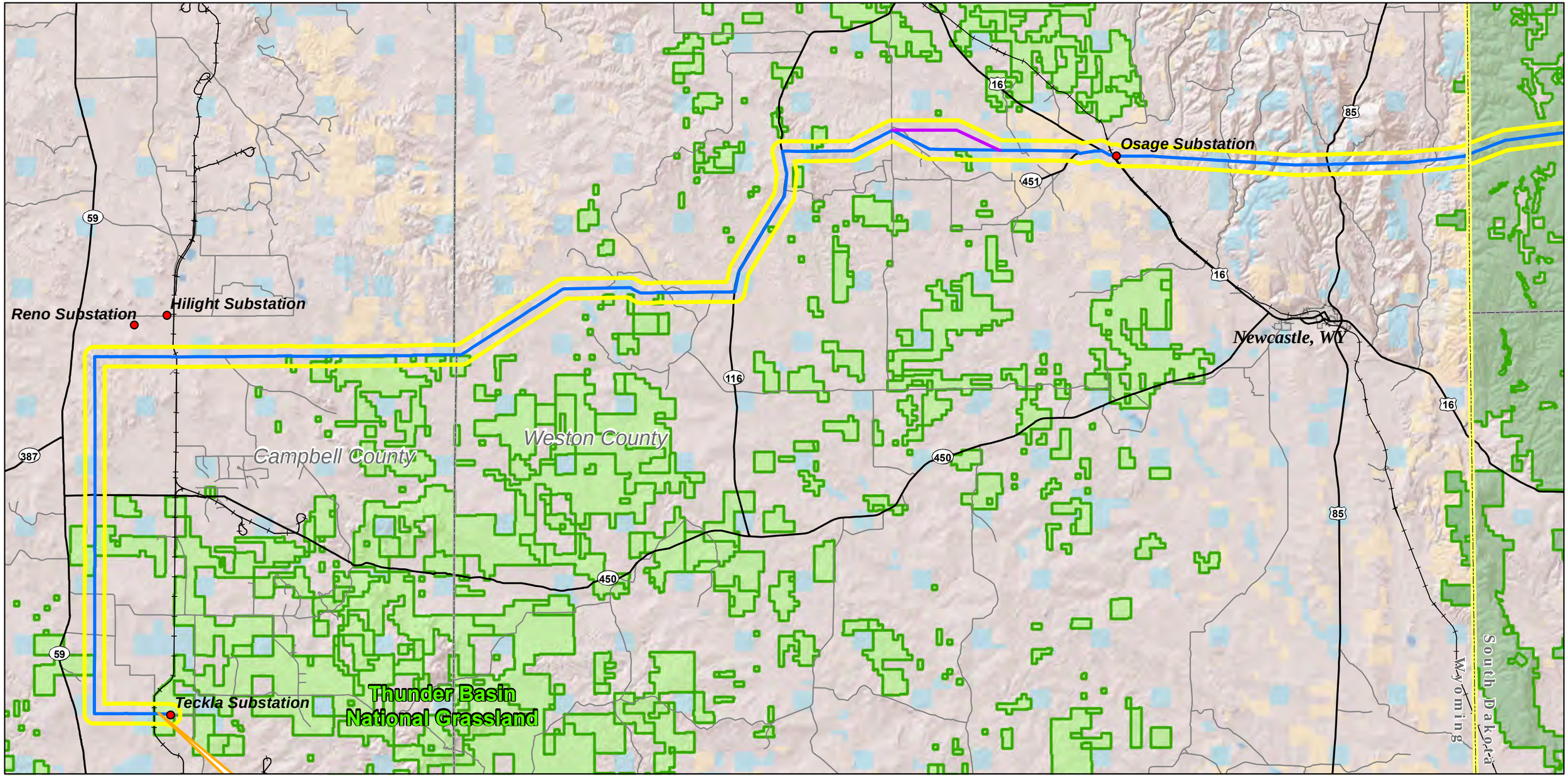
Teckla – Osage – Rapid City 230 kV Transmission Line

FIGURE 3-1
JURISDICTIONAL LAND OWNERSHIP
SOUTH DAKOTA

Map Extent: Lawrence, Pennington, and Custer Counties, South Dakota

Date:11-07-14 | Author: rnc

I:\SD-WY\Figure 3-1 Jurisdictional Land Ownership South Dakota 11x17_110714.mxd



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

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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

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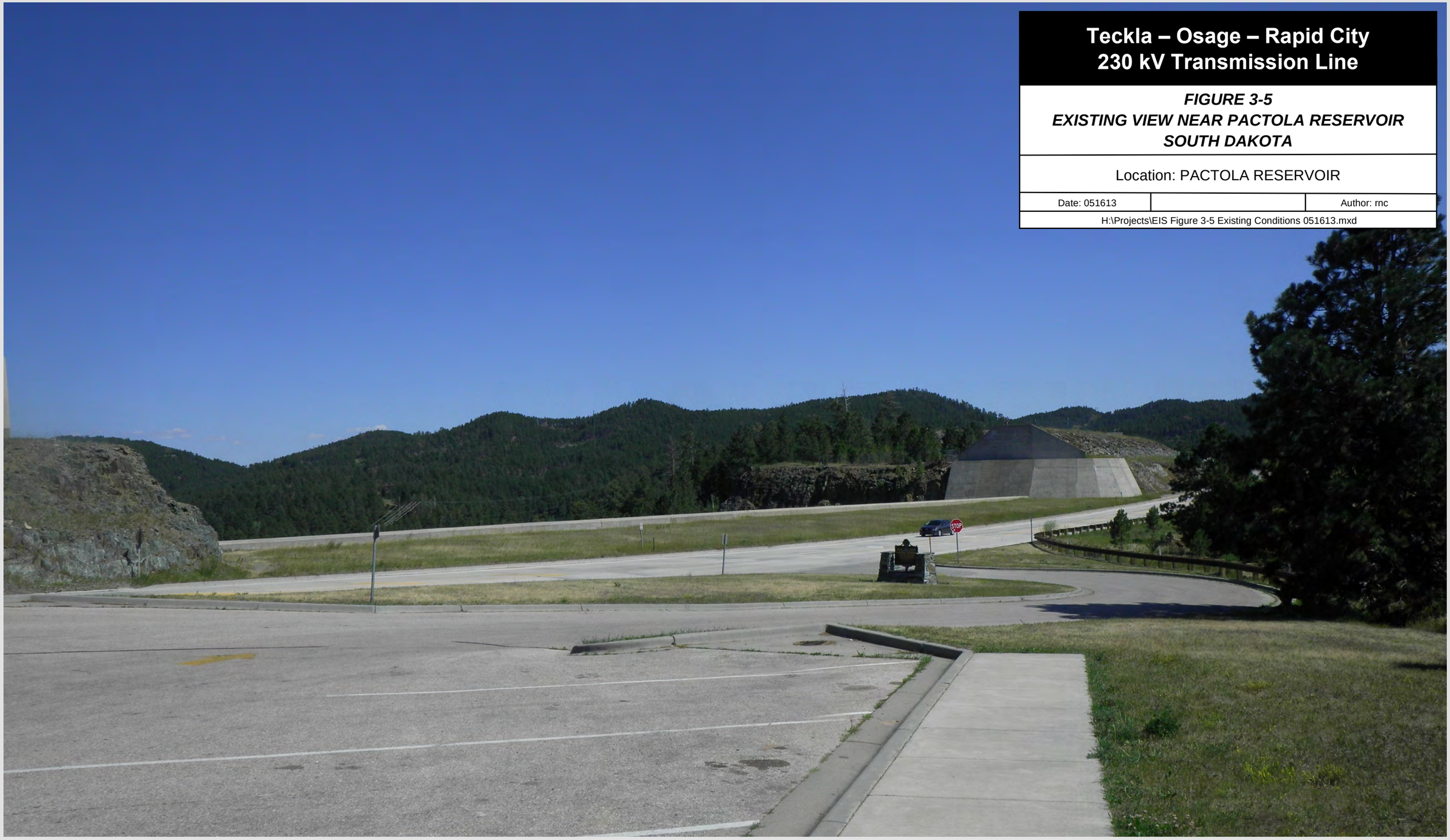

DATE: 07/09/2012 TIME: 4:34 PM LENS LENGTH: 33 mm DIRECTION: SOUTHEAST

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

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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

