Black Hills Electric Cooperative, Inc.

Rockerville Electric Transmission Line Project

Final
Environmental Assessment

USDA Forest Service
Black Hills National Forest
Custer, South Dakota

Commonly Used Acronyms and Abbreviations

ARC	At-Risk-Community
ATV	All-Terrain Vehicle
BHNF	Black Hills National Forest
BHEC	Black Hills Electric Coop
BMP	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWD	Coarse Woody Debris
DN	Decision Notice
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FSR	Forest System Road
FEA	Final Environmental Assessment
FONSI	Finding of No Significant Impact
FS	Forest Service
FSH	Forest Service Handbook
FSM	Forest Service Manual
GIS	Geographic Information System
MA	Management Area
MIS	Management Indicator Species
MVUM	Motorized Vehicle Use Map
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFS	National Forest System
NFSR	National Forest System Road
OHV	Off Highway Vehicle
DN	Decision Notice
S&G	Standard(s) and Guideline(s)
SDGF&P	South Dakota Game, Fish & Parks
SHPO	State Historic Preservation Office
SOLC	Species of Local Concern
SS	Structural Stage
T&E	Threatened and Endangered
TMP	Travel Management Plan
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WUI	Wildland-Urban Interface

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Black Hills Electric Cooperative, Inc.
Rockerville Electric Transmission Line Project
Final
Environmental Assessment
Pennington County, South Dakota

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Abstract: The Black Hills National Forest has prepared a Final Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. The Black Hills National Forest is responding to a proposal by the project proponent, Black Hills Electric Cooperative, Inc. (BHEC), to construct a new 69kV electrical transmission line on National Forest System lands south and east of Rockerville, South Dakota. This proposal is guided by the Black Hills National Forest Land and Resource Management Plan (Forest Plan) and evaluated in accordance with the National Environmental Policy Act (NEPA) and other agency direction. The focus of the proposal is to construct a transmission line that begins at Rockerville substation located along US Hwy 16 just east of Rockerville, South Dakota, then south and east for approximately 5.8 miles to a point where it exits National Forest (just south of Jackson Springs). The transmission line is needed to provide a loop in the electrical transmission system in the area to ensure reliable electrical service for its cooperative members now and into the future. Five alternatives are considered in detail. Alternative 1 is the proposed action. Alternative 2 is a transmission line route (approximately 6.1 miles long) developed in response to public comments expressing concern for the prominent visibility of the proposal (Alternative 1). Alternative 3 is a route (approximately 4.6 miles long) developed in response to the Forest Service desire to consider a route that is shorter in length on NFS lands. Alternative 4 is a route that focuses upon staying on private land, as much as possible (4.8 miles long). Alternative 5 is the No Action Alternative. This EA discloses the direct, indirect, and cumulative environmental impacts resulting from the proposed action and alternatives. At this time, the Forest Service has identified Alternatives 3 as the preferred alternatives.

SUMMARY

The Black Hills National Forest is responding to a proposal by the project proponent, Black Hills Electric Cooperative, Inc. (BHEC), to construct a new 69kV electrical transmission line on National Forest System lands south and east of Rockerville, South Dakota. This proposal is guided by the Black Hills National Forest Land and Resource Management Plan (Forest Plan) and evaluated in accordance with the National Environmental Policy Act (NEPA) and other agency direction.

The transmission line route proposed by BHEC begins at Rockerville substation located along US Hwy 16 just east of Rockerville. From there the route generally follows the section line southward from the substation for four miles, then southeastward two miles to a point where it exits National Forest (just south of Jackson Springs).

BHEC has determined a need for a loop in the electrical transmission system in the area to ensure reliable electrical service for its cooperative members now and into the future. The need for this project has been established and approved through the appropriate planning and oversight criteria--described in Chapter 1 of this document.

Public involvement regarding this proposal included receiving public comments concerning the proposal to help determine the breadth of issues and concerns to be addressed in the Environmental Assessment. This effort included publishing a legal notice in the Rapid City Journal on January 20, 2010, inviting comment; holding a public meeting on February 4, 2010; and mailing a scoping letter to 220 interested parties. Comments on the proposed action were solicited from members of the public, American Indian Tribes, other public agencies, adjacent property owners, organizations, and Forest Service specialists. The Forest Service received public response that expressed support and opposition to the proposal, as well as suggestions for alternative routes and mitigation. A total of 60 responses were received via letters, faxes, public meeting transcripts, personal-delivery, or email during the formal scoping process.

Comments received during public scoping were used to help in defining issues, develop alternatives, and analyze effects. Through review and analysis of the comments and proposal specifics, the Project Analysis Team identified three prevailing or key issues related to BHEC's proposal. These include: scenery or visual impact issue; socio-economic issue; and access and travel management issue. These issues are described in detail in Chapter 1 of this document.

These issues led the Project Analysis Team to develop alternatives to BHEC's proposed action. The alternatives are described in detail in Chapter 2 of this document. Briefly, the alternatives analyzed in this Environmental Assessment include:

Alternative 1 (Proposed Action). Alternative 1 is the transmission line route proposed by the project proponent, Black Hills Electric Cooperative, Inc. (BHEC). The Cooperative proposes to construct approximately a 5.8 mile segment of new 69kV transmission line across National Forest System (NFS) lands as part of a loop system that would extend from the Rockerville substation to Hermosa. This route runs from the Rockerville substation to a location where it exits the National Forest boundary just south of Jackson Springs (see Project Area map in Chapter 1).

Alternative 2. This alternative is the transmission line route developed in response to public comments made during public scoping concerning the prominent visibility of the proposal (Alternative 1) on ridgetops for much of its projected route. The Alternative 2 route roughly parallels Alternative 1, but deviates away from prominent ridgetops along some segments allowing it to run below ridges and in draws to make it less visible on the landscape. It covers 6.1 miles between the Rockerville substation to where it exits the National Forest boundary just south of Jackson Springs at the same location as Alternative 1 (see Project Area map in Chapter 1).

Alternative 3. This alternative is the route developed in response to the Forest Service desire to consider a route that is shorter in length on NFS lands, yet still accomplishes loop design objectives, as well as addressing scenery concerns. From Rockerville substation, the route generally parallels Alternative 2 to the large meadow located roughly in the center of the project area. From there, the route angles away southeast down a drainage to the National Forest boundary. This alternative extends across a total of approximately 4.6 miles of terrain with 4.1 miles on National Forest (see Project Area map in Chapter 1).

Alternative 4. This alternative route focuses upon staying on private land, as much as possible, along open section lines not closed by other entity rights. This route still maintains loop design objectives. The route covers 4.8 miles between the Rockerville substation to where it exits the National Forest boundary at the same location as Alternative 3. This alternative is routed along 2.6 miles of land that straddles both private lands and NFS lands. The route crosses 2.2 miles of fully private land (see Project Area map in Chapter 1).

Alternative 5 (No Action). The National Environmental Policy Act (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 or other action alternatives, analyzed in this EA, would take place on NFS lands. The theme of this no action alternative would be to not permit the proponent to construct a new 69kV transmission line on National Forest as described in the proposed action or alternative actions. In light of a no action decision, BHEC may choose to construct a new transmission line fully on private lands.

The reader is directed to Tables 2-1 and 2-2, in Chapter 2 of this document, which provide a relative comparison of the alternative effects and/or characteristics relative to the key issues in the project area.

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CHAPTER 1 PROPOSED ACTION and PURPOSE OF AND NEED FOR ACTION

DOCUMENT STRUCTURE

The Black Hills National Forest has prepared this Environmental Assessment in compliance with the National Environmental Policy Act and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action, alternative actions, and the no action alternative. The document is organized into seven chapters followed by Appendices A – E:

Chapter 1. Proposed Action and Purpose of and Need for Action: The chapter includes information related to the background of the project proposal, issues, the purpose of and need for the project, and a description of the agency's proposal for addressing that purpose and need. This section also details how the Forest Service involved the public, 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 for achieving the stated purpose, as well as a no action alternative. The proposed action was developed based on addressing the purpose and need and key issues raised by the public, other agencies, and internally. This chapter also provides a discussion of design criteria and monitoring required. Alternatives considered, but eliminated from further detailed study are also discussed. Finally, this section includes summary tables displaying the activities planned in the proposed action and a comparison of effects on the key issues associated with implementing the proposal versus no action.

Chapter 3. Affected Environment and Environmental Consequences: This chapter describes the environmental effects of implementing the proposed action Alternative 1, Alternative 2, Alternative 3, Alternative 4, and Alternative 5 the no action. This analysis documentation is organized by resource area, e.g., Vegetation, Soils, Wildlife, Travel Recreation Use, Scenery, etc.

Chapter 4. References: The bibliography provides a list of references supporting the documentation in the EA.

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

Chapter 6. List of Preparers: This chapter provides a list of preparers during the development of the EA.

Chapter 7. Index: The index references page numbers for many key document topics and words.

Appendices: The appendices provide more detailed information to support the documentation and analysis presented in the EA.

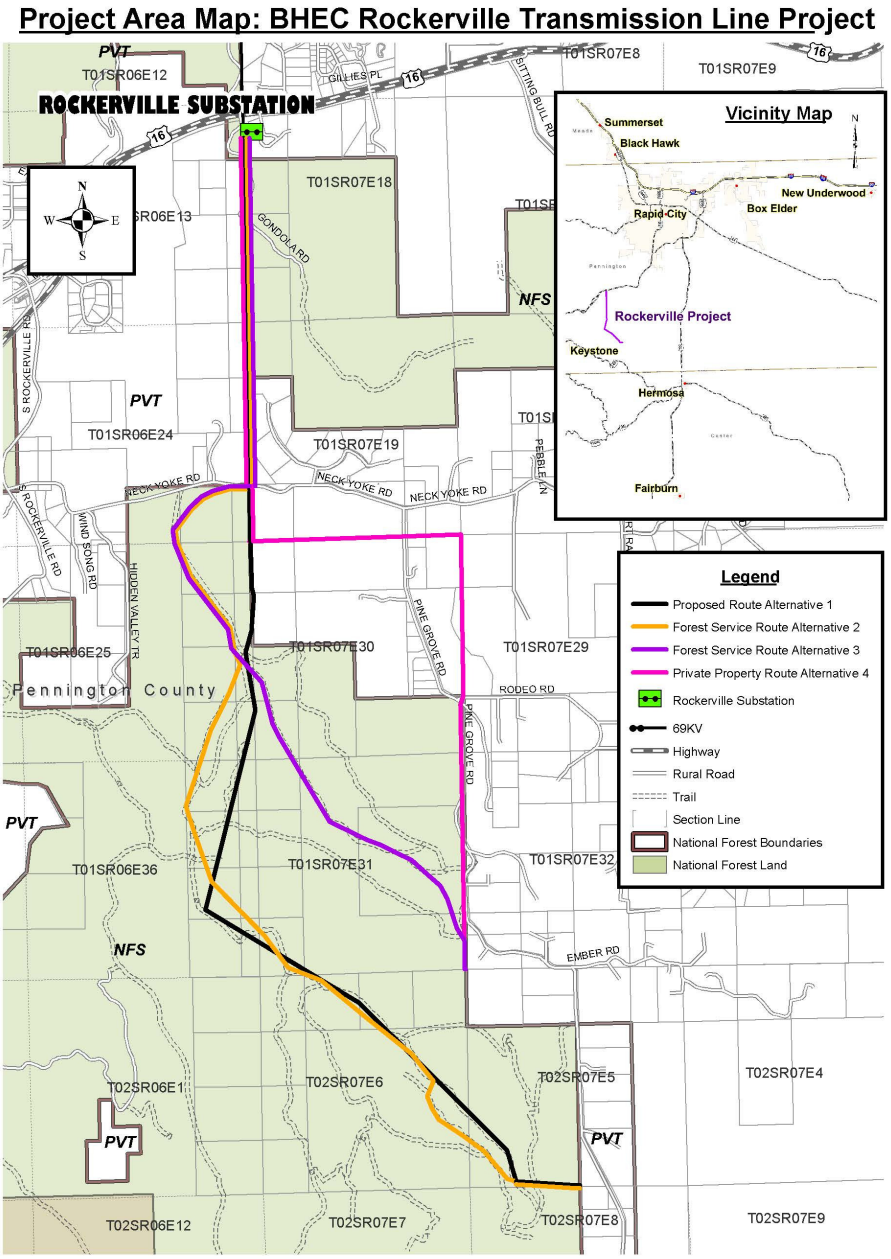
Additional documentation, including more detailed analysis of project-area resources, may be found in the Project File located at Mystic Ranger District office in Rapid City, South Dakota.

BACKGROUND

Black Hills Electric Cooperative, Inc., (hereafter referred to as BHEC, the project proponent or the Cooperative) has proposed construction of a new electrical transmission line on National Forest System lands south and east of Rockerville, South Dakota. The BHEC Transmission Line Project is proposed in an area partially located on the Black Hills National Forest 10 miles southwest of Rapid City, SD. The proposal involves construction of a new 69kV electrical transmission line from the Rockerville substation to Hermosa. The focus of this environmental assessment is the portion of the proposed route and alternative routes that cross and/or are adjacent to National Forest.

The transmission line route initially proposed by BHEC begins at Rockerville substation located along US Hwy 16 just east of Rockerville. From there the proposed route generally follows the section line southward from the substation for four miles, then southeastward two miles to a point where it exits National Forest (just south of Jackson Springs). This route then continues toward the east and south, along a yet undetermined route across private land, ending in Hermosa, SD. The scope of the environmental study described in this Environmental Assessment and associated Decision Notice is limited to the approximately six miles of proposed transmission line route (and alternative routes) within and adjacent to the Black Hills National Forest (see Project Area Map, Figure 1-1).

Figure 1-1 Project Area Map



MANAGEMENT DIRECTION

The following sections provide an overview of the management direction applicable to the BHEC Rockerville Transmission Line Project.

National Environmental Policy Act (NEPA)

A portion of the total BHEC project proposal is routed over National Forest System lands. Consequently, that portion of the proposed project must be subjected to environmental analysis and decision in accordance with the National Environmental Policy Act (NEPA).

Forest Plan Direction

The Black Hills National Forest programmatic management direction document 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 Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA).

The Forest Plan was amended by the Phase II Forest Plan Amendment Record of Decision (ROD) made in October 2005. This amendment provides revised and new Standards and Guidelines focused on: protecting communities, property, and forest values by reducing severe insect and fire hazards; conserving viable plant and animal species and habitats for the long term supported by the best available science; designating research natural areas; and providing for the continuing viability of the existing forest products industry and infrastructure essential to cost effectively treating vegetation on the Black Hills National Forest.

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

The Forest Plan establishes eleven multiple use goals and associated objectives for management of the Forest. Goals 1-4, 10 and 11 are directed toward natural resource objectives for multiple use management of the Forest. Also, Goal 3 and 5-9 provide socio-economic emphasis for management of the Forest. The goals and objectives, applicable to specific resource management issues, provide the basic direction for supporting the purpose and need for the proposal. The eleven Forest Plan goals are discussed in Chapter I of the Forest Plan.

The Forest Plan goal that generally provides direction for the BHEC Rockerville Transmission Line Project proposal is **Goals 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 National Forest are listed below. Of note is that all Forest Plan S&Gs apply depending on the resource affected by a given project.

8303 (Guideline). Bury new or reconstructed electrical utility lines of 33kV or less and telephone lines, unless one or more of the following applies:

a. Scenic integrity objectives of the area can be met using an overhead line;
b. Burial is not feasible due to geologic hazard or unfavorable geologic conditions;
c. It is not technically feasible; or
d. Greater long-term site disturbance would result.

8304 (Guideline). Reduce effects of utility corridors.

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

8308 (Standard). Existing powerline poles with unsafe raptor configurations should be replaced or reconfigured with raptor-safe designs during normal pole and line replacement schedules. In areas with identified raptor electrocution problems, power poles will be replaced or reconfigured with raptor-safe designs as soon as possible.

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.

The Forest Plan sets management allocations for specific uses of land (Management Areas) within the Forest to meet multiple use objectives (FP Chapter III). The Project Team reviewed Management Area (MA) direction and confirmed that no new information existed that would require reconsideration of Forest Plan resource allocations. The MA designated in the Forest Plan through which the proposed and alternative routes of the BHEC Rockerville Transmission Line Project is **MA 5.4 Big Game Winter Range Emphasis**—100% of the area.

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 project and it provides guidance to the Project Team during environmental analysis for the Rockerville Transmission Line Project Area.

BHEC has determined a need for a loop in the system to ensure reliable electrical service for its cooperative members now and into the future. The need for this project has been established and approved through the appropriate planning and oversight criteria.

Specifically, because BHEC finances its projects (including this proposal) largely with Federal loans from the USDA Rural Utilities Service (RUS), the cooperative is required to complete studies and plans to be reviewed and approved by engineers and staff at the RUS. BHEC has two engineering plan studies (a Long Range Plan and a Construction Work Plan) reviewed and approved by RUS and other appropriate entities.

This Federally approved documentation definitively concludes that the Rockerville-Hermosa 69kV Line segment is a necessary project to assure sufficient capacity and high level dependability for service to consumers in the Rockerville-Hermosa-Rapid City area. Both plans were reviewed with the BHEC Board of Directors and given approval through Board resolutions. The USDA RUS reviewed the plans and, finding them acceptable, granted approval both to utilize the Long Range Plan for planning system expansion and to proceed with the construction projects (including the proposal) contained in the Construction Work Plan (USDA Forest Service 2010). Proceeding with projects would be subject to implementation approval by applicable local environmental and other jurisdictional authorities.

The existing electrical transmission system substations currently serve approximately 850 square miles and approximately 5,000 Black Hills Electric Cooperative members in the Rockerville, Hayward, Hermosa, Red Shirt, Fairburn, Spring Creek, and Sheridan Lake areas. The area continues to develop with residential dwellings, businesses, tourist attractions, resorts, and recreational opportunities on private and federal lands--all of which are heavily dependent on reliable electric service.

Existing electrical power is supplied to this entire area through two radial line segments of a single transmission line system, most of which is 30 or more years old. Without a backup system or alternative way to maintain electrical service, such a system configuration is vulnerable to longer term power outages. A major incident (e.g. tornado, ice storm, fire, wind, vandalism, etc.) occurring in any segment of the existing line could leave up to 2,500 customers without electricity for hours or days depending upon the severity of damage to the line. Additionally, maintenance, such as hardware tightening, insulator replacement, or pole ground wire repair, is possible only with the line de-energized and an interruption of electrical service.

Connecting the ends of the two transmission line segments (one existing and one proposed), thereby establishing a loop in this system, would vastly improve reliability for the area by reducing the likelihood of extended periods without electrical power. A looped transmission system mitigates the outage risk by permitting continuation of service to all customers, even

when a line segment is open for maintenance or because of damage to the line. Distribution level voltages and conductor capacities cannot adequately handle cascaded substation loadings that would be required in the event of a transmission outage. Constructing the proposed line segment and completing the transmission loop would ensure adequate and reliable electrical service for cooperative members in this area for decades into the future.

The situation described clearly demonstrates the need for the Cooperative to improve the adequacy and reliability of electrical service to its members. BHEC proposes to construct a new electrical transmission line to address this need as described in the following section.

Within the project area, the Deciding Official has chosen to focus on analyzing the proponent's proposal and alternatives to comply with:

- Desired conditions embodied in Forest Plan Goal 7 and underlying objectives as outlined in Chapter I of the Forest Plan (Phase II Amendment).
- Standards and Guidelines applicable Forest-wide, as well as those specifically applicable to the proposal.
- Desired conditions for Management Area 5.4 (within which the Project Area lies) described in Chapter III of the Forest Plan (Phase II Amendment).

PROPOSED ACTION

The proposed action was introduced to the public during the scoping period (see Public Involvement and Scoping section discussed later in Chapter 1). BHECs proposal was developed to address the need described in the previous section.

BHEC is proposing to construct a new 69kV overhead electrical transmission line (powerline) on the Black Hills National Forest, Mystic Ranger District. The proposed route follows the existing section line right-of-way southward from the Rockerville, SD substation (adjacent to US Hwy 16) for four miles, then southeast two miles to a point where it exits National Forest (just south of Jackson Springs). The transmission line would continue on to Hermosa, SD along a route as yet undetermined. See attached project area map. The scope of this environmental study and eventual decision is limited to the approximately six miles of proposed transmission line and/or alternatives within and adjacent to the National Forest. Specifics of the proposed facility are outlined as follows:

- 69kV overhead electrical transmission line extending six miles within the Black Hills National Forest.
- Wooden single-pole, vertical configuration would be used for the majority of the transmission line. Two-pole structures would be used where needed for required extra support (e.g., ridgetops, corners).
- Wires include one overhead ground wire at the top of the pole for lightning protection and three energized, electric charged conductor wires, staggered and equally spaced below the pole top.
- Standard poles would likely be 45-60 feet above ground and spaced 250–400 feet apart.
- ROW corridor would be 40 feet wide—20 feet on either side of centerline.

- Vegetation up to nine feet in height would remain within ROW clearing.
- Designed and configured to provide protection for raptors and other birds.
- No new permanent roads would be constructed. Pole placement and future maintenance would use existing roads. Low impact all-terrain vehicles would facilitate access needs off road.
- Construction to begin within six months of approval and would take one to two years to complete.
- No temporary work areas on National Forest are anticipated.

DECISION FRAMEWORK

Given the purpose and need, the Deciding Official (Forest Supervisor) reviews the proposed action, the issues identified during scoping, the alternatives, the environmental consequences of implementing the proposal and alternatives, and public comments on the EA. This forms the basis for the Deciding Official to make the following determinations:

- Whether or not the proposed activities and alternatives address the issues, are responsive to Forest Plan direction, and meet the purpose of and need for action.
- Whether or not the information in this analysis is sufficient to implement proposed activities.
- Which action, if any, to approve (decide which alternative or combination of alternatives to implement).

If any action alternative is selected, project implementation could begin within six months of the Decision Notice and would be accomplished within one to two years.

PUBLIC INVOLVEMENT AND SCOPING

Scoping is the process of obtaining public comments about proposed federal actions to determine the breadth of issues to be addressed. Comments on the proposed action were solicited from members of the public, American Indian Tribes, other public agencies, adjacent property owners, organizations, and Forest Service specialists.

The project was entered into the Schedule of Proposed Actions (SOPA) on December 7, 2009. SOPA contains a list of Forest Service proposed actions that will 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 (located on-line at www.fs.fed.us/sopa).

A scoping letter was mailed to approximately 220 interested parties, including adjacent landowners on January 12, 2010. This letter included a description of the project area, an overview of the NEPA process, a general explanation of the action proposed, and an invitation to comment on the project. An effort was made to engage in consultation regarding the project with 31 Tribal contacts known to have interest in management of the National Forest.

A legal notice inviting the public for an opportunity to comment on the project was published in the Rapid City Journal on January 20, 2010.

During the public scoping period, one public meeting was held at the Rockerville Community Hall on February 4, 2010. At this meeting, Forest Service and BHEC representatives presented the project proposal to the public, questions were answered, concerns and issues were solicited and documented for consideration.

During the scoping period, the Forest Service received public response that expressed support and opposition to the proposal, as well as suggestions for alternative routes and mitigation. A total of 60 responses were received via letters, faxes, public meeting transcripts, personal-delivery, or email during the formal scoping process.

The public was provided an opportunity to comment on the BHEC Rockerville Transmission Line Project Predecisional Environmental Assessment during the 30 day comment period. This comment period began when the legal notice was published in the Rapid City Journal on August 31, 2012. The comment period ended on October 1, 2012. The US Forest Service received comments from 17 respondents (see Appendix A).

ISSUES

This section provides a summary of issues identified during the public and internal scoping period for the BHEC Rockerville Transmission Line Project. Comments received from public scoping were used to help in defining issues. A total of 60 responses were received via letters, public meeting transcripts, personal-delivery, or email during the formal scoping process. Internal concerns or issues were also considered in developing and refining the issues. Through review and analysis of scoping comments and input, the Project Analysis Team identified three (3) prevailing or key issues related to the proposed project. Comments received and the agency "response to comments" are summarized in the BHEC Transmission Line Project File located at the Mystic Ranger District, Rapid City office.

The key issues represent those needing special emphasis or attention. These issues received the most public and internal specialist attention during the scoping and analysis period. In some cases, they could represent unresolved conflicts regarding the proposed action. Key issues identified are also characterized by the need to address an internal or external resource management concern; the need to meet Forest Service direction; and are relevant to addressing the purpose of and need for action within Project Area. A brief description of the three key issues follows below:

Following each key issue category below is a list of issue measurement indicators, developed by the Project Analysis Team. Use of measurement indicators applicable to the respective issues provides a basis from which the reader and decision maker can make a relative comparison between the proposed action and alternative actions regarding their effects on the respective issues.

1. Scenery Issue

A category of concern expressed by many who commented during the public scoping period was the scenic or visual impact of the proposed transmission line.

The concern most often mentioned regarded the visual impact of the transmission line as proposed and routed on prominent (visible) ridgetops. A sample of some of the comments are paraphrased as follows: Placement of line on ridge would degrade view; currently unimpeded view in all directions; last thing we need is giant powerline along the ridge to destroy this view; negative visual effects from afar and close-up; look at other routes other than ridgeline; impact of line on prominent ridge.

Other scenic impact concerns conveyed in the comment responses included the clearing of the 40 ft. right-of-way; the cumulative impact of dotting the land with electric lines; line as proposed could cross within close proximity of one home's primary view. Also, more than one responder indicated they put their own lines underground to decrease visual impact.

Many comments were received expressing their concern for the scenic impact of the proposed transmission line in highly visible locations. Given the large number of responses, it is evident that this is a topic of concern among many respondents and warrants increased attention during project analysis. It was deemed appropriate to consider this topic a key issue.

The parameters listed below are measurement indicators for the multiple aspects of the scenery resource. These indicators are representative of a number of variables associated with the effects to the scenery resource. These measurement indicators are intended to provide the public and decision maker a basis for making a relative comparison between alternative resolutions regarding the scenery effects.

A comparison between alternatives relative to this issue is displayed in table format at the end of Chapter 2. A narrative description of the comparative differences in effects is presented briefly in the Comparison of Alternatives section in Chapter 2. Evaluation and disclosure of effects, relative to this issue, is documented in Chapter 3 of this EA—specifically the Scenery section.

Measurement Indicators for the Scenery Issue:

- **Contributes toward achievement of MA 5.4 Scenery Integrity Objectives (SIO) (FP Guidelines 5601 and 5.4-5601) (Yes, No).**
- **Transmission line design and construction impacts scenery (Low, Moderate, High level of impact).**
- **Visibility from travel corridors (None/Low, Moderate, High)**
- **Visibility from residences or subdivisions (None/Low, Moderate, High).**
  Note: relative measures are to be defined/clarified in the context of this issue.

2. Socio-Economic Issue

A diverse number of public comments received regarding the proposed transmission line fall into a category of concern relating to social-economic impacts of the proposal.

A concern often mentioned related to the quality of life and setting respondents enjoy in the area. Comment themes included: impacts quiet peaceful lifestyle; line would bisect our subdivision; chosen to live here for beauty, quiet, feel that is threatened by proposal; change in lifestyle

concerns--peace, quiet, health, beauty, wildlife, privacy, no thru fare between Hwys 16 and 40; infringement of individual rights; chose to live near NF...limited access portion.

Some comments expressed concerns about property, growth and land values. Such comments are paraphrased as follows: There would be a development or growth promoting effect to the south of the project area; it would decrease property values; most area around is already developed—no increase in demand (for power) expected; effect on productive value of FS lands; loss of real estate values.

Other responses received from the public comments had cost related questions and concerns: cost projections of new line vs. maintaining old lines; impact on future management and revenue from wildlife, hunting, grazing; will BHEC compensate for (property value) loss due to proximity of lines; returns (monetary) to BHNF for granting access in area.

Some respondents had health related concerns: effects of low frequency electromagnetic fields on public health; human health impact from transmission line.

There was considerable concern about the socio-economic impacts of the proposed transmission line. It is evident that this is a topic of concern among many respondents and deserves increased attention. It was determined appropriate to consider this topic a key issue. Evaluation and disclosure of effects, relative to this particular issue, received added focus during environmental analysis.

The parameters listed below are measurement indicators for the multiple aspects of the socio-economic environment. These indicators are representative of a number of variables associated with the effects. These measurement indicators are intended to provide the public and decision maker a basis for making a relative comparison between alternatives and their effects.

A comparison between alternatives relative to this issue is displayed in table format at the end of Chapter 2. A narrative description of the comparative differences in effects is presented briefly in the Comparison of Alternatives section in Chapter 2. Evaluation and disclosure of effects, relative to this issue, is documented in Chapter 3 of this EA—specifically the Socio-Economic Environment section.

Measurement Indicators for the Socio-economic Issue:

- **Maintains or contributes toward achievement of Forest Plan Standards and Guidelines relative to utility corridors (FP Guidelines or Standards 8303-8310) (Yes, No).**
- **Cost. The cumulative costs of respective alternatives.**
- **Miles of transmission line within ¼ mile of private land.**
- **Miles of transmission line within ¼ mile of residences.**

3. Access and Travel Management Issue

A considerable number of comments received from the public identified a concern for the impact of the proposed transmission line on access and travel in the area.

Access related concerns are summarized as follows: Pressure to use private access easement; chose to live near this limited access portion of the National Forest; conflict between limiting access and traffic for pole maintenance; does granting access provide a return (monetary) to the BHNF; effect of creating another access, enforcement; BHEC access during winter closure; impact of additional access to users through and to private land and public land; access pressures and control issues; local covenants conflict with BHEC wanting to use private road to access line.

General travel management related concerns included: effect on maintaining non-motorized use; effect of extra traffic needed for maintenance of lines; effects of increased unauthorized traffic; increased traffic in the area; new public ROW.

It was evident that many respondents were concerned about a number of general access related impacts as well as travel management problems related to the proposed transmission line. Because of this volume of concern among many respondents, it was deemed appropriate to consider this topic a key or significant issue. Evaluation and disclosure of effects, relative to this particular issue, received added attention during environmental analysis.

Measurement Indicators for the Access and Travel Management Issue:

- **Contributes toward achievement of Forest Plan Goals, Objectives, and Guidelines relative to Access and Travel Management (FP Goal 4, Objectives 420-422, Standards or Guidelines 9101-9109, 9201-9205) (Yes, No).**
- **Change in public motorized access (Yes, No).**
- **Change in public non-motorized access (Yes, No).**
- **Miles of road constructed.**

There were a number of **other resource concerns** raised during the scoping period that need to be addressed during the environmental analysis. They are important and warranted attention and analysis by the project analysis team and the agency, but are not considered key issues. They are listed below:

Lands. During comment analysis, multiple comments were also coded as lands concerns because this is a lands and special uses project. Generally, these comments were broad concerns about shortage of information, process, procedure, direction in allowing BHEC to propose project.

Wildlife and Habitat. Concerns for the impact on raptors; overall effect on fauna and specifically elk and elk habitat; fragmentation; growth and development effect on wildlife.

Fire and Fuels. Concerns about fire control measures; increased fire hazard from downed lines, lightning, winds.

Heritage. Concerns about protection of Rockerville flume sites; effects on archaeology/historic sites; strong opposition to all new construction in the respondents sacred He Sapa; concern about protection of D/Lakota cultural resources; expect Class III cultural survey conducted by tribal monitors.

Hydrology, Geology and Soils. Impact on surface and ground water quality.

Vegetation. Introduction and control of weeds; impact on flora including observed wild lilies in proposal ROW; expect discussion of structural stages, cover type, stand age, size; impacts to rare plants; full analysis of impacts on flora; the gamut of noxious weed concerns; interference with reforestation.

Range. Fencing concerns.

Recreation. Increased hunter, hiker use in ROWs; discuss/evaluate ROS classes.

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CHAPTER 2 ALTERNATIVES, INCLUDING THE PROPOSED ACTION

INTRODUCTION

This Chapter provides a detailed description of the proposed action (Alternative 1), other action alternatives to the proposed action (Alternatives 2, 3, and 4), as well as a No Action alternative (Alternative 5) for the BHEC Rockerville Transmission Line Project. Maps of the proposed action and alternatives are located in Appendix E of this EA.

This chapter presents the alternatives comparatively by both describing and displaying the quantitative and qualitative differences between each alternative. The intent 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 EA.