t:\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

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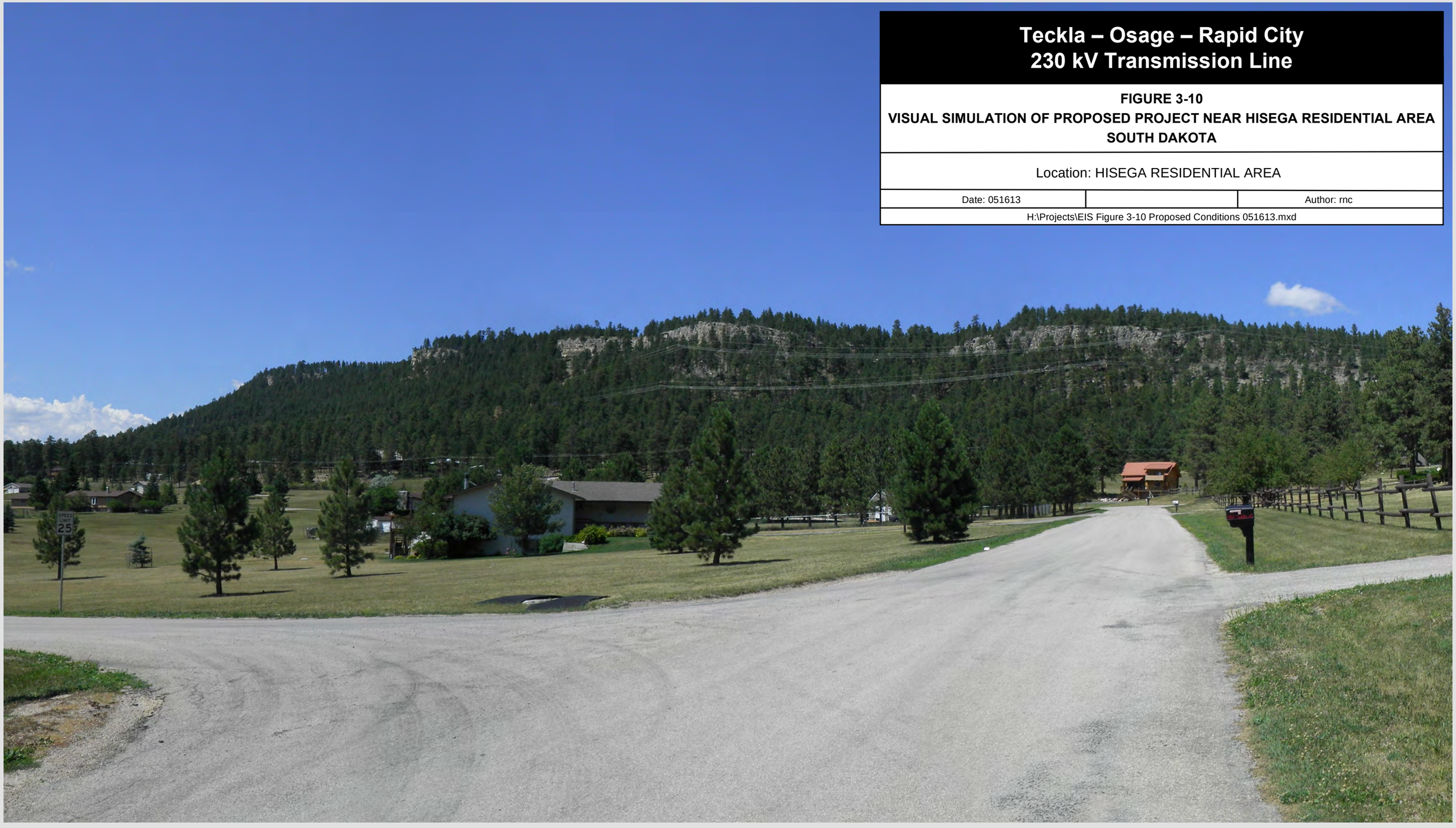

DATE: 07/09/2012 TIME: 3:18 PM LENS LENGTH: 33 mm DIRECTION: NORTH

Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-11
VISUAL SIMULATION OF PROPOSED PROJECT ON GILLETTE PRAIRIE ROAD
SOUTH DAKOTA

Location: GILLETTE PRAIRIE ROAD

Date: 051613		Author: rnc

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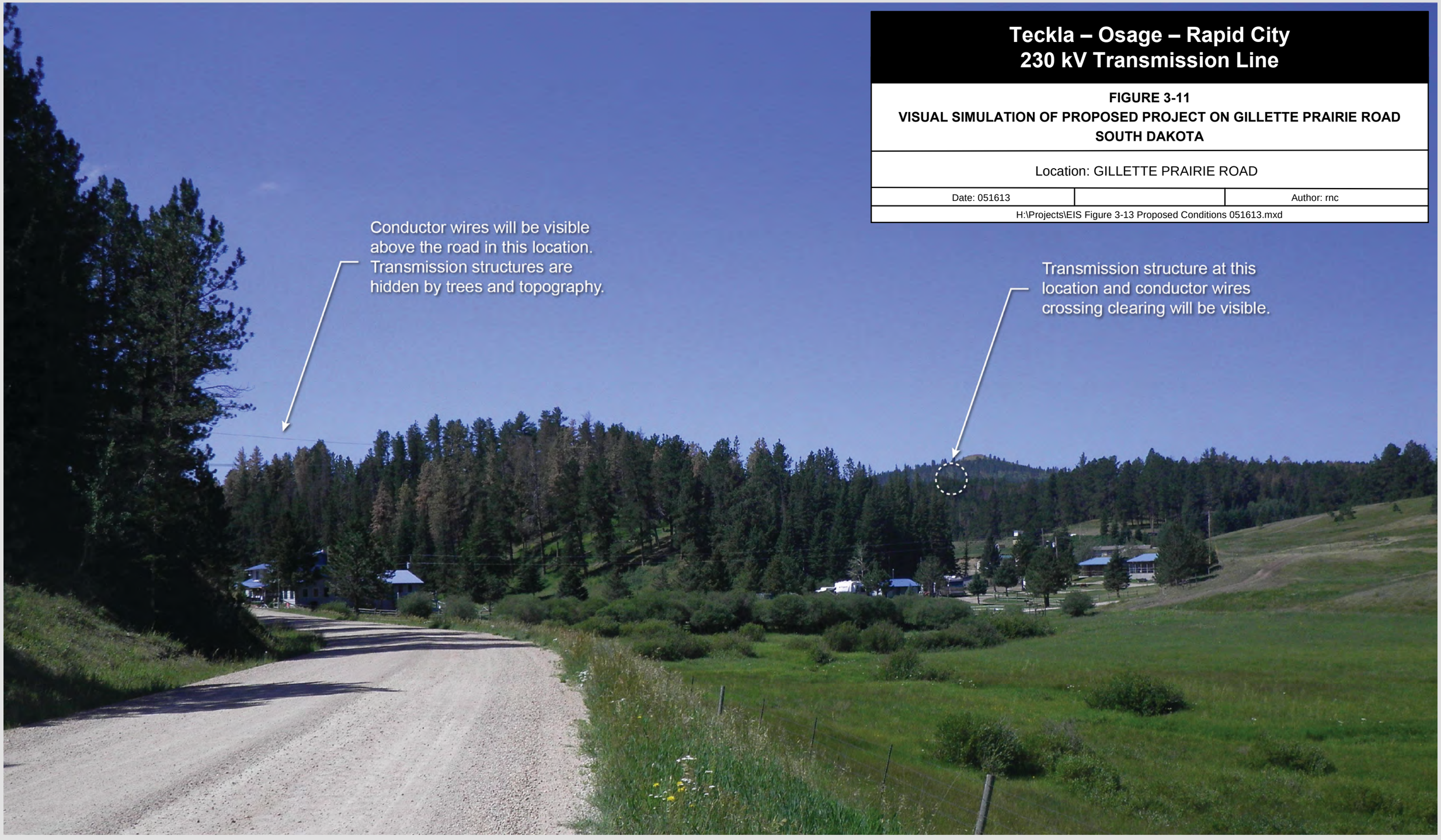

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Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-12
VISUAL SIMULATION OF PROPOSED PROJECT NEAR PACTOLA RESERVOIR
SOUTH DAKOTA

Location: PACTOLA RESERVOIR

Date: 051613		Author: rnc

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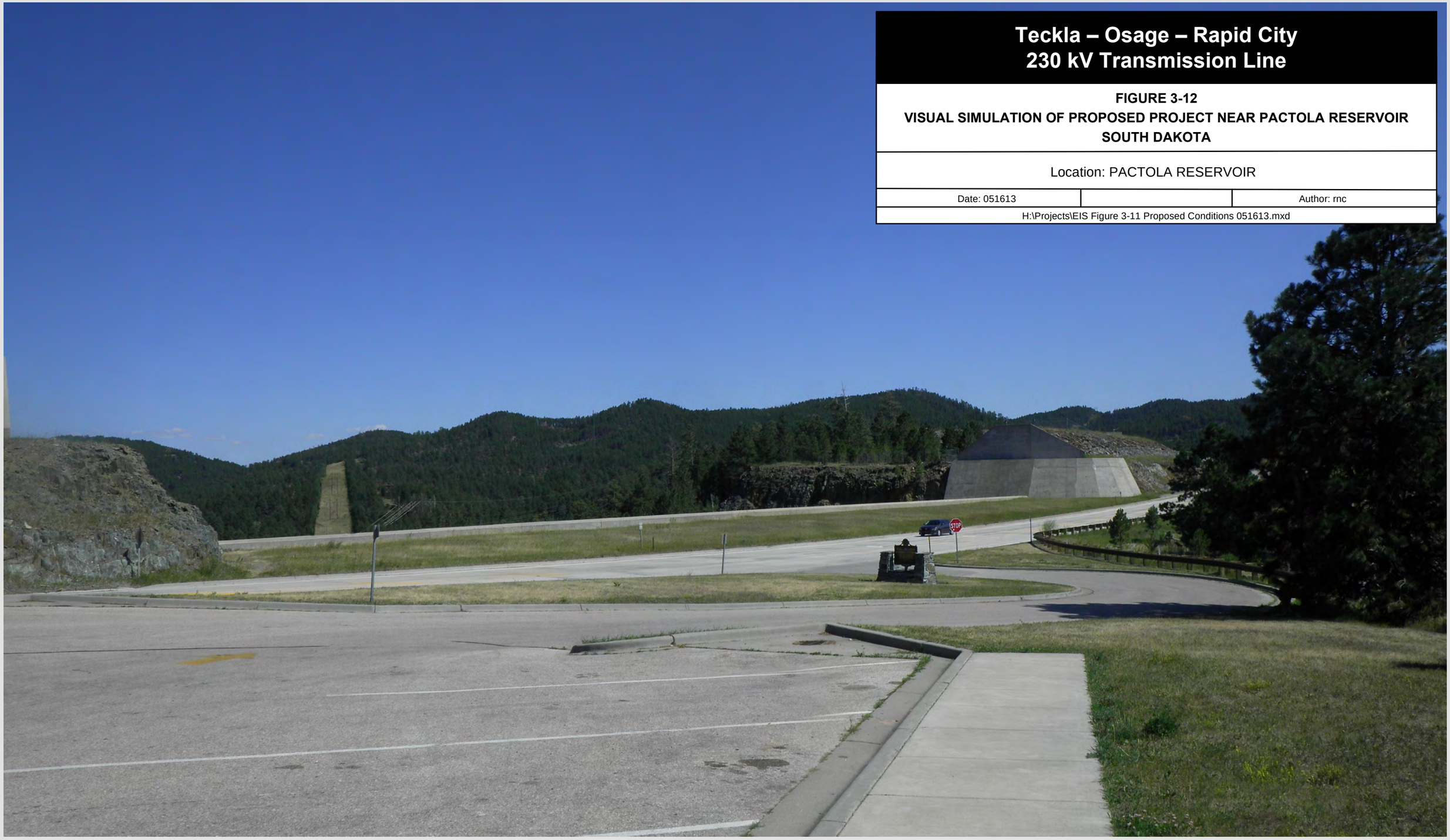

DATE: 07/09/2012 TIME: 4:34 PM LENS LENGTH: 33 mm DIRECTION: SOUTHEAST

Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-13
VISUAL SIMULATION OF PROPOSED PROJECT NEAR MICKELSON TRAIL
SOUTH DAKOTA

Location: MICKELSON TRAIL

Date: 051613		Author: rnc

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DATE: 07/11/2012 TIME: 2:16 PM LENS LENGTH: 33 mm DIRECTION: SOUTH

Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-14

VISUAL SIMULATION OF ROUTE MODIFICATION 3H FROM PARKING LOT SOUTH OF DEERFIELD RESERVOIR

Location: Parking Lot South of Deerfield Reservoir

Date: 112414		Author: rnc

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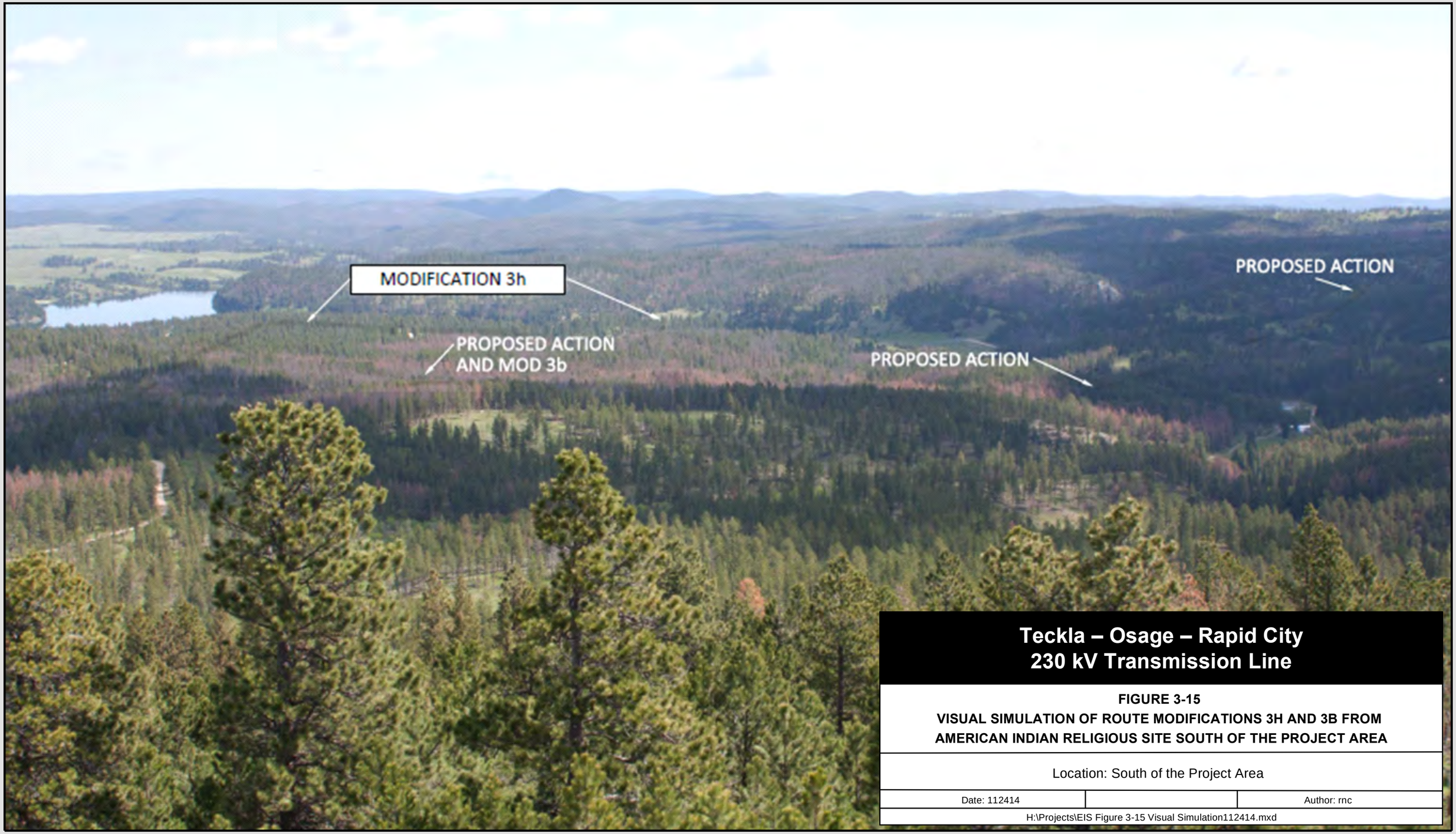


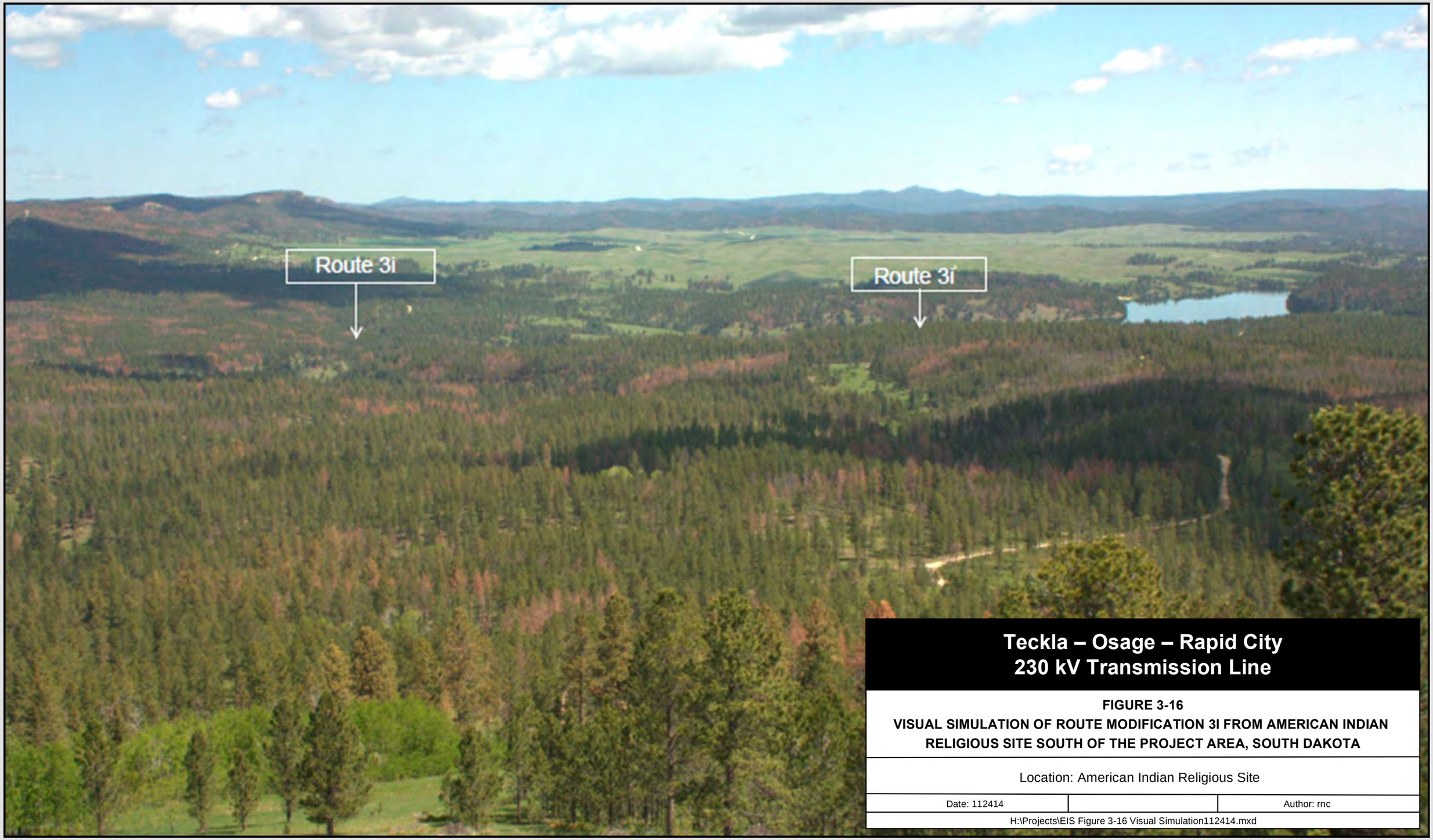
Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-15
VISUAL SIMULATION OF ROUTE MODIFICATIONS 3H AND 3B FROM AMERICAN INDIAN RELIGIOUS SITE SOUTH OF THE PROJECT AREA