A brief overview is presented toward the end of this chapter regarding those alternatives that were considered by the Project Analysis Team, but eliminated from detailed development and study. The last section of the chapter contains two comparative tables that describe each alternative and display the quantitative and/or qualitative effects of implementing each alternative relative to the three key issues presented in Chapter 1.

ALTERNATIVES CONSIDERED IN DETAIL

This section provides a description of the alternatives that were considered in detail by the Project Analysis Team. *It is important to note that units (e.g. acres, miles, feet, etc.) used in describing any alternative are approximate* (based on inventory, GPS, or GIS estimates). Actual figures may increase or decrease somewhat during "on-the-ground" preparation or implementation of project actions.

Alternative 1 - Proposed Action

Alternative 1 is the transmission line route proposed by the project proponent, Black Hills Electric Cooperative, Inc. (BHEC). The Cooperative proposes to construct approximately a 5.8 mile segment of new 69kV transmission line across National Forest System (NFS) lands as part of a loop system that would extend from the Rockerville substation to Hermosa. This route runs from the Rockerville substation to a location where it exits the National Forest boundary just south of Jackson Springs (see Figure 1-1 Project Area Map). The route crosses about 5.3 miles of National Forest and 0.5 miles of private land (see Table 2-2). The 0.5 miles of fully private land lies just north of Neck Yoke Road. The width of the ROW on both National Forest and private land is a maximum of 40 feet (see Appendix E, Map 2). With about 5.8 total miles of proposed line, it is second to Alternative 2 (6.1 miles) in terms of total length of transmission line within or near the National Forest.

A single-pole, vertical configuration would be used for the majority of the transmission line. Two-pole structures would be used where needed for required extra support. Span lengths and

pole heights are dictated by a number of interrelated factors, including terrain, conductor tension and spacing, wind loading on ice-covered conductors, clearances, and the pole-top arrangement.

Poles would extend 45-60 feet above ground with most at 52 feet. Span lengths would vary from 250 feet to 400 feet, and the average span length will be around 350 feet. The line would support four wires, one overhead ground wire at the top of the pole for lightning protection and three energized, current carrying conductor wires, staggered and equally spaced below the pole top. For changes in line direction, guy wires and anchors, usually one per conductor wire, would support the tension forces and prevent the pole from leaning or breaking. Guy wires attach to the pole at the conductor height and extend approximately 45° from the pole to the anchor. Figures 2-1 and 2-2 illustrate the single-pole configuration. Additional drawings/schematics that illustrate single pole top assemblies in detail are held in the project file.

When terrain requires longer spans (e.g., ridge to ridge across a canyon), BHEC would install two-pole "h-frame" structures. Pole heights would be similar to those described for vertical single pole construction, but spans would be much longer. Span lengths could range between 500 feet and 1,000 feet depending on the need. The "h-frame" construction supports five wires, two at the top for shielding from lightning, and the three energized conductor wires, equally spaced horizontally, about ten feet below the pole top. Guy wires and anchors would be used as needed for support. Figure 2-3 illustrates the h-frame configuration. Additional drawings/schematics that illustrate the "h-frame" configuration are held in the project file.

The wooden poles used for this project would be either Douglas Fir or Western Red Cedar, treated with a wood preservative. With the treatment, the poles initially appear dark brown in color, but over time that coloring fades leaving more of the natural wood color. BHEC would use gray-colored polymer insulators made with silicone alloy rubber, a material that offers outstanding insulating performance, vandalism protection, resistance to ultraviolet and contaminant degradation, and lightweight handling. Both types of pole structures are designed and configured to provide protection for raptors and other birds due to conductor spacing and orientation on the pole.

See Table 2-1 and Table 2-2 at the end of this chapter for a tabular comparison of alternatives. Appendix E, Maps 2-5, display the location of the alternative routes and ROW widths on National Forest and private lands along each route. Design criteria and monitoring are summarized in Appendix B.

Summary of specific characteristics of Alternative 1 include:

- Construction of 5.8 miles of 69kV Transmission Line.
- 5.3 miles routed on National Forest (40 foot ROW).
- 0.5 miles routed fully on private land (40 foot ROW).
- Primarily single pole configuration.
- H-frame configuration supports for longer spans or where extra support needed (e.g. ridge to ridge across a canyon).
- Three (3) conductor lines individually mounted on staggered arms.
- Overhead lightning protection wire(s) on top of poles.

- No new roads.
- ROW clearing of vegetation 40 foot wide where needed, leaving vegetation up to nine feet in height.

Figure 2-1 Single Pole Configuration

Figure 2-2 Single Pole Configuration Schematic

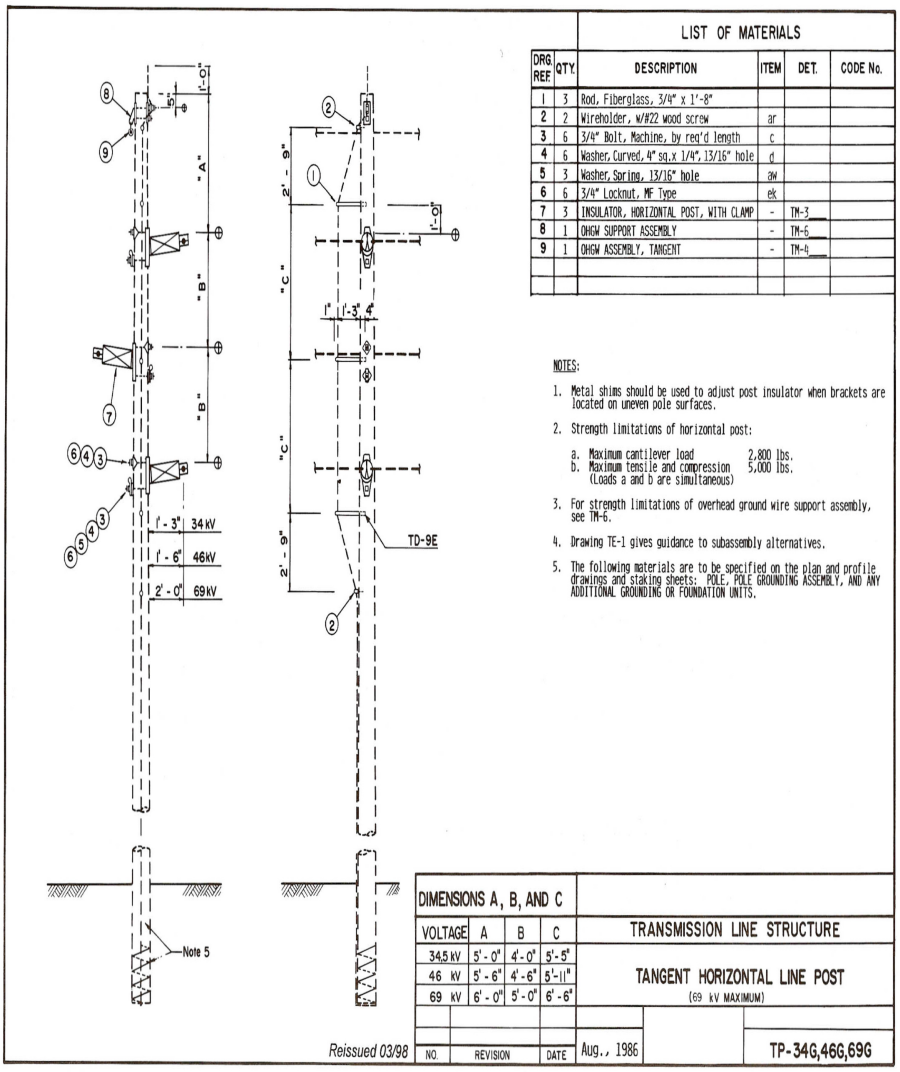
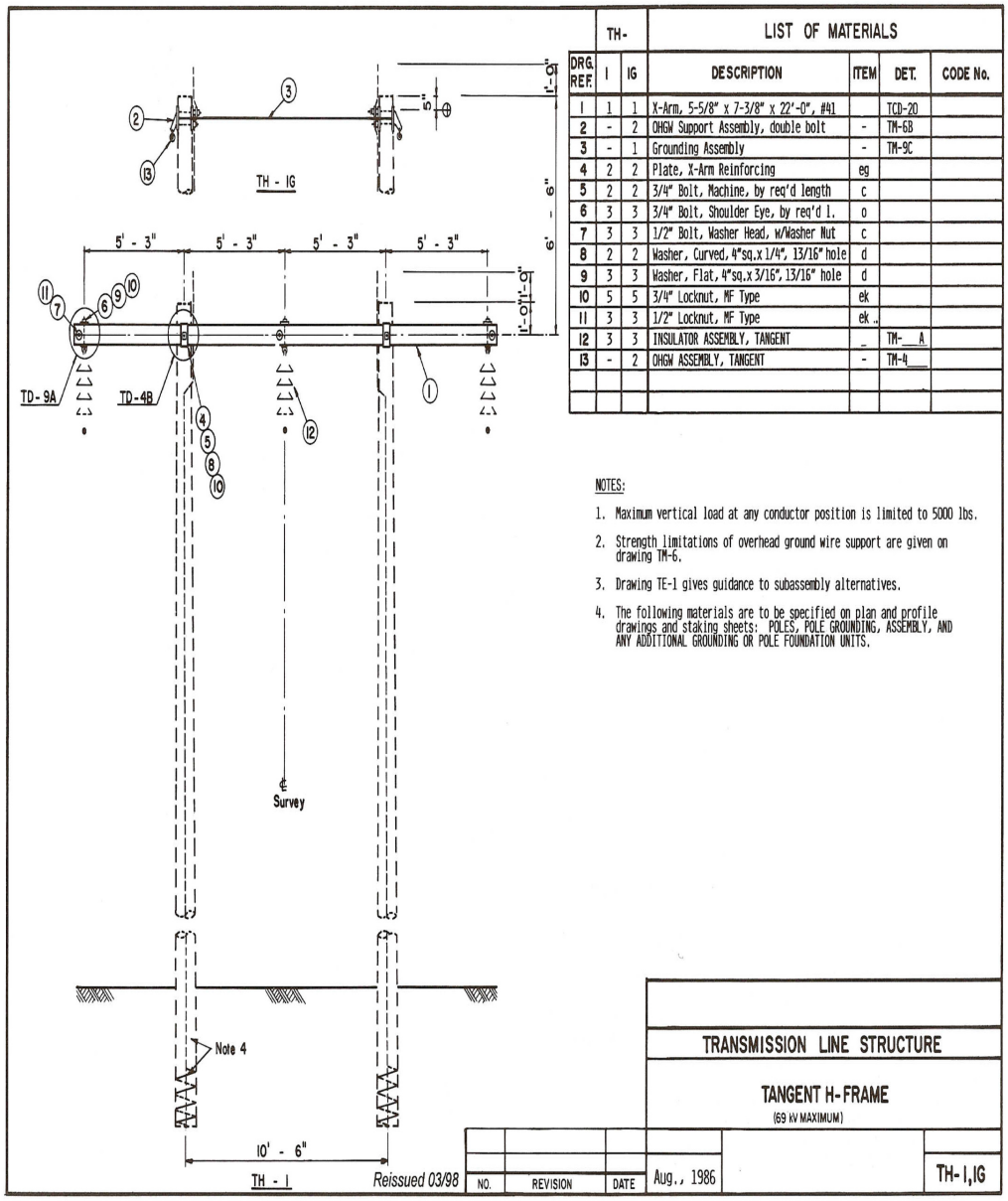


Figure 2-3 H-frame Configuration Schematic



DRG. REF.	TH- I	TH- IG	LIST OF MATERIALS DESCRIPTION	ITEM	DET.	CODE No.
1	1	1	X-Arm, 5-5/8" x 7-3/8" x 22'-0", #41		TCD-20	
2	-	2	OHGW Support Assembly, double bolt	-	TM-6B	
3	-	1	Grounding Assembly	-	TM-9C	
4	2	2	Plate, X-Arm Reinforcing	eg		
5	2	2	3/4" Bolt, Machine, by req'd length	c		
6	3	3	3/4" Bolt, Shoulder Eye, by req'd l.	o		
7	3	3	1/2" Bolt, Washer Head, w/Washer Nut	c		
8	2	2	Washer, Curved, 4"sq.x 1/4", 13/16" hole	d		
9	3	3	Washer, Flat, 4"sq.x 3/16", 13/16" hole	d		
10	5	5	3/4" Locknut, MF Type	ek		
11	3	3	1/2" Locknut, MF Type	ek		
12	3	3	INSULATOR ASSEMBLY, TANGENT	_	TM-__A	
13	-	2	OHGW ASSEMBLY, TANGENT	-	TM-4___	

Alternative 2 – Route Responsive to Scenery Concerns

This alternative is the transmission line route developed in response to public comments made during the public scoping period expressing concern regarding the prominent visibility of the proposal (Alternative 1) on ridgetops for much of its projected route. The Alternative 2 route roughly parallels Alternative 1, but deviates away from prominent ridgetops along some segments so that it runs below ridges and in draws to make it less visible on the landscape. It covers 6.1 miles between the Rockerville substation to where it exits the National Forest boundary just south of Jackson Springs at the same location as Alternative 1 (see Figure 1-1 Project Area Map). This alternative extends across 5.6 miles of NFS lands and 1.6 miles of private land located just north of Neck Yoke Road (reference Table 2-2 and Figure 1-1). The total width of the ROW is 40 feet. Some of this length straddles both National Forest and private land. Specifically, about 1.1 mile of the Alternative 2 route on the west side of the "elephant trunk" area has ROW that is 33 feet on private land and seven feet on National Forest System land (see Appendix E, Maps 2-5). Alternative 2 (at 6.1 miles) is the longest of the action alternatives in terms of line length before it exits National Forest for the last time.

See Table 2-1 and Table 2-2 at the end of this chapter for a tabular comparison of alternatives. Appendix E, Maps 2-5, display the location of the alternative routes and ROW widths on National Forest and private lands along each route. Design criteria and monitoring are summarized in Appendix B.

Specific characteristics of Alternative 2 are the same as Alternative 1 except as noted below:

- Construction of 6.1 miles of 69kV Transmission Line.
- 5.6 miles routed on National Forest (about 1.1 miles straddle both National Forest and private lands as noted above).
- 0.5 miles routed fully on private land.

See Figures 2-1, 2-2, and 2-3 for illustration of pole and conductor configuration.

Alternative 3 – Shorter Route and Responsive to Scenery Concerns

This alternative is the transmission line route developed in response to the Forest Service desire to consider a route that is shorter in length on NFS lands, yet still accomplishes loop design objectives, as well as addressing scenery concerns. From Rockerville substation, the Alternative 3 route generally parallels Alternative 2 to the large meadow located roughly in the center of the project area (NE1/4, SE1/4, S25, T1S, R6E). From there, Alternative 3 angles away southeast down a drainage to the National Forest boundary exit point, which is the section corner common to Sections 31 and 32, T1S, R7E; and Sections 5 and 6 T2S, R7E (reference Figure 1-1 Project Area Map). This alternative extends across a total of approximately 4.6 miles of terrain with 4.1 miles on National Forest and 1.6 miles on private land just north of Neck Yoke Road (reference Table 2-2 and Figure 1-1). The width of the ROW on both NFS land and private land is 40 feet. Some of this length straddles both National Forest and private land. Specifically, about 1.1 miles of the Alternative 3 route on the west side of the "elephants trunk" area is 33 feet on private land and 7 feet on NFS land (see ROW Designation maps in Appendix E).

See Table 2-1 and Table 2-2 at the end of this chapter for a tabular comparison of alternatives. Appendix E, Maps 2-5, display the location of the alternative routes and ROW widths on National Forest and private lands along each route. Design criteria and monitoring are summarized in Appendix B.

Specific characteristics of Alternative 3 are the same as Alternative 1 except as noted below:

- Construction of 4.6 miles of 69kV Transmission Line.
- 4.1 miles routed on National Forest (1 mile of this straddles both private and NFS lands).
- 0.5 miles routed fully on private land.

See Figures 2-1, 2-2, and 2-3 for illustration of pole and conductor configuration.

Alternative 4 – Route Mostly on Private Lands

This alternative is the transmission line route that focuses upon staying on private land, as much as possible, along open section lines unencumbered or not closed by other entity rights. This route still maintains loop design objectives. The route covers 4.8 miles between the Rockerville substation to where it exits the National Forest boundary at the same location as Alternative 3 (see Figure 1 Project Area map). This alternative is routed along 2.6 miles of land that straddles both private lands and NFS lands. This occurs in the following areas: west side of "elephants trunk" area and just south of Neck Yoke Road where the ROW width is seven feet on National Forest and 33 feet on private land; and parallel to Pine Grove Road along the National Forest boundary where the ROW width is 20 feet on National Forest and 20 feet on private land. The route crosses 2.2 miles of fully private land--just north of Neck Yoke Road and south of Neck Yoke Road (see Table 2-2 and Figure 1-1).

See Table 2-1 and Table 2-2 at the end of this chapter for a tabular comparison of alternatives. Appendix E, Maps 2-5, display the location of the alternative routes and ROW widths on National Forest and private lands along each route. Design criteria and monitoring are summarized in Appendix B.

Specific characteristics of Alternative 4 are the same as Alternative 1 except as noted below:

- Construction of 4.8 miles of 69kV Transmission Line.
- 2.6 miles that straddles both private and NFS lands.
- 2.2 miles fully on private land.

See Figures 2-1, 2-2, and 2-3 for illustration of pole and conductor configuration.

Alternative 5 – No Action

The National Environmental Policy Act (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 or other action alternatives, analyzed in this EA, would take place on NFS lands. The theme of this no action alternative would be to **not** permit the proponent to construct a new 69kV transmission line

on National Forest as described in the proposed action or alternative actions. In light of a no action decision, the company may choose to construct a new transmission line fully on private lands.

It is important to note that not implementing a proposed action or alternative actions does not mean that conditions in the area would remain static over time. In fact, they would change, maybe dramatically. This is related to the actions of nature and to the actions of people. Natural processes would include growth and regeneration of vegetation; continuance of other natural processes—erosion, wildfire, wildlife use etc. Human caused changes include further development on private land—including increased demands for reliable utility services, continued dispersed recreation use including hunting, hiking, etc., and increased motorized traffic on the many local roads and NFS roads and trails in the project area.

ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

The following is a description of specific activities planned that are common to all action alternatives (with some exceptions as noted) both in terms of type of action, amount, or size.

Construction Activities. Under all Action Alternatives, construction activities would be similar in scope. Depending on the route selected there would be some variation in the amount of vegetation clearing, overland access required, number of poles placed and length of conductor line laid out and strung. Construction would begin in the spring after ground thaws and dries out. Construction activity related to the action alternatives is expected to take four-to-six months given reasonable (e.g., not overly wet) summer weather pattern.

Once the route has been selected with approval to implement, the center line location and elevations would be established through land survey techniques to produce plan and profile drawings of the project. The structures are then spotted on the drawings according to calculated design criteria, and then laid out in the field with structure locations marked with stakes and lath. When actual work begins, the construction contractor would scatter poles and pole top assembly materials to each structure location. A pole framing crew would then follow working on the ground to install the pole top assembly materials (e.g., insulators, crossarms, bolts, brackets, guy hardware, stringing rollers, etc.) on each pole. Behind the framing crew, a pole setting crew would then install each pole in a hole augured by a digger truck to the appropriate design depth (7-8 ft.). In solid rock, controlled explosives would be used to fragment the rock for removal. When the pole is in place and plumbed and aligned properly, the crew backfills the hole, shoveling and tamping the dirt until the hole is filled and solidly compacted. At line turns or angles, this crew would also install anchors to secure the pole against the line tension. Where conditions permit, power installed screw anchors are turned into the ground. Sometimes, however, a plate anchor must be installed in a hole dug and backfilled with a backhoe. The framing and setting process proceeds pole to pole from one end of the project to the other. Conductor wires are strung next in approximately one-mile sections. The stringing crew pulls rope from one end of the section to the other through the stringing rollers which are attached to the insulators. The ropes are attached to the conductor wires still coiled on reels on a trailer, and at the other end motorized reels pull and coil the rope, pulling the conductor wires into place. Conductor wires are then pulled to the correct design tension, removed from the rollers, and secured to the insulators. Stringing conductor wires continues section to section with sections spliced together using secure compression connectors. When the conductor stringing is complete from one end of the project to the other the crew moves

back through the project checking for anything left undone, cleaning up any excess or waste material, repairing ground disturbance from heavy equipment, etc.

Maintenance of ROW and Vegetative/Ground Conditions. Implementation of any of the action alternatives would require periodic maintenance by the cooperative in addition to the required transmission line infrastructure maintenance. Examples would include periodic removal of vegetation that could pose a hazard (e.g., electrical, fire, etc.); weed treatments; and correcting or mitigating any erosion or other soil/water concerns associated with the transmission line corridor. See Appendix B - Design Criteria, Mitigation, and Monitoring.

DESIGN CRITERIA

Design Criteria include standard practices such as Forest Plan Standards and Guidelines (S&Gs), Best Management Practices, and others. They are actions that are applicable and expected to be implemented on NFS land as a matter of standard operating procedures consistent with the theme of a given alternative. Design criteria are applied in order to protect resources and forest users as well as minimize impacts resulting from implementing action alternatives (see Appendix B - Design Criteria, Mitigation, and Monitoring).

MONITORING

The Mystic Ranger District is responsible for monitoring the implementation of a selected action. The District would ensure that EA and Decision Notice (DN) direction including design criteria and any necessary mitigation measures are applied and carried out appropriately. Reviews would be documented during and upon project completion.

Project and permit administrators would perform much of the project monitoring during implementation of project actions. Other resource specialists would monitor specific progress including application of design criteria and mitigation measures related to their resource of concern. There would be a negligible difference in costs associated with monitoring across all action alternatives. See Appendix B - Design Criteria, Mitigation, and Monitoring.

ALTERNATIVES CONSIDERED but ELIMINATED FROM DETAILED STUDY

A broad range of alternative transmission line routes, suggested by the public during the public scoping period or generated by the Project Resource Analysis Team that address the purpose and need, were considered during environmental analysis. These alternative routes were considered by the Project Team, but eliminated from detailed study and not carried forward through the analysis. The Responsible Official concurred with this determination. Maps of these routes are held in the project file. An overview of the alternative routes considered and reasons for eliminating them from detailed study is summarized below.

1. Other Private Land (non-public land) routes. Go east with a transmission line from Rockerville substation then south between Neck Yoke Road and SD Hwy 79 (Spring Creek Road) to SD Hwy 79 and then south to Hermosa. Or alternatively, route transmission line along US Hwy 16 eastward to SD Hwy 79 and then south to Hermosa. These suggested routes are all on private

land; have significant topographic construction and maintenance challenges; and have closed section lines. They do not resolve the need for a loop in the transmission line system since no loop would exist because the existing line goes to Hermosa in the vicinity of US Hwy 79. A loop is needed to accomplish system reliability goals—a basic premise of the initial proposal.

2. South to SD Hwy 40 then to Hermosa route. Follow proposed route southward crossing NFS land and proceeding on to SD Hwy 40 west of Hayward, then continue eastward to Hermosa along SD Hwy 40. Keep off ridges and avoid private property going underground when needed. Topographic ground features are challenging and not conducive for transmission line construction because of the steep valleys and ridges; very limited existing road access in this area for maintenance needs on NFS lands. The multiple curvature and steep, broken topography of a SD Hwy 40 route does not allow for straight right-of-way routing needed to reduce power lost and minimize costs.

3. South Rockerville Road to SD Hwy 40 to Hermosa route. Follow existing distribution line along South Rockerville Road to Black Hills Children's Home; then south to SD Hwy 40 or Harney and east to Hermosa along SD Hwy 40. This route follows distribution line routes part of the way and traverses both NFS land and private lands. The same reasons and challenges for routing a transmission line along US Hwys 16, 16A, and SD Hwy 40 apply here. Higher density of development and adjacency to heavily traveled roads and highways are also limiting factors here.

4. US Hwy 16 to US Hwy 16A to Keystone (SD Hwy 40) to Hermosa route. This route loops to the west through Keystone and then back eastward to Hermosa along SD Hwy 40. This route parallels existing heavily traveled highways (a primary route to and from Mt. Rushmore) most of the way. This route would require increasing the width of the road right-of-way to include an additional 40 foot wide powerline right-of-way in areas with steep side-slopes. Considerable additional private land would be required to be crossed; additional costs for transmission line construction and no better route than currently proposed.

5. Multiple potential routes north, east, and south of Pine Grove Road. Section line routes in these areas were evaluated as to accessibility from both a topographic, construction feasibility, and statutory standpoint. It was determined that for these routes either the section line route is legally closed or section line routing would bring transmission lines right over homes/structures or within/abutting peoples improved spaces.

6. Underground transmission line along one of the alternative routes analyzed in detail. The suggestion to bury the transmission line was submitted by some in the public during scoping to reduce visual concerns. Analysis indicated that overhead transmission line alternative routes on NFS lands would create less ground and vegetative disturbance during construction and subsequent maintenance than buried transmission line and could still meet Forest Plan direction (even regarding scenery effects).

While an overhead power line undoubtedly creates certain visual impacts, the installation of poles represents a much smaller footprint on the terrain with much less disturbance to the surface and subsurface than a trench needed to lay and bury underground power cable six feet deep. Comparatively, for one mile of line, 18 poles would require auguring holes removing about 900 cu. ft. of material compared with excavation of 95,000 cu. ft. of material for a trench 3 ft. wide

by 6 ft. deep needed to lay underground line. Also, a greater magnitude of disturbance to the ground and vegetation is expected from equipment and construction extending continuously for the length of the underground line trenching effort. If explosives are required for trenching in solid rock, a very likely possibility along the routes considered, the disturbance would be more and may reach well beyond the immediate location.

Lightning is more of a concern for underground cables. Special protection must be provided to protect the cable insulation from damage due to lightning surges. Overhead lines are much more forgiving with respect to lightning, due to the insulating and healing properties of air around the conductors as well as the spacing between the conductors and the earth below or the shield wire above the conductors. Induced voltages produced by lightning surges can be thousands of times higher than the operating voltage, stressing underground cable insulation material beyond its capability. Special protection is needed for underground cable. For example, special lightning arresters must be included at each point of connection to an overhead system to shunt lightning surges to ground. This introduces an additional point of potential failure into the electrical system. Any problem or failure in the subsurface cable would require re-excavation along problem areas of concern.

For the same amount of electrical load, an underground powerline conductor must be sized larger than an overhead powerline. Because the conductor line is contained within a solid dielectric material, heat does not readily move away from the cable into the surrounding environment. As heat in a conductor is retained, the conductor temperature and resistance also increase, generating higher energy losses. A bare, overhead conductor, on the other hand, is able to take advantage of the cooling ability of moving air and dissipate heat more easily and effectively.

Burying the transmission line for the length of any of the action alternatives on NFS lands is more costly in terms of construction and maintenance. The projected cost of overhead transmission line is $370,000/mile versus $1,211,000/mile for underground line. The greater cost of buried line is associated with insulated cables and materials; labor for burying, splicing, and terminating the cables; and trenching, bedding, back-filling, and reclamation of a more extensive disturbed area.

The Project Analysis Team reviewed the six alternatives described above. In consideration of the reasons noted, they determined that the purpose and need for the proposal could be addressed and the applicable goals and objectives met with the range of alternatives analyzed in detail and presented in this EA. The Deciding Official agreed with this determination. For these reason, the six alternatives listed above have been considered, but eliminated from detailed study.

COMPARISON OF ALTERNATIVES

This section presents a brief comparative discussion of the five alternatives given detailed study in this EA. The alternatives are described and compared in terms of the effects each alternative has on the key issues described in Chapter 1. Table 2-1 provides a summary of this discussion. Also, Table 2-2 provides additional comparative description of the alternative transmission line routes evaluated. The environmental consequences of the alternatives to the resources affected in the Project Area are more completely described in Chapter 3 of this EA and information contained in the Project File.

1. Scenery Issue

A category of concern expressed by many who commented during the public scoping period was the scenic or visual impact of the proposed transmission line. The concern most often mentioned regarded the visual impact of the transmission line as proposed and routed on prominent (visible) ridgetops. Other scenic impact concerns conveyed in the comment responses included the clearing of the right-of-way; the increased number of transmission lines; and the proximity of lines to home's primary view. Some indicated they put their own lines underground to decrease visual impact and felt this should be considered. Comparison of the impacts of the alternatives can be made relative to the measurement indicators described below. Table 2-1 summarizes the comparative differences.

Scenic Integrity Objectives. Consistency with Management Area (MA) 5.4 Scenery Integrity Objectives (SIO) (FP Guidelines 5601 and 5.4-5601). For all action alternatives, the Scenic Integrity Objectives (SIO) would need to be changed in locations along the route where they are not being met – in compliance with Forest Plan scenery management Guideline 5602. The modification to the SIO would occur between mile post 0.0 and 1.6 on Neck Yoke Rd. Within these mile markers, approximately 0.4 miles would require a change to the SIO. Because these modifications are being made to a Forest Plan Guideline, a Forest Plan amendment is not needed. Beyond mile post 1.6, Alternatives 2 and 3 would contribute toward achieving MA 5.4 SIOs. Alternatives 1 and 4 would not contribute toward achieving MA 5.4 SIOs because they fall below the required SIO of "Moderate". See discussion in Chapter 3, Scenery section.

Transmission line design and construction impacts. Infrastructure design and construction can affect scenery. A relative assessment of the level of impact was made. As Table 2-1 indicates, the proposed route in Alternative 1 has a moderate level of impact. Alternatives 2 and 3 are rated as having a low level of impact and Alternative 4 has a high level of impact. These ratings are discussed in Chapter 3, Scenery section.

Visibility from travel corridors. The visibility of a transmission line from travel corridors (primarily highways and local roads) can affect scenery. A relative assessment of the level of visibility was made. As Table 2-1 indicates, Alternatives 1 and 4 have a high level of visibility. Alternative 2 is rated as moderate level and Alternative 3 is low. These ratings are discussed in Chapter 3, Scenery section.

Visibility from residences or subdivisions. The visibility of a transmission line from residences or subdivisions can affect scenery. A relative assessment of the level of visibility was made. As Table 2-1 indicates, Alternatives 1 and 4 have a high level of visibility from these locations. Alternatives 2 is rated as moderate level and Alternative 3 is low. These ratings are discussed in detail in Chapter 3, Scenery section.

2. Socio-Economic Issue

Many public comments received regarding the proposed transmission line fall into a category of concern relating to social-economic impacts of the proposal. A concern often mentioned related to the quality of life and setting respondents enjoy in the area. Some comments expressed

concerns about property, growth, and land values. Other comments had cost related questions and human health concerns.

Comparison of the impacts of the alternatives can be made relative to the measurement indicators described below. Table 2-1 summarizes the comparative differences.

Forest Plan direction. The BHNF LRMP, as amended by Phase II, contains management standards and guidelines 8303 through 8310 that apply to utility corridors on the Black Hills National Forest (USDA Forest Service 2006). All alternatives have been evaluated relative to the management direction provided by these standards and guidelines and have been determined to be consistent with this Forest Plan direction.

Cost per mile. Over a period of 35 years, the cumulative cost of the proposed action (and the other action alternatives) in terms of cost per mile is estimated at $370,000 to design, plan, construct, maintain, and amortize. This is an average cost/mile for the 69kV, three conductors, one overhead lightning protection line and single pole configuration proposed. The cost of overhead transmission line contrasts with the 35-year expenditure for underground or buried transmission line, which is estimated at $1,211,000 per mile to design, plan, construct, maintain, and amortize. The greater cost of buried line is associated with insulated cables and materials; labor for burying, splicing, and terminating the cables; and trenching, bedding, back-filling, and reclamation of the disturbed area (BHEC 2011).

Miles of transmission line near private land and residences. The proximity of the transmission line to private land and residences provides a relative indication of the potential for the line or poles being in more immediate view or increased potential for impact associated with construction, maintenance, noise, and/or other effects. As Table 2-1 indicates, the proposed route in Alternative 1 has about 2.9 miles of transmission line and associated infrastructure within ¼ mile of private land. Moreover, 1.7 miles of this route lies within ¼ mile of residences on private land. Alternative 2 is similar to Alternative 1 in this respect. Alternative 2 has three miles of line within ¼ mile of private land and 1.5 miles of this route lies within ¼ mile of residences. Alternative 3 has 2.4 miles of line within ¼ mile of private land and 1.8 miles of this route lies within ¼ mile of residences. Alternative 4, much of which is located on private land or straddles both private land and National Forest, has 4.8 miles of line within ¼ mile of private land. This is the entire length of the transmission line corridor in this alternative. About 4.1 miles of this route lies within ¼ mile of residences.

3. Access and Travel Management Issue

The public identified concerns relating to the impact of the proposed transmission line on access and travel in the area. Comparison of the impacts of alternatives can be made relative to the measurement indicators described below. Table 2-1 summarizes the comparative differences.

Forest Plan direction. The BHNF LRMP, as amended by Phase II, contains management goals, objectives, standards and guidelines applicable to the access and travel management issues in this project (Goal 4, Objectives 420-422, Standards or Guidelines 9101-9109, 9201-9205). All alternatives have been evaluated and determined to be consistent with this Forest Plan direction.

Change in public motorized access. Although the Proposed Route (Alternative 1), as well as the other action alternatives, have a certain amount of ground disturbance and clearing on NFS lands, it does not affect motorized travel management within the project area. Motorized access and use within the project area is governed by the recently implemented BHNF Travel Management Plan. Regardless of which action alternative is implemented, there would be no motorized cross country travel in this area and the roads and trails that are designated would have controls such as season of use, and width or type of vehicle permitted. The only exception to this would be any periodic administrative use by the Forest Service or by BHEC for maintaining their power line.

Change in public non-motorized access. Non-motorized use numbers and distribution for activities such as hiking, biking, hunting, and horseback riding may change somewhat due to thinned ROW corridors, better sight distance and easier traverses. Some users might avoid a transmission line area preferring instead areas with a more natural setting. Non-motorized access and use within the project area would be governed by the recently implemented BHNF Travel Management Plan. No appreciable change to non-motorized access resulting from implementation of an action alternative is anticipated.

Miles of road constructed. No new permanent road construction is planned for any of the action alternatives. Temporary road access will use existing routes on the ground or use low impact all-terrain vehicles across the landscape.

There were a number of other resource issues raised during the scoping period that were addressed during the environmental analysis. They are important and warranted attention by the project analysis team, but were not considered key or significant issues. Disclosure of effects to these other resources are detailed in Chapter 3 of this EA.

Table 2-1 displays the effects of the alternatives to the key issues in terms of measurement indicators for each issue. Table 2-2 displays some additional general comparative characteristics of each alternative.

Table 2-1 Effects to Key Issues by Alternative

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Proposal	Visual	Shorter NF Route	Mostly Private	No Action
1. Scenery Issue					
Consistency with MA 5.4 Scenery Integrity Objectives (SIO) (FP Guidelines 5601 and 5.4-5601) (Yes, No). Mile Post 0.0 to Mile Post 1.6 (Neck Yoke Road) Mile Post 1.6 (Neck Yoke Road) to End of Project	 No* No	 No* Yes	 No* Yes	 No* No	 Yes Yes
Transmission line design and construction impacts scenery (Low, Moderate, High level of impact)[1]. Mile Post 0.0 to Mile Post 1.6 (Neck Yoke Road) Mile Post 1.6 (Neck Yoke Road) to End of Project	 H H	 H M	 H L	 H L	 NA NA
Visibility from travel corridors (None/Low, Moderate, High)[1]. Mile Post 0.0 to Mile Post 1.6 (Neck Yoke Road) Mile Post 1.6 (Neck Yoke Road) to End of Project	H H H	L H L	L H L	H H M	NA NA NA
Visibility from residences or subdivisions (None/Low, Moderate, High)[1].	H	L	L	H	NA
2. Socio-economic					
Consistency with Forest Plan Standards and Guidelines relative to utility corridors (FP Guidelines or Standards 8303-8310) (Yes, No).	Yes	Yes	Yes	Yes	Yes
Cost ($/Mile). The cumulative costs of respective alternatives.	$370,000	$370,000	$370,000	$370,000	0
Miles of transmission line within ¼ mile of private land.	2.9	3.0	2.4	4.8	0
Miles of transmission line within ¼ mile of residences.	1.7	1.5	1.8	4.1	0
3. Access and Travel management.					
Consistency with Forest Plan Goals, Objectives, and Guidelines relative to Access and Travel Management (FP Goal 4, Objectives 420-422, Standards or Guidelines 9101-9109, 9201-9205) (Yes, No).	Yes	Yes	Yes	Yes	Yes
Change in public motorized access (Yes, No).	No	No	No	No	No
Change in public non-motorized access (Yes, No).	No	No	No	No	No
Miles of permanent road constructed.	0	0	0	0	0

* Approximately 0.4 miles interspersed along Neck Yoke Rd between mile posts 0.0 and 1.6 do not meet SIO.

Table 2-2 Additional Comparative Characteristics of Alternatives

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Proposal	Visual	Shorter NF Route	Mostly Private	No Action
Characteristics					
No. of residences within ¼ mile of transmission line.	16	16	15	30	0
No. of residences within 500 feet of transmission line.	2	2	3	6	0
Total miles of transmission line to National Forest exit.	5.8	6.1	4.6	4.8	0
Total miles of transmission line on private land.	0.5	0.5	0.5	2.2	0
Total miles on National Forest[1]	5.3	5.6	4.1	2.6	0
Acres of ROW on NFS land	25.8	22.9	15.3	4.2	0
Acres of ROW on Private land	2.5	6.9	6.9	19.3	0
Total ROW acres	28.3	29.8	22.2	23.5	0
Scenic Class Value[2]	24	20	14	23	0

[1]**Total miles on National Forest.** This includes those segments where the ROW corridor is partially on National Forest and partially on private land along section lines.

[2]**Scenic Class Value.** This is a subjective numerical rating of the four action alternatives relative to scenery conditions developed during the analysis process. The lowest adverse effect on scenery conditions is given a rating or value of "1." A moderate effect is given a rating of "2." The highest adverse effect is given a rating of "3." See Table 3-21 and Table 3-22 in Chapter 3 for a tabular list of scenery variables and associated ratings.

CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter describes the affected environment for each resource analyzed. Subsequently, the environmental consequences of the alternatives on the resource components of the physical, biological and social environment in the BHEC Transmission Line Project area are disclosed. Environmental consequences are described in terms of the environmental effects that are beneficial/adverse, short and long-term direct/indirect and cumulative. Effects are quantified where possible, although qualitative discussion is often necessary. Resources or conditions not affected or minimally affected by the action alternatives (e.g., climate, topography, lands and special uses) are not discussed. This chapter provides the scientific and analytical basis for the comparison of alternatives presented in Chapter 2.

Effects of the alternative actions were analyzed over the 20-30 year estimated operational life of the new transmission line. The area considered in analysis covers a one to two mile buffer around a given alternative unless otherwise noted in the resource discussion. Past, present, and foreseeable activities are considered under the respective resource sections in this chapter.

The resource components described in this chapter are arranged in three sections:

- Physical Environment
- Biological Environment
- Social Environment

PHYSICAL ENVIRONMENT

This section describes the affected environment and environmental consequences for each alternative on the physical resource environment. Resources discussed below include: Water Resources, Soils, Geology, Minerals, and Air and Noise resources.

WATER RESOURCES

Affected Environment

The project lies within the Rockerville Quadrangle. Source data describing the water resources affected environment is often provided and presented as characteristic of conditions within this quadrangle. Much of this data provides a basis for water resource analysis in the project area.

Streams. There are no perennial streams along the proposed power line routes within the BHNF. Spring Creek is located in the northern portions of the Rockerville Quadrangle, north of Highway 16 and outside of the project area. Battle Creek also has its headwaters in the southwestern portion

of the quadrangle. Battle Creek is the nearest stream of perennial flow to the project. It is located approximately three miles down Lead Draw from the nearest project location.

There are several unnamed ephemeral drainages in the area. These streams may flow intermittently as a result of snowmelt or following extended periods of heavy precipitation when the soil has been saturated allowing runoff from adjacent slopes to augment flow. However, these events occur infrequently and flows in these drainages are of relatively short duration and generally restricted to periods between March and June.

Ponds. Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Ponding is not probable in most years. However, two ponds were observed during project analysis following periods of significant precipitation. Ponds in valleys and depressions are caused by increased soil depths as a result of accumulated erosion from higher elevations. This factor coupled with the accumulation of organic matter added from the decomposition of plant material, makes ponding possible in some places.

Groundwater. The U.S. Geological Survey's Groundwater Site Inventory (GWSI) database was reviewed in order to assess well location and depth to groundwater along proposed powerline routes. Lester (2004) also provides additional well information that is not included here in her study. Several drillers' logs were found for wells located adjacent to the Black Hills National Forest. Analysis data providing location, water depth and aquifer information for a few selected wells in the Rockerville Quadrangle is held in the project file.

As a result of uplifting and erosion, the thickness of the Deadwood, Madison and Minnelusa aquifers has been reduced in the western portions of the Rockerville Quadrangle and increases significantly to the east. Rahn (1987) calculated a generalized elevation of the water table for the Deadwood, Madison, and Minnelusa aquifers from a topographic elevation of 4,500 feet near Rockerville to an elevation of 3,500 feet east of Rockerville. His calculations demonstrate that wells in the western portion of the Rockerville Quadrangle are generally less productive due to a lack of saturated thickness of the aquifer. Wells in the eastern part of the quadrangle have a much larger saturated thickness and therefore are likely to be much more productive.

Numerous small areas of perched water can be found in alluvial material throughout the quadrangle. A well dug 30 feet deep in T1S R7E S20 had a depth to water of 12 feet. Other examples include a 56 foot deep well in T1S R6E S13 had a depth to water of six feet. These small areas of perched water may be sufficient to provide water to individual homes in the area.

Solution openings are present in karst formations such as the Madison and Minnelusa. Water movement through karst features can be dynamic, allowing for rapid changes in groundwater levels during significant precipitation and runoff events. The Deadwood Formation, Madison Limestone and Minnelusa Formation are used extensively and considered major aquifers in the Black Hills area. Therefore, care must be taken to protect groundwater quality. Mitigation actions should be taken to reduce the potential for contaminated sediments to enter the subsurface.

Springs. Many small springs and seeps are found within the Rockerville Quadrangle. These contact springs occur when water percolating downward contacts impermeable layers and begins to move horizontally until it reaches the surface on the base or flanks of ridges. Impermeable layers in this area are probably a result of subsurface layers of clay or shale. Rahn (1987) identified springs in T1S R7E S21 and in T2S R6E S1. Jackson Spring is located in T2S R7E S5 and lies within the Pahasapa Limestone. It lies several hundred feet below the ridges to the west in an area where several small drainages converge. Small Tertiary deposits also appear near the spring. Historical accounts indicate that the spring area generally holds water. All the proposed routes for the powerline avoid the Jackson Spring area.

Environmental Consequences

Effects Common to All Action Alternatives

Depths to groundwater are generally greater than 200 feet throughout much of the project area except where isolated pockets of perched water exist. Disturbances associated with the power line construction and access road work could be a short-term source of sediment to local ephemeral drainages and ponds and could have a minor effect on vegetation. The addition of sediments to ephemeral streams or ponds has the potential to increase turbidity and decrease light penetration and increase water temperatures within the receiving waters. Accumulations of sediments also can lead to a reduction in holding capacity of ponds, thus reducing the water available to livestock and wildlife.

Flooding is the temporary inundation of an area caused by overflowing streams or by runoff from adjacent slopes. Flooding potential within the project area is depicted on the Flooding Frequency Map (USDA NRCS 2010) held in the project file. The potential for flooding along the alternative powerline routes within the Black Hills National Forest is unlikely.

Most erosion that would occur from this project would be very localized and would not travel far from the source because of the vegetation and ground cover present on the landscape. Barring a mega storm, sediment would generally not make it to the ephemeral drainages and ponds, unless there is project related disturbance immediately adjacent to ephemeral drainages and ponds. Consequently, it is anticipated there would be negligible impacts from sediment.

Alternative 1 Proposed Action

Direct and Indirect Effects

The Alternative 1 route crosses Quaternary Alluvial deposits located in T1S R6E S13 and S24. It crosses Tertiary Gravel deposits in T2S R7E S5 just prior to exiting BHNF and entering private land. Alluvial materials are deposited by flowing water. They are typically transported during periods of high runoff and deposited as flows subside. Alluvial material deposited in valleys may allow for surface water to be hydraulically connected to groundwater. The alluvial deposits described above may allow for surface water runoff to recharge groundwater.

One pond, a small impoundment in an unnamed drainage, is located near the Alternative 1 route. This pond was located on Quaternary Alluvial deposits in T1S R6E in the eastern portion of S24.

No springs were identified near the Alternative 1 route. This route would avoid Jackson Spring area, taking it west and south of the spring. Also this route would cross a small Tertiary Gravel deposit just prior to exiting the BHNF and entering private property.

Activities associated with powerline construction could have both direct and indirect impacts on groundwater resources within the project area, although the potential for impacts are considered to be minimal. Contaminants from drilling equipment and other vehicles (i.e., oil, gasoline and grease) could bind to soils with the potential to infiltrate the subsurface as runoff in areas identified as sensitive where the permeability of the underlying geologic material is conducive to such transport. Activities associated with powerline construction should take every possible action necessary to reduce the potential for contamination as outlined in the design criteria section.

Failure to take the necessary precautions during powerline construction and construction of access routes could potentially lead to the introduction of contaminants to both surface and groundwater resources within the project area that could have cumulative effects. While the potential for the contamination of water resources within the study area are expected to be minimal, the potential for contamination would be further reduced provided that Forest Plan Standards and Guidelines are implemented in conjunction with established Best Management Practices (BMPs) (see Project File).

Cumulative Effects
Cumulatively, all activities are expected to maintain current water quality levels with the implementation of Design Criteria and WCPs/BMPs (see Project File). Thus, the project proposal (and action alternatives) complies with the intent of the Clean Water Act and the associated subset of laws. Other Federal ongoing and foreseeable activities would also adhere to applicable Forest Service policy and Federal and State regulations regarding water resources. Grazing management strategies are employed to prevent water quality impairment associated with livestock concentration in or near water bodies. Recreation use would have no measurable effect on sediment yields in the project area, due to the fact that disturbance created by these activities would be small, if any and dispersed across the landscape.

The proposed project (and action alternatives) is consistent with Executive Orders regarding floodplains (EPA, 2008a), wetlands (EPA, 2008b), and municipal water supplies because proposed activities avoid floodplains, wetlands, and municipal water supply areas. The implementation of Design Criteria and BMPs is fully expected to protect any floodplain and wetland that may be adjacent or down-drainage of the project area.

Alternative 2

Direct and Indirect Effects
There are no significant differences between the Alternative 1 and 2 routes from a water resources perspective. Therefore, the direct and indirect effects outlined for Alternative 1 above apply to the Alternative 2 Route.

Cumulative Effects
The cumulative effects for Alternative 2 would be the same as those addressed for Alternative 1.

Alternative 3

Direct and Indirect Effects
Alternative 3 follows the route of Alternatives 1 and 2 until it crosses the Quaternary Alluvial deposits located in the southeastern portion of T1S R6E S24 (Neck Yoke Road crossing). At this point it follows Alternative 2 to the eastern section line of T1S R6E S25. Then Alternative 3 follows along an unnamed ephemeral drainage. Alternative 3 follows the drainage and lower ridgelines until it exits the BHNF and enters private property. Just prior to exiting the BHNF, the Alternative route crosses small Quaternary Alluvial and Tertiary Gravel deposits in the southeast quarter of T1S R7E S31. Alternative 3 would utilize a significant portion of existing trail throughout its length. However, this alternative would potentially require more construction of temporary access trails or roads for construction equipment than any of the other alternatives.

One concern is that efforts to minimize aesthetic impacts of a powerline route would cause the route to be moved to a lower elevation, perhaps to the flanks of ridgelines in order to reduce public visibility—e.g., Alternative 3. This may require the construction of more temporary access or roads than the other three Alternative routes. This route could lead to increased potential for erosion unless additional preventative actions are employed.

Activities associated with powerline construction could have both direct and indirect impacts on groundwater resources within the project area, although the potential for impacts are considered to be small. These are similar to Alternatives 1 and 2.

Cumulative Effects
The cumulative effects for Alternative 3 would be the same as those addressed for Alternative 1.

Alternative 4

Direct and Indirect Effects
Effects on water resources associated with this alternative were estimated using maps and from comparisons drawn from conditions observed nearby. This was developed because a significant portion of this alternative is on private land. Alternative 4 follows section lines or utilizes private lands throughout the entire proposed route. Because access to private land was restricted at the time of this assessment, comments are limited to information available on the Geologic Map of the Rockerville Quadrangle (held in Project file). The proposed route for Alternative 4 is the same as the Alternative 1 until it reaches the southwest corner of T1S R7E S19 (¼ mile south of the Neck Yoke Road crossing). Thus the water resources encountered to that point would be similar to those discussed under Alternative 1. About half-way down the section line between T1S R7E S31 and 32 (along Pine Grove Road), Alternative 4 crosses small deposits of alluvial and terrace gravel deposits. Further to the south, the Alternative 4 route briefly crosses outcrops of the Madison Limestone and the Minnelusa Formation. The route turns east (near where Pine Grove Road turns eastward) following the section line between T1S R7E S32 and T2S R7E S5 again crossing outcrops of the Madison Limestone and the Minnelusa Formation.

No direct or indirect effects from this alternative could be identified for the water resources encountered along this route.

Cumulative Effects
Cumulative effects would be the same as Alternative 1 where the project area falls on NFS land.

Alternative 5 No Action

Direct, Indirect, and Cumulative Effects
Because no ground disturbance would occur, the No Action Alternative would have no impact on the water resources in the project area. Because this alternative would have no direct impact to water resources in the project area, it would not contribute to a cumulative impact on the water resources in the project area.

SOILS

Affected Environment

In the immediate area of the proposed powerline routes, the soils are mainly comprised of eight soil map units. These include: (1) Sawdust-Vanocker-Paunsaugunt complex (SrE); (2) Vanocker-Sawdust-Rock outcrop complex (VoG); (3) Hilger cobbly loam (HgD); (4) Bullflat-Cordeston silt loams (BsB); (5) Paunsaugunt-Gurney complex (PbD); (6) Rock outcrop-Sawdust complex (RnG); (7) Vanocker-Citadel complex (VcE); and (8) Vanocker-Paunsaugunt complex (VnC).

The location and extent of the various soil map units has been reviewed using information provided by the Natural Resources Conservation Service (NRCS) through their National Cooperative Soil Survey. The detailed soil survey map depicting where the multiple soil combinations predominant is filed with the project record. Table 3-1 below provides a summary of the certain soil characteristics of the predominant soil map units within and immediately adjacent to the proposed Black Hills Electric Cooperative (BHEC) powerline routes within the BHNF.

Table 3-1 Soil Interpretation Characteristics--Erosion Hazard (Off-Trail, Off-Road) (USDA NRCS 2011)

Soil Map Unit Name and Map Unit Symbol	Percent Slope	Erosion Hazard Rating	Rating Reasons (numeric value)
Sawdust-Vanocker-Paunsaugunt complex (SrE)	10 to 40%	Moderate	Slope/erodibility (0.50)
Vanocker-Sawdust-Rock outcrop complex (VoG)	40 to 80%	Severe	Slope/erodibility (0.75)
Hilger cobbly loam (HgD)	6 to 40%	Moderate	Slope/erodibility (0.50)
Bullflat-Cordeston silt loams (BsB)	2 to 9%	Slight	
Paunsaugunt-Gurney complex (PbD)	2 to 15%	Slight	
Rock outcrop-Sawdust complex (RnG)	40 to 80%	Severe	Slope/erodibility (0.75)
Vanocker-Citadel complex (VcE)	10 to 40%	Moderate	Slope/erodibility (0.50)
Vanocker-Paunsaugunt complex (VnC)	2 to 15%	Slight	

Soils ratings in Table 3-1 indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface i.e. construction.. The soil loss is caused by sheet or rill erosion where 50 to 75 percent of the surface has been exposed by some type of physical disturbance. Ratings are both verbal and numerical (termed a K factor). A rating of

"slight" indicates erosion is unlikely under ordinary climatic conditions; "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, including revegetation of bare areas is advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion control measures are costly and generally impractical. Numerical ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on a specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

Seven classes of natural soil drainage are recognized by the NRCS in the National Cooperative Soil Survey and they include: (1) excessively drained; (2) somewhat excessively drained; (3) well drained; (4) moderately well drained; (5) somewhat poorly drained; (6) poorly drained, and (7) very poorly drained. The location and extent of these natural soil classes were reviewed using information provided by the NRCS through their National Cooperative Soil Survey. All the soil map units along the proposed power line routes within the Black Hills National Forest listed in Table 3-1 have been categorized as well drained, except for the Paunsaugunt-Gurney complex (PbD), which has been categorized as somewhat excessively drained.

Environmental Consequences

Effects Common to All Action Alternatives

All four of the action alternatives have the potential to cause some minor soil disturbance. BHEC would utilize existing trails or roads and section lines to the greatest extent possible for all the alternative routes. Thus, the amount of new low grade access trail or road construction is expected to be minimal compared to existing disturbances. Under any of the four action alternatives, disturbances associated with the power line construction could be a short-term source of sediment to local ephemeral drainages and ponds and could have a minor effect on local vegetation and water.

Depending on terrain access and proximity to designated roads or trails, any of the proposed power line routes would be driven (by all-terrain or 4x4 vehicles) periodically for maintenance activities. If light-duty vehicles are used, the expected impact to soils would likely be minimal. These impacts include exposure of soil through crushing/compaction of vegetation and soil displacement and loosening from repeated travel. Although these impacts would be ongoing, they would be relatively infrequent. In the event that any of the action alternatives are selected, soils would be managed according to requirements established for the BHNF.

Alternative 1 Proposed Action

Direct and Indirect Effects

Impacts to soils with this alternative are expected to be minimal. Selection of Alternative 1 would mean the powerline would cross most of the soil map units listed in Table 3-1 above. In the northern portions of this route, SrE (10-40% slopes, moderate erodibility) and VoG 40-80% slopes, severe erodibility) are predominate soil map units. In the southern portion of this route, VcE (10-40% slopes, moderate erodibility), VoG (40-80% slopes, severe erodibility) and VnC

(2-15% slopes, slight erodibility) are predominate soil map units. This alternative utilizes a significant portion of section lines and existing trails which greatly reduces the potential for soil erosion and compaction. And off-road, even though soil map units with a moderate or severe rating may be crossed, there would be minimal soil movement unless there is a lot of bare soil over a lot of distance on steep slopes. If any of these soils become compacted, compaction would be short-term because of the freeze-thaw cycles here.

BHEC should not operate construction equipment when ground conditions are such that unacceptable soil compaction or displacement could occur. Soil compaction can increase soil bulk density levels which could reduce large pore spaces within the soil profile. Thus, soil compaction could lead to increased runoff that could result in erosion at specific locations especially on steeper slopes. Fine textured soils (e.g., loam soils or those with high levels of clay) can generally compact more than sandy soils. However, clay is only a minor component of the soil map units present along the Alternative 1 route. Therefore, it seems likely that the implementation of Alternative 1 is expected to have minimal impact on either the compaction or erosion of soils encountered along this route. Any new primitive trails or roads made for the purpose of establishing new power lines or for permanent maintenance should use best management practices to limit erosion.

Frequent intervals and design of water bars to avoid concentration of water should be placed along any new trail or road work to prevent sediment transport. Ground cover and vegetation should filter most sediment if water is not allowed to concentrate. A routine maintenance and monitoring plan should be developed for all new trail or road construction until vegetation becomes reestablished. Monitoring should include detailed estimates of soil erosion and include specific action plans for any problem areas identified. See Appendix B.

Cumulative Effects

Some erosion of soils would likely occur, especially adjacent to newly constructed access routes. However, it is expected that any impacts to soils within the project area encountered along the proposed route for Alternative 1 would be minimally additive, provided that the Forest Plan Standards and Guidelines are implemented in conjunction with established Best Management Practices. This expectation also applies to other forest management activities and uses. Design Criteria and appropriate WCP/BMP measures apply to all forest management activities and uses. Therefore, the risk of cumulative detrimental soil erosion or compaction is mitigated for all forest management activities. Grazing management is not expected to have extensive soil erosion. Grazing management is also not expected to cause detrimental levels of soil compaction due to where livestock naturally tend to roam and the presence of rock fragments in most of the soils within the project area. Dispersed recreation activities generally do not cause excessive soil erosion issues or detrimental soil compaction due to the lack of concentrated use.

Alternative 2

Direct and Indirect Effects

Alternative 2 is very similar to Alternative 1 with only minor variations occurring in the southeastern portion of T1S R6E S25 and the northeastern portion of section T1S R6E S36. Thus, soil map units encountered along the both routes are similar (reference Soils Map in

project file). Alternative 2 also utilizes existing trails throughout most of the proposed route. Therefore, this alternative is expected to have a minimal impact on either the compaction or erosion of soils encountered along this route, provided the mitigation actions outlined in Alternative 1 are employed.

Cumulative Effects
The cumulative effects on soils for Alternative 2 would be the same as those addressed for Alternative 1.

Alternative 3

Direct and Indirect Effects
Alternative 3 would utilize a significant portion of existing trail throughout its length. See route description for this alternative under the Water Resources section. However, this alternative would require clearing and some blading for more low-grade or primitive access trails or roads than any of the other alternatives. The Alternative 3 route also follows a lower ridgeline above an unnamed ephemeral drainage. This route was chosen to reduce the visual impacts of the powerline from residents to the east. Soils along this route are comprised almost entirely of the VoG (40-80% slopes) soil type (see Table 3-1). The erodibility of VoG soils is characterized as severe. Vigilance and adherence to BMPs and other protective measures is necessary along this segment of the route.

Cumulative Effects
This alternative has potential to contribute to a cumulative increase in erosion associated with cleared segments for low grade access trails or roads. A routine maintenance and monitoring plan should be developed for such trail or road construction in order to monitor condition and the effects of any disturbance on soil erosion until vegetation becomes reestablished.

Alternative 4

Direct and Indirect Effects
Soil conditions associated with this alternative were estimated using maps and from comparisons drawn from conditions observed nearby. This was done because a significant portion of this alternative is on private land. As described earlier, Alternative 4 follows section lines or utilizes private lands throughout the entire proposed route. Because access to private land was restricted at the time of this assessment, comments therefore are based on information available on the area and inference made from accessible adjacent areas. The proposed route for Alternative 4 is the same as Alternative 1, as indicated earlier, until it reaches the southwest corner of T1S R7E S19, thus the soils encountered to that point would be similar to those discussed under that Alternative. At this point, Alternative 4 turns east following the section line for one mile. From there it turns south following Pine Grove Road for two miles eventually turning east and following Ember Road.

Soils encountered along the northern edge of T1S R7E S30 are largely comprised of SrE (10-40% slopes, moderate erodibility) and BsB (2-9% slopes, slight erodibility) soil map units. The area where SrE soils are present along this route has generally lower topographic relief than the other alternative routes discussed and therefore soil erodibility for this alternative is expected to be minimal. Soils encountered along the eastern edge of T1S R7E S 30 and T1S R7E S 31(along

Pine Grove Road) and along the southern edge of T1S R7E S32 (along Ember Road) are largely composed of SrE, PbD (2-15% slopes, slight erodibility) and VoG (40-80% erodibility, severe erodibility) soil map units.

Cumulative Effects
Because this route follows existing section line trails, the additive impact to soils would be minimal.

Alternative 5 No Action

Direct, Indirect, and Cumulative Effects
Because no ground disturbance would occur, the No Action Alternative would have no direct or indirect impact on soils in the project area. Furthermore, this alternative would not contribute to a cumulative impact on soils in the project area.

GEOLOGY

Affected Environment

The project area lies within the USGS Rockerville Quadrangle—within which the geologic assessment for the project area was based. The geology in this area has been studied in detail and is fairly well understood. Dr. Perry Rahn of the South Dakota School of Mines and Technology published the geologic map, including the measured stratigraphic map, for the Rockerville quadrangle in 1987 (Rahn 1987). Previous investigators that also helped define the geology within the Rockerville Quadrangle include Darton and Paige (1925) who mapped the southern half of the Black Hills. Wilde (1964) mapped the Stratobowl area. Dheeradilok (1972) mapped the Precambrian formations in the Rockerville area. Other investigations were conducted by Aho (1974) who examined the paleontology of the White River Group within the central part of the Rockerville Quadrangle, and Redden (1975) who mapped the Precambrian rocks throughout the Black Hills. Lester (2004) completed a fracture study of the northern half of the Rockerville Quadrangle.

Gold was discovered near Rockerville in 1876. It quickly became a placer mining boom town. Gries (1996) suggests that a fossil beach placer at the base of the Deadwood sandstone resulted from weathering and erosion of up gradient gravels and soils. The lack of water in the area is highlighted by the fact that most of the early mining was “dry digging.” Eventually, miners constructed a flume to transport water to the placer deposits. The flume ran for nearly 17 miles and stretched from a reservoir on Spring Creek to the mining area. Traces of the old flume trail are still visible today.

The western portion of the Rockerville Quadrangle is primarily underlain by a diverse mixture of metamorphic and igneous rocks of Precambrian age and includes slates, schists and quartzites. Due to its ability to resist erosion, quartzite can be found at higher topographic levels. Metamorphism generally increases from north to south within the Rockerville Quadrangle. Subsequently, more resistant pegmatites are present as outcrops on higher ridges (Rahn 1987).

The Cambrian-Ordovician Age Deadwood Formation overlies the Precambrian rocks within the Quadrangle. Rahn divided the Deadwood Formation into three distinct units. The upper unit consists of light purple to green, fine grained, calcareous sandstone that forms cliffs. Rahn estimated the thickness of this unit to be about 80 feet. The middle unit consists of purple to green shale which is covered throughout most of the quadrangle. The thickness of this unit is about 135 feet. The basal unit consists of brown sandstone containing Precambrian quartzite. Rahn estimated the thickness of this unit to range from 0-30 feet. The overall thickness of the Deadwood Formation is greatest in the northern portion of the quadrangle and becomes shallower in the southern portion. Rahn measured the thickness of the Deadwood Formation at 239 feet along Spring Creek compared to 200 feet in the southern portion of the quadrangle. The Deadwood Formation is present throughout much of the Rockerville Quadrangle within the Black Hills National Forest.

The Devonian-Mississippian Age Englewood Limestone is covered throughout most of the quadrangle. The Englewood Limestone is purple and relatively thin-bedded. Rahn measured the thickness of the Englewood at 49 feet along Spring Creek Canyon and at 60 feet in the southern portion of the quadrangle.

Mississippian Age Pahasapa (Madison) Limestone has two distinct units. The upper unit consists of a tan colored limestone but turns black when weathered. It forms massive caves and cliffs. The upper unit was measured by Rahn and determined to be about 170 feet thick. The lower unit of the Madison is a buff to tan colored limestone that also weathers to black. It also forms massive cliffs. Rahn measured the thickness of the lower unit to be about 253 feet thick. The Madison Limestone provides a valuable source of groundwater in the area.

The Pennsylvanian-Permian Age Minnelusa Formation overlies the Madison Limestone. Rahn divided the Minnelusa Formation into four units. The upper sandstone unit is an orange, medium to coarse-grained sandstone. Rahn measured the thickness of this unit to be about 70 feet. The Minnelusa Formation also provides a valuable source of groundwater in the area.

The basal unit of the Minnelusa Formation consists of shale. The shale is red colored and is semi-consolidated. Rahn estimated the thickness of this unit to range from 0 to 50 feet. The Minnelusa Formation is largely absent along most of the proposed powerline route within the Black Hills National Forest, except in the south. Within the Paleozoic rock interval, aquifers in the Deadwood Formation, Madison Limestone, and the Minnelusa Formation are used extensively and are considered major aquifers in the Black Hills area. These aquifers receive recharge from infiltration of precipitation on outcrops within the Rockerville Quadrangle, and the Madison and Minnelusa aquifers also receive substantial recharge from streamflow losses along Spring Creek located in the northern portions of the Quadrangle. In general, ground-water flow in these aquifers is radially outward from the crystalline core of the Black Hills (Heakin 2004). Potential effects on groundwater are discussed in the Water Resources section.