Location: South of the Project Area

Date: 112414		Author: rnc

H:\Projects\EIS Figure 3-15 Visual Simulation112414.mxd



Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-16
VISUAL SIMULATION OF ROUTE MODIFICATION 3I FROM AMERICAN INDIAN RELIGIOUS SITE SOUTH OF THE PROJECT AREA, SOUTH DAKOTA

Location: American Indian Religious Site

Date: 112414		Author: rnc

H:\Projects\EIS Figure 3-16 Visual Simulation112414.mxd

Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-17
EXISTING VIEW FROM SUN RIDGE ROAD

Location: Sun Ridge Road

Date: 112414		Author: rnc

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Teckla – Osage – Rapid City
230 kV Transmission Line

FIGURE 3-18
VISUAL SIMULATION OF ROUTE MODIFICATION 3G
FROM SUN RIDGE ROAD

Location: Sun Ridge Road

Date: 112414		Author: rnc

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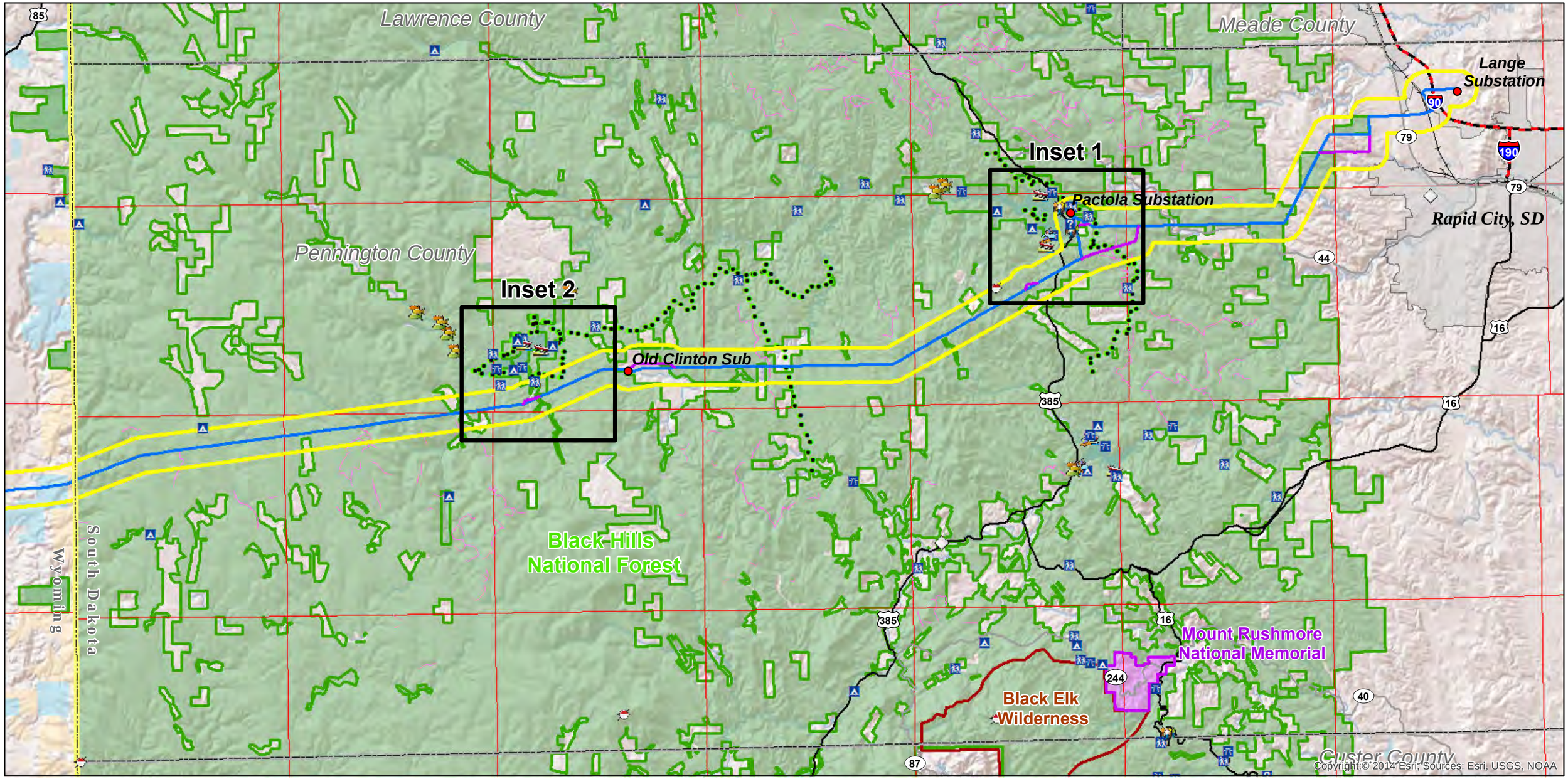

Legend

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 3-19
RECREATION RESOURCES IN SOUTH DAKOTA

Map Extent: Lawrence, Pennington, and Custer Counties, South Dakota

Date: 11-24-14 | Author: rnc

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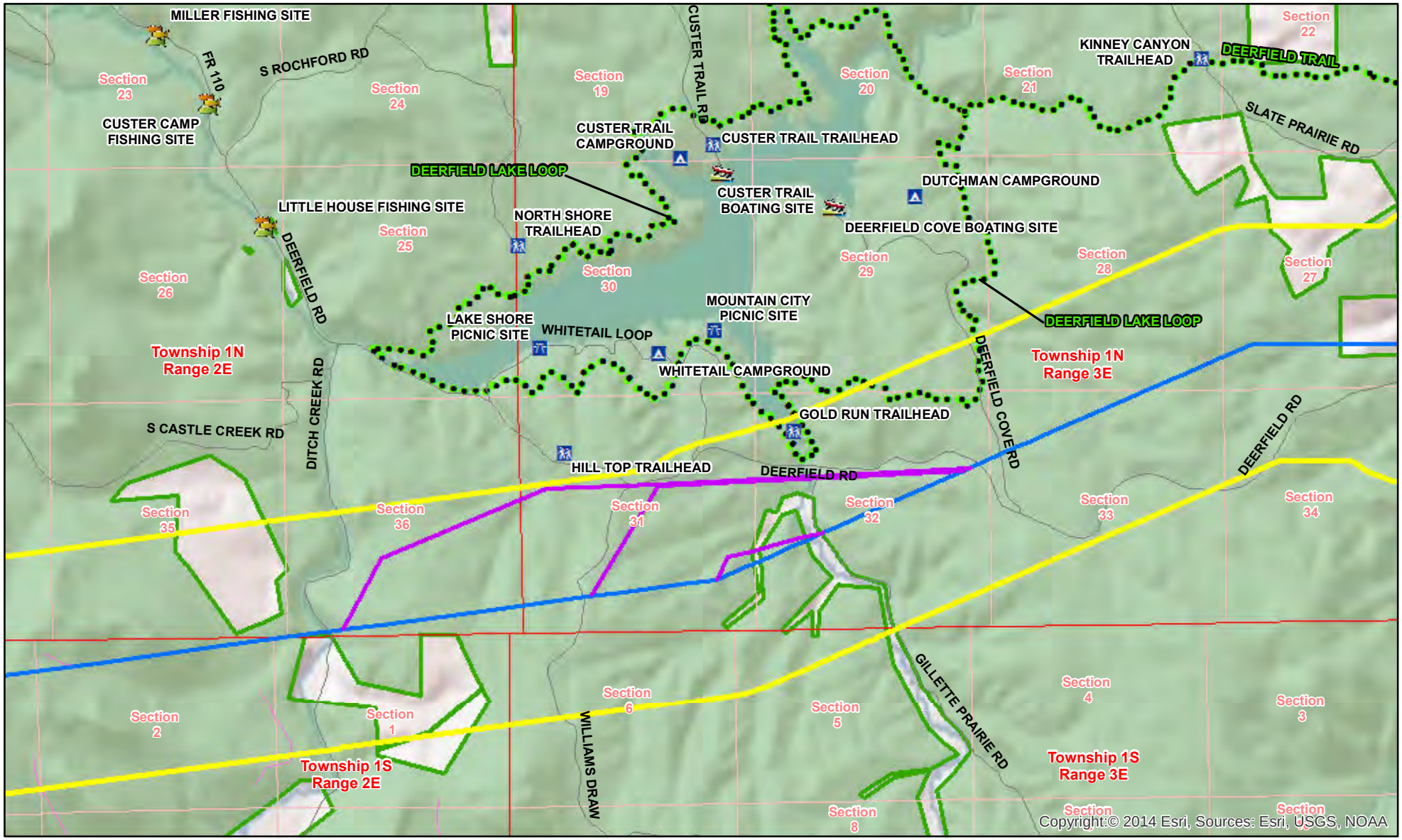