Environmental Consequences

Effects Common to All Action Alternatives

All four of the action alternatives have the potential to cause some minor ground disturbance. However, given the shallow depths (7-8 ft.) associated with powerline poles and the distance

between them (averages 350ft.), it seems likely that activities associated with powerline construction would have no effect on the underlying geology within the project area. One concern is that some of the alternative routes cross areas where alluvial and terrace gravel deposits have been identified. These areas can have high permeability that may allow for rapid infiltration of surface water to the subsurface. Potential effects on groundwater resources within the area are discussed in the Water Resources section above.

In 2004, Lester studied the effects of fracturing in the northern portion of the Rockerville Quadrangle. Lester's study showed that fracturing within the northern portions of the quadrangle may cause groundwater to migrate to the north or northeast through interconnected fractures in the bedding. Lester also concluded that groundwater infiltration may facilitate karst formations along the Mississippian-Pennsylvanian contact. Although the geology is fractured in the northern 1/3 of the Rockerville Quadrangle, the proposed powerline routes would be located in the southern 2/3 of the quadrangle. Therefore, the impact of the powerline on the underlying geology would be minimal.

Alternative 1 Proposed Action

Direct and Indirect Effects

The four alternative powerline routes were plotted on the Geologic Map of the Rockerville Quadrangle (reference project file). The Alternative 1 route crosses the Deadwood Formation at T1S R7E S25. This Alternative 1 route has only minimal contact with the Deadwood Formation in the eastern portion of section 25 and in the southwestern portion of T1S R7E S30. The route stays well east of the Formation from this point until it exits the BHNF.

The Alternative 1 route crosses the Englewood Limestone within the BHNF in the area known as the Elephant's Trunk. It likely crosses the Englewood Limestone in the northwest corner of T1S R7E S18. And it crosses the Englewood Limestone only once again briefly within the BHNF. A brief encounter would occur in the southwest corner of T1S R7E S30.

To the south, Alternative 1 would cross the Madison Limestone in the northeastern and southeastern corners of T1S R6E S24 & 25 and in T1S R6E S36, T1S R7E S31, and T2S R7E S6 & 5. Alternative 1 would cross the Minnelusa Formation in the southeastern portion of T2S R7E S6 and again in the southern portion of T2S R7E S5.

Numerous houses, septic systems, and roads already exist on private lands adjacent to the BHNF and these structures overlie similar geologic formations as those determined to underlie the proposed alternative routes 1, 2, and 3. The influence and effect of these overlying structures and development far outweigh any direct or indirect effects associated with any of the proposed powerline routes. Numerous roads and trails currently exist above these geologic formations both on private lands and within the BHNF. The direct and indirect effects associated with the proposed powerline construction would be relatively minimal with respect to the underlying geologic formations within the project area.

Cumulative Effects

It is expected that any impacts to the underlying geology within the project area encountered along this or any of the routes would have a minimal additive effect.

Alternative 2

Direct and Indirect Effects
The Alternative 2 route is very similar to Alternative 1 with only minor variations occurring (reference Geologic Map of the Rockerville Quadrangle held in project file). At the section line between T2S R7E S6 and S8, both Alternatives 1 and 2 meet and turn east following the section line briefly crossing gravel deposits before exiting the BHNF and entering private land.

Because the proposed route for Alternative 2 is similar to the proposed route for Alternative 1, the direct and indirect effects previously discussed apply for Alternative 2. Alternative 2 also briefly crosses gravel deposits near its exit from National Forest. Placement of power poles should be avoided in or near identified alluvial deposits or terrace deposits due to the increased porosity and permeability of these deposits. Because these deposits are usually small and isolated, power lines should be able to span them easily. No appreciable direct or indirect effects for this alternative could be identified for the underlying geology within the project area.

Cumulative Effects
The cumulative effects on the underlying geology for Alternative 2 would be the same as those disclosed for Alternative 1.

Alternative 3

Direct and Indirect Effects
The Alternative 3 route follows the proposed route for Alternative 2 to where it enters the southwest ¼ of T1S R7E S30 (reference Geologic Map of the Rockerville Quadrangle held in project file). At approximately the section line, the Alternative 3 route leaves the Deadwood Formation and enters the Englewood Formation. The Alternative 3 route turns southeast and leaves the Englewood Formation as it enters into the northwest portion of T1S R7E S31 where it crosses the Madison Limestone. Alternative 3 bisects T1S R7E S31 from northwest to southeast using existing trails or roads through approximately 1/3 of its route. It remains on the Madison Limestone until it briefly crosses the Minnelusa Formation. Here the route meets the section line between T1S R7E S31 and S32. Then, the Alternative 3 route turns south and follows the section line until it turns east (where it enters private property) following the section line between T1S R7E S32 and T2S R7E S5. No direct or indirect effects on the underlying geology within the project area could be identified for this alternative.

Cumulative Effects
The cumulative effects on the underlying geology for Alternative 3 would be the same as those disclosed for Alternative 1.

Alternative 4

Direct and Indirect Effects
Underlying geology associated with this alternative was estimated using maps and from comparisons drawn from conditions observed nearby. This was done because a significant portion of this alternative is on private land. Alternative 4 follows section lines straddling BHNF and

private lands in places or fully utilizes private lands throughout the entire proposed route. Because access to private land was not provided at the time of this assessment, comments therefore are limited to information available on the Geologic Map of the Rockerville Quadrangle (reference project file). The proposed route for Alternative 4 is the same as Alternative 1 until it reaches the southwest corner of T1S R7E S19. Thus, the geology underlying Alternative 4 encountered to that point would be similar to that discussed under Alternative 1. At this point, Alternative 4 turns east following the section line for one mile. From there, it turns south following Pine Grove Road for two miles eventually turning east and following Ember Road.

Along the section line between T1S R6E S24 and T1S R7E S19, the Alternative 4 route would cross a Quaternary Alluvial deposit. To the south of this deposit, the route would briefly cross the Englewood Limestone and the Madison Limestone. At the section line between T1S R7E S19 and S30, the route turns east and crosses the Quaternary Alluvial deposits again. Continuing east along the section line, the Alternative 4 route would cross the Madison Limestone and enter the Minnelusa Formation. At the section line between T1S R7E S19 and 20, the route turns south following the section line remaining on the Minnelusa Formation for approximately 1 ½ miles. Here the route has a brief encounter with Quaternary Alluvial deposits and Terrace deposits. To the south of the Tertiary Deposits, the route briefly crosses the Minnelusa Formation and then turns east following the section line between T2S R7E S5 and S32.

It is recommended that siting powerline poles in or near identified alluvial deposits or terrace deposits should be avoided due to the increased porosity and permeability of these deposits. Because these deposits are usually small and isolated, power lines should be able to span them easily. No direct or indirect effects for this alternative could be identified for the underlying geology within the project area.

Cumulative Effects
The cumulative effects on the underlying geology for Alternative 4 would be the similar to those disclosed for Alternative 1.

Alternative 5 No Action

Direct, Indirect, and Cumulative Effects
Because no ground disturbance would occur, the No Action Alternative would have no direct or indirect impact on the geology in the project area. Furthermore, this alternative would not contribute to a cumulative impact on the underlying geology in the project area.

Although studies have shown that the geology is fractured in the northern 1/3 of the Rockerville Quadrangle, the proposed powerline routes would be located in the southern 2/3 of the quadrangle. It seems likely that all action alternatives would have minimal impact on either the underlying geology or groundwater resources underlying these routes, provided the design criteria outlined under “Effects Common to All Action Alternatives” were employed.

Effects Summary

The proposed action appears to be consistent with Forest Service management direction in the area. If an alternative route is selected, the impact to National Forest land appears to be minimal provided the design criteria discussed are employed (See Appendix B). Using existing roads/trails along section lines, coupled with light impact equipment, should limit disturbance. The potential for direct and indirect effects on water resources, soils (discussed in previous sections) and geology within the study area are expected to be minimal. The potential for these disturbances would be further reduced provided that the Forest Plan Standards and Guidelines are implemented in conjunction with established BMPs.

MINERALS

Affected Environment

Minerals can be divided into three categories on National Forest System (NFS) lands. This includes locatable, leasable, and saleable minerals. Locatable minerals are those such as gold, copper, and silver and other metals, which can be claimed under the mining laws. A person or company files a mining claim when they have found something of value, and must get approval from the Forest Service before conducting any surface disturbing activities. There are mining claims located within the project area. One claim is known to be undergoing active operations within the general project area.

Leasable minerals include deposits such as oil and gas or coal. Leases are awarded at the discretion of the government for these types of minerals. There are no mineral leases within the project area and the potential for these types of minerals is low in this area.

Saleable minerals include such things as sand, gravel and building stone. The project area contains deposits of saleable type minerals. One developed gravel pit exists on National Forest in the elephants trunk area that provides limestone to the BHNF. No other deposits in the project area are being developed at this time.

Mining has played a big part in the development of this area especially near Rockerville as evidenced by the numerous prospect pits, adits, shafts, signs of placer mining and abandoned flumes and mine workings in the greater Rockerville area. The BLM index to mining claims LR 2000 lists numerous claims within the Transmission Line Project area. While not active (other than the one claim referenced above), there is always the possibility that they may become so during the life of the project. This could affect travel management as the owners of these claims need administrative access to their area of operation.

Environmental Consequences

All Alternatives

Direct, Indirect, and Cumulative Effects
Future road access needs are unknown. However, once an operating plan is submitted to develop a mining claim, access must be provided. This requirement for road access is specified under 36

CFR 228.1 subpart A and United States Mining Laws 30 U.S.C. 21-54, which confers a statutory right to enter upon public lands to search for minerals. If road access becomes a necessity, then the category of road use and maintenance level of the road would be determined. Roads currently in place may be suitable for access thus reducing the need to open decommissioned or construct additional new roads.

Roads used and maintained to support any of the action alternatives could potentially provide improved travel access to mining claims. There should be minimal negative direct, indirect, or cumulative effects to the mineral resource or to mining claimants from any of the alternatives. The only areas where it would be difficult to approve mining activity are the actual power pole locations. There would be no irreversible or irretrievable commitment of mineral resources resulting from any of the action alternatives.

AIR and NOISE

Affected Environment

Air Quality

High wind and fire events aside, air quality in the project area is generally good to excellent. Fugitive dust from ground disturbing activities is the single air quality concern relative to the proposed action and alternatives. The project vicinity is a Class II airshed; requires standard pollution control. The nearest Class I airshed is located some 30 miles to the south in Wind Cave National Park. Class I airsheds have more stringent standards of pollution control and of incremental degradation than Class II.

Currently, the relatively low population density and limited number of major sources of pollution contribute to existing air quality in the project area. Five stations maintained by South Dakota Department of Environment & Natural Resources in Rapid City, SD and surrounding areas monitor air quality. DENR rates air quality as either in attainment or in non-attainment status relative to the National Ambient Air Quality Standards (NAAQS). Airborne particulate matter category PM10 and PM2.5 rate attainment status currently at these five monitoring stations (US EPA 2011).

Table 3-2 below delineates current state and federal standards for air particulate pollution. Table 3-3 delineates conditions at the monitoring stations. The table also denotes the approximate, straight-line map distance from the project vicinity to each monitoring station.

Table 3-2 National Ambient Air Quality Standards

Pollution Category	Micrograms per Cubic Meter ($\mu g/m^3$)
PM 10-24 Hr Average	150
PM 2.5-24 Hr Average	35
PM 2.5 Annual	15

Table 3-3 Air Particulate Pollution Values at Five Monitoring Stations (SD DENR 2010)

Pollution Category	Station Name	2009 3-Year Avg (µg/m³)	% of Standard	~Distance from Project (Mi.)
PM 10-24 Hr	RC[1] Library	50	33	10
	RC[1] National Guard	79	53	10
	RC[1] Credit Union	118	79	10
	Black Hawk	37	25	15
	Wind Cave	41	27	30
PM 2.5-24 Hr	RC[1] Library	15.0	43	10
	RC[1] Credit Union	16.2	46	10
	Wind Cave	12.6	36	30
PM 2.5-Annual	RC[1] Library	6.7	45	10
	RC[1] Credit Union	7.6	51	10
	Wind Cave	5.3	35	30

[1] Rapid City, SD.

Measurement indicators, useful for analysis or comparison of the proposed action and the alternatives, are:

- Consistency with Forest Plan Objective 101 (USDA Forest Service 2006): Maintain air quality standards in accordance with state implementation plans. Yes/No.
- Length of transmission line traversing forest system lands and private lands (Miles).
- Qualitative assessment of ease of access for construction equipment to transmission line route from existing roads.
- Comparative assessment of the amount of ground disturbance for powerline pole placement.
- Comparative assessment of the amount of vegetation clearing in Right-Of-Way on National Forest System lands.

Noise

Existing noise in the project vicinity is relative to the density of local traffic and kinds of land uses. Land uses along the proposed routes are rural living, dispersed recreation, timber production and livestock grazing. The area management (MA 5.4) emphasizes big game winter range attributes with seasonal vehicle restrictions (USDA Forest Service 2006). Two to six rural, private residences are within 500 feet of the transmission line in the proposed action and action alternative routes. See Table 3-24 in the Socio-economic section of this EA. Pronounced noise levels exist intermittently in the northern end of the project area during excavation in a nearby Forest Service gravel pit and hauling of material to US Hwy 16; and for approximately a 3-week period in August during the annual motorcycle rally in Sturgis, SD. The throaty drone of hundreds of motorcycles passing by on US Hwy 16 is nearly continuous and very discernible several miles south of the Rockerville substation, all day long.

Environmental Consequences

Effects Common to All Action Alternatives

The environmental impacts of the proposed action and action alternatives are very similar relative to air quality and noise. The variance among alternatives is mainly due to the different distances traversed by each alternative and the width of the Right-of-Way (ROW) cleared of trees and other vegetation greater than nine feet in height. The longer the distance traversed, the more poles need to be set. The more poles set the more fugitive dust and noise created by construction activities and the more ground disturbance. Additionally, the ROW clearing will create fugitive dust and noise disturbance. Table 3-4 below provides a comparison of effects in this context by the proposed action and action alternatives. Though analysis of impacts to private lands carries no direct relevance to this environmental analysis, Table 3-4 does display the acreage that would likely be cleared at the same time and in the same manner as the portion of the ROW on the BHNF. This and the number of poles sited on private land would be additive to the effects of those on NFS land.

Calculation of estimated, potential ground disturbance for pole placement on National Forest based on an approximate pad of 0.01 acre in size (12 ft. radius), the width of the ROW and the length of route on NFSL. Poles are set at the approximate centerline of the ROW, 40 feet width. This width on National Forest is seven feet, 20 feet or the full 40 feet, depending on the location along the planned routes. Where this portion is equal to seven feet, poles set on or close to ROW centerline would likely cause little to no soil disturbance on NFS land. For calculation purposes, the distance between poles is approximately 300 feet, but actual spacing may vary from 250 – 500 feet apart.

Construction equipment would ingress and egress using existing roads and 2-tracks to the extent possible. Low impact all-terrain vehicles would facilitate needs off road. Implementation of appropriate best management practices (BMP) would minimize fugitive dust and soil disturbance/displacement, including re-vegetating disturbed ground and annual monitoring for recovery of vegetative ground cover. Implemented repeated seeding as necessary with native plant species.

Table 3-4 Air and Noise Effects--Measurement Indicators

	Alt 1	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Issue - Measurement Indicators	Proposal	Visual	Shorter NF Route	Mostly Private	No Action
Contribute to achieving Forest Plan Objective 101: Maintain air quality (Yes, No).	Yes	Yes	Yes	Yes	Yes
Total miles of transmission line on fully private land	0.5	0.5	0.5	2.2	Unknown
Total miles of Transmission line on National Forest[1]	5.3	5.6	4.1	2.6	0.0
Total acres of vegetation clearing on NF in ROW[2] Year 0 (2011)	13.4	7.9	3.2	0.7	0.0
Total acres of vegetation clearing on NF in ROW[2] Year 10 (2021)	22.6	17.6	9.4	2.6	0.0
Total acres of vegetation clearing on Prvt in ROW[2] Year 10 (2021)	2.5	6.9	6.9	19.3	Unknown

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Qualitative assessment of ease of access for construction equipment, miles of route cross-country (away from existing roads)	2.6	2.4	2.6	2.0	NA
Ground disturbance for poles (est. 0.01 acre each) on NF in ROW	1.1	0.8	0.5	0.1	0.0

[1]Note: Total miles of transmission line on NFSL includes those segments where the ROW corridor is partially on National Forest and partially on private land.
[2]Note: This estimate only includes sites which may be occupied by vegetation greater than 9 feet tall. Calculations based on existing data in National Resource Information System database for the Black Hills National Forest.

Long-term noise effects associated with the proposed transmission line, or alternative routes, are limited to periodic noise generated by intermittent Aeolian (wind) noise and corona noise (powerline hum). Corona noise levels at the edge of a ROW for transmission lines less than 138kV is less than 40 decibels, which is below the ambient noise level in the average home. See the discussion of corona noise in the Socio-economic section of this EA.

Future maintenance (vegetation clearing) would occur on a 10-year frequency and create adverse effects similar to direct effects described earlier. Periodic inspection by BHEC personnel would occur as needed and may create minor, short-term adverse noise effects.

There would be no irreversible or irretrievable commitment of resources or effects relative to air quality and noise resulting from any of the action alternatives.

Alternative 1 Proposed Action

Direct and Indirect Effects
The Proposed Action is a route composed of relatively straight line segments initially proposed for its practical, economic and engineering considerations for transmission line construction. It would traverse approximately 5.3 miles across NFS land and 0.5 miles across fully private land. An important distinction from the other action alternatives is the ROW is 40 feet wide on NFS land and 40 feet wide where it crosses private land. The other action alternatives have various combinations of ROW width shared by NFS land and private landowners.

The Proposed Action would implement the most vegetation clearing in the ROW on NFS land. It also entails the most cross-country travel by construction equipment and would disturb the most soil for pole setting of the action alternatives. As such, this action would likely create the most fugitive dust and noise disturbance, both of which are adverse effects. These would be minor and short-term in scope and scale. Since ROW vegetation maintenance would occur approximately at 10-year intervals, this is temporally, long-term relative to noise and air quality. Some forest (tree) cover-type or species-type sites may grow sufficiently tall during this time period to require treatment, whereas clearing may not be required initially. ROW clearance acreage may more than double from Year 0 to Year 10 (2021) (see Table 3-4). ROW clearing activities in the short-term and long-term pose minor adverse effects.

Cumulative Effects
Incidental excavating and hauling of material from the gravel pit in the area, locally known as the Elephant Trunk area, possible high wind events raising dust from the old Battle Creek burn area and any future fires may be temporally cumulative with fugitive dust created by

implementation of this action and subsequent maintenance. Air quality and noise impacts may be additive to that of increased traffic, new residential construction and ranching/farming activities in the Neck Yoke and Pine Grove roads vicinity. However, implementation of Alternative 1, along with past, present and reasonably foreseeable future actions, would have minimal cumulative adverse effects on air quality and noise resources.

Alternative 2

Direct and Indirect Effects
The route proposed by Alternative 2 is very similar to that of the proposed action. This slightly longer route locates the transmission line, for the most part, below ridgelines and out of view of some residences in the project vicinity. It necessarily does not traverse the landscape in as much of a straight-line fashion.

Alternative 2 traverses slightly more NFS land and possibly presents more engineering challenges due to terrain features than the proposed action. As such, it is also likely to create more fugitive dust and noise disturbance than the proposed action. Ground disturbance for pole pad construction and setting of poles is slightly more the proposed action. Due to the additional angles and dangles (diagonal cross-slope traverse), more 2-pole sets (H type) may be required. Slightly less cross-country travel may be necessary than the proposed action due to greater proximity to existing roads and trails. Creation of fugitive dust and construction noise are adverse effects, but are minor and short-term in Alternative 2. ROW clearing effects are consistent with those described for Alternative 1 and somewhat less in scale.

Cumulative Effects
Same as Alternative 1.

Alternative 3

Direct and Indirect Effects
Going south from Rockerville substation, Alternative 3 initially runs the same path as Alternative 2, but diverges in an upland meadow to follow the drainage down canyon. It is considerably shorter in length than both the proposed action and Alternative 2.

Soil disturbance due to pole setting is half or less than the proposed action. Miles of cross-country travel to construct the transmission line is comparable to both the proposed action and the Alternative 2, but the terrain is less harsh. Adverse impacts to air quality and noise resources are less under Alternative 3 than both the proposed action and Alternative 2 because the route is shorter. Impacts are minor and short-term. ROW clearing adverse effects are minor, but considerably less both initially and long-term than Alternative 1 and Alternative 2.

Cumulative Effects
Same as Alternative 1.

Alternative 4

Direct and Indirect Effects
Alternative 4 diverges from the proposed action about ¼ mile south of where the routes for Alternatives 2 and 3 leave the proposed action route. Alternative 4 proceeds east along a section

line for a mile and then south two miles. This route runs mainly along NFS land boundary lines with comparatively very little adverse impacts to NFS land. Right-of-way on NFS land for most of its route adjacent to private property is only seven feet in width.

Soil disturbance on NFS land is less than 1/10th acre for pole setting activities; less than one acre of vegetation in the ROW on NFS land would require clearing initially. This is far less disturbance and dust creation than the proposed action and other action alternatives create individually. This alternative, however, may create adverse effects the others do not, at least directly, due to its proximity to private residences and traffic along Pine Grove Road. Adverse effects to air quality and noise resources are minor and short-term. This alternative creates the least impact to NFS land of the four action alternatives because it crosses the least amount NFS land.

Cumulative Effects
Same as Alternative 1.

Alternative 5 No Action

Direct, Indirect, and Cumulative Effects
The No Action alternative maintains the status quo and entails no ground disturbance to produce dust in the air nor any noise disturbance. No direct effect to existing air resources (visibility and air quality) and noise anticipated. The existing power requirements of the local area and the ever increasing demand for more remain unchanged whether this transmission line is constructed or not. No indirect or cumulative effects on air resources and noise are anticipated.

BIOLOGICAL ENVIRONMENT

This section describes the affected environment and environmental consequences for each alternative to the Biological Environment. Resources discussed below include: Vegetation, Botany, Noxious and Invasive Weeds, Range, Fire and Fuels, and Wildlife.

VEGETATION

Affected Environment

The proposed Rockerville powerline route (Alternative 1) and three alternate routes (Alternatives 2-4) are all located within the Minnelusa Foothills section of the eastern Black Hills (Larson and Johnson 1999). The general landscape is characterized by alternating ridges and narrow valleys carved from limey sandstone bedrock. Most of the area is covered by ponderosa pine (*Pinus ponderosa*) forest intermixed with patches of native grassland on limestone ridgetops and mixed conifer/bur oak/ironwood forests in shady, mesic canyons. Some of the more mesic draws along the east side of Black Hills National Forest have been converted to hay meadows dominated by smooth brome (*Bromus inermis*) and other introduced grasses. The 2002 Battle Creek fire burned extensive areas of ponderosa pine woodlands on National Forest and private lands south of the Neck Yoke Road.

All four action alternative powerline routes begin just south of the Rockerville substation in open ponderosa pine woodlands with an understory of snowberry (*Symphoricarpos*), smooth brome and bur oak (*Quercus macrocarpa*) that conforms to the *Pinus ponderosa/Symphoricarpos albus* habitat type of Hoffman and Alexander (1987). This stand contains a mix of mature, intermediate age, and sapling trees. An existing powerline corridor just south of the substation bisects the forest and is dominated by smooth brome, short bur oak, and several weedy species, including Canada thistle (*Cirsium arvense*) and summer-cypress (*Kochia scoparia*).

After passing through an open meadow of smooth brome and various forbs, all four routes then cross a small drainage bisecting the Gondola Road at the western edge of the "Elephant Trunk" section of the National Forest. This drainage bottom and the adjacent hills to the south are dominated by a mixed conifer/deciduous woodland of ponderosa pine, bur oak, water birch (*Betula occidentalis*), ironwood (*Ostrya virginiana*), and occasional plains cottonwood (*Populus deltoides*) that corresponds with the *Quercus macrocarpa/Ostrya virginiana* habitat type of Hoffman and Alexander (1987). These north and east-facing slopes and bottoms tend to have deeper soils than other areas of the potential powerline routes and support a denser understory of plant species adapted to moister conditions. Common understory species in this area include bearberry (*Arctostaphylos uva-ursi*), Canada buffaloberry (*Shepherdia canadensis*), false melic grass (*Schizachne purpurascens*), and cream colored vetchling (*Lathyrus ochroleucus*).

Proceeding south, the powerline routes pass through a mosaic of second growth ponderosa pine/ bur oak woodland and meadows to Neck Yoke Road. At this juncture, Alternatives 1 and 4 diverge from Alternatives 2 and 3. Both Alternatives 1 and 4 continue south for approximately 1/4 mile along the Black Hills NF boundary before Alternative 4 diverges to the east and south through private lands. Just past mile marker 3.5, Alternative 4 parallels Pine Grove Road. The ROW along this segment is 20 feet on NFS land and 20 feet on private land—or essentially within Pine Grove Road itself. Near 4.9 miles out, Alternative 4 briefly rejoins Alternative 3 along the Forest Boundary before turning sharply eastward again along section lines that nearly parallel Ember Road. Outside of the USFS boundary, Alternative 4 is entirely on private lands and cuts across a mosaic of ponderosa pine-bur oak woodlands, open meadows, and suburban homes and yards.

From Neck Yoke Road, Alternative 1 continues due south along the National Forest boundary through a patchwork of burned and unburned ponderosa pine woodland (*Pinus ponderosa/Quercus macrocarpa* or *P. ponderosa/Symphoricarpos albus* habitat types) on a limestone bedrock ridgecrest. The line briefly rejoins Alternatives 2 and 3 in an open meadow with a small dam and cattle pond in the NE1/4 of the SE1/4 of Section 25 (Township 1S Range 6E) before all three routes diverge again. This meadow community is dominated by introduced pasture grasses such as Kentucky bluegrass (*Poa pratensis*) and smooth brome, as well as snowberry, bee balm (*Monarda fistulosa*), cudweed sagewort (*Artemisia ludoviciana*), thistles *(Cirsium* sp.), leafy spurge (*Euphorbia esula*), common mullein (*Verbscum thapsus)*, and goldenrod (*Solidago* sp.). Many of the herbaceous species are of low palatability, suggesting their abundance has been influenced by livestock use.

Alternative route 1 continues south and then southwestward up a limestone ridge system of unburned ponderosa pine/bur oak forest on north-facing slopes and mixed burned and unburned

ponderosa pine/oak forests and open rocky meadows on ridgetops. The composition of the ponderosa pine forests varies depending on the depth of soil, amount of exposed limestone bedrock, and degree of previous disturbance. Unburned sites with relatively deep soils tend to support a rich understory of blue wildrye (*Elymus glaucus*), slender wheatgrass (*Elymus trachycaulus*), and Ross's sedge (*Carex rossii*) with 30-40% vegetative cover or greater. Limestone rock outcrops within the forest support an array of species, including mountain ninebark (*Physocarpus monogynus*), chokecherry (*Prunus virginiana*), prickly rose (*Rosa acicularis*), and various ferns. Some ponderosa pine understories are extremely depauperate due to a thick litter layer (vegetative cover well under 20%) with scattered grasses or abundant downfall. Stands near existing roads or on the edge of meadows tend to have understories of smooth brome, western snowberry (*Symphoricarpos occidentalis*), leadplant (*Amorpha canescens*) and an abundance of sapling oaks and pines.

Ponderosa pine stands that burned in the Battle Creek fire occur on ridgecrests and adjacent valley bottoms intermixed with small unburned stands and native limestone prairie. At present, the burned stands are dominated by resprouting bur oak, chokecherry, poison ivy (*Toxicodendron rydbergii*), and leadplant mixed with smooth brome, Kentucky bluegrass, and little bluestem (*Schizachyrium scoparium*). Relatively few ponderosa pine saplings have become established yet and some areas remain dominated by woody downfall and debris. Areas that burned especially hot (as evidenced by the absence of standing dead timber or coarse debris) are often dominated by Canada thistle, leafy spurge, horseweed (*Conyza canadensis*), stiff goldenrod (*Solidago rigida*), goatsbeard (*Tragopogon dubius*), Ross's sedge, and common mullein.

Patches of prairie grasslands occur on limestone ridgetops with shallow soils over bedrock. Less disturbed grasslands are dominated by native bunchgrasses, including big bluestem (*Andropogon gerardii*), little bluestem, sideoats grama (*Bouteloua curtipendula*), and blue grama (*B. gracilis*). These sites often have high cover of important medicinal and cultural plant species used by the Plains Indians, such as soapweed (*Yucca glauca*), Indian hemp (*Apocynum cannabinum*), and purple coneflower (*Echinacea angustifolia*). Areas adjacent to roads or that may have been disturbed tend to have higher cover of introduced meadow grasses, such as Kentucky bluegrass and smooth brome.

The mosaic of burned ponderosa pine areas, unburned ponderosa pine-bur oak, and limestone prairie continues along the remainder of Alternative route 1. This route continues along the ridge system paralleling Deadman Gulch to the ridge east of Jackson Spring. From Jackson Spring to the National Forest boundary, the route cuts through unburned ponderosa pine forest with a mixed age-class of mature, young, and sapling trees and a grassy understory (dominated by smooth brome).

From the Neck Yoke Road, Alternatives 2 and 3 follow an old logging trail along the lower toe of a limestone ridge to the west and southwest. Before reaching National Forest System Road (NFSR) 686, the logging trail (now largely grown over with smooth brome) skirts a probable former overstory removal comprised of even-aged black-barked ponderosa pine on the east and a small patch of mature, yellow-barked ponderosa pine to the west. This stand has a more open, savanna-like understory than the even-aged patch just upslope. The open condition may be the result of past selective thinning when the adjacent stands were either subject to overstory removal or burned. This is the only mature yellow-bark stand along any of the potential routes

and covers 5-10 acres. The routes of both Alternatives 2 and 3 continue into an open meadow of Kentucky bluegrass, smooth brome, and snowberry where they briefly rejoin Alternative route 1.

From this meadow, Alternative route 2 parallels Alternative route 1, but remains mostly in the valley bottom to the west, rather than immediately ascending the main north-south trending limestone ridge system. The valley bottom contains open meadows, as well as small pockets of unburned ponderosa pine/bur oak forest. In the southeast corner of Section 36, Alternative 2 once again mostly follows the same track of Alternative 1 through sections 31 and 6 in recently burned ponderosa pine forest and limestone prairie described previously. Alternative 2 drops into burned ponderosa woods in Deadman Gulch in the SE corner of Section 6 before rejoining Alternative 1 as it exits the National Forest.

Alternative 3 diverges from routes 1 and 2 in Section 25 by proceeding southeast through a narrow alluvial valley of Kentucky bluegrass/smooth brome meadows in Sections 30 and 31 (Township 1S Range 7E). The valley bisects two parallel northwest-southeast trending limestone ridges. The ridge to the north includes patches of prairie grassland and burned ponderosa pine forest, while most of the southern ridge contains unburned ponderosa pine/bur oak forest on steep, north-facing slopes. The valley is pinched by a prominent limestone bedrock ledge within a patch of bur oak, quaking aspen (*Populus tremuloides*), and ponderosa pine. The slope to the north of this outcrop has been disturbed in the past and contains a thick stand of Canada thistle, houndstongue, poison ivy, and other weedy species. Alternative 3 continues to the National Forest boundary where it passes through unburned ponderosa pine savanna slopes and pastures before terminating in another disturbed patch of Canada thistle and woody downfall. The route follows Alternative 4 to the east after leaving the Black Hills National Forest.