Legend

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 3-20
RECREATION RESOURCES NEAR DEERFIELD RESERVOIR IN SOUTH DAKOTA

Map Extent: Pennington County, South Dakota

Date: 11-24-14 | Author: rnc

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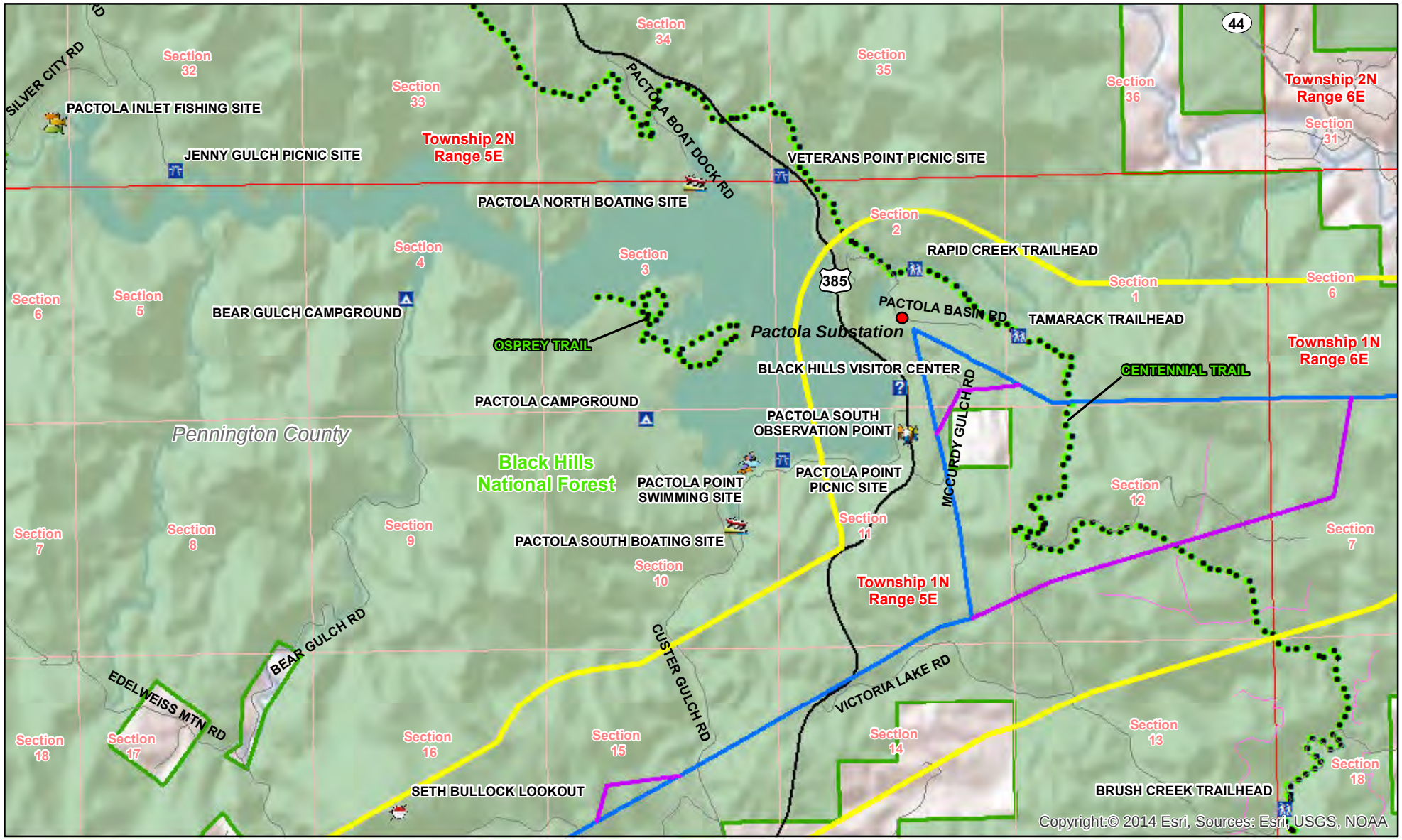

Legend

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 3-21
RECREATION RESOURCES NEAR PACTOLA RESERVOIR IN SOUTH DAKOTA

Map Extent: Pennington County, South Dakota

Date: 11-24-14 | Author: rnc

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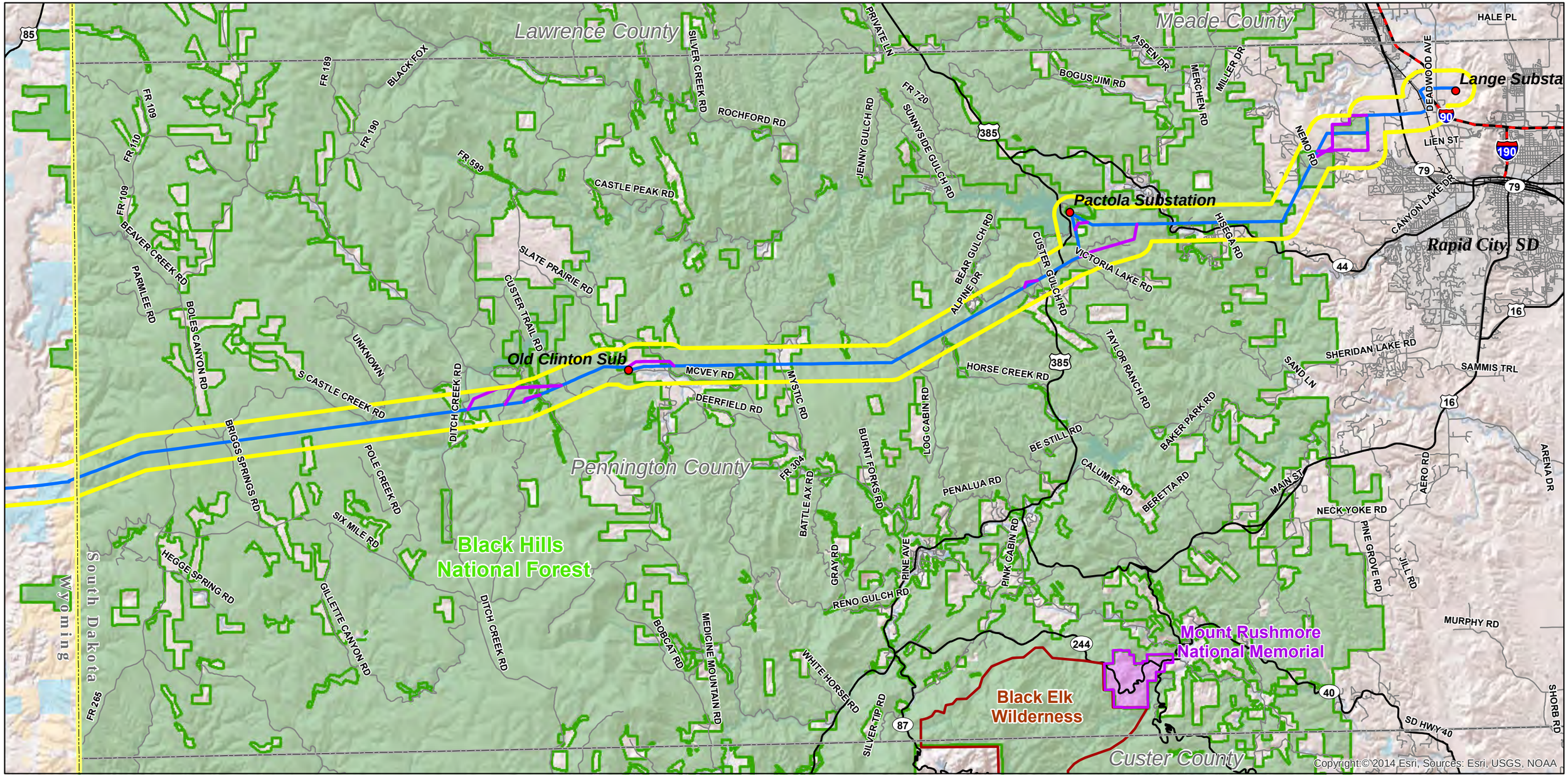

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Legend

- 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 3-22
TRANSPORTATION SYSTEM
SOUTH DAKOTA

Map Extent: Lawrence, Pennington, and Custer Counties, South Dakota

Date: 11-24-14 | Author: rnc

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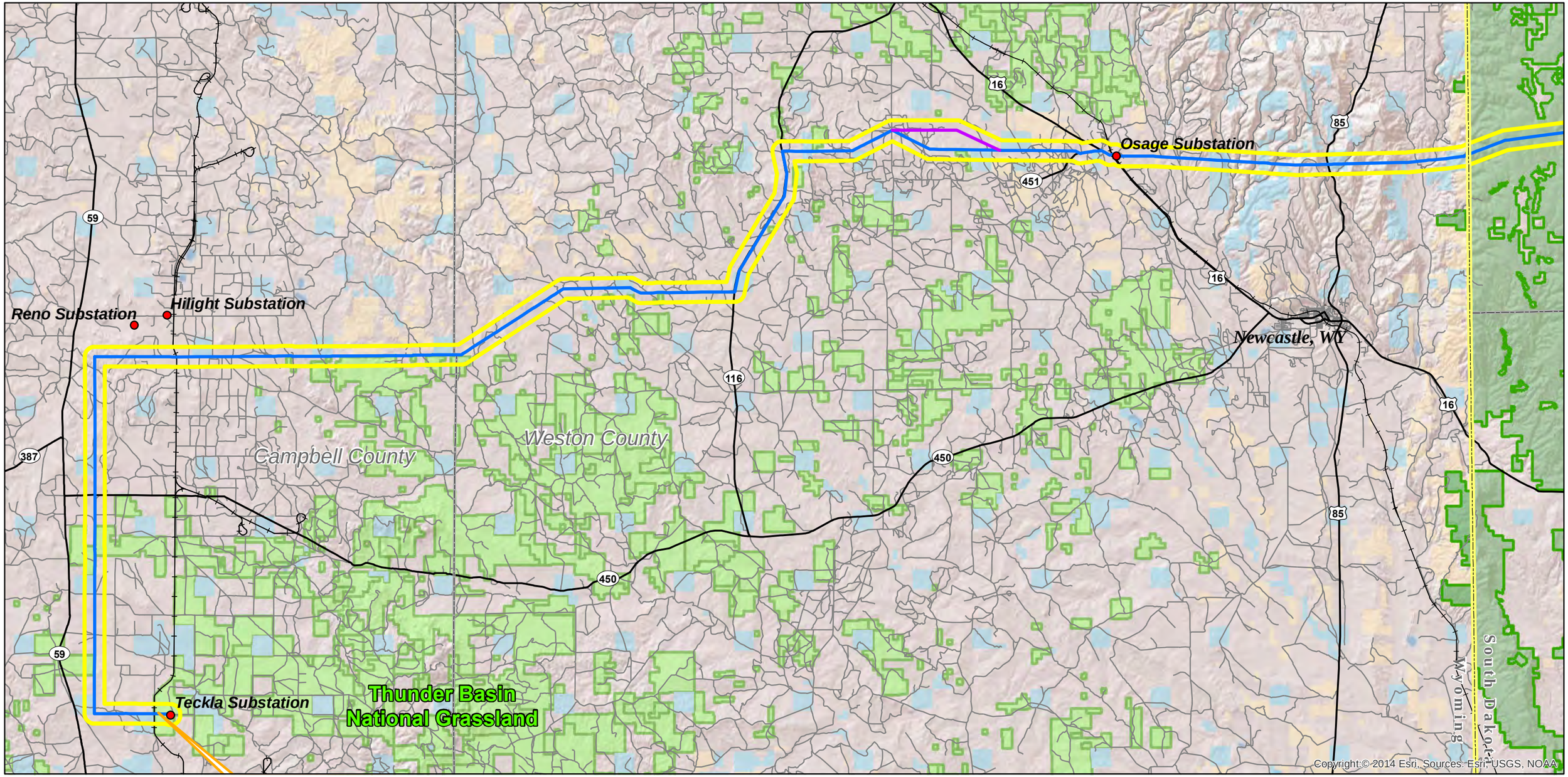

Legend

- 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 3-23
TRANSPORTATION SYSTEM WYOMING

Map Extent: Campbell, Weston, Converse and Niobrara Counties, Wyoming

Date: 11-24-14 | Author: rnc

I:\SD-WY\Figure 3-23 Transportation System Wyoming 11x17_112414.mxd

CHAPTER 4
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CHAPTER 5
GLOSSARY

Access - The opportunity to approach, enter and make use of public or private lands.

Affected Party-Under the Native American Graves protection and repatriation Act of 1990 (NAGPRA), an affected party is “an Indian tribe, Native Hawaiian organization, lineal descendant, Federal agency, or museum.”

Archaeological Resource - Any material remains or physical evidence of past human life or activities which are of archeological interest, including the record of the effects of human activities on the environment. They are capable of revealing scientific or humanistic information through archeological research.

Area of Potential Effects (APE) - The geographic area or areas within which an undertaking may cause changes in the character or use of historic properties, if any such properties exist.

Artifact – Something made or given shape by man, such as a tool or a work of art, especially an object of archaeological interest. An object that has been intentionally made or produced for a certain purpose.

Best Management Practices (BMPs) - Land management methods, measures, or practices intended to minimize or reduce water pollution. Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility.

Big Game - Certain wildlife that may be hunted for sport under state laws and regulations. In the Black Hills, these animals include deer, elk, turkey, mountain goats, and bighorn sheep.

Biological Diversity - The full variety of life in an area including the ecosystems, plant, and animal communities; species and genes; and the processes through which individual organisms interact with one another and with their environments.

Biological Evaluation (BE) - As defined by FSM 2670.5, a biological evaluation is a documented Forest Service review of Forest Service programs or activities in sufficient detail to determine how an action or proposed action may affect any threatened, endangered, proposed, or sensitive species. FSM 2672.4 identifies biological evaluation objectives and standards.

BMPs - (See "Best Management Practices.")

CFR - Code of Federal Regulations.

Conductor - A wire or combination of wires not insulated from one another, suitable for carrying electric current.

Conifer - A group of cone-bearing trees, mostly evergreen, such as the pine, spruce and juniper.

Conservation - The management of a renewable natural resource with the objective of sustaining its productivity in perpetuity while providing for human use compatible with sustainability of the resource; for a forest this may include managed periodic cutting and removal of trees followed by regeneration.

Council on Environmental Quality (CEQ) - An advisory council to the President established by the National Environmental Policy Act NEPA) of 1969.

Cover Type - The vegetative species that dominates a site. Cover types are named for one plant species or non-vegetated condition presently (not potentially) dominant, using canopy or foliage cover as the measure of dominance. In several cases, sites with different species dominant have been lumped together into one cover type; co-dominance is not necessarily implied.

Crown (Vegetation) - The upper part of a tree or other woody plant carrying the main branch system and foliage and surmounting at the crown base a more or less clean stem.

Cultural Properties - (See "Historic Property.")

Cultural Resources - (See "Heritage Resources.")

Cumulative Effects - Collective results of past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes the actions.

DBH – A measurement of trees "Diameter at Breast Height."

Decision Documents - Documents that provide the criteria and information used in the formulation and evaluation of alternatives and the preferred alternative.

Direct Effects - Results of an action occurring when and where that action takes place.

Distribution Line - Electrical systems or lines that are installed at or near the location where the electricity is used (e.g., residential areas), as opposed to central transmission systems that supply electricity to grids.

Diversity - Diversity refers to the distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan (LRMP). This term is derived from the National Forest Management Act (NFMA). This term is not synonymous with "biological diversity."

Draft Environmental Impact Statement (DEIS) - The draft of the statement of environmental effects required for major federal actions under Section 102 of the National Environmental Policy Act (NEPA) and released to the public and other agencies for comment and review.

Easement - A right held by one person to make use of the land of another for a limited purpose, such as a special-use authorization for a right-of-way that conveys a conditioned interest in National Forest System (NFS) land and is compensable according to its terms.

Ecosystem - 1) A community of living plants and animals interacting with each other and with their physical environment. A geographic area where it is meaningful to address the interrelationships with human social systems, sources of energy, and the ecological processes that shape change over time. 2) The complex of a community of organisms and its environment functioning as an ecological unit in nature.

Electric and Magnetic Fields (EMF) - Fields describing properties of a location or point in space and its electrical environment, including the forces that would be experienced by a charged body in that space by virtue of its charge or the movement of charges. The voltage, which is the "pressure," produces an electric field that moves the electricity through wires. The current produces a magnetic field, which is a measure of how much electricity is flowing. Thus, wherever there is electric current flowing (including through any type of wiring), there is both an electric and a magnetic field.

Eligible (Heritage Resources) - Indicates a specific heritage resource qualifies for or is already listed in the National Register of Historic Places.

Endangered Species - Any species of animal or plant in danger of extinction throughout all or a significant portion of its range and so designated by the Secretary of Interior in accordance with the 1973 Endangered Species Act.

Environmental Impact Statement (EIS) - A document prepared by a federal agency in which anticipated environmental effects of a planned course of action or development are evaluated. A federal statute requires that such statements be prepared. It is prepared first in draft or review form and then in a final form. An impact statement includes the following points: the environmental impact of the proposed action; any adverse impacts that cannot be avoided by the action; the alternative courses of actions; the relationships between local short-term use of the human environment and the maintenance and enhancement of long-term productivity; and a description of the irreversible and irretrievable commitment of resources that would occur if the action were accomplished.

Erosion - The wearing away of the land surface by running water, wind, ice, gravity, or other geological activities.

Feature (archeological) – A nonportable object, not recoverable from its matrix (usually in an archeological site) without destroying its integrity. Examples are rock paintings, hearths, post holes, floors, and walls.

Feature (historic) - A prominent or distinctive aspect, quality, or characteristic of a historic property; a historic property.

Fire Risk - The chance of a fire starting, as affected by the nature and incidence of causative agents, including lightning, people and industry. 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 fire in the past.

Firewood - (See "Fuelwood.")

Forage - Vegetation used for food by wildlife, particularly ungulate wildlife and domestic livestock.

Forbs - Any herbaceous plant other than those in the grass, sedge, and rush families. For example, any non-grass-like plant that has little or no woody material.

Forest Supervisor - Official responsible for administering the Black Hills National Forest. The Forest Supervisor reports to the Regional Forester.

Forested Area - Land at least 10 percent of which is occupied by trees of any size or formerly having had such tree cover and not currently developed for non-forest use. Lands developed for non-forest use include areas for crops; improved pastures; residential or administrative areas; improved roads of any width; and adjoining road clearing and powerline clearing of any width.

FSM - Forest Service Manual.

Fuel Loading - The volume of the available or burnable fuels in a specified area, usually expressed in tons per acre.

Fuels - The organic materials that will support the start and spread of a fire: duff, litter, grass, weeds, forbs, brush, trees, and dead woody materials.

Goal - Broad, general statement that encompasses the desired future conditions that the U.S. Forest Service seeks to attain.

Grass/Forb, Grass/Forb Stage (Structural Stage1) - (See Structural Stages - Structural Stage1)

Guideline Preferred or advisable courses of action; deviations from guidelines are permissible, but the responsible official must document the reasons for the deviation.

Habitat - The place where an organism (plant or animal) lives.

Hard Snags (Vegetation) - A dead or partially dead tree composed primarily of sound wood, particularly sound sapwood.

Hardwood - Pertains to broadleaf trees or shrubs.

Heritage Resources - The physical remains (including but not limited to artifacts, structures, landscape modifications, rock art, trails, or roads) and conceptual content or context (as a

setting for legendary, historic, or prehistoric events, such as a sacred area for native peoples) of an area.

Historic Property - Any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register. This term includes artifacts, records, and remains related to and located within such properties.

Human Remains – The body of a deceased person in any stage of decomposition or after cremation.

Ignition (Fire Management) - The initiation of combustion.

Implementation - Those activities necessary to initiate the actions in the approved land and resource management plan (LRMP).

Indirect Effects - Results of an action occurring at a location other than where the action takes place and/or later in time but in the reasonably foreseeable future.