Environmental Consequences

Alternative 1 Proposed Action

Direct and Indirect Effects

Construction of the powerline would create a 40 foot right-of-way (ROW) through National Forest and adjacent private lands. The ROW traverses a mix of forested and non-forested areas totaling about 25.8 acres on NFS land and 2.5 acres on private land. All trees would be cut within the ROW that are over nine feet tall to prevent branches from getting snagged in the electrical transmission line. Adjacent trees might be cut as well if they could fall into the ROW and catch or knock over transmission lines or posts. Additional vegetation would need to be cleared to provide access to the ROW corridor during construction. Once completed, periodic vegetation clearing would occur to maintain the corridor. Trees and brush below nine feet tall could be left standing as long as they did not interfere with the electrical line. The main area affected by vegetation treatment in creation and maintenance of the ROW corridor would be currently unburned stands of ponderosa pine-bur oak and mixed conifer-bur oak-ironwood bottomland forest from the Rockerville substation through the Elephant Trunk and south to the Neck Yoke Road. Additional areas of scattered ponderosa pine-bur oak forest occur south of Neck Yoke Road amid burned stands and open limestone prairie. The burned stands and prairie sites would have some initial disturbance during powerline construction (including removal of standing dead trees that pose a hazard to workers or the electrical line). Future maintenance in

these areas would have little effect on vegetation recovering from the Battle Creek fire until tree and brush cover became taller than nine feet. Additional vegetation treatment in these areas (removal of trees and shrubs under nine feet tall and mowing or clearing of ground-level vegetation) could promote prairie-like conditions on ridgetops along the route that are prone to invasion by recovering ponderosa pine woodlands.

Disturbance associated with powerline construction and maintenance could facilitate the spread of non-native plant species, including such noxious weeds as Canada thistle, houndstongue, and leafy spurge. ROW areas have a similar potential for infestation by noxious weeds as areas impacted by wildfire or prescribed burns. See discussion under Noxious and Invasive Weeds.

Cumulative Effects

The proposed project is bound: in space by an area of one to two miles outside of the project area; bound in time by 10 years prior to account for disturbance associated with the 2002 Battle Creek fire; and bound by 10 years after to account for reasonably foreseeable actions. Activities outside the scope of the proposed action would continue regardless of which alternative is chosen.

The overall reduction of unburned forest cover would be limited to the 40 foot ROW within unburned stands of ponderosa pine-bur oak and mixed conifer-bur oak-ironwood. This represents less than ½ of the proposed line. Burned ponderosa pine woodlands and open limestone prairie vegetation would not be reduced to any extent. The reduction in area of harvestable timber through construction and future maintenance of the powerline corridor is minimal and acceptable under Forest Plan direction.

Wildfire suppression would continue at current levels. Over time, the risk of wildfire may increase as ponderosa pine forests regenerate following the 2002 Battle Creek fire and fuel loads begin to increase. Natural succession could make open limestone meadow areas become woodier and shadier.

The BHEC Transmission Line Project is within Management Area 5.4 Big Game Winter Range Emphasis. Management of these areas would continue at current levels under this alternative. Management activities could include timber stand improvement, timber harvest, road and utility right-of-way clearing, mining, prescribed burning, dispersed recreation opportunities, grazing, and range developments.

The proposed project area is within the Rockerville Grazing Allotment. Livestock grazing affects most of the project area, with the greatest impacts on meadows and wet areas. Under this alternative, grazing would continue at current level although grazing patterns may change over time due to changes in forage production and water availability. See Range section of this document.

Under this alternative, ground disturbance and use of heavy equipment for power line construction could increase the impacts from noxious weeds.

The project area is in the proposed Echo Timber Management Planning Area scheduled for 2014. The management of the timber resource within ROW's usually consists of removal and subsequent

maintenance by removing pine invading the ROW. Areas within the ROW are considered to be unsuitable inclusions within stands of timber and are not managed for growth and yield.

Site productivity during the period of use should generally not change except for areas of soil disturbance such as access trails and clearings for poles. These areas would have reduced productivity. The reduction in productivity would have no consequence as long as the power line is in use. At some time in the future, if the power line is abandoned or relocated, then reclamation would need to occur.

Some protection to surrounding timber stands may occur due to the fire break effect of the power line vegetation treatments. In terms of timber suitability, as long as the use remains as is, the ROW would be unsuitable.

Alternative 2

Direct and Indirect Effects
The potential effects of Alternative 2 are similar to those of Alternative 1 where the two potential powerline routes are co-located. The ROW traverses a mix of forested and non-forested areas totaling about 22.9 acres on NFS land and 6.9 acres on private land. This includes the forested area from the Rockerville substation and Elephant Trunk to Neck Yoke Road, the mosaic of burned ponderosa pine forest, unburned woodlands, and open limestone prairie in the vicinity of NFSR 641 along the ridge east of Deadman Gulch, and the ponderosa pine woodlands southeast of Jackson Spring where the lines exit the National Forest. The proposed ROW would include 33 feet on private lands and seven feet on NFS lands from the Rockerville substation to Neck Yoke Road where the route follows the Forest boundary. The remainder of the proposed route on NFS lands would use a 40 foot ROW).

Alternative 2 deviates from the route of Alternative 1 just south of Neck Yoke Road, where it would follow an old skid trail along the boundary between a small stand of mature yellow-bark ponderosa pine on the west and an even-aged ponderosa pine stand that was previously burned. A large number of mature, yellow-bark trees within and bordering the ROW would need to be cut to prevent damage to the transmission line from stems or branches falling into and snagging electrical wires or powerline poles. Relocation of this route 40 feet to the east (upslope) would bypass the mature stand but would still result in younger trees being cut. As with Alternative 1, trees and shrubs under nine feet tall would not have to be cut during construction or maintenance of the ROW as long as they did not pose a risk of damaging the electric lines.

Disturbance associated with powerline construction and maintenance could facilitate the spread of non-native plant species, including such noxious weeds as Canada thistle, houndstongue, and leafy spurge. See discussion under Noxious and Invasive Weeds.

Cumulative Effects
Alternative 2 is comparable to Alternative 1 where the two routes overlap. However for the segment in the Elephants Trunk area, effects may be less for Alternative 2 because the ROW is seven feet on National Forest and 33 feet on adjacent private land versus a full 40 feet on National Forest in Alternative 1. The main area of additional tree removal would be along the

edge of a mature stand of yellow-bark ponderosa pine and a younger, even-aged, black-bark stand just south of Neck Yoke Road along an old Forest Service skid trail. Possible relocation of the route to the east (upslope) could reduce the overall loss of mature stand conditions (See suggested vegetation design criteria in Appendix B). Less than half of the line passes through unburned ponderosa pine forest. Burned woodlands in valley bottoms, ridge crests, meadow and limestone grassland habitats would have a minimal reduction of their current area due to powerline construction and maintenance.

The affected area is small, the cumulative effects of this project on the timber resource are minimal. Timber removal is acceptable under forest plan direction and is a byproduct of this activity. Other activities occurring within the watershed when added to this project should have minimal impacts on the timber resource. See Cumulative Effects under Alternative 1 and Forseeable Activities, Appendix C.

Alternative 3

Direct and Indirect Effects
Potential effects are comparable to Alternative 1 for the stretch of proposed route from the Rockerville substation to Neck Yoke Road, with the exception that the ROW would be 33 feet on private lands and seven feet on NFS lands. The ROW traverses a mix of forested and non-forested areas totaling about 15.3 acres on NFS land and 6.9 acres on private land. Impacts to a small patch of mature yellow-bark ponderosa pine woodland along an old skid trail just south of Neck Yoke Road would be similar to that of Alternative 2. The remainder of Alternative 3 passes through an open meadow southeast towards the National Forest boundary. The line bypasses adjacent limestone ridges with grassland and ponderosa pine/bur oak forest. The route drops over a limestone bedrock ledge in the middle of the open valley where some trees might have to be cut to maintain the 40 foot ROW. The rock ledge may be bypassed entirely by relocating the line to the east along the toe of a recently burned slope, or by using longer spans of transmission line. A small area of ponderosa pine woodland is present near the junction of the route and Alternative 4 (near the National Forest boundary) and some larger trees would need to be cut to prevent damage to the transmission lines within the ROW.

Disturbance associated with powerline construction and maintenance could facilitate the spread of non-native plant species, including such noxious weeds as Canada thistle, houndstongue, and leafy spurge (several large patches of Canada thistle and houndstongue are present in Section 31 of the route). These patches might need to be sprayed, mowed, hand-pulled, selectively grazed by goats, or use of other biological control measures to reduce their spread.

Cumulative Effects
Effects would be similar to Alternatives 1 and 2 in the area between the Rockerville substation and Neck Yoke Road, and similar to Alternative 2 in the potential loss of some mature, yellow-bark ponderosa pine forest along the skid trail just south of Neck Yoke Road. The main difference between Alternatives 1 and 3 is that a smaller area of forest and meadow would be impacted by initial clearing and subsequent power corridor maintenance due to the narrower width (seven feet on NFS land for Alternative 3 versus 40 feet width on NFS land for Alternative 1) of the ROW. Small areas (less than two to four acres) of bur oak and ponderosa pine

woodland would be subjected to thinning to maintain the 40 foot ROW in the lower portion of the line in Section 31. Impacts to open meadow habitat would be minimal given the lack of tall brush or trees in this area needing removal to create or maintain the line. Also, similar to Alternative 2, effects may be less for Alternative 3 in the Elephants Trunk area because the ROW is seven feet on National Forest and 33 feet on adjacent private land versus a full 40 feet on National Forest as with Alternative 1. The reduction in area of harvestable timber through construction and future maintenance of the powerline corridor is minimal and acceptable under Forest Plan direction.

Alternative 4

Direct and Indirect Effects
Impacts would be comparable to Alternative 1 along the common stretch of proposed powerline along the National Forest Boundary between the Rockerville substation and Neck Yoke Road except that the ROW would be 33 feet on private lands and seven feet on adjacent National Forest System lands. The ROW traverses a mix of forested and non-forested areas totaling about 4.2 acres on NFS land and 19.3 acres on private land. Beyond Neck Yoke Road, Alternative 4 is entirely on private lands except for a 1/4 mile stretch just south of Neck Yoke Road (33 feet on private and seven feet on National Forest) and a stretch bordering the National Forest along the section line running parallel to Pine Grove Road (where the ROW would be 20 feet wide on private and 20 feet wide on National Forest). Much of this route is through open meadows where vegetation treatment would be unnecessary. Some portions of the route would cross through small patches of ponderosa pine where the ROW would need to be cleared of trees taller than nine feet within the corridor. Tall trees adjacent to the ROW would also be cut to prevent damage to poles or transmission lines from falling trunks or branches.

Disturbance associated with powerline construction and maintenance could facilitate the spread of non-native plant species, including such noxious weeds as Canada thistle, houndstongue, and leafy spurge. See discussion under Noxious and Invasive Weeds section.

Cumulative Effects
As with Alternative 1, there would be a reduction in the number of large trees within the ROW from the Rockerville substation to Neck Yoke Road, though this loss would be relatively small compared to the entire National Forest. As with Alternatives 2 and 3, effects may be less for Alternative 4 in the Elephants Trunk area because the ROW is seven feet on National Forest and 33 feet on adjacent private land versus a full 40 feet on National Forest as with Alternative 1. A further lessening of vegetative effects to National Forest may be realized with Alternative 4 because its route is located mostly on private land relative to Alternatives 1-3. The reduction in area of harvestable timber through construction and future maintenance of the powerline corridor is minimal and acceptable under forest plan direction.

Alternative 5 No Action

Direct and Indirect Effects
Under the No Action Alternative, there would be no direct or indirect effects (either negative or beneficial) to any habitat types because implementation of elements of the proposed action would not take place. Ongoing activities such as recreation, fire suppression, and road

maintenance would continue as directed by the Forest Plan. The No Action Alternative would maintain existing plant habitat and would not interfere with ongoing ecological succession (which would likely change the current vegetation structure over time, especially as forest cover recovers from recent wildfires).

Cumulative Effects
Under the No Action Alternative, wildfire suppression would continue at current levels. The risk of wildfires, however, may increase over time due to increased fuel loads in the area from pine regeneration or mountain pine beetle kill. The 2002 Battle Creek fire burned much of the project area and vegetation is still recovering from the large scale disturbance. Under the No Action Alternative, vegetation recovery would continue unless set back by another disturbance.

The BHEC Transmission Line Project is within Management Area 5.4 Big Game Winter Range Emphasis. Management of these areas would continue at current levels under the No Action Alternative. Management activities could include timber stand improvement, timber harvest, road and utility right-of-way clearing, mining, prescribed burning, grazing, and range developments.

The proposed project area is within the Rockerville Grazing Allotment. Livestock grazing affects most of the project area, with the greatest impacts on meadows and wet areas. Under the No Action Alternative, grazing would continue at current levels although grazing patterns may change over time due to changes in forage production and water availability.

BOTANY

Affected Environment

The proposed Rockerville powerline corridor and alternative routes pass through a mosaic of burned and unburned ponderosa pine forest, mixed conifer/bur oak/ironwood forest, and open meadows overlying limestone bedrock. Suitable habitat is present for several Black Hills National Forest plant Species of Local Concern (SOLC) and Region 2 (R2) sensitive species, particularly in mesic bur oak/ironwood communities and limestone meadows.

Species Considered and Evaluated

Federally Listed and Candidate Plant Species
No federally listed Threatened or Endangered plant species are presently documented from the South Dakota Black Hills. Western prairie fringed orchid (*Platanthera praeclara*) is a Threatened species believed to be extirpated in South Dakota. Historically, it occurred in wet areas within the Great Plains of the eastern portion of the state. The threatened Ute ladies'-tresses orchid (*Spiranthes diluvialis*) is known from scattered riparian sites in eastern Wyoming and western Nebraska, but has not been documented in the Black Hills. Narrowleaf grapefern (*Botrychium lineare*) was formerly a candidate species for potential listing under the Endangered Species Act, but was officially dropped from the US Fish and Wildlife Service candidate list in 2007. Since no Federally threatened, endangered, or candidate plant species are known or suspected to occur in the Black Hills of South Dakota, Endangered Species Act Section 7 Consultation is not required for this project.

Region 2 Sensitive Species
Twelve of the 89 plant species designated as Sensitive in 2009 by the US Forest Service's Rocky Mountain Region occur in the Black Hills National Forest (see Table 3-5) (The R2 sensitive species list was updated May 25th 2011. The addendum at the end of this Botany section addresses these changes. Changes are also addressed in the Botany BA/BE and the Botany Specialist Report.). Region 2 sensitive species are considered vulnerable to local extirpation due to predicted downward trends in population size and density or habitat conditions. A biological evaluation (BE) is written to ensure that Forest Service actions do not contribute to a loss of viability of Region 2 sensitive species or cause a trend toward federal listing.

None of the twelve species currently listed as R2 sensitive are known to occur within a one to two mile buffer of the proposed or alternate powerline routes. All but three of the R2 sensitive species lack suitable potential habitat within the project area. Foxtail sedge (*Carex alopecoidea*) is an obligate wetland species of perennial streams and beaver ponds and is known only from the Cement Ridge and Bear Lodge Mountain areas of Black Hills National Forest. Giant helleborine (*Epipactis gigantea*) is restricted to warm springs in the Cascade Springs area. Trailing clubmoss (*Lycopodium complanatum*), yellow lady's-slipper (*Cypripedium parviflorum*), large round-leaf orchid (*Platanthera orbiculata*), and great spurred violet (*Viola selkirkii*) are found mostly in moist, shady canyons dominated by white spruce (*Picea glauca*). Sage willow (*Salix candida*), and autumn willow (*S. serissima*) occur only in fen and saturated meadow habitats. Bloodroot (*Sanguinaria canadensis*) is found on forested terraces, floodplains, drainage bottoms, and north-facing slopes in rich hardwood communities from Spearfish Canyon to Tilford.

Potential habitat could occur for highbush cranberry (*Viburnum opulus* var. *americanum*) in moist bottomland sites with paper birch/ironwood forest mixed with ponderosa pine and bur oak along the west edge of the "Elephant Trunk" section of Black Hills National Forest (where the Gondola Road crosses a small drainage). This area has been surveyed thoroughly by Black Hills NF staff in recent years, but no populations of this species were located. Additional surveys in October 2009, June 2010, and October 2010 did not locate this species in the area.

Suitable habitat may also exist for two rare fern species Iowa moonwort (*Botrychium campestre)* and narrowleaf grapefern (*B. lineare)* in limestone grassland and meadow areas in the vicinity of Alternative routes 1 and 2 between the SW corner of Section 36 (Township 1S Range 6E) and the NW corner of Section 6 (Township 2S Range 7E). Both of these inconspicuous ferns occur on shallow soils over limestone bedrock in areas dominated by little bluestem, Western snowberry, and other prairie species at scattered locations in the foothills of the Black Hills. Iowa moonwort is thought to be dependent on periodic wildfire to maintain its prairie habitat and has been documented in disturbed roadside habitats (Anderson and Carriveau 2003). Narrowleaf grapefern has also been found along old dirt or gravel roadsides with infrequent levels of disturbance (Beatty et al. 2003). Both moonworts are known to persist underground for up to five years at a time due to their association with mycorrhizal fungi. Surveys for these species were conducted at several promising sites on open limestone ridgetops and roadsides along NFS Road 641 in June 2010, but neither species were observed.

Table 3-5 Region 2 Sensitive Plant Species of the Black Hills National Forest

SCIENTIFIC NAME	COMMON NAME	KNOWN TO OCCUR IN PROJECT AREA	POTENTIAL HABITAT	SPECIES ADDRESSED IN EFFECTS ANALYSIS
Botrychium campestre	Iowa moonwort	No	Yes	Yes
Botrychium lineare	narrowleaf grapefern	No	Yes	Yes
Carex alopecoidea	fox-tail sedge	No	No	No
Cypripedium parviflorum	yellow lady's slipper	No	No	No
Epipactis gigantea	giant helleborine	No	No	No
Lycopodium complanatum	trailing clubmoss	No	No	No
Platanthera orbiculata	large round-leaved orchid	No	No	No
Salix candida	sage willow	No	No	No
Salix serissima	autumn willow	No	No	No
Sanguinaria canadensis	bloodroot	No	No	No
Viburnum opulus var. *americanum*	highbush cranberry	No	Yes	Yes
Viola selkirkii	Selkirk's violet	No	No	No

Plant Species of Local Concern

Eleven plant species are classified as "Species of Local Concern" by Black Hills National Forest (see Table 3-6). Note that the Black Hills Species of Local Concern list was updated August 23, 2011. The updates are addressed in the addendum at the end of this Botany section and also in the Botany Specialist Report. Unlike Region 2 sensitive species, SOLC may be vulnerable to extirpation on the Black Hills National Forest, but are not considered at risk rangewide and none would qualify for listing as Threatened or Endangered under the Endangered Species Act. None of these species have been found within one to two miles of the proposed and alternate powerline routes on the Forest. All but two Species of Local Conern lack suitable habitat within the project area. Southern maidenhair fern (*Adiantum capillus-veneris*) and beaked spikerush (*Eleocharis rostellata*) are limited to warm spring sites that are not found in the project area. Leathery grapefern (*Botrychium multifidum*), broadlipped twayblade (*Listera convallarioides*), and stiff clubmoss (*Lycopodium annotinum*), occur in north-facing white spruce stands which are absent from the project area. Southwestern showy sedge (*Carex bella*) and alpine mountainsorrel (*Oxyria digyna*) are restricted to high elevation granitic sites in the core of the Black Hills. Arrowleaf sweet coltsfoot (*Petasites frigidus* var. *sagittatus*), and shining willow (*Salix lucida* ssp. *caudata*) are wetland species known from perennial creek and marsh habitats that are not present in the project site. Potential habitat might occur for northern hollyfern (*Polystichum lonchitis*) in north-facing limestone ravine sites with birch, ironwood, or aspen in the Elephant Trunk area east of the proposed routes, though no populations were located during recent Forest Service surveys for other sensitive plants in the area.

Suitable habitat might also occur for pleated gentian (*Gentiana affinis*) in limestone meadow areas similar to those that might contain the two sensitive *Botrychium* species. No populations of

pleated gentian were found during surveys of the powerline routes in June and October 2010. Note that pleated gentian was replaced by downy gentian on the SOLC list--see addendum.

Table 3-6 Plant Species of Local Concern of the Black Hills National Forest

SCIENTIFIC NAME	COMMON NAME	KNOWN TO OCCUR IN PROJECT AREA	POTENTIAL HABITAT	SPECIES ADDRESSED IN EFFECTS ANALYSIS
Adiantum capillus-veneris	southern maidenhair fern	No	No	No
Botrychium multifidum	leathery grape-fern	No	No	No
Carex bella	southwestern showy sedge	No	No	No
Eleocharis rostellata	beaked spikerush	No	No	No
Gentiana affinis	pleated gentian	No	Yes	Yes
Listera convallarioides	broadlipped twayblade	No	No	No
Lycopodium annotinum	stiff clubmoss	No	No	No
Oxyria digyna	alpine mountainsorrel	No	No	No
Petasites frigidus var. *sagittatus*	arrowleaf sweet coltsfoot	No	No	No
Polystichum lonchitis	northern hollyfern	No	Yes	Yes
Salix lucida ssp. *caudata*	shining willow	No	No	No

Other Plant Species

Data provided by the South Dakota Natural Heritage Database (2009) indicate that 12 plant species currently tracked as state "species of concern" are found within a six mile radius of the proposed and alternate routes. The state natural heritage program list includes a number of species not considered as Region 2 sensitive species or Species of Local Concern by Black Hills National Forest, though many are on the Forest's list of species with "insufficient information." The Black Hills National Forest Plan, as amended, emphasizes that additional field data is desirable for species with insufficient information to better determine their status and potential management needs (Objective 236). These species do not, however, have the same protective status as officially designated Region 2 sensitive species or Species of Local Concern.

All but one of the species reported by the natural heritage program from the vicinity of Rockerville occur in deep, shady canyons or wetland sites west or northwest of the project area. Comparable habitats are not present along the proposed and alternate powerlines. The one exception is downy gentian (*Gentiana puberulenta*) which is known from dry meadow and limestone prairie habitats and the edge of ponderosa pine woods just north of the Neck Yoke Road and in the vicinity of the Gondola Road in the Elephant Trunk area. One individual was also found in October 2010, along routes 1, 2, and 3 on the south side of the Neck Yoke Road. Additional potential habitat for this species occurs in limestone ridgetop sites dominated by big bluestem and other native prairie grasses along NFSR 641 in the same areas where Iowa moonwort, narrowleaf grapefern, and pleated gentian might occur.

In the past year, a small population of pale moonwort (*Botrychium pallidum*) has been documented from the Elephant Trunk area of the Forest. The identification of this species was confirmed in the field by Dr. Don Farrar of Iowa State University, who has been conducting

research on the moonworts of western North America for several decades. Genetic confirmation of this population is still pending. Pale moonwort is rare in South Dakota and tracked as a species of concern by the state natural heritage program, but is not presently listed as a Region 2 sensitive species or as a Species of Local Concern. The Elephant Trunk occurrence is unusual, as this species has previously only been found at higher elevations in the Black Hills on granite.

Four species that were formerly listed as Region 2 sensitive species are known from the project area or vicinity. Each was dropped from the R2 sensitive species list in recent years after surveys found them to be more abundant or widespread and at less risk of local extirpation than originally suspected. Dwarf scouring rush (*Equisetum scirpoides*) and cottongrass bulrush (*Scirpus cyperinus*) are known from white spruce and wet streambank habitats in Coon Hollow Canyon approximately one mile northwest of Rockerville (outside the one to two mile buffer surrounding the four alternate routes). These habitats are not present within the proposed project area. Northern arnica (*Arnica lonchophylla*) and long-stalk sedge (*Carex pedunculata*) have been documented from four sites on north-facing slopes and limestone-rich soils in ponderosa pine, bur oak, and ironwood stands in the Elephant Trunk area of Black Hills National Forest between 0.25-1.5 miles east of the proposed and alternate routes.

Environmental Consequences

No R2 sensitive plant species or Species of Local Concern are known to occur in the immediate path of the proposed powerline corridor or alternate routes. Potential habitat may exist for two R2 sensitive plant species (Iowa moonwort and narrowleaf grapefern) and one Species of Local Concern (pleated gentian) in limestone meadow sites adjacent to existing roads within the proposed project area. Ponderosa pine/bur oak and aspen/birch/ironwood limestone ravine habitats in the Elephant Trunk area may also have potential habitat for highbush cranberry (R2 sensitive species) and northern hollyfern (Black Hills NF Species of Local Concern). Construction of the powerline route and maintenance activities could impact individuals of these species or alter habitat conditions to favor competing species. In the case of limestone meadow species, however, ongoing maintenance activities (mowing or reducing brush cover) could actually promote prairie-like habitat conditions conducive to their survival or establishment.

Alternative 1 Proposed Action

Direct and Indirect Effects

No R2 sensitive plant species have been found directly along the proposed powerline route, but potential habitat does occur for Iowa moonwort and narrowleaf grapefern along limestone ridgecrests bordering NFSR 641 from the SE1/4SE1/4 of Section 25 and E1/2 of Section 36 of Township 1S Range 6E to the SW4 of Section 31 of Township 1S Range 7E and the N1/2 of Section 6 of Township 2S Range 7E. Pleated gentian from the Forest's list of Species of Local Concern and downy gentian from the state natural heritage program list of species of special concern could also occur in this same habitat and area. No populations of any of these species were observed during field surveys of the potential routes in June and October 2010. Recent rangewide status reviews by the US Forest Service suggest that Iowa moonwort and narrowleaf grapefern can persist or recolonize native road surfaces that are infrequently used and often respond favorably to wildfire that maintains open prairie habitat. Direct effects to undetected R2

sensitive species and SOLC could include destruction of individuals during powerpole installation, as well as trampling or uprooting by equipment and personnel. Maintenance of a 40 foot ROW corridor along the powerline would entail removal of trees and brush over nine feet tall that might interfere with the transmission lines. Periodic mowing or other vegetation removal of plants less than nine feet tall is not required by the Forest Service, though doing so would create suitable open grassland habitat conditions favorable to the rare limestone prairie species. Mowing could negatively affect the R2 Sensitive *Botrychium* species or pleated gentian if conducted when the plants are above-ground and producing spores or flowers and fruit, but impacts could be mitigated by leaving a stubble height of greater than six inches or mowing after October.

No populations of highbush cranberry or northern hollyfern have been documented from the proposed powerline route, although potential mixed ponderosa pine-paper birch-ironwood or limestone ravine habitat occurs in the Elephant Trunk area at the north end of each alternative route. Removal of tree cover and soil disturbance could impact these species if they are present, or result in changes in habitat condition (less shade, increased weed cover) that would be deleterious. Construction and maintenance of the powerline corridor could help spread noxious weed species into the area that would, if established, potentially out-compete the rare prairie plants. Cleaning vehicles and construction equipment before site visits could reduce this risk. Use of herbicides to control vegetation in the 40 foot powerline corridor could have negative impacts on rare plant species.

Cumulative Effects

The two *Botrychium* species are known from fewer than a dozen populations in the Black Hills area. Loss of additional habitat could be deleterious. Maintenance of open, prairie-like conditions in the powerline corridor by removing brush and periodic mowing could offset habitat loss during the construction phase of the project and provide suitable habitat for the duration of the powerline's existence. The route could actually increase the amount of suitable habitat for the moonworts and rare gentians where long-term trends have probably been downward as Ponderosa pine woodlands have spread following earlier periods of logging.

Alternative 2

Direct and Indirect Effects

The route of Alternative 2 largely differs from that of Alternative 1 in following valley bottoms rather than ridgecrests in the area from the Neck Yoke Road south to the vicinity of Deadman Gulch. Alternative 2 bypasses most of the potential limestone ridgecrest prairie habitat of Iowa moonwort, narrowleaf grapefern and pleated gentian except for the area in the SW1/4 of Section 31 (Township 1S Range 7E) and N1/2 of Section 6 (Township 2S Range 7E) where the line follows the same approximate route of Alternative 1. No populations of any of these species were observed during field surveys of the potential route in June and October 2010. Recent rangewide status reviews by the US Forest Service suggest that both moonwort species can persist or recolonize native road surfaces that are infrequently used and can respond favorably to wildfire that maintains open prairie habitat. Direct effects to undetected R2 sensitive species and SOLC could include destruction of individuals during powerpole installation, as well as trampling or uprooting by equipment and personnel. Maintenance of a 40 foot corridor along the powerline that entails manual cutting or removal of trees, brush, and dense plant cover would

likely create suitable grassland habitat conditions favorable to each of these rare species. Access routes for construction and maintenance of the powerline, for any of the action alternatives, could create open habitat conditions, but would have a negative impact if use is too high.

Alternative 2 follows an old skid trail just south of Neck Yoke Road on Black Hills National Forest and would bisect a small population of downy gentian discovered in October 2010. This species is not currently on the Black Hills Sensitive or Species of Local Concern lists, but is considered a species of concern by the South Dakota Natural Heritage Program. The population is located in a ponderosa pine woodland with an open, grassy understory over shallow limestone bedrock. The pine forest may be encroaching on what was once a more open meadow. The area is grazed by cattle, but the livestock appeared not to feed on the gentian (gentians are known to be inedible). Cutting the ponderosa pine to create the powerline corridor at this site could help recreate open, prairie-like conditions where this plant more typically grows. Compaction of soils, trampling, or other activities associated with construction and maintenance of the line could negatively impact the plants. Effects to highbush cranberry and northern hollyfern would be the same as effects described in Alternative 1.

Construction and maintenance of the powerline corridor could help spread noxious weed species into the area that would, if established, potentially out-compete the rare prairie plants. Cleaning vehicles and construction equipment before site visits could reduce this risk. Use of herbicides to control vegetation in the 40 foot powerline corridor could have negative impacts on rare plant species.

Cumulative Effects
Same as Alternative 1.

Alternative 3

Direct and Indirect Effects
Alternative 3 initially follows the same route as Alternative 2 before heading southeast through a small drainage across Sections 30 and 31 of Township 1S Range 7E. This part of the route cuts between two parallel NW-SE trending limestone ridges that might have potential habitat for Iowa moonwort, narrowleaf grapefern and pleated gentian. Since the route does not cross these ridges, it is unlikely that any of the rare limestone prairie plant species would be adversely impacted along this stretch. The bottomland habitat is primarily moist meadows dominated by smooth brome, Kentucky bluegrass, and other pasture grasses, or bur oak woodland. The line does drop over a low limestone cliff, but no US Forest Service Sensitive species were located there. This alternative would have the least impact on R2 sensitive species and Species of Local Concern plant taxa.

Alternative 3 follows an old skid trail just south of Neck Yoke Road on Black Hills National Forest and would bisect a small population of downy gentian discovered in October 2010. This species is not on the Region 2 sensitive species or Species of Local Concern lists (and thus the Forest Service is not obligated to protect its habitat), but is considered a species of concern by the South Dakota Natural Heritage Program. This population is located in a ponderosa pine woodland with an open, grassy understory over shallow limestone bedrock. The pine forest may be encroaching on what was once a more open meadow. The area is grazed by cattle, but the livestock appeared not to feed on the gentian (gentians are known to be inedible). Cutting the

ponderosa pines to create the powerline corridor at this site could help re-create open, prairie-like conditions where this plant more typically grows. Compaction of soils, trampling, or other activities associated with construction of the line could negatively impact the plants if conducted during the flowering season. Maintenance of the line, however, could create prairie-like conditions conducive to this species. Effects to highbush cranberry and northern hollyfern would be the same as effects described in Alternative 1.

Construction and maintenance of the powerline corridor could help spread noxious weed species into the area that would, if established, potentially out-compete the rare prairie plants. Cleaning vehicles and construction equipment before site visits could reduce this risk. Use of herbicides to control vegetation in the 40 foot powerline corridor could have negative impacts on rare plant species.

Cumulative Effects
Same as Alternative 1.

Alternative 4

Direct and Indirect Effects
The private land corridor was surveyed only along roads and other areas of public access. Potential habitat exists along this route for downy gentian where the line initially crosses Neck Yoke Road. This species is adapted to relatively open limestone prairies and populations could be augmented by powerline maintenance activities that reduce competing tree cover or vegetation. Downy gentian is not an R2 sensitive species or Species of Local Concern plant (and thus not protected under the Forest Plan), but is considered a species of concern by the South Dakota Natural Heritage Program. None of these designations confers any legal protective status on private lands. No populations of Region 2 sensitive species are known from the potential private land route and no areas of likely habitat were identified in brief road-based field reconnaissance. Direct negative effects of the proposed action to undetected individuals include destruction of individuals during tree felling and trampling by equipment and personnel.

The private land route largely follows existing roadways. Roadsides may contain populations or potential habitat for noxious weed species that might spread. Effects to highbush cranberry and northern hollyfern would be the same as effects described in Alternative 1.