Infrastructure - The facilities, utilities, and transportation systems needed to meet public and administrative needs.

Insulators - A material that offers high electric resistance making it suitable for covering or supporting components, terminals and wires to prevent contact of adjacent conductors resulting in a short circuit.

Interdisciplinary Team (IDT) or Project Analysis Team - A group of individuals with different specialized training assembled to solve a problem or perform a task. The team is assembled out of recognition that no one discipline is sufficiently broad to adequately solve the problem. Through interaction, participants bring different points of view and a broader range of expertise to bear on the problem.

Intermittent Stream - 1) A stream that flows only at certain times of the year, as when it receives water from springs or from a surface source, such as melting snow. 2) A stream that does not flow continuously, as when water losses from evaporation or seepage exceed the available streamflow.

Irretrievable, Irretrievable Commitments - Decisions causing changes that cannot be reversed. For example, road construction leads to an irretrievable loss of the productivity of the land under which the road is located. If the road is later obliterated, the land may eventually become productive again. The production lost is irretrievable, but the action is not irreversible. Irreversible commitments often apply to non- renewable resources, such as minerals and heritage resources.

Isolated Find - The recovery of a single artifact, or very few non-diagnostic artifacts, during a cultural resources survey. Information is recorded, but no official site number is obtained.

Kilovolt (kV) - 1000 volts (see Volt).

Landscape Character - Particular attributes, qualities, and traits of a landscape that give it an image and make it identifiable or unique. Valued landscape character creates a "sense of place" and describes the image of an area. The landscape character provides a reference for defining the inherent scenic attractiveness classes.

Management Indicator Species (MIS) - Plant or animal species or habitat components selected in a planning process that are used to monitor the effects of planned management activities on populations of wildlife and fish, including those that are socially or economically important.

Management Objectives - Clearly stated objectives describing the intended post-management status of an area. Typically, objectives are disclosed in the NEPA documentation.

Milligauss (mG) - A unit used to measure magnetic field strength; one-thousandth of a gauss.

Mitigation - Includes avoiding the impact altogether by not taking certain action or parts of an action; minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impacts by repairing, rehabilitating or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

Monitoring - The sample collection and analysis of information regarding Forest Plan management practices to determine how well objectives have been met as well as the effects of those management practices on the land and environment.

National Environmental Policy Act of 1969 (NEPA) - An act declaring a national policy to encourage productive harmony between people and their environment; to promote efforts that will prevent or eliminate damage to the environment and the biosphere and simulate the health and welfare of people; to enrich the understanding of the ecological systems and natural resources important to the nation; and to establish a Council on Environmental Quality.

National Forest Management Act (NFMA) - A law passed in 1976 amending the Forest and Rangeland Renewable Resources Planning Act that requires the preparation of Regional and Forest Plans and the preparation of regulations to guide that development.

National Forest System (NFS) Land - Federal lands designated by Executive Order or statute as National Forests, National Grasslands or Purchase Units, or other lands under the administration of the Forest Service.

National Historic Preservation Act (NHPA) – An act to establish a program for the Preservation of Historic Properties throughout the Nation, and for other purposes.

National Register of Historic Places (NRHP) - A list of heritage resources that have local, state, or national significance. The list is maintained by the Secretary of the Interior.

Native American Graves Repatriation Act (NAGPRA) - NAGPRA was established in 1990 to provide a means for museums and curation facilities to return certain collected items to Native

American and Native Hawaiian groups. The Act pertains to the repatriation of human remains, funerary objects, sacred objects, and objects of cultural patrimony. Federal grants are awarded to indigenous groups and institutions holding collections under the act to assist in the repatriation process, which is overseen by the Native American Graves Protection and Repatriation Review Committee.

Natural Regeneration - The renewal of a tree crop by natural means without seeding or planting done by people. The new crop is grown from self-sown seed or by vegetative means, such as root suckers.

Non-motorized Activities - Activities that do not incorporate the use of a motor, engine, or other non-living power source. Non-motorized activities exclude such machines as aircraft, hovercraft, motorboats, automobiles, motor bikes, snowmobiles, bulldozers, chainsaws, rock drills, and generators.

Noxious Weeds - Those plant species designated as weeds by federal or state laws. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage; poisonous; toxic; parasitic; a carrier or host for serious insects or diseases; and generally non-native.

Objective - Concise statement of desired measurable results intended to promote achievement of specific goals. Attainment of objectives is limited by the application of standards and guidelines.

Off-Highway Vehicle (OHV) - Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, snow, ice, marsh, swampland, or other natural terrain.

Plant Communities - Assemblage of plant species living in an area. It is an organized unit to the extent that it has characteristics in addition to the individuals and populations and functions as a unit.

Project - One or more site-specific activities designed to accomplish a specific on-the-ground purpose or result. Projects are tiered to the Forest Plan and will have further site-specific analysis.

Public Access - Usually refers to a road or trail route over which a public agency has secured a right-of-way for public use.

Ranger District - Administrative subdivisions of the Forest supervised by a District Ranger who reports to the Forest Supervisor.

Reforestation - Reestablishment of a tree crop on forested land.

Responsible Official (Deciding Official) - The Forest Service employee who has the delegated authority to make a specific decision.

Revegetation - The reestablishment and development of a plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through the direct action of reforestation or reseeding.

Right-of-way (ROW) - Land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project or facility passing over, upon, under, or through such land. The privilege that one person or persons particularly described may have of passing over the land of another in some particular line.

Right-of-way Corridors - A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries.

Riparian Area - (See "Riparian Ecosystem.")

Roads - A general term denoting a way with at least two-wheel tracks for purposes of travel by vehicles greater than 50 inches in width.

Sacred Site - 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.

Scenery - The composition of basic terrain, geologic features, water features, vegetative patterns, and landrise effects that typify a land unit and influence the visual appeal the unit may have for visitors.

Scenic Class - Scenic classes measure the relative importance or value of discrete landscape areas having similar characteristics of scenic attractiveness and landscape visibility. Scenic classes are used during forest planning to compare the value of scenery with the value of other resources, such as timber, wildlife, late succession, or minerals. The higher the scenic class, the more important it is to maintain the highest scenic value. Scenic classes are determined and mapped by combining the three classes of scenic attractiveness with the distance zones and concern levels of landscape visibility. A numerical value of 1 to 7 is assigned to Forest lands. Generally, scenic classes 1-2 have high public value; classes 3-5 have moderate value; and classes 6 and 7 have low value.

Scenic Integrity (Existing or Objective) - State of naturalness or conversely the state of disturbance created by human activities or alteration. Integrity is stated in degrees of deviation from the existing landscape character in a national forest. It is the 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. Scenic integrity is used to describe an existing situation, standard for management, or desired future conditions.

- **Very High**: A scenic integrity level that generally provides for ecological change only.
- **High**: A scenic integrity level meaning human activities are not visually evident. In high scenic integrity areas, activities may only repeat attributes of form, line, color, and texture found in the existing landscape character.
- **Moderate**: A scenic integrity level that refers to landscapes where the valued landscape character "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed.
- **Low**: A scenic integrity referring to the landscapes where the valued landscape character "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed, but they borrow valued attributes such as size, shape, effect, and pattern of natural opening, vegetative type changes, or architectural styles within or outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed but compatible or complimentary to the character within.
- **Very Low**: A scenic integrity level that refers to landscapes where the valued landscape character "appears heavily altered." Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect, and pattern of natural openings, vegetative type changes, or architectural styles within or outside the landscape being viewed. However, deviations must be shaped and blended with the natural terrain so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition.
- **Unacceptable Low**: A scenic integrity level that refers to landscapes where the valued landscape character being viewed appears extremely altered. Deviations are extremely dominant and borrow little if any line, form, color, texture, pattern, or scale from the landscape character. Landscapes at this level of integrity need rehabilitation. This level should only be used to inventory existing integrity. It must not be used as a management objective.

Section l06, or "l06" - Refers to Section l06 of the National Historic Preservation Act of l966, which requires federal agencies to take into account the effects of their proposed undertakings on properties included or eligible for inclusion in the National Register of Historic Places and give the Advisory Council on Historic Preservation a reasonable opportunity to comment on the proposed undertakings.

Sediment - Material suspended in water or that has been deposited in streams and lakes.

Sensitive Species - Those plant and animal species identified by the Regional Forester for which population viability is a concern, as evidenced by 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.

Seral (Ecology) - A biotic community that is in a developmental, transitory stage in an ecological succession.

Seral Stages (Ecology) - The sequence of a plant community's successional stages to potential natural vegetation.

Species of Greatest Conservation Need - Species whose conservation status warrants increased management attention, and funding, as well as consideration in conservation, land use, and development planning.

SHPO - (See "State Historic Preservation Officer.")

Silviculture - Generally, the science and art of tree management, based on the study of the life history and general characteristics of forest trees and stands, with particular reference to local factors; more particularly, the theory and practice of controlling the establishment, composition, constitution, and growth of forests for desired conditions.

Site - the location of an event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or removed, where the location itself maintains historical, cultural, or archeological value and integrity. Examples are battlefields, historic campgrounds, ancient trails or gathering places, deposits of cultural debris (i.e. middens or trash dumps), and historic homesteads and farms.

Slash (Timber Management) - The residue left on the ground after harvesting, sanitation operations, windstorm, or fire. It includes such material as unutilized logs, uprooted stumps, broken or uprooted stems, tops, branches, and leaves.

Socio-economic - Of, relating to, or involving a combination of social and economic factors.

Soil Compaction - A physical change in soil properties that results in a decrease in porosity and an increase in soil-bulk density and strength.

Soil Erosion - The detachment and movement of soil from the land surface by water or wind. Soil erosion and sediment are not the same (See "Sediment.")