Cumulative Effects
Same as Alternative 1

Alternative 5 No Action

Direct and Indirect Effects
Under the No Action Alternative, there would be no direct or indirect effects (either negative or beneficial) to any R2 sensitive species or Species of Local Concern plant taxa since the proposed powerline project would not take place. Ongoing activities such as recreation, fire suppression, off road vehicle use, and road maintenance would continue as directed by the Forest Plan. The No Action Alternative would maintain existing plant habitat, although over time there may be indirect effects that cause changes in the potential habitat (e.g., change in species composition due to succession, lack of disturbance, or changes from disturbance such as insect outbreaks and

wildfires). These changes over time may increase or decrease the amount of suitable habitat for Region 2 sensitive species and Species of Local Concern.

Cumulative Effects
Under the No Action Alternative, there would be no net loss of habitat for R2 sensitive species or Species of Local Concern plant taxa in the short term, and the status of these species in Black Hills National Forest would be unchanged. Ongoing natural succession and the likely increase in tree and shrub density and cover could reduce habitat suitability for R2 sensitive species and Species of Local Concern adapted to open limestone grassland habitats. Increase in woody cover would also increase fuel loads and make these areas more prone to future wildfire or mountain pine beetle kill.

Relevant Forest Plan Direction

Objective 205 – Manage for 122,000 acres of prairie grassland and 3,600 acres of meadow during the life of the Plan. Restored acres would not be considered suitable for timber production.

Objective 221 – Conserve or enhance habitat for R2 sensitive species and species of local concern (SOLC). Monitoring will be conducted at a Forest-wide level, not at the project level, and will be done for habitats or populations.

Standard 3115 – A R2 sensitive species or species of local concern located after contract or permit issuance will be appropriately managed by active coordination between permittee, contractor or purchaser, Forest Service 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.

Standard 4304 – (Noxious Weeds) Treat individual plants or groups of plants in areas where R2 sensitive or species of local concern plants occur. Use a treatment method that is the least risk to the species being protected.

Standard 4309 – Monitor weed treatments used at R2 sensitive and species of local concern plant occurrences and re-treat as needed during the season.

Addendum to Chapter 3 Botany Section

The Region 2 sensitive species list was updated May 25, 2011, and the Black Hills National Forest Species of Local Concern list was updated September 6, 2011. Because the Botany BA/BE and Botany Report were written and reviewed prior to the changes in the list, this addendum will document changes to the lists, as well as supersede applicable portions of the botany section of the EA.

Region 2 Sensitive Species
Thirteen of the 86 Region 2 sensitive species are known to occur within the Black Hills National Forest (see Table 3-7). No BHNF species were added to the 2011 Region 2 sensitive species list. However, sphagnum moss (*Sphagnum angustifolium)*, which was on the 2009 list and remains on the 2011 list, was recently confirmed to occur in the Black Hills National Forest. Because this species was not known to exist in the Black Hills at the time this document was written, it was not analyzed in the EA.

Table 3-7 Region 2 sensitive species of the Black Hills National Forest (updated)

SCIENTIFIC NAME	COMMON NAME	KNOWN TO OCCUR IN PROJECT AREA	POTENTIAL HABITAT	SPECIES ADDRESSED IN EFFECTS ANALYSIS
Botrychium campestre	Iowa moonwort	No	Yes	Yes
Botrychium lineare	narrowleaf grapefern	No	Yes	Yes
Carex alopecoidea	fox-tail sedge	No	No	No
Cypripedium parviflorum	yellow lady's slipper	No	No	No
Epipactis gigantea	giant helleborine	No	No	No
Lycopodium complanatum	trailing clubmoss	No	No	No
Platanthera orbiculata	large round-leaved orchid	No	No	No
Salix candida	sage willow	No	No	No
Salix serissima	autumn willow	No	No	No
Sanguinaria canadensis	bloodroot	No	No	No
Sphagnum angustifolium	sphagnum moss	No	No	No
Viburnum opulus var. *americanum*	highbush cranberry	No	Yes	Yes
Viola selkirkii	Selkirk's violet	No	No	No

Sphagnum moss is not known to occur within the project area nor is there any suitable habitat present. Sphagnum moss occurs only in fen and saturated meadow habitats which are not present within a two mile buffer of the project area. Because no suitable habitat exists, this species will not be analyzed further. The Determination of Effects will not be affected by the changes to the Region 2 sensitive species list.

Plant Species of Local Concern

Fourteen plant species are classified as "Species of Local Concern" by the Black Hills National Forest (see Table 3-8). Two Species of Local Concern, pleated gentian (*Gentiana affinis*) and shining willow (*Salix lucida* var. *caudata*), were removed from the 2011 list. Downy gentian (*Gentiana puberulenta*), fivestamen miterwort (*Mitella pentandra*), limber pine (*Pinus flexilis*), shining willow (eastern species) (*Salix lucida*), and shining willow (western species) (*Salix lasiandra* var. *caudata*) were added to the 2011 SOLC list. Four of the five new species lack suitable habitat in the project area. Shining willow (eastern species) and shining willow (western species) are wetland species known from perennial creek and marsh habitats that are not present in the project area. Fivestamen miterwort occurs in north-facing white spruce stands which are also absent from the project area. Limber pine grows at the highest elevations of the Black Hills in granitic substrates which are not present in the project area.

Table 3-8 Plant Species of Local Concern of the Black Hills National Forest (updated)

SCIENTIFIC NAME	COMMON NAME	KNOWN TO OCCUR IN PROJECT AREA	POTENTIAL HABITAT	SPECIES ADDRESSED IN EFFECTS ANALYSIS
Adiantum capillus-veneris	southern maidenhair fern	No	No	No
Botrychium multifidum	leathery grape-fern	No	No	No
Carex bella	southwestern showy sedge	No	No	No
Eleocharis rostellata	beaked spikerush	No	No	No
Gentiana puberulenta	downy gentian	Yes	Yes	Yes
Listera convallarioides	broadlipped twayblade	No	No	No
Lycopodium annotinum	stiff clubmoss	No	No	No
Mitella pentandra	fivestamen miterwort	No	No	No
Oxyria digyna	alpine mountainsorrel	No	No	No
Petasites frigidus var. *sagittatus*	arrowleaf sweet coltsfoot	No	No	No
Pinus flexilis	Limber pine	No	No	No
Polystichum lonchitis	northern hollyfern	No	Yes	Yes
Salix lucida	shining willow (eastern species)	No	No	No
Salix lasiandra var. *caudata*	shining willow (western species)	No	No	No

Four populations of downy gentian are known to occur within the project area. Downy gentian occurs in grass/shrub meadows on limestone substrates. Three of these populations were discovered in the fall of 2011, and subsequently were not reported in the original Botany Report or Botany section of this EA. It is possible that more populations occur within the project area that have not yet been discovered. All occurrences in the project area are situated in areas that receive some level of shading throughout the day whether it is from encroaching pines, north facing slopes or adjacent ponderosa pine stands. Alternative 1, Alternative 2, and Alternative 3 bisect the known populations of downy gentian.

Direct and Indirect Effects of All Action Alternatives

Effects would be similar to those described in the original botany section of this EA document. Effects to downy gentian could include trampling or uprooting by equipment and personnel, and uprooting during power pole placement. The maintenance of the 40 ft. ROW may increase the amount of suitable meadow habitat for downy gentian. Downy gentian species and their habitat may be indirectly impacted by the increased disturbance, which may adversely increase invasive species abundance. The non-native and/or noxious plant species have the possibility of out-competing native plants resulting in a change in community composition. However, design criteria are in place to protect the known occurrences of downy gentian from direct effects and limit the impact of indirect effects.

Cumulative Effects

Same as Alternative 1.

NOXIOUS and INVASIVE WEEDS

Affected Environment

Canada thistle (*Cirsium arvense*) and leafy spurge (*Euphorbia esula*) are the only state of South Dakota designated weed species (South Dakota code 2005) known from the project area. Populations of houndstongue (*Cynoglossum officinale*), a local noxious species listed by Pennington County (www.co.pennington.sd.us/weedpest/ declaredwdpst.htm) are also found along several of the proposed routes. Field bindweed (*Convolvulus arvensis*) was formerly a statewide noxious weed but is now treated as noxious only at the county level in some counties. (South Dakota code 2005). Although a small colony was observed in the project area northwest of Jackson Spring, Pennington County does not currently list this species as noxious (www.co.pennington.sd.us/weedpest/declared wdpst.htm). Nearly two dozen other non-native plant species, including summer-cypress (*Kochia scoparia*), goatsbeard (*Tragopogon dubius*) and common mullein (*Verbascum thapsus*) were recorded in the vicinity of the project area in 2010 (Fertig 2010), but are not listed as noxious at the local or state level.

Patches of Canada thistle occur sporadically at several locations along the proposed powerline routes. A small population is found in disturbed ground between the Rockerville substation and Gondola Road where all four alternative routes originate. Larger populations occur along NFSR 641 within recently burned ponderosa pine forest. The most extensive of these is found along the ridgecrest between Deadman Gulch and Jackson Spring in the vicinity of Alternative routes 1 and 2. Large populations of Canada thistle also occur along Alternative route 3 in the vicinity of the SW 1/4 of the NE 1/4 of Section 31 (Township 1S Range 7E). A smaller population is also found in the extreme SE 1/4 of Section 31 along the Forest Service boundary where Alternatives 3 and 4 intersect. Additional populations probably occur elsewhere in the project area, especially in areas that have been recently disturbed.

Leafy spurge was documented in 2010, on the divide between Lead Draw and Foster Gulch (Township 2S Range 6E Section 12 NE 1/4 of SE 1/4) to the west of Alternative routes 1 and 2 and along the ridge between Alternatives 1, 2, and 3 in the SW 1/4 of Section 31 (Township 1S Range 7E). Populations observed tend to be small in acreage and number of individuals, and provide only trace amounts of cover. Additional habitat occurs over much of the project area, especially in alluvial draws, disturbed slopes, and roadsides.

Houndstongue grows sporadically in the project area and vicinity, where it frequently co-occurs with Canada thistle. Populations were observed along Alternative routes 1 and 2 on the divide between Deadman Gulch and Jackson Spring, and on the north side of Alternative 3 east of the limestone bedrock outcrop near the head of the valley. Additional populations are likely to occur in burned areas and on disturbed soils in open meadows, alluvial valley bottoms, ridgecrests, and roadsides (such as Alternative 4).

Field bindweed was noted only in the vicinity of NFSR 641 on the divide between Deadman Gulch and Jackson Spring (Township 2S Range7E Section 5 SW 1/4 and Section 6 SE 1/4). Other populations could occur on disturbed alluvial soils in the valley bottom along Alternative 3 and in roadside areas along Alternative 4.

Periodic maintenance within the 40 foot ROW along the powerline is planned to remove trees that might interfere with the electrical transmission lines and reduce grass or brush cover that might pose a fire hazard. Livestock grazing might also be employed to reduce vegetative cover. Ground-disturbing activities associated with construction and routine maintenance of the corridor could encourage the spread of undesirable weed species. Restricting vehicle access to existing roads, washing vehicles before use in the area (to remove weed seeds), and other actions might be necessary to reduce this risk.

Biological control measures have been taking place in the project area for over five years. These include the release of flea beetles (*Aphthona czwalinae, A. flava, A. lacertosa*, and *A. nigriscutis*), root boring beetles (*Oberea erythrocephala*), and hawkmoths (*Hyles euphorbiae*) for leafy spurge control and gall flies (*Urophora cardui*) and stem miners (*Hadroplontus litura* or *Ceutorhynus litura*) for Canada thistle.

Environmental Consequences

Alternative 1 Proposed Action

Direct and Indirect Effects
Ground disturbance associated with construction of the powerline (cutting trees and brush, mowing vegetation, driving equipment, placement of poles and guywires) could facilitate the spread of existing patches of Canada thistle, leafy spurge, and houndstongue, or create opportunities for invasion of other state or local noxious weeds and non-native plant species. These species are capable of colonizing newly disturbed soil from nearby populations or from an existing seedbank. Some populations are currently small enough that targeted eradication by herbicide application, controlled grazing or hand-pulling might be possible prior to construction. Restricting vehicle access to existing roads, washing vehicles before use in the area (to remove weed seeds), and minimizing soil disturbance could all reduce the likelihood of weed spread.

Long-term maintenance of the powerline corridor by periodic mowing or cutting of brush could result in soil disturbance that encourages germination of existing weed seed or establishment of new weed populations from off-site sources. These potential problems would be lessened if trees and brush less than nine feet tall are not cut within the ROW.

Cumulative Effects
Canada thistle, leafy spurge, houndstongue, and other weedy non-native species are already established in the vicinity and would continue to spread due to ongoing activities (such as grazing or vehicle travel) that create disturbed soils or assist the spread of weed seeds. The amount of disturbance associated with construction and maintenance of the powerline corridor may increase the spread of weeds, though probably no more than other on-going activities.

Alternative 2

Direct and Indirect Effects
Direct effects of this alternative are similar to Alternative 1. The location of Alternative 2 (primarily in valley bottoms) may result in more weed problems than in Alternative 1, as Canada

thistle, leafy spurge, and houndstongue may be more successful on more mesic alluvial soils than on stony ridgecrests.

Cumulative Effects
Same as Alternative 1.

Alternative 3

Direct and Indirect Effects
Direct effects are similar to those for Alternative 1, but like Alternative 2 much of this route has deeper alluvial soils that may be more susceptible to invasion by Canada thistle, leafy spurge, and houndstongue than Alternative 1. The meadow areas in Section 31 especially may be vulnerable to expansion of noxious weed populations, especially on the dry south-facing slopes near the large limestone bedrock outcrop. The existing populations of Canada thistle and houndstongue at this site are the largest observed in the project area and could become a source of seed to infest other sites if precautions are not taken to control seed production or clean equipment at the time of construction or during future corridor maintenance.

Cumulative Effects
Same as Alternative 1.

Alternative 4

Direct and Indirect Effects
Known noxious weed populations within Black Hills National Forest are smaller along this route than for other potential routes and limited primarily to the Rockerville substation area and the forest boundary along Pine Grove Road. Extensive areas of potential noxious weed habitat could occur along disturbed roadsides outside of the National Forest on private lands. Powerline construction and maintenance would likely facilitate the spread of noxious weed seed depending on the degree of soil disturbance and the presence of an existing seed bank or nearby seed sources.

Cumulative Effects
Canada thistle, leafy spurge, houndstongue, and other noxious and non-native weed species are already well established on the east side of the Black Hills. Powerline construction could increase the spread of existing noxious weed populations or allow new ones to become established. Due to its proximity to Black Hills NF, populations of noxious weeds on private lands could provide a seed source for invasion onto the Forest.

Alternative 5 No Action

Direct and Indirect Effects
Under the No Action Alternative there would be no direct or indirect effects (either negative or beneficial) on the containment of noxious weeds in the project area because implementation of the proposed action would not take place. Ongoing activities such as recreation, fire suppression, and road maintenance would continue as directed by the Forest Plan. The No Action Alternative would maintain existing plant habitat and would not interfere with ongoing

ecological succession (which would likely change the current vegetation structure over time, especially as forest cover recovers from recent wildfires). An increased risk of wildfire is possible if vegetation clearing is not conducted around existing power lines. Any direct contact of standing or falling trees or their branches onto a live wire may cause fire ignition. If weather conditions are dry, adverse direct, indirect, and cumulative effects due to wildfire would occur.

Cumulative Effects
Under the No Action Alternative, wildfire suppression would continue at current levels. The risk of wildfires, however, may increase over time due to increased fuel loads in the area from pine regeneration or mountain pine beetle kill. The 2002 Battle Creek fire burned much of the project area and vegetation is still recovering from the large scale disturbance. Under the No Action Alternative, vegetation recovery would continue unless set back by another disturbance.

RANGE

Background

This section addresses rangeland resources and livestock grazing use associated with the Black Hills Electric Cooperative, Inc. (BHEC) Rockerville Transmission Line Project. It summarizes the environmental analysis of the BHEC project proposal and associated alternatives from a range management perspective. The scope of this analysis covers transmission line routes considered in detail within the Black Hills National Forest (BHNF) that begin at Rockerville substation and end where the proposed routes finally exit the National Forest boundary. This report focuses on providing a simple relative comparison of alternative routes analyzed across and adjacent to the National Forest.

Information used to compile this report was provided by various governmental websites and databases, personnel of Mystic Ranger District, Rapid City, SD and Black Hills Electric Cooperative. Additionally, three reconnaissance field trips were conducted (10/25-29/2009; 08/02-06/2010; 10/12-15/2010), by walking the various alternative routes and walking surveys in timbered stands on or near these routes. The National Resource Information System (NRIS) data for the project area used in this report is compiled and adjusted to account for the effects of the 2002 Battle Creek Fire, included here by reference and is located in the project file; named Wildlife Data for Locations and Sites from R2Veg Table, Forest System Lands Only (digital file name: Veg Location Sites-wildlife1).

Affected Environment

Forest-wide, demand for grazing use is higher than supply (Phase II Amend, Preface, USDA Forest Service 2006). BHNF allocates livestock use in the north half of the Rockerville Allotment to two permittees in four pastures for cattle grazing, with a period of use from 06/01-10/31. Range condition ranks generally as satisfactory throughout the allotment

All routes for action alternatives, including the proposed action, run south from the Rockerville substation along the line between Township 01 South, Range 6 East and 7 East, an area locally known as the Elephant Trunk. No livestock grazing is currently permitted in the Elephant's Trunk.

As the routes continue southward, they cross into or run along the boundary of NFS land in the Rockerville Allotment to the point where they exit the BHNF boundary. Under the proposed action (Alternative 1), the transmission line ROW width (40 feet) would be located entirely on NFS lands, except north of Neck Yoke where all alternatives cross a private inholding. For the other action alternatives, the ROW width on NFS land varies from 7, 20, or 40 feet.

The Battle Creek Fire burned over three pastures affected by this project. Allotment rangeland has partially recovered (early to the beginning of mid-seral stage). However, substantial quantities of down woody debris are still present. Noxious weeds that increased after the fire, especially Canada thistle, continue to persist despite treatment efforts. Poison ivy seems to be ubiquitous across the burned landscape.

Actions Common to All Alternatives

All action alternatives would comply with appropriate Best Management Practices. Pertaining to the action alternatives, this mainly includes keeping the Mystic Ranger District informed of current locations of transmission line construction and schedule, keeping fences up where egress/ingress of construction equipment is occurring BHEC would need to keep all gates closed during the grazing permitted season June 1 to October 31. Sharing information between BHEC and Mystic Ranger District resource specialists would facilitate coordination of grazing use patterns and construction activities to minimize any conflicts in timing or schedules.

All action alternatives would comply with appropriate Standards and Guidelines listed in Chapter 2, Black Hills National Forest, Phase II Amendment, Land and Resource Management Plan, 2006. The following list, provided for reader convenience, is not necessarily all-inclusive.

- 1109. Reclaim roads and other disturbed sites when use ends, as needed, to prevent resource damage. STANDARD
- 1110. Initiate re-vegetation…STANDARD
- 1111. Stabilize, scarify...landings [pole pads] prior to seeding. GUIDELINE
- 8310. 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. GUIDELINE
- 9104. Motorized vehicles may be used on restricted areas and roads [Management Area 5.4] to accomplish administrative purposes. GUIDELINE

Measurement indicators, useful for analysis or comparison of the proposed action and the alternatives, are listed below and displayed in Table 3-7.

- Contributes to achieving Forest Plan Objective 301: Produce on a sustained basis and make available…forage for livestock and wildlife… Yes/NoContributes to achieving Forest Plan Objective 302: Maintain rangelands in satisfactory range condition. Yes/No
- Comparative assessment of the amount of ground disturbance for powerline pole placement.
- Comparative assessment of the amount of vegetation clearing in Right-Of-Way on BHNF.

Environmental Consequences

Effects Common to All Action Alternatives

The environmental impacts of the proposed action and the action alternatives are very similar relative to Range. The variance among alternatives is mainly due to the different distances traversed by each alternative and the width of the Right-of-Way (ROW) cleared of trees and other vegetation greater than nine feet in height. The longer the distance traversed, the more poles need to be set. The more poles set, the more ground disturbance. The ROW clearing creates additional disturbance to vegetation and soils. Table 3-9 below provides a comparison of effects in this context by the proposed action and action alternatives. Though analysis of impacts to private lands carries no direct relevance to this environmental analysis, Table 3-9 does display the acreage that would likely be cleared at the same time and in the same manner as the portion of the ROW on BHNF. This and the number of poles sited on private land would be additive to the effects of those on the NF.

Calculation of estimated, potential ground disturbance for pole placement on National Forest based on an approximate pad of 0.01 acre in size (12 ft. radius), the width of the ROW and the length of route on NF. Poles are set at the approximate centerline of the ROW, 40 feet width. This width on National Forest is seven feet, 20 feet or the full 40 feet, depending on the location along the planned routes. Where this portion is equal to seven feet, poles set on or close to ROW centerline would likely cause little to no soil disturbance on National Forest. For calculation purposes, the distance between poles is approximately 300 feet, but actual spacing may vary from 250 – 500 feet apart.

Construction equipment would ingress and egress using existing roads and 2-tracks to the extent possible. Low impact all-terrain vehicles would facilitate needs off road. Implementation of appropriate best management practices (BMP) would minimize soil disturbance/displacement, including re-vegetating disturbed ground and annual monitoring for recovery of vegetative ground cover; repeated seeding as necessary with native plant species; facilitate maintaining control of livestock, by keeping fences up/repaired where construction equipment requires ingress/egress. Implement adequate measures to minimize the spread of noxious weeds onto, across or from NFS lands. Monitor for infestation during the initial 3 years after construction and treat to mitigate spread. BHEC is responsible for controlling noxious weeds under the terms of a transmission line special use permit.

Clearing of the vegetation greater than nine feet in height would occur as needed or approximately every 10 years after construction. Periodic inspection of the transmission line and ROW conditions by authorized personnel would occur annually or as needed.

Table 3-9 Range--Measurement Indicators

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Issue - Measurement Indicators	Proposal	Visual	Shorter NF Route	Mostly Private	No Action
Contributes to achieving Forest Plan Objective 301: Forage production (Yes, No).	Yes	Yes	Yes	Yes	Yes
Contributes to achieving Forest Plan Objective 302: Range condition (Yes, No).	Yes	Yes	Yes	Yes	Yes
Total miles of transmission line on private land	0.5	0.5	0.5	2.2	0.0
Total miles of Transmission line on National Forest[1]	5.3	5.6	4.1	2.6	0
Total acres of vegetation clearing on National Forest in ROW[2] Year 0 (2011)	9.7	6.5	3.2	0.8	0.0
Total acres of vegetation clearing on National Forest in ROW[2] Year 10 (2021)	23.5	17.7	9.6	2.9	0.0
Total acres of vegetation clearing on Private land in ROW[2] Year 10 (2021)	3.0	7.4	6.8	12.9	N/A
Qualitative assessment of ease of access for construction equipment, miles of route cross-country (away from existing roads)	2.6	2.4	2.6	2.0	N/A
Ground disturbance for poles (est. 0.01 acre each) on National Forest in ROW	1.1	0.7	0.4	0.0	0.0

[1]Note: Total miles of transmission line on National Forest includes those segments where the ROW corridor is partially on National Forest and partially on private land.
[2]Note: This estimate only includes sites which may be occupied by vegetation greater than nine feet tall. Calculations based on existing data in National Resource Information System database for the Black Hills National Forest.

Alternative 1 Proposed Action

Direct and Indirect Effects

The Proposed Action is a route composed of relatively straight line segments initially proposed for its practical, economic and engineering considerations for transmission line construction. It would traverse approximately 5.3 miles across NFS lands and 0.5 miles across private land. An important distinction from the other action alternatives is the ROW is 40 feet wide on NFS land and 40 feet wide where it crosses private land. The other action alternatives have various combinations of ROW width shared by National Forest and private landowners.

The Proposed Action would implement the most vegetation clearing in the ROW on National Forest, entails the most cross-country travel by construction equipment and would disturb the most soil for pole setting of the action alternatives (see Table 3-9). Right-of-way vegetation maintenance would occur approximately at 10-year intervals--temporally short-term relative to biological resources. Some forest (tree) cover-type or species-type sites may grow sufficiently tall during this period to require treatment, whereas clearing may not be required initially. ROW clearance acreage may more than double from Year 0 to Year 10 (2021), Table 3-9. Construction activities and ROW clearing activities in the near term and long term pose minor adverse effects through disturbance of soil, vegetation and displacement of grazing use. These may also produce minor and temporary increases in forage production, beneficial short-term and long-term effects.

Alternative 2

Direct and Indirect Effects
The route proposed by Alternative 2 is very similar to that of the proposed action. This slightly longer route locates the transmission line, for the most part, below ridgelines and out of view of some residences in the project vicinity. It does not traverse the landscape in as much of a straight-line fashion.

Alternative 2 traverses slightly more National Forest and possibly presents more engineering challenges due to terrain features than the proposed action. As such, it also has a likely potential to create more disturbance than the proposed action. Ground disturbance for pole pad construction and setting of poles is somewhat less than the proposed action. Due to the additional angles and variable terrain, this difference from Alternative 1 may range from being negligible to potentially even larger than the proposed action as more 2-pole sets (H type) may be required. Slightly less cross-country travel may be necessary than the proposed action. Increased forage production due to ROW clearing effects are consistent with those described for Alternative 1 but somewhat less in scale.

Similar to Alternative 1, adverse and beneficial effects, both short-term and long-term would be minimal on rangeland resources within the Rockerville Allotment.

Alternative 3

Direct and Indirect Effects
Going south from Rockerville substation, Alternative 3 initially runs the same path as Alternative 2, but diverges in an upland meadow to follow the drainage down canyon. It is considerably shorter in length than both the proposed action and Alternative 2.

Soil disturbance due to pole setting is half or less than the proposed action. Miles of cross-country travel to construct the transmission line is comparable to both the proposed action and Alternative 2, but the terrain is less harsh. Adverse impacts to range resources are less (less disturbance) under Alternative 3 than both the proposed action and Alternative 2. Impacts are minor and short-term. ROW clearing adverse effects are minor, but considerably less both initially and long-term than Alternative 1 and Alternative 2. Beneficial effects of potentially increased forage production due to ROW clearing are minimal and short-term as tree seedlings and saplings reclaim dominance on forest sites.

Alternative 4

Direct and Indirect Effects
Alternative 4 diverges from the proposed action about ¼ mile south of where Alternatives 2 and 3 routes leave the proposed action route and proceeds east along a section line for a mile and then south two miles. This route runs mainly along National Forest boundary lines with comparatively very little adverse impacts to NFS land. Right-of-way on NF for most of its route adjacent to private property is only seven feet.

Soil disturbance on NFS land is less than 1/10th acre for pole setting activities; less than one acre of vegetation in the ROW on NFS land would require clearing initially. This is far less disturbance than the proposed action and other action alternatives create individually. Adverse and beneficial effects to range resources are minor and short term. This alternative creates the least impact to NFS land of the four action alternatives.

Alternative 5 No Action

Direct and Indirect Effects
Under Alternative 5, no new transmission line activity would occur. Management activities would continue as they are currently.

Minimal, though beneficial, periodic short-term increases in forage in cleared ROW on NFS land would not occur. No long-term beneficial or adverse effects would occur.

Cumulative Effects
Implementation of the proposed action or any one of the action alternatives, along with past, present and reasonably foreseeable future actions, would have minimal or no cumulative effects on range resources. The assumption is that disturbance effects (including introduction of invasive or noxious weeds) from construction will be mitigated. And as discussed under the action alternatives, there is potential for a slight increase in forage availability for a period of time.

FIRE and FUELS

Background

This section addresses fire and fuels associated with the Black Hills Electric Cooperative, Inc. (BHEC) Rockerville Transmission Line Project. The discussion that follows summarizes environmental analysis of the project proposal and associated alternative transmission line routes from a wildland fire and fuels perspective. The scope of this analysis covers transmission line routes considered in detail within the Black Hills National Forest (BHNF) that begin at Rockerville substation and end where the proposed routes finally exit the National Forest boundary. The disclosure in this section focuses on providing a simple relative comparison of alternative routes analyzed across and adjacent to the National Forest.

Information used to compile this report was provided by various governmental websites and databases, personnel of Mystic Ranger District, Rapid City, SD and Black Hills Electric Cooperative. Additionally, three reconnaissance field trips where conducted (10/25-29/2009; 08/02-06/2010; 10/12-15/2010), which entailed walking the various alternative routes and walking surveys in timbered stands on or near these routes. The National Resource Information System (NRIS) data for the project area used in this report is compiled and adjusted to account for the effects of the 2002 Battle Creek Fire (See blue layer (fire outline) on Map 6, Appendix E), included here by reference. This spreadsheet is located in the project file; named Wildlife Data for Locations and Sites from R2Veg Table, Forest System Lands Only (digital file name: Veg Location Sites-wildlife1).

Affected Environment

The Battle Creek Fire, August 2002, burned-over approximately 13,700 acres. Fire severity was stand replacing, including the immediate vicinity of all action alternatives. The area locally known as the Elephant Trunk was not burned. A Burned Area Emergency Rehabilitation Plan was developed and implemented as soon as the fire cooled sufficiently to allow workers to proceed.

The fire area was a forest of blackened tree boles, which over the past ten seasons, have mostly fallen down. Those that have not yet fallen have had their tops knocked out by storms. Current fuel loading in the fire area in the vicinity of the routes of the action alternatives ranges from 5 to 20 tons/acre (field reconnaissance, ocular estimation). Loading in this range is classed as low to moderate, but can be ranked as a moderate to high hazard (Brown et al 2003). Some areas of the burn vicinity have recently received fuels treatment work to reduce hazardous fuel accumulations.

Post-fire down woody debris is melting down, but is still more than one foot deep in many locations presenting high hazard. Much of the large diameter debris is now at least half rotten and can readily contribute to fire behavior when ignited. Fire behavior in these areas during windy conditions would likely have a high rate of spread (0.25-0.62 mph) and high flame length (12-25 ft.). A fire behavior fuel model specifically for old burned areas is not available. However, fuel model Timber-Understory 3 or 4 (TU3, TU4) would provide a representative characterization of potential fire behavior. The primary carrier of fire is now grass, forbs and possibly some shrubs, which would be considered a grass or grass-shrub model, but the grass models do not include large amounts of somewhat rotten fuel represented by the charred boles from the old fire. Slash-Blowdown 3 or 4 (SB3, SB4), depending on the compactness of the fuelbed could provide an indication of fire behavior as they include the larger sizes and large amounts of fuel, but these models also have a large component of fine fuels. The needles and twigs less than one inch in diameter are missing as they were consumed in the Battle Creek Fire. As such, Timber-Understory models provide a reasonable compromise between grass models and slash-blowdown models (Scott and Burgan 2005).

Fuel loading in the unburned, Elephant Trunk area ranges from 3 to 10 ton/acre (field reconnaissance, ocular estimation and use of photo series) (NWCG 1997). In the vicinity of the action alternatives route (Forest land only), the landscape is predominantly fire behavior fuel model Grass 2 (GR2). During hot, dry, windy conditions, GR2 is also expected to exhibit high rate of spread, but moderate flame length (4-8 ft.). Though not analyzed, fuel configuration on the adjacent private lands to the west of the route is predominantly fire behavior fuel model Timber Litter 8 and 9 (TL 8; TL 9). In many areas, especially the private land, crown base height is less than 5 feet. Ladder fuels would likely carry a surface wildfire into the tree canopy.

Dense stands of saplings and poles are common as are open, park-like areas (shelterwood or partial cuts and upland meadows). All action alternatives pass through or adjacent to ½ mile-wide buffers established (mapped) in the vicinity of structures or evacuation routes in the wildland urban interface (WUI) (Mattox 2006). This situation occurs along a major portion of the proposed routes, mainly in the north half. The partial private property route, Alternative 4, runs through these half-mile buffers nearly its entire length. Note if this project is implemented, the infra-structure it provides becomes a component of the WUI.

This project area encompasses Area Matrix Values of high risk, high hazard and high value. These are specified and described in the BHNF Protection Analysis and Plan on file at Mystic District office.

Actions Common to All Action Alternatives

All action alternatives would comply with appropriate Best Management Practices. Pertaining to the action alternatives, this mainly includes keeping the Mystic Ranger District informed of current locations of transmission line construction and schedule.

All action alternatives would comply with appropriate Standards and Guidelines listed in Chapter 2, Black Hills National Forest, Phase II Amendment, Land and Resource Management Plan, 2006. The following list, provided for reader convenience, is not necessarily all-inclusive.

- 2308.a. During vegetation management activities on ponderosa pine forested sites, retain an average of at least 50 linear feet per acre of course woody debris with a minimum diameter of 10 inches... STANDARD.
- 4110. Base activity and natural fuel treatment on area matrix values within the Black Hills National Forest FPA in accordance with the following treatment options.
- 4110.a(1). Reduce or otherwise treat all fuels (activity fuels within three years of cutting) so the potential fireline intensity does not exceed 200 BTUs/second/foot on 90 percent of the days when fires occur. GUIDELINE.
- 4110.a.(2) Interim activity fuel treatment will be accomplished by requiring all slash to be lopped to 18 inches or less [slash depth] at the time of cutting. GUIDELINE
- 4112. Treat activity fuels adjacent to roads and trails as follows:
  b. For federal, state, county and Forest Development Roads classed as arterials, remove 70 to 90 percent of the activity fuels seen from the roads edge up to a maximum distance 300 feet. Treat debris within one year of [cutting]… GUIDELINE

No National Forest System Roads classed as arterials are located along or intersected by any alternative route discussed herein. Guideline 4112 above would be applicable to slash created by this project on NFS land along Neck Yoke Road and Pine Grove Road.

Measurement indicators, useful for analysis or comparison of the proposed action and the alternatives are listed as follows and also displayed in Table 3-10.

- Contributes toward achieving Forest Plan Objective 10-01: … Manage the remainder of the Forest for 50 percent moderate to low fire hazard… Yes/No
- Contributes toward achieving Forest Plan Objective 10-04: Reduce or otherwise treat fuels commensurate with risks… Yes/No
- Comparative assessment of the amount (acres) of vegetation clearing in Right-Of-Way on BHNF.
- Estimated amount of slash created by the vegetation clearing—NFS lands only.

Environmental Consequences

Effects Common to All Action Alternatives

The environmental impacts of the proposed action and the action alternatives are very similar relative to fire and fuels. The variance among alternatives is mainly due to the different distances traversed by each alternative and the width of the Right-of-Way (ROW) cleared of trees and other vegetation greater than nine feet in height. The longer the distance traversed, the more poles need to be set. The more poles set, the more ground disturbance. The ROW clearing creates additional disturbance to vegetation and soils and temporarily increases fuel load. Table 3-10 below provides a comparison of effects in this context by the proposed action and action alternatives. Though analysis of impacts to private lands carries no direct relevance to this environmental analysis, Table 3-10 does display the acreage that would likely be cleared at the same time and in the same manner as the portion of the ROW on BHNF. This and the number of poles sited on private land would be additive to the effects of those on the NFS land.

Calculation of estimated, potential ground disturbance for pole placement on National Forest is based on an approximate pad of 0.01 acre in size (12 ft. radius), the width of the ROW and the length of route on NFS lands. Poles are set at the approximate centerline of the ROW, 40 feet width. This width on National Forest is seven feet, 20 feet or the full 40 feet, depending on the location along the planned routes. Where this portion is equal to seven feet, poles set on or close to ROW centerline would likely cause little to no soil disturbance on National Forest. For calculation purposes, the distance between poles is approximately 300 feet, but actual spacing may vary from 250 – 500 feet apart.

Construction equipment would ingress and egress using existing roads and 2-tracks to the extent possible. Low impact all-terrain vehicles would facilitate needs off road. Implementation of appropriate best management practices (BMP) would minimize soil disturbance/displacement, including re-vegetating disturbed ground and annual monitoring for recovery of vegetative ground cover; repeated seeding as necessary with native plant species; facilitate maintaining control of livestock, by keeping fences up/repaired where construction equipment requires ingress/egress.

Clearing of vegetation greater than nine feet in height would occur as needed and approximately every 10 years after construction. Periodic inspection of the transmission line and ROW conditions by authorized personnel would occur annually or as needed.

Vegetation greater than two feet in height would generally be removed along the selected alternative center-line. The width of this cut located in straight sections of the route would be approximately 10 to 15 feet to provide access for construction equipment and facilitate the various construction activities required. Additional width would be required at turning points. On the remainder of the ROW, vegetation in excess of nine feet in height would be trimmed or removed to provide adequate clearance for transmission line conductors and guy wires.

Created slash in excess of a baseline six tons per acre would be treated by any appropriate means. This may include: hand piling and burning, light-machine piling and burning, chipping and removal to an off-site disposal location. Residual slash would be lopped to a depth of 12 inches instead of 18 inches to satisfy concerns relative the BHNF FPA (Fire Prevention Plan)

area matrix values and to comply with the fire days (90) and fireline intensity (200 BTUs/second/foot) criteria of Guideline 4110.a(1). An average of at least 50 linear feet per acre of course woody debris with a minimum diameter of 10 inches would be retained for ecosystem health and wildlife habitat.

Table 3-10 Fire and Fuels – Measurement Indicators

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Issue - Measurement Indicators	Proposal	Visual	Shorter NF Route	Part Private	No Action
Contributes toward achieving Forest Plan Objective 10-01: Manage fire hazard (Yes, No).	Yes	Yes	Yes	Yes	Yes
Contributes toward achieving Forest Plan Objective 10-04: Treat fuels commensurate with risks (Yes, No).	Yes	Yes	Yes	Yes	Yes
Total miles of transmission line on fully private land	0.5	0.5	0.5	2.2	Unk
Total miles of Transmission line on National Forest[1]	5.3	5.6	4.1	2.6	0.0
Total acres of vegetation clearing on National Forest in ROW[2] Year 0 (2011)	13.4	7.9	3.2	0.7	0.0
Total acres of vegetation clearing on National Forest in ROW[2] Year 10 (2021)	22.6	17.6	9.4	2.6	0.0
Total acres of vegetation clearing on Private land in ROW[2] Year 10 (2021)	2.5	6.9	6.9	19.3	Unk
Slash created by vegetation clearing on National Forest in Year 0 (tons/acre)	38	41	46	53	0.0

[1]Note: Total miles of transmission line on National Forest includes those segments where the ROW corridor is partially on National Forest and partially on private land.
[2]Note: This estimate only includes sites which may be occupied by vegetation greater than nine feet tall. Calculations based on existing data in National Resource Information System database for the Black Hills National Forest. Unk=unknown.

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 within less than an acre in size, but do heighten the risk to firefighters because of proximity to live wires, regardless of the size.

Alternative 1 Proposed Action

Direct and Indirect Effects

The proposed action is a route composed of relatively straight line segments initially proposed for its practical, economic and engineering considerations for transmission line construction. It would

traverse approximately 5.3 miles across NFS lands and 0.5 miles across fully private land. An important distinction from the other action alternatives, the ROW is 40 feet wide on NFS land and 40 feet wide where is crosses private land. The other action alternatives have various combinations of ROW width shared by NFS land and private landowners.

The proposed action would implement the most vegetation clearing in the ROW on National Forest, entails the most cross-country travel by construction equipment and would disturb the most soil for pole setting of the action alternatives. Right-of-way vegetation maintenance would occur approximately at 10-year intervals, temporally short-term relative to biological resources. Some forest (tree) cover-type or species-type sites may grow sufficiently tall during this period to require treatment, whereas clearing may not be required initially. ROW clearance acreage may more than double from Year 0 to Year 10 (2021), Table 3-10. Construction activities and ROW clearing activities in the near term and during periodic vegetation maintenance pose minor adverse effects through temporary increase in hazardous fuel load. These activities may also provide a temporary, beneficial effect by providing wildland firefighters additional access routes or fire breaks for fire suppression. A calculated average slash load created over 8.9 acres of vegetation within the ROW is 38 tons/acre (see Table 3-10 above).

Alternative 2

Direct and Indirect Effects

The route proposed by Alternative 2 is very similar to that of the proposed action. This slightly longer route locates the transmission line, for the most part, below ridgelines and out of view of some residences in the project vicinity. It necessarily does not traverse the landscape in as much of a straight-line fashion.

Alternative 2 traverses slightly more National Forest and possibly presents more engineering challenges due to terrain features (steep slopes) than the proposed action. As such, it is also likely to create more disturbance than the proposed action. Ground disturbance for pole pad construction and setting of poles is somewhat less than the proposed action. However, due to diagonal or cross-slope traverse of the route in places, this difference may be negligible or could even be larger than the proposed action as more 2-pole sets (H type) may be required. Slightly less cross-country travel may be necessary than the proposed action. Increased hazardous fuel loads due to ROW clearing effects are consistent with those described for Alternative 1. A calculated average slash load over the 5.1 acres of ROW is 41 tons/acre.

Adverse effects would be an increase in hazardous fuel loading. The vegetation clearing also may provide beneficial effects as access may be improved for fire personnel and equipment, and a fuel break is created. Adverse and beneficial effects, both short-term and long-term would be minor and temporary relative to fire and fuels.

Alternative 3

Direct and Indirect Effects

Going south from Rockerville substation, Alternative 3 initially runs the same path as Alternative 2, but diverges in an upland meadow to follow the drainage down canyon. It is considerably shorter in length than both the proposed action and Alternative 2.

Adverse impacts for fire and fuels considerations are less under Alternative 3 than both the proposed action and Alternative 2. A calculated average slash load over 3.2 acres of ROW is 46 tons/acre. This loading is slightly higher than Alternatives 1 and 2, but is spread over 40 to 60 percent fewer acres than either of these alternatives. On the whole, less disturbance by treating slash on few acres would result in less of an adverse impact than previously considered alternatives. ROW clearing adverse effects are minor, but considerably less both initially and long-term than Alternative 1 and Alternative 2. Beneficial effects of ROW clearing are minimal short-term and less in scale than Alternative 1 and Alternative 2.

Alternative 4

Direct and Indirect Effects
Alternative 4 diverges from the proposed action about ¼ mile south of where alternatives 2 and 3 leave the proposed action route. From there, Alternative 4 proceeds east along a section line for a mile, south for two miles, and then east across private land to Hermosa. This route runs along National Forest boundary lines with ROW width ranging from 7 to 20 feet.

Less than one acre of vegetation in the ROW on NFS lands would require clearing initially. This is far less disturbance than the proposed action and other action alternatives create individually. Less slash is created on NFS land; the increase in hazardous fuel load is much less under Alternative 4 than for the other action alternatives. A calculated average slash load over 0.7 acres of ROW is 53 tons/acre. Potentially, improvement of access for fire personnel and equipment and creation of a fuel break could temporarily result from the vegetation clearing. Adverse and beneficial effects relative to fire and fuel considerations are minor and short-term. This alternative creates the least impact to NFS land of the four 4 action alternatives.

Alternative 5 No Action

Direct and Indirect Effects
Under Alternative 5, no new transmission line activity would occur on NFS land. Transmission line construction would occur entirely on private land. Management activities on the BHNF would continue as they are currently.

Increased hazardous fuel loads from slash generated by vegetation clearing of a transmission line corridor would not occur. Minor adverse impact due to increased hazardous fuel loads would not occur. Minimal, though beneficial, periodic short-term increases in firefighter access in cleared ROW on NFS land would not occur. No long-term beneficial or adverse effects would occur.

Cumulative Effects
Implementation of the proposed action or any one of the action alternatives, along with past, present and reasonably foreseeable future actions, would have minimal or no cumulative effects relative to fire and fuel considerations. The new power line, regardless of location, would be an additional value-at-risk within the wildland-urban interface (WUI) that fire fighters would need to take into account during fire suppression activities. It is expected that this additional powerline will not result in a significant increase in powerline-caused fires, but does have the potential to contribute to wildfires on a local scale.

WILDLIFE

Affected Environment

The BHEC Rockerville Transmission Line Project lies along or in close proximity to the eastern border of the Black Hills National Forest (BHNF) south of the Rockerville electric power substation located on US Hwy 16, about one mile east of Rockerville, SD. The area is composed mostly of semi-dry, ponderosa pine forest and grasslands on limestone soils. Though the project proposal and alternatives cross many drainages, few run water for more than a short distance downstream from the few springs present. Most drainage flow is ephemeral storm or springtime runoff. Isolated pockets of riparian habitat are present and exist mainly in narrow bands in the bottom of Rockerville Gulch and a few others.

Pronounced noise levels exist intermittently in the northern end of the project area during excavation in a nearby gravel pit and hauling of material to US Hwy 16; during approximately a 3-week period straddling the annual motorcycle rally in Sturgis, SD. The sound of hundreds of motorcycles passing by on US Hwy 16 is nearly continuous and very discernible several miles south of the Rockerville substation.

The project area is composed of a mix of National Forest System land, rural or suburban private land in agricultural setting and a few mining claims. The 2002 Battle Creek Fire burned over 80 percent of the area with high intensity and high severity, removing much of the forested overstory.

With respect to National Forest System land, the project analysis area (relative to wildlife) covers portions of Management Area 5.4 (MA) and MA 5.1 (USDA Forest Service 2006). See Wildlife Map 2 (in Appendix E). The majority of the analysis area (described below) is in MA 5.4, which encompasses 396,516 acres and where seasonal travel restrictions minimize wildlife disturbance during the critical winter months (Dec 15 through May 15). The Phase II Amendment Land Use Plan (USDA Forest Service 2006) lists MA 5.4 as areas that provide high-quality winter and transitory habitat for big game, high quality habitat for turkey, habitat for other species, and a variety of multiple uses. Goals are to improve forage on range areas and manage for wildlife habitat and vegetative diversity on forested areas. The management goals and objectives for MA 5.1 emphasize commodity production while being sensitive to visual quality, wildlife diversity and other resource values. The proposed action (Alternative 1) route and other action alternatives routes directly traverse MA 5.4 only.

MA Objective 5.4-206 strives to achieve a portion of the Forest's vegetative diversity goal by managing for a variety of tree ages, sizes, stand shape, stand size and location in the landscape. The desired composition of structural stages (SS) in ponderosa pine is displayed in Table 3-11. Structural stages are any of several developmental stages of pine stands described in terms of tree size and the extent of canopy closure they create (see the Glossary, in Chapter 5 of this EA, for definitions of the five structural stages).

Table 3-11 Desired Ponderosa Pine Structural Stage Percentages for MA 5.4

Structural Stage			Structural Stage	
SS1	5%		SS4A*	25%
SS2	5%		SS4B*	25%
SS3A	10%		SS4C*	5%
SS3B	15%		SS5	5%
SS3C	5%		Very Large Trees (SS4)	10%

*10% of the structural stage 4 ponderosa pine acreage in the MA will have an average tree size of "very large."

Existing structural stage composition in MA 5.4 is deficient in SS2, in each SS3 class and in SS5, though only slightly so in SS3C (see Table 3-12). The MA has an over-abundance of openings (SS1) and is somewhat deficient in acres dominated by very large (≥16 inches dbh) pine trees. Approximately 157,468 acres or about 46% of the pine in the MA is rated as high risk to mountain pine beetle (USDA Forest Service 2011a).

Table 3-12 Forest-wide MA 5.4, Existing Habitat Structural Stage Acres in Ponderosa Pine Cover Type (339,494 acres)

						Very Large Trees[1]	
Structural Stage	Acres	%	Structural Stage	Acres	%	Acres	%
SS1	45,616	13.4	SS4A	86,487	25.5	19,761	8.7
SS2	10,152	3.0	SS4B	87,864	25.9		
SS3A	17,454	5.1	SS4C	52,865	15.6		
SS3B	22,227	6.6	SS5	1,066	0.3		
SS3C	15,763	4.6					

[1]Structural stages 4 with average tree size ≥16 inches DBH.

Wildlife Map 3 (see Appendix E) denotes the vegetation cover types in the project vicinity pre-fire and to what the landscape 'should' eventually return, based on soil types and future forest management. After the Battle Creek Fire and continuing presently, much of the pine vegetative cover reverted to early seral structural stages (e.g., SS1, SS2, and SS3A) which is contributing to the early seral forest-wide structural stages but does not contribute toward the more mature seral pine structural stages (e.g., SS4 and SS5). Only a small area, locally known as the Elephant Trunk, and a smaller area in the vicinity of Jackson Spring (southern end of project) escaped the wildfire in 2002. These areas contribute only a small portion toward meeting Forest-wide objectives for mature pine structural stages.

The analysis area for the project encompasses the proposed route and alternative routes, buffered out one mile from their outer most segments (Wildlife Maps 1a and 1b, see Appendix E). This polygon is comprised of 3,802 acres of NFS land. The boundary captures some parcels of private land, but acreage of these is not included in the analysis of the impacts to NFS lands. The analysis area is described in more detail in the next section.

The vegetative cover types in the project analysis area currently consist of grassland (399 acres), bur oak (91 acres), and ponderosa pine (3,268 acres). Acres are approximate. NRIS data indicates

one site (44 acres) as dominated by aspen (TAA), but has ponderosa pine seedlings established in the understory. Vegetative diversity across the landscape is lacking (see Table 3-13).

Analysis conducted on habitat structural stage composition at MA 5.4 level indicates structural stage 5 is absent from the project area, and due to the Battle Creek Fire SS1 is abundant. Except for SS3C (only slightly below Objective 5.4-206), all other habitat structural stages are deficient if compared to the composition desired in objectives for MA 5.4, (see Table 3-11) (USDA Forest Service 2006).

Table 3-13 Rockerville Transmission Line Analysis Area, Existing Habitat Structural Stage Acres in Ponderosa Pine Cover Type (3,802 acres)

						Very Large Trees[1]	
Structural Stage	**Acres**	**%**	**Structural Stage**	**Acres**	**%**	**Acres**	**%**
SS1	1,920	50.5	SS4A	195	5.1	24.5	0.6
SS2	63	1.7	SS4B	468	12.3		
SS3A	89	2.3	SS4C	154	4.1		
SS3B	213	5.6	SS5	0	0		
SS3C	167	4.4					

[1]Structural stages 4 with average tree size ≥16 inches DBH.

Environmental Consequences

The proposed project is a 69kV electrical transmission line and corridor across the landscape from the Rockerville substation to a point where the route exits the BHNF. This utility corridor would be new construction nearly its entire length. Alternative routes to this proposal are located in the general vicinity (see Wildlife Maps 1a and 1b, Appendix E). The route length of the transmission line across BHNF and private land varies by alternative, ranging conjointly from 4.6 to 5.8 miles (Table 3-14).

Beginning at the Rockerville substation and proceeding south, all action alternatives would traverse the same route for approximately 1.7 miles before diverging. The first 1.1 mile traverses the west edge of the Elephant Trunk, an area of generally continuous ponderosa pine forest habitat. From the Elephant Trunk vicinity, the corridor would run three or four miles across the 2002 Battle Creek Fire area, exiting BHNF to the east. Project area maps referenced above show the routes of the proposed action (Alternative 1) and three other action alternatives. Aerial photography, to produce Wildlife Map 1a (see Appendix E), was conducted in the Fall of 2010, nine years after the Battle Creek Fire. Open areas are quite apparent. See Chapter 2 of this document for more detailed descriptions of the alternative routes and activities.

Analysis Area

The wildlife analysis area (BHNF land only) for this project is an area encompassed by a one mile wide buffer of all the proposed routes taken together (Wildlife Maps 1a and 1b, see Appendix E Maps). Generally, direct effects are those expected to occur within the ROW; indirect effects are those expected to occur within the combined buffer area of the proposed

routes. Staging areas for equipment and materials are to be determined in coordination with the BHEC after an alternative has been selected.

Only sites within the buffer distance south of US Hwy 16 are included in the analysis as these are the sites that would be affected by short-term construction activities, and long-term presence and operation of the transmission line. The highway continuously impacts wildlife and habitat on both sides, causing mortality from vehicle collisions, disturbance and noise from vehicle use and possibly acting as a barrier to some species. These consequences are likely to continue to increase over time as more development occurs and traffic increases. With respect to sites north of the highway within the buffered area, the effects of construction and operation of this transmission line would be but background noise compared to over-all effects of the highway. As such and because no construction activities related to project would occur north of US Hwy 16, this portion of the buffered area was not included in the area analyzed.

Analysis

Environmental Consequences (this section) discloses predicted effects to wildlife resources associated with the Rockerville Transmission Line Project. It also addresses pertinent Forest Plan direction (e.g., Objectives, Standards, and Guidelines). The analysis of direct and indirect effects for wildlife species focuses on Management Indicator Species (MIS), Species of Local Concern (SOLC) and R2 Sensitive species (see Project Wildlife/Fish Biological Evaluation Summary, Appendix D), their habitat needs and their prey species availability as it relates to the project area and associated activities (e.g., access for construction, maintenance, inspection, noxious weed treatment). Fragmentation and connectivity of habitat communities as it relates to MIS species were analyzed as part of the Forest Plan EIS (USDA Forest Service 1996), and analyzed in relation to SOLC species in the Phase II EIS (USDA Forest Service 2005). The best available science for each species was taken in to account, which may include additional information and referencing (e.g., conservation assessments). This report also provides information and analyses for a few special habitats and features that are necessary for accurate species analyses, and that are not fully addressed in other resource specialist's reports. The habitats, features, and other species are:

- Pine
- Aspen
- Meadow
- Riparian
- Snags (standing dead trees)
- Migratory Birds

Detailed analysis of species listed as Endangered, Threatened or Candidate by the US Fish and Wildlife Service (USFWS), or as Sensitive by the USDA Forest Service, Region 2 (R2) are included in a separate report titled, Rockerville Transmission Line Project: Biological Assessment/Biological Evaluation (BA/BE), filed in the project record. A BA/BE summary of the findings is provided in Appendix D. Fish species are not included because no fish habitat or fish populations exist in the project analysis area.

Habitats and Special Features

Pine Habitat

Ponderosa pine cover type, in general, is not considered a unique habitat in this analysis because it comprises the bulk of the project area and National Forest. However, as discussed in the Affected Environment section above, it is important habitat for many forest dwelling species. Key aspects such as acres of pine stands, tree size and/or age, density (e.g., number of trees per acre), and juxtaposition across the landscape are used as indicators of habitat quality or habitat suitability for dependent species. See the BA/BE in project file for additional information. The pioneer and successional vegetation recovering the Battle Creek Fire area is not unique habitat due to the extensive amount in the project vicinity. Information in the supplied NRIS data has been adjusted with respect to presence of snags, covertype, mountain pine beetle (MPB) risk, habitat structural stage and tree size. This was accomplished in order to be consistent with the maps and other data supplied by Mystic Ranger District personnel. The adjusted data more appropriately reflects current conditions. Various structural stages of pine may be of pronounced importance to some Management Indicator Species (MIS) or Species of Local Concern (SOLC) and implications of changes in structural stages for certain wildlife species is discussed later in this section.

This analysis relies upon information originally presented in other project- and Forest-level documents. Most notable among them are the Forest Plan Monitoring and Evaluation Report (FPMER) (USDA Forest Service 2010a); the Final Environmental Impact Statement for the 1997 Forest Plan (USDA Forest Service 1996); the Final Environmental Impact Statement for the Phase II Amendment to the Forest Plan (Phase II FEIS) (USDA Forest Service 2005); and the amended Land and Resource Management Plan (LRMP) (USDA Forest Service 2006). Location data (e.g., species occurrences) were obtained from several sources, including corporate databases, district files, and personal observations during field visits.

Generally, environmental impacts of the proposed action and the action alternatives are very similar relative to wildlife resources. The variance among alternatives is mainly due to the different distances traversed by each alternative and the width of the Right-of-Way (ROW) cleared of trees and other vegetation greater than nine feet in height (Maps 3 through 5, Appendix E). As mentioned earlier, the ROW width varies between alternatives (Table 3-14). The longer the distance traversed, the more poles need to be set. The more poles set, the more noise, vegetation and ground disturbance. The ROW clearing creates additional disturbance to vegetation and soils and temporarily increases fuel load. Table 3-14 provides a comparison of effects in this context by the proposed action and action alternatives. Though impacts to private land carries no direct relevance to this environmental analysis, Table 3-14 does display the acreage that would likely be cleared at the same time and in the same manner as the portion of the ROW on BHNF. This and the number of poles sited on private land would be additive to the effects of those on the National Forest, and are included in consideration of cumulative effects in this report.

Table 3-14 Right-of-Way Length, Width and Acreage by Land Ownership and Alternative

Alt	ROW Width (feet)	ROW Length (feet)	ROW Acres	ROW Length (miles)	Pole Set (acres)[1]	Yr 1 Veg Clearing (acres)[2]	Yr 10 Veg Clearing (acres)[2]
1	Pvt 40'	2,706.9	2.5	0.5	0.1	Unknown	Unknown
1	NF 40'	28,045.9	25.8	5.3	1.1	13.4	22.6
	Total NF		**25.8**	**5.3**	**1.1**	**13.4**	**22.6**
2	Pvt 40'	2,706.9	2.5	0.5	0.1	Unknown	Unknown
2	NF 40'	23,916.5	22.0	4.5	0.8	7.2	16.9
2	Pvt 33'	5,821.9	4.4	1.1	0.2	Unknown	Unknown
	NF 7'	5,821.9	0.9	1.1	0.0	0.7	0.7
	Total NF		**22.9**	**5.6**	**0.8**	**7.9**	**17.6**
3	Pvt 40'	2,706.9	2.5	0.5	0.1	Unknown	Unknown
3	NF 40'	15,669.8	14.4	3.0	0.5	2.5	8.7
3	Pvt 33'	5,821.9	4.4	1.1	0.2	Unknown	Unknown
	NF 7'	5,821.9	0.9	1.1	0.0	0.7	0.7
	Total NF		**15.3**	**4.1**	**0.5**	**3.2**	**9.4**
4	Pvt 40'	11,714.2	10.8	2.2	0.4	Unknown	Unknown
4	Pvt 33'	7,095.1	5.4	1.3	0.2	Unknown	Unknown
	NF 7'	7,095.1	1.1	1.3	0.0	0.7	0.9
4	Pvt 20'	6,663.4	3.1	1.3	0.1	Unknown	Unknown
	NF 20'	6,663.4	3.1	1.3	0.1	0.0	1.7
	Total NF		**4.2**	**2.6**	**0.1**	**0.7**	**2.6**

[1]Pad for setting of pole, which includes the area trampled by construction vehicles, is estimated to have a radius of approximately 12 feet.
[2]Estimate includes only sites which may be occupied by vegetation greater than nine feet tall and therefore require an initial treatment or maintenance treatment.

Calculation of estimated, potential ground disturbance for pole placement on National Forest is based on an approximate pad of 0.01 acre in size (12 foot radius), the width of the ROW and the length of route on NFS lands. Poles are set at the approximate centerline of the ROW, 40 feet width. This width on National Forest is seven feet, 20 feet or the full 40 feet, depending on the location along the planned routes; is explained in more detail below in the discussion of individual alternatives. Where this portion is equal to seven feet, poles set on or close to ROW centerline would likely cause little to no soil disturbance on National Forest. For calculation purposes, the distance between poles is approximately 300 feet, but actual spacing may vary from 250 – 500 feet apart.

Actions Common to All Alternatives

Construction equipment would ingress and egress using existing roads and 2-tracks to the extent possible. Low impact all-terrain vehicles would facilitate needs off road. Implementation of appropriate best management practices (BMP) would minimize soil disturbance/displacement, including re-vegetating disturbed ground and annual monitoring for recovery of vegetative ground cover; repeated seeding as necessary with native plant species; facilitate maintaining

control of livestock, by keeping fences up/repaired where construction equipment requires ingress/egress. Implement measures to minimize the spread of noxious weeds onto, across or from NFS lands.

Clearing of vegetation in the ROW, only where greater than nine feet in height, would occur as needed during construction and repeatedly approximately every 10 years to control re-growth. This is to provide for safety during construction and to reduce potential contact by vegetation with conductors, potentially causing damage to the powerline and power outages. Periodic inspection of the transmission line and ROW conditions by authorized personnel would occur annually or as needed. Additionally during construction, vegetation greater than two feet in height would be removed along the selected alternative center-line. The width of this cut located in straight sections of the route would be approximately 10 to 15 feet to provide access for construction equipment and facilitate the various construction/maintenance activities required. Additional width may be required at turning points.

Pole and conductor design incorporates protection measures to avoid or minimize electrocution or collision deaths of raptors following suggested practices for avian protection on power lines (APLIC 2006, 2012). Conductors would be arranged in a variety of configurations depending on engineering and human safety factors. A minimum distance of 60 inches (5 feet) between conductors would provide adequate protection for raptors in most cases. The engineering specification drawings in (see Wildlife Report, Appendix 3-3 or Figures 2-2 and 2-3 in Chapter 2 of this document) exceed this criteria by providing a seven to ten feet distance between conductors. Bald eagles, golden eagles, osprey and other raptors may use power structures for nesting or perching or forage along corridors (USDA Forest Service 2010b). Bald eagles have the longest wing span (approximately 80 inches or 6.7 feet) of the raptors inhabiting the Black Hills (Sibley 2000).

Created slash in excess of a baseline six tons per acre would be treated by any appropriate means, which may include: hand piling and burning, light-machine piling and burning, chipping, and/or removal to an off-site disposal location. Residual slash would be lopped to a depth of 12 inches and left for wildlife habitat. An average of at least 50 linear feet per (ROW) acre of course woody debris with a minimum diameter of 10 inches would be retained for ecosystem health and wildlife habitat. Tree boles of a size suitable to meet the above constraint, may be removed to a suitable location. This may be considered a connected action if the location is outside the project area.

Alternative 1 Proposed Action

The proposed action is a route composed of relatively straight line segments initially proposed for its practical, economic and engineering considerations for transmission line construction. It would traverse approximately 5.3 miles across NFS lands and 0.5 miles across private land. An important distinction from the other action alternatives, the ROW is 40 feet wide on NFS land and 40 feet wide where it crosses private land. The other action alternatives have various combinations of ROW width shared by BHNF and private landowners.

Alternative 2

The route proposed by Alternative 2 is very similar to that of the proposed action. This slightly longer route locates the transmission line, for the most part, below ridgelines and out of view of

some residences in the project vicinity. It necessarily does not traverse the landscape in as much of a straight-line fashion. The width of the ROW would be variable, mostly 40 feet, but a small section would be 33 feet on private and seven feet on Forest.

Alternative 3

Going south from the Rockerville substation, Alternative 3 initially runs the same path as Alternative 2, but diverges at an upland meadow to follow the drainage down a canyon. It is considerably shorter in length than both the proposed action and Alternative 2. The width of the ROW would be variable, similar to Alternative 2.

Alternative 4

Alternative 4 diverges from the proposed action about ¼ mile south of where Alternatives 2 and 3 leave the proposed action route. From there, Alternative 4 proceeds east along a section line for a mile, south for two miles and then east across private land to Hermosa. This route runs along National Forest boundary lines with ROW width ranging from seven to twenty feet.

Alternative 5 No Action

Under Alternative 5, no new transmission line activity would occur on NFS land. Transmission line construction would occur entirely on private land. Management activities on the BHNF would continue as they are currently.

Table 3-15 displays the cover types and the acres in each ROW, which may require vegetation manipulation (vegetation clearing, slash disposal, snag removal, etc.), in the action alternatives. The aggregate of these acres in each of the ROWs include those which would be disturbed in the course of delivering materials to planned pole locations (not yet determined), the setting of poles and stringing of the conductors. Notable in Table 3-15 is the relative magnitude or scale of vegetation manipulation for each action alternative. It is also important to note that even though an alternative traverses through a grassland cover type, vegetation clearing activities would likely not be required, though poles may need to be installed.

Table 3-15 Project Acres of: Analysis Area, Cover Type, and Special Habitat Features in ROW by Alternative

	Acres	Affected Acres			
Analysis Area[1]	3,802	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**
TPP (p. pine)	3,268	20.1	15.0	9.5	2.8
TAA (Aspen)	44	1.4	0.0	0.0	0.0
TBO (Bur oak)	91	1.1	2.5	0.0	0.0
GRA (grassland)	399	3.2	6.5	6.0	1.4
Riparian	0.0	0.0	0.0	0.0	0.0
Very Large Trees[2]	24	0.2	0.0	0.0	0.0

[1]Project Analysis Area, 1-mile buffer.
[2]Average tree size >16" DBH.