Soil Productivity - The inherent capacity of a soil to support the growth of specified plants, plant communities, or a sequence of plant communities. Soil productivity may be expressed in terms of volume or weight/unit area/year, percent plant cover, or other measures of biomass accumulation.

Soil Surveys - The systematic examination, description, classification, and mapping of soils in an area.

Staging Area - A fenced, generally flat location where materials, equipment, and vehicles are stored prior to their use in construction of the transmission line or its ancillary facilities. Also known as a Laydown Yard.

Structures - Refers to a type of support used to hold up transmission or substation equipment.

Standard - Mandatory courses of action; any deviation from standards requires amendment of the LRMP.

Stand (Vegetation) - A community, particularly of trees, possessing sufficient uniformity as regards to vegetation type, age class, risk class, vigor, size class, and stocking class that distinguishes it from adjacent communities and thus forms a management or silvicultural unity. Within a stand, a dominant or primary species and age class is identifiable, but there may be inclusions or clusters of different species or ages. R2 RIS stands are typically greater than 10 acres. IRI stands are typically greater than 5 acres.

State Historic Preservation Officer (SHPO) – An official within each state appointed by the governor to administer the state historic preservation program and carry out certain responsibilities relating to federal undertakings within the state.

Structural Stages (Vegetation) - Any of several developmental stages of tree stands described in terms of tree size and the extent of canopy closure they create.

Subdivisions - Areas of previously undeveloped land divided into individual home sites and/or blocks of lots.

Substations - Substations are located at switching points in an electrical grid. They connect different parts of a grid and are a source for subtransmission and distribution lines. Substation transformers change the voltage to lower levels for use by end-users.

Temporary Roads - A short-term or non-permanent transportation facility.

Thinning (Silviculture) - The practice of removing some of the trees in a stand to meet desired conditions. Two types of thinning may be done:

- **Pre-commercial, Non-commercial**: Removing trees that are too small to make a merchantable product.
- **Commercial**: Removing trees that have reached sufficient size to be manufactured into a product and to improve tree spacing and promote more rapid growth.

Threatened Species - Any species likely to become endangered within the foreseeable future throughout all or a significant portion of its range and that has been designated in the Federal Register by the Secretary of Interior as such.

Timber - A general term applied to tree stands that provide a wood-fiber product.

Timber Stand Improvement (TSI) - The elimination or suppression of the less desirable vegetation in favor of the more desirable tree growth, such as thinning, cleaning, weeding, and release cuttings.

Traditional Cultural Property (TCP) – A property that is eligible for inclusion in the National Register of Historic Places 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 An example would be a location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world.

Trail - A general term denoting a way usually less than 50 inches wide for purposes of travel by foot, stock, or trail vehicle.

Transportation System - All roads needed to manage and administer Forest resources. A road network.

Travel Management - Travel management is the movement of people and products to and through national forests and grasslands. It connects many different varieties of users and multiple uses on National Forest System (NFS) lands.

Transmission line (electrical) - Transmission lines carry electric energy from one point to another in an electric power system. They carry electric current and are operated at relatively high voltages varying from 69kV to 765kV. They transmit large quantities of electrical power over longer distances. Also see Distribution line.

Tribal Historic Preservation Officer (THPO)- the tribal official appointed by the tribe's chief governing authority or designated by a tribal ordinance or preservation program who has assumed the responsibilities of the SHPO for purposes of section 106 compliance on tribal lands in accordance with section 101(d)(2) of the act. This official is approved to assume the responsibilities of the SHPO on Tribal Land by the Secretary of Interior under the NHPA.

Understory (Vegetation) - The lowest layer of vegetation in a forest or shrub community composed of grass, forbs, shrubs, and trees less than 10 feet tall. Vegetation growing under the tree canopy.

Vegetative Management, Vegetative Manipulation, Vegetative Treatment - Any activities undertaken to modify the existing condition of the vegetation.

Viewshed - Total visible area from a single observer position or the total visible area from multiple observer positions. Viewsheds are accumulated seen areas from highways, trails, campgrounds, towns, cities, or other view locations. Examples are corridors, feature, or basin viewsheds.

Visual Resources – The physical features of a landscape that can be seen (e.g., land, water, vegetation, structures, and other features).

Volt (V) - A unit of measure of the force, or “push,” given the electrons in an electric circuit. One volt produces one ampere of current when acting on a resistance of one ohm.

Unanticipated Discovery – A previously unrecorded cultural resource is encountered in the field. Unanticipated discoveries could consist of all types of archaeological artifacts or remains.

Watershed - The area of land bounded by a divide that drains water, sediment, and dissolved materials to a common outlet at some point along a stream channel or to a lake, reservoir, or other body of water. Also called drainage basin or catchment.

Waters of the United States - Waters used for navigation and all other waters such as lakes, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes or natural ponds, and their tributaries.

Wetlands - Those areas that are inundated by surface water or groundwater with a frequency sufficient to support and under normal circumstances do or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

Wildfire - Any wildland fire not designated and managed as a prescribed fire within an approved prescription. All wildfires will be given an appropriate suppression action.

CHAPTER 6
LIST OF PREPARERS AND REVIEWERS

6.1 ID TEAM – BLACK HILLS NATIONAL FOREST

Name		***Role***
Ed	Fischer	ID Team Leader (Second)
Dave	Slepnikoff	Project Manager, ID Team Leader (First)
Jessica	Eggers	NEPA
Kelly	Warnke (Owens)	Botany
Matthew	Scott	Botany
Chelsea	Monks (Vollmer)	Botany
Deanna	Reyher	Soils
Alberta	Settle	Engineering
Christopher	Stover	Fire/Fuels
Gwen	Sanchez-Lipp	Fire/Fuels
Steven	Hirtzel	Fisheries
Dawn	Laybolt	Heritage/Cultural Resources
Matthew	Padilla	Heritage/Cultural Resources
Michael	Hilton	Heritage/Cultural Resources
Les	Gonyer	Hydrology
Jessica	Lucas (Gould)	Hydrology
Meagan	Buehler	Land Use/Land Management
Gary	Haag	Land Use/Land Management
Rodney	Brown	Land Use/Land Management
Kelly	Honors	NEPA
Mark	Vedder	Range
Craig	Beckner	Range
Justin	McConkey	Range
Rick	Hudson	Recreation
Amy	Ballard	Recreation
Dave	Pickford	Recreation
Randy	Rick	Timber/Silviculture
Matt	Daily	Timber/Silviculture
Terry	Tompkins	Fire/Fuels
Darci	Collins	Transportation/Travel Management
Stephen	Keegan	Visuals
Shirlene	Haas	Wildlife
Kerry	Burns	Wildlife
Bradley	Phillips	Wildlife

6.2 ID TEAM – THUNDER BASIN NATIONAL GRASSLANDS

Name		Role
Hillary	Shirley	ID Team Leader
Geri	Proctor	Lands/Realty
Shawn	Anderson	Aquatics
Katie	Haynes	Botany
Clay	Westbrook	Fire/Fuels
Amy	Sanchez	Heritage/Cultural Resources
Orrin	Koenig	Heritage/Cultural Resources
Kolleen	Kralick	Heritage/Cultural Resources
Dave	Gloss	Hydrology
Amy	Ormseth	Lands/Realty
Allen	Hambrick	NEPA
Rhonda	Boyd	NEPA
Barb	Beasley	Paleontology
Angela	Bulla	Paleontology
Moriah	Shadwick	Range
Charlie	Bradshaw	Range
Joy	Nickerson	Recreation
Misty	Hays	Socioeconomics
Randy	Teplar	Soils
Jeff	Tupala	Visual Resource/Scenery
Cristi	Painter	Wildlife

6.3 ID TEAM – BUREAU OF LAND MANAGEMENT

Name		Role
George	Soehn	Resource Advisor (HPDO)
Michael	Robinson	Resource Advisor (HPDO)
Alice	Tratebas	Archaeology (NFO)
Tracy	Pinter	Wildlife Biology (NFO)
Robert	Means	Forestry (NFO)
Richard	Miller	Field Manager (NFO)
Allison	Barnes	Outdoor Recreation (NFO)
Doug	Tingwall	Archaeology (BFO)
William	Ostheimer	Supervisory Natural Resource Specialist (BFO)
Kathy	Brus	Supervisory Natural Resource Specialist (BFO)
Arnie	Irwin	Soils (BFO)
John	Kelley	Planning / Environmental Coordinator (BFO)
Amber	Haverlock	Realty (BFO)
Duane	Spencer	Field manager (BFO)

HPDO – High Plains District Office; NFO – Newcastle Field Office; BFO – Buffalo Field Office

6.4 THIRD-PARTY EIS CONTRACTOR - ENVALUE

Name		***Role***
Randy	Schroeder	Project Manager
Jeanette	Lostracco	Assistant Project Manager Land Use, Socioeconomics
Pat	Golden	Biology
Scott	Yanko	Biology
Steve	Faulk	Biology
Trish	Mitchell	Cultural Resources
Rachel	Clark	GIS

6.5 TECHNICAL REPORTS – POWER ENGINEERS, INC.

Name		***Role***
Kevin	Lincoln	Project Management
Jim	Rudolph	Heritage/Cultural Resources
Cindy	Lysne	Fire/Fuels
Charles	Hutchinson	Hazardous Materials/Public Health and Safety; Recreation; Socioeconomics; Transportation/Travel Management
Wendy	Hosman	Hydrology
Charles	Hutchinson	Land Use/Land Management
Andy	Mork	Paleontology
Beth	Colket	Range, Weeds and Botany
Holly	Cunha	Soils
Cindy	Lysne	Timber/Silviculture
Gina	Fegler	Visual Resource/Scenery
Wendy	Hosman	Wetlands
Ben	Bainbridge	Wildlife