Table 3-16 displays the acres of ponderosa pine cover type by habitat structural stages which would potentially be treated under the action alternatives. This breakdown is important for

analysis of impacts to wildlife species associated with one or more habitat structural stages (SS). As in the discussion about Table 3-15, vegetation manipulation is unlikely to occur on SS1 acres and possibly SS2, depending on the height of the trees.

Table 3-16 Acres of Vegetation Clearing in ROW, in Ponderosa Pine

Structural Stage	Alternative 1	Alternative 2	Alternative 3	Alternative 4
1	9.2	9.7	6.2	2.0
2	0.4	0.2	0.0	0.0[1]
3A	0.0[1]	0.4	0.0	0.0[1]
3B	4.2	0.8	0.3	0.0[1]
3C	0.7	0.0	0.0	0.1
4A	1.5	1.1	0.2	0.0
4B	3.6	2.6	2.6	0.7
4C	0.5	0.2	0.1	0.1
5	0.0[1]	0.0[1]	0.0[1]	0.0[1]
Total	20.1	15.0	9.4	2.8

[1]No sites in this structural stage treated.

These alternatives would not treat SS5 sites as there are no site acres classed as SS5 in the analysis area. Though the project area contains no sites classed as riparian, small, narrow, and isolated areas do exist and may require vegetation manipulation within established standards and guidelines. The database lists no sites classed as meadow sites in the analysis area. Snags would be removed only if determined a safety hazard. Viewed at the MA 5.4 level, these potential treatment acres can have little influence on wildlife resources relative to the Habitats and Special Features discussion below.

Aspen

Aspen is an early seral species that requires significant sunlight. Historically, recurrent fire helped perpetuate aspen. Fire stimulates new growth from root "suckers." Fire also kills conifers, which can grow taller, out competing aspen for valuable sunlight. Fire suppression during the past century has affected aspen by limiting new growth and allowing conifer encroachment. Forest Plan Objective 201 encourages a Forest-wide increase in aspen to 92,000 acres (USDA Forest Service 2006). According to FPMER, less than half of that exists currently (45,805 acres) forest-wide (USDA Forest Service 2010a). Aspen is not abundant in the analysis area and is listed as covertype for only one site (site 092703-32, 44 acres) in the Rocky Mountain (RM) vegetation table in NRIS. Aspen is also found in isolated patches in the project area, often associated with north-facing slopes, other hardwoods (e.g., bur oak) and/or steep drainages where conditions are moister. Aspen may also occur as an understory species but are dominated by (and classified as) ponderosa pine covertype. Aspen response in the Battle Creek Fire is not known, but the fire may have stimulated aspen suckering where it had previously occurred.

Direct and Indirect Effects

No alternative would implement hardwood restoration treatments. Only Alternative 1 would traverse aspen site 092703-32, skirting along the uphill border of the site. The area of the site affected by the new corridor would be approximately 1.4 acres. The project may limit potential aspen growth (height) within the ROW due to clearing required for line maintenance. None of

the alternatives would take action to specifically increase or decrease the amount of aspen. Therefore, all alternatives have no effect on meeting Forest Plan Objective 201.

Grassland/Meadow

Upland grassland and lowland meadow habitat can be found in the project area, covertype GRA (see Table 3-15). Historically, fire increased the growth and vigor of these communities while reducing pine encroachment. Fire suppression in the last century had changed the size and shape of native grasslands, where pine encroachment has continued to reduce the size and productivity of these communities. Other grassland can be found in isolated patches along drainages and openings where soil types are conducive to native grassland communities. Grasslands and meadows that occur in drainages usually have deeper soil profiles which are considered to be productive foraging areas for big game and livestock. Many of the bottomlands are now dominated by non-native grasses (e.g., smooth brome) and brush (snowberry). Invasive species (smooth brome, Canada thistle etc.) can replace native grassland communities, reducing foraging quality, reduced prey abundance and loss of pollinator specific host and nectar species which could have long-term effects on wildlife species. The Battle Creek fire, due to its severity and intensity has greatly increased grassland acreage due to the loss of pine overstory but has also increased the presence of invasive species in the area. Forest Plan Objective 205 is to manage for 122,000 acres of prairie grassland and 3,600 acres of meadow. Currently, the BHNF is below meeting this objective (USDA Forest Service 2010a).

Direct and Indirect Effects

No alternative would implement meadow restoration treatments. Alternatives 2 and 3 would affect more grassland habitat (average six acres) compared to Alternatives 1 and 4. Impacts under Alternatives 2 and 3 would be due to locating the routes, mostly along the bottom of drainages and in openings. ROW clearing in grassland/meadow habitat would reduce pine encroachment in those treated areas, maintaining these communities long-term. Ground disturbance as a result of line construction activities (e.g., pole placement, equipment use) could increase the potential for invasive species. Design criteria such as seeding disturbed areas and noxious weed treatment could reduce the potential for noxious weed spread in these areas. None of the alternatives would take action to specifically increase or decrease the amount of grassland/meadow habitat. Therefore, all alternatives would have no effect on attainment of Forest Plan Objective 205.

Riparian Habitat

Forest Plan Objective 213 encourages management that maintains riparian area diversity, physical structure and size. There are also riparian area objectives (i.e., 214, 215) that promote active restoration of riparian habitats.

Riparian habitats are typically very narrow, and are not well represented in the Forest's corporate vegetation database. The vegetation database contains no acres typed as riparian in the project area. Several drainages are found in the project area, but most of these are considered ephemeral. Due to the porous nature of the limestone formation, water flow usually goes underground and water holding capacity is limited. Small inclusions of riparian vegetation do exist where water is present (e.g., springs) and along some of the mesic drainage bottoms within stands typed as ponderosa pine or some other cover type. Plants found in these drainages may

include river birch, paper birch, aspen, hazelnut, bur oak, white spruce, sedges, and rushes. Not all of these are riparian obligates, but they are usually species with higher moisture requirements than are found on most adjacent uplands. Pine may also be present, although it is not considered a riparian species. Because riparian areas are not quantified in the vegetation dataset, they will be discussed in qualitative terms only. See the Botany Report for more information.

Direct and Indirect Effects

Riparian restoration falls outside the scope of this project. All action alternatives cross Rockerville Gulch and vegetation clearing and slash treatment would likely be necessary. Since Alternative 2 and 3 line location is in drainage bottoms, these alternatives would likely impact ephemeral drainages and any future riparian associated communities more so than Alternatives 1 and 4. Riparian communities that are located within the ROW clearing limits could be negatively affected by clearing, causing mesic micro-site conditions to deteriorate and may reduce the capability and size of these isolated riparian habitats.

Riparian vegetation could potentially be trampled or removed by using riparian areas as vehicle staging, log decking or materials staging areas. However, no pole pads would be installed in riparian habitat, rather poles would be set to span these areas. Standards 1301 through 1306 reduce this potential by dictating that riparian areas be managed for long-term health and sustainability. Standard 1306 prohibits log landings, decks, and mechanical slash piling within riparian areas unless riparian integrity can be protected. Guidelines 9107 and 9108 prohibit vehicles from entering perennial streams where resource damage would occur, and restrict vehicular traffic in riparian areas to established roads and trails.

Design criteria would maintain existing riparian characteristics and the Project should have no effect on these areas. Therefore, all of the alternatives and associated activities would meet the intent of Objective 213.

Snags

The Forest Plan Objective 211 is to provide an average of three hard snags per acre in forested portions of a Management Area (MA), well-dispersed across the Forest. These snags should be greater than 9” dbh and at least 25’ tall; one-quarter of the total should be greater than 14” dbh. This objective is applied at the Forest-wide scale. According to the Phase II FEIS, snag densities vary by structural stage, fire history, and several other factors. Therefore, it is not reasonable to expect a uniform density across the Forest. However, by following the MA structural stage objectives, the Phase II FEIS asserts that an average of three snags per acre would be provided. Due to recent large fires and bark beetle outbreaks, the Forest is currently exceeding the Forest-wide snag density objective, despite the imbalance of structural stages (USDA Forest Service 2010a, 2011a).

There are no Forest Plan objectives that define desired snag densities within a project area. However, Standard 2301 states if snag densities within a project area are below the Forest-wide objective, then all snags must be retained unless they are a safety hazard. If the project area meets the Forest-wide objective, then only snags greater than 20” dbh must be retained. The snag density within the project analysis area is estimated at 0.4 hard snags and 0.0 soft snags per acre over more than 3,400 forest and woodland cover types. Current snag density in the Battle Creek Fire portion of the project analysis area has not been quantified. Therefore, the information provided by the

database may be of limited utility. Most fire-killed trees have fallen or had the tops knocked out by storms since 2002. In the Battle Creek Fire area, the majority of snags present in 2002 were consumed during the fire.

Direct and Indirect Effects

Snag harvest is not part of any alternative. All vegetation, alive and dead that is greater than nine feet tall would be removed within the ROW to prevent line interruption and fire. If snags occur within the ROW, it is likely that snags would be cut for these safety reasons. In addition, snags may be cut adjacent to the ROW, if they have the potential to fall onto the powerline and if they pose a safety concern during construction activities and associated activities.

Because Alternative 4 traverses the least distance across BHNF land, snag retention would be the highest of the action alternatives. Alternatives 1 and 2 would have the greatest potential to reduce snag density in the project analysis area. As snags would only be removed for safety reasons, all action alternatives would comply with Objective 211 and Standard 2301.

According to the Phase II FEIS, snag recruitment is not expected to be a problem at the Forest-wide scale as long as management actions contribute to meeting the overall MA structural stage objectives. NRIS data for the project analysis area shows that none of the alternatives would change the Forest-wide structural stage percentages. Changes this small in magnitude are not expected to affect the attainment of Objective 211 in the future.

Very Large Trees

The Forest Plan structural stage objectives specify that at least 10% of pine SS4 in MA 5.4 should be in the "very large tree" size category. This category is achieved when the average stand's basal area is dominated by trees ≥16" dbh. The objective applies to MA's at the Forest-wide scale. For most of the project area, the intensity and severity of the Battle Creek Fire has reduced the potential for Very Large Tree component in the analysis area long-term. There are very few stands remaining in the project area that could provide this habitat. These stands can be found in the Elephant Trunk area and along the Forest boundary, areas that escaped the stand replacing effects of the Battle Creek Fire.

The Forest Plan Objectives do not include SS5 (i.e., late succession or "old growth") in the very large tree size requirements. This is because all SS5 is dominated by trees >16" dbh (i.e., the stage is defined by very large tree size). Ecologically speaking, SS5 functions the same as the subset of structural stage 4 that has very large tree size designation. There is no SS5 in the project area (see Table 3-16).

Direct and Indirect Effects

The Forest-wide tree size objective for SS4 (i.e., ≥10%) is currently not being met in MA 5.4 (8.7%) (USDA Forest Service 2011a). Alternative 1 would potentially remove an estimated 0.2 acre of 'very large trees' through vegetation clearing activities in the ROW. The other action alternatives would remove less than 0.1 acre of trees in this size category. All alternatives would have a minimal effect on the Forest-wide percentages. Therefore, these alternatives would not influence attainment of the very large tree component of FP Objective 5.4-206.

Special Status Species

Table 3-17 provides the full list of MIS and SOLC that are applicable to any portion of the BHNF. The table also provides a basic habitat description for each species, and discloses whether that habitat is expected to occur within the project area (USDA Forest Service 2005). Only those species with habitat in the Rockerville Transmission Line project analysis area are analyzed in subsequent text. The depth and content of analysis varies among species because each status category has different regulatory requirements, and because individual species have varying levels of information about them.

Table 3-17 Identification of Special Status Species and Rationale for Project Level Analysis. Species Listed in Alphabetical Order within Major Life Form Groups

	Status	Analyzed in Detail?	Habitat Description[1] and Rationale for Analysis
Birds			
American Dipper (*Cinclus mexicanus)*	SOLC	No	Swift-flowing montane streams. In Black Hills, restricted to Spearfish, Whitewood, and Rapid Creeks and their tributaries. Therefore, no analysis is necessary.
Black-and-White Warbler *(Mniotilta varia)*	SOLC	Yes	Hardwood riparian areas below 4700' elevation. Habitat may be present.
Black-backed Woodpecker (*Picoides arcticus*)	MIS/R2	Yes	Recently burned areas, late successional or dense mature forests, and forests with high mountain beetle populations (USDA Forest Service 2010a). Recently burned areas and forested habitat present.
Broad-winged Hawk *(Buteo platypterus)*	SOLC	No	Found almost exclusively in extensive aspen stands in northern Black Hills and Bearlodge Mountains. Habitat not present, and project area outside of known range.
Brown Creeper (*Certhia americana*)	MIS	Yes	Late successional ponderosa pine and white spruce. Pine habitat present.
Cooper's Hawk *(Accipiter cooperii)*	SOLC	Yes	Uses a variety of habitats, including ponderosa pine. Habitat present.
Golden-crowned Kinglet (*Regulus satrapa)*	MIS	No	Primarily spruce forests, including forests that have spruce as a minor component. Habitat not present.
Grasshopper Sparrow (*Ammodramus savannarum*)	MIS/R2	Yes	Native mixed-grass prairies, especially in southern Black Hills. Habitat may be present in the burn area of Battle Creek Fire.
Northern Saw-whet Owl *(Aegolius acadicus)*	SOLC	Yes	Forest habitat generalist; dense coniferous or mixed forest. Habitat present.

	Status	Analyzed in Detail?	Habitat Description[1] and Rationale for Analysis
Pygmy Nuthatch (*Sitta pygmaea*)	SOLC	Yes	Mature ponderosa pine stands with large trees and snags. Habitat present.
Ruffed Grouse (*Bonasa umbellus)*	MIS	Yes	Forests containing aspen or other hardwoods. Habitat present.
Sharp-shinned Hawk (*Accipiter striatus)*	SOLC	Yes	A variety of forested areas, but nesting habitat typically restricted to dense young conifer stands. Habitat present.
Song Sparrow *Melospiza melodia*	MIS	No	Closely associated with riparian and wetland habitats. Habitat not present.
Mammals			
Beaver (*Castor canadensis*)	MIS	No	Lakes, rivers, streams, and marshes with perennial water. Habitat not present.
Long-eared Myotis *(Myotis evotis)*	SOLC	Yes	Coniferous montane habitats. Habitat present.
Long-legged Myotis (*Myotis volans)*	SOLC	Yes	Coniferous montane habitats. Habitat present.
Meadow Jumping Mouse *(Zapus hudsonius)*	SOLC	Yes	Strongly associated with riparian habitats along small streams in meadows. Habitat potentially present, very limited in area.
Mountain Goat (*Oreamnos americanus)*	SOLC	Yes	Rugged terrain with cliffs, rock faces, ledges, and talus slopes. Limited primarily to Black Elk Wilderness Area, Norbeck Wildlife Preserve and the Battle Creek Drainage. Habitat present.
Northern Flying Squirrel *(Glaucomys sabrinus)*	SOLC	Yes	Boreal and montane forests with very large coniferous or mixed coniferous-deciduous trees. Habitat present.
Northern Myotis (*Myotis septentrionalis)*	SOLC	Yes	Coniferous montane habitats. Habitat present.
Rocky Mountain Bighorn Sheep (*Ovis canadensis)*	SOLC	Yes	Cliffs, rock outcrops, and nearby meadows. Limited primarily to areas around Sheridan Lake, Dark Canyon (Rapid Creek), Spring Creek, and Custer State Park. Habitat present. Have been reported grazing in the Battle Creek Fire area.
Small-footed Myotis (*Myotis ciliolabrum)*	SOLC	Yes	Variable habitats, but usually associated with rocky areas like bluffs, dissected breaks, ridges, cliffs and major rock outcrops. Habitat present.
White-tailed	MIS	Yes	Uses a variety of habitats including pine forests. Habitat

	Status	Analyzed in Detail?	Habitat Description[1] and Rationale for Analysis
Deer *(Odocoileus virginianus)*			present.
Invertebrates			
Atlantis Fritillary *(Speyeria atlantis pahasapa)*	SOLC	No	Wet meadows and boggy areas near springs and headwaters of small streams. Larvae feed exclusively on violets (Viola spp.). Habitat is not present.
Callused Vertigo (*Vertigo arthuri*)	SOLC	Yes	Moist, relatively undisturbed forest with diverse understories, deep litter, and abundant woody material. Calcareous or schist soils. Habitat present, but limited.
Frigid Ambersnail (*Catinella gelida*)	SOLC	Yes	Limestone or schist soils. Usually in open ponderosa pine forest (sometimes spruce) with a deciduous tree and shrub component. Habitat present, but limited.
Mystery Vertigo (*Vertigo paradoxa)*	SOLC	Yes	On limestone or schist soils, usually in spruce forests (but sometimes pine) with relatively closed canopy, abundant litter, and well-developed understories. Habitat present, but limited.
Striate Disc (*Discus shimekii)*	SOLC	Yes	Usually limestone but sometimes schist soils, in litter of rich mesic forests, generally on shaded, north-facing slope bases; often bordering or ranging slightly onto stream flood plains. Habitat present, but limited.
Tawny Crescent *(Phyciodes batesii)*	SOLC	Yes	Wet meadows, springs, and stream bottoms near forested openings. Habitat is present.

[1]Habitat descriptions summarized from USDA Forest Service (2005) unless otherwise noted.

Management Indicator Species (MIS)

Management Indicator Species (MIS) are species that represent a suite of wildlife and fish species and their habitats. MIS are evaluated based on observations and/or presence of suitable habitat within the Project Area. The Phase II Amendment FEIS (USDA Forest Service 2005; Sec 3-3.3.6 through Sec 3-3.3.8.2) provides in-depth information (i.e., range, distribution etc.) for each MIS selected for analysis. The project analysis for MIS is tiered to this document. Tables 3-17 and 3-18 identify MIS species selected for analysis for the project, and reasons for their Forest Plan designation (USDA Forest Service 2005).

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 the Forest Plan Monitoring and Evaluation Reports (FPMER) (USDA Forest Service 2010a) unless otherwise indicated. Viability analysis has been completed at the Forest Plan level (USDA Forest Service 2005), and therefore is beyond the scope of this project level analysis. If the MIS species or suitable habitat does not occur in the project area, or if the species or its habitat is not affected by the project, then it is excluded from further evaluation. If a species is known or suspected to occur in the project area or if suitable

but unoccupied habitat is present or adjacent to the area, then the species has been evaluated with respect to effects of the proposed project activities.

Table 3-18 MIS Species and Rationale for Project Analysis

Species	Species/ Habitat Present?	Analyzed	Habitat Description
Black-backed woodpecker *(Picoides arcticus)*	Y	Y	Burned areas with a high density of pre-burn snags, dense and/or mature forests with a high snag density (Anderson 2003a, Rocky Mountain Bird Observatory 2001-2010).
Brown creeper *(Certhia americana)*	Y	Y	In the Black Hills, white spruce and late successional pine appears to be the most important habitat type for this species (Wiggins 2005c, Rocky Mountain Bird Observatory 2001-2010).
Golden-crowned kinglet *(Regulus satrapa)*	N	N	Found almost exclusively in white spruce habitat but occasionally present in other habitats with a spruce component (Rocky Mountain Bird Observatory 2001-2010).
Beaver *(Castor canadensis)*	N	N	Large rivers and lakes down to streams, marshes, and small lakes with seepage/weak flow adequate for damming and suitable woody vegetation.
Song sparrow *(Melospiza melodia)*	N	N	Streamside thickets, particularly shrubby willows, are required. Occasionally found in adjacent spruce habitat (Rocky Mountain Bird Observatory 2001-2010).
Grasshopper sparrow *(Ammodramus savannarum)*	Y	Y	Found almost exclusively in native mixed-grass prairies (Slater 2004, Rocky Mountain Bird Observatory 2001-2010).
Ruffed grouse *(Bonasa umbellus)*	Y	Y	Variable aged aspen stands, other hardwoods, and pine forests provide habitat. Winter habitat is almost exclusively aspen (Tallman et al. 2002).
White-tailed deer *(Odocoileus virginianus)*	Y	Y	Very adaptable species that can live in almost any habitat. In South Dakota, this includes grasslands, wetlands, and woodlands (USDA Forest Service 2005).
Mountain sucker *(Catostomus platyrhynchus)*	N	N	Found in cool, clear streams.

Pertinent Forest Plan Direction: Objective 238 addresses MIS. In summary, the objective leads the BHNF to maintain or enhance habitat for MIS as outlined through other objectives (mainly vegetation objectives). For example, the ruffed grouse habitat objective relies on specific direction relating to aspen (i.e., Objective 201), because aspen is the primary habitat used by grouse. To continue following this example, any actions that allow or contribute to a Forest-wide increase in aspen would demonstrate progress toward Objective 238a for ruffed grouse,

because the recent Phase II Amendment FEIS shows that the Forest currently has less aspen than is called for in objective 201.

As demonstrated above, the parent objectives must be evaluated before the MIS objectives can be. These evaluations are presented in the Habitats and Features portion discussed above (i.e., the Snag, Very Large Tree, Aspen, and Riparian sections). Therefore, it is imperative that the reader review these analyses in order to fully understand effects to MIS.

Effects disclosures typically center around changes to habitat, because this is invariably where the effects to wildlife are most certain and pronounced. Although project activities could on rare occasion cause injury or mortality to MIS, the likelihood of such effects are very low, and at most, only a few individuals would be affected (i.e., there would be no potential to affect populations).

Black-backed Woodpecker

The black-backed woodpecker has dual management status; it is both an MIS and a sensitive species. To reduce redundancy, most life history, current condition, and predicted effects information are provided in one place: the sensitive species assessment (i.e., BA/BE). Only MIS-specific documentation requirements are provided here (e.g., trend information, analysis of Objective 238).

The black-backed woodpecker was selected as a Forest Plan MIS for its link to burned forest, mature and late successional forest, insects, and snags. The Forest Plan vegetation objectives that most closely apply to the woodpecker in project area are 211 (snags), and 5.4-206 (forest structural stages). The woodpecker MIS objective also mentions Objective 11-03, which applies to stand replacing events (e.g., wildfire, insect outbreaks) that create large areas of heavy fuels. Although the Battle Creek Fire has affected the project area, no salvage logging is proposed under any alternative.

In burned area habitat, population trend analysis reveals a notable decrease 2003 through 2007, and then a dramatic increase (2009) in black-backed woodpecker densities. This pattern mirrors the availability of recently-burned areas and areas with large populations of mountain pine beetles. The pattern of rapid colonization after fire and subsequent decline with post-fire habitat changes is consistent with findings of other studies (Anderson 2003), and is not cause for alarm or re-evaluation of species viability. The Forest-wide relative density for this species is probably higher than "normal" given the current habitat conditions (USDA Forest Service 2010a).

Habitat trend analysis is complicated because there are three preferred habitats to consider: recently burned areas (i.e., <5 years old), areas with large populations of mountain pine beetles, and dense mature or late successional pine forests (i.e., SS4C and 5). According to FPMER, the long-term (10-25 year) combined habitat trend has shown a large increase, but in the past few years, tend is decreasing. This is primarily due to the aging burn areas and thinning to reduce insect risk. Overall, habitat is relatively abundant on the Forest due to many consecutive years of above-average acreages affected by fire and mountain pine beetles.

According to the Forest Plan Monitoring and Evaluation Report (FPMER), there is an estimated total of 157,897 acres of SS4C and SS5 ponderosa pine (about 18%) on the Forest (USDA Forest Service 2010a). MA 5.4 has an estimated total of 53,931 acres (16%) of SS4C and SS5 (USDA Forest Service 2011a). NRIS data for the project analysis area lists approximately 154 acres of

SS4C and no acres of SS5. These acres amount to less than 0.1% of the Forest-wide total habitat, and 4.7% of the ponderosa pine within the project area.

The Forest Plan structural stage objectives all call for 5% each of 5 MA's to be managed for SS4C, and 5% in SS5. MA 5.4 currently exceeds the objective for 4C habitat, and does not meet the objective for SS5.

Another indicator of potential woodpecker habitat is the amount of area with high risk of mountain pine beetle attack. Forest-wide, approximately 530,548 acres (51% of the Forest) are in high risk condition (USDA Forest Service 2011a). According to the NRIS data, 819 acres (25%) of the project area is currently rated as high risk. This is approximately 0.1% of the total amount of high risk habitat present on the Forest.

Direct and Indirect Effects

The no action alternative would have no direct effect on the amount of SS4C and SS5 pine habitat, or on snag availability within those habitats. Over time, and in the absence of large catastrophic events (e.g., fire), forest canopy closure would increase, and additional forest would mature into SS4C and/or SS5 stands. Snag abundance would also increase. All of these indirect effects of no treatments would result in more woodpecker habitat than currently exists, but would require a very long time. For these reasons, the No Action Alternative would be most favorable for the black-backed woodpecker.

The action alternatives would slightly reduce the amount of forested (SS4C) woodpecker habitat present after treatment (see Table 3-16). This loss of habitat would be long-term since line maintenance would preclude this structural stage returning until the line is abandoned. Alternative 1 would potentially remove 0.5 acre of SS4C ponderosa pine through vegetation clearing activities in the ROW. The other action alternatives each would remove less than 0.1 acre. These small changes in SS4C at the project scale would not affect Forest-wide MA 5.4 objectives, therefore the project would have no effect on attainment of FP Objective 5.4-206.

As disclosed in the Snag section, the action alternatives could decrease snag densities and recruitment rates in the ROW and the areas immediately adjacent to the ROW. This could translate to reduced habitat for the black-backed woodpecker in these treated forested areas. None of the alternatives would have an effect on mountain pine beetle populations, and therefore would have no direct effect on this important woodpecker food source. Because less than 0.01% of the Forest-wide woodpecker habitat would be affected under any alternative, none of the alternatives would influence the Forest-wide population trend, Forest-wide habitat trend, or attainment of Objective 238b.

<u>Brown Creeper</u>

The brown creeper was selected as a Forest Plan MIS for its link to dense mature pine forest, late successional pine forest, and spruce forest. The Forest Plan vegetation objective that most closely applies to the brown creeper in the project area is 5.4-206, which relates to structural stages of ponderosa pine. Objective 239-LVD relates to spruce, and is not relevant to this project because spruce is nearly non-existent in the project area.

Monitoring data collected on the Forest show that the species is well distributed, but in low abundance across the Forest, and is closely associated with dense mature and late successional ponderosa pine stands (SS4C and SS5) and white spruce forests. Within that context, dead or decaying trees are particularly important because they provide nesting and foraging substrates.

According to FPMER, brown creeper densities fluctuated between 2001 and 2005, with no obvious upward or downward Forest-wide population trend. In 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). Over all, preferred habitat has been stable or slightly increasing on the Forest over the past five years.

Again, the FPMER reports are an estimated 11,220 acres of SS4C and SS5 ponderosa pine on the Forest, and 25,749 acres of spruce. It is assumed that these figures represent the amount of brown creeper habitat on the Forest (178,645 acres total). It is possible that not all of this habitat is occupied, and that other areas outside of this description may be occupied by creepers in very low densities.

As presented earlier, there are approximately 154 acres of SS4C and zero acres of SS5 pine in the project analysis area. There are no acres typed as spruce. This equals slightly less than 1.4% of the Forest-wide of brown creeper SS4C and SS5 pine habitat; much less than 0.1% of the Forest-wide habitat total including spruce.

The Forest Plan vegetation objectives pertinent to the MIS brown creeper relate directly to structural stages of ponderosa pine in MA 5.4. Objective 5.4-206 calls for 5% of the MA to be managed for SS4C, and 5% in SS5. MA 5.4 currently exceeds the objective for SS4C habitat Forest-wide, and does not meet the objective of SS5. The project contributes little to assist in meeting the above listed objective. SS4C is approximately 4.7% of the project area pine and zero percent for SS5.

Direct and Indirect Effects

Each of the action alternatives would slightly reduce the amount of brown creeper habitat present after treatment (See Table 3-16). Alternative 1 would result in a loss of 0.5 acres. Alternatives 2 through 4 would result in a loss of 0.2 acres or less, each. They would not alter the current Forest-wide structural stage mixes, and therefore would not influence the attainment of any of the structural stage objectives.

As disclosed in the Snag section, the action alternatives could decrease snag densities and recruitment rates in the ROW and the areas immediately adjacent to the ROW. This could translate to reduced habitat for the brown creeper in these treated forested areas. However, because the snag objective (211) would continue to be met at the Forest-wide scale, creeper habitat would be maintained at that scale.

Due to the small amount of brown creeper habitat in the project area and lack of effect on forest-wide structural stage and snag objectives, none of the alternatives would influence the Forest-wide population trend, Forest-wide habitat trend, or the attainment of Objective 238a.

<u>Grasshopper Sparrow</u>

The grasshopper sparrow has dual management status. It is both an MIS and a R2 sensitive species. To reduce redundancy, most life history, current condition, and predicted effects

information are provided in the Project Wildlife BA/BE. Only MIS-specific documentation requirements are provided here (e.g., trend information, analysis of Objective 238).

The grasshopper sparrow was selected as a Forest Plan MIS for its link to native grassland communities. In the Black Hills, this species is found mostly in native mixed-grass prairies but is documented in other types of grasslands. This species appears to be "area sensitive" (>30 ha), with a close association with grasslands of intermediate height.

According to the FPMER, density estimates for the grasshopper sparrow have continued to increase since 2002. 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 and then a decrease. This is likely explained as inconsistencies in the vegetation database not reflecting on-the-ground conditions. 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 (USDA Forest Service 2010a).

In the project area, there are approximately 400 acres of grassland covertype. Additional acres of grassland probably exist, especially on soils that have formed under native grass communities.

Direct and Indirect Effects

The following analyses incorporate information previously disclosed in the Meadow section discussed above. Please see that section for additional rationale and analyses.

No alternative would implement meadow restoration treatments. ROW clearing in grassland/meadow habitat would reduce pine encroachment in those treated areas, maintaining habitat for the grasshopper sparrow. Short-term disturbance as a result of line construction activities (e.g., pole placement, equipment use) could cause loss of nests, crushing of eggs or young or increase predation rates due to trampling, compaction and loss of vegetative cover. In addition, disturbance could also increase the potential for invasive species to outcompete native plant communities, affecting foraging habitat of these sparrows. Alternatives 2 and 3 would affect more grassland habitat compared to Alternatives 1 and 4. Design criteria such as seeding disturbed areas and noxious weed treatment could reduce the potential for noxious weed spread in these areas. However, chemical treatment for noxious weeds could reduce native forb species abundance, thus affecting prey abundance. None of the alternatives would take action to specifically increase or decrease the amount of grassland/meadow habitat. Therefore, none of the alternatives would influence the Forest-wide population trend, Forest-wide habitat trend, or the attainment of Objective 238a.

Ruffed Grouse

The ruffed grouse was selected as a Forest Plan MIS for its link to aspen forests. The Forest Plan vegetation objective that most closely applies to ruffed grouse is 201, which encourages the Forest to provide at least 92,000 acres of aspen.

Monitoring data collected on the Forest show that the species is widespread, but in low abundance. It is associated with aspen in a variety of structural stages. There are approximately

45,850 acres typed as aspen on the Forest. In the project area, there are approximately 44 acres dominated by aspen. Both the Forest and the project area have additional, but unquantifiable acres that have aspen as a minor component on them.

The ruffed grouse was designated an MIS species in October 2005, and prior to this, the species had no special status. The Forest worked with the South Dakota Department of Game, Fish and Parks (SDGF&P) and the Rocky Mountain Research Station to develop a new monitoring protocol for ruffed grouse (Hansen et al. 2008). Occupancy estimates are 0.106 and 0.111 for 2008 and 2009, respectively. This data form a baseline for future monitoring.

Direct and Indirect Effects

The following analyses incorporate information previously disclosed in the Aspen section discussed above. Please see that section for additional rationale and analyses.

None of the alternatives incorporates hardwood restoration treatments. In Alternative 1, there would be a slight reduction on the amount of ruffed grouse habitat as a result of the construction activities and maintenance of the ROW. The other action alternatives would not affect aspen covertype. None of the alternatives would influence the attainment of aspen Objective 201.

In summary, none of the alternatives would influence the Forest-wide population or habitat trends of ruffed grouse or the attainment of FP Objective 238a.

White-tailed Deer

The white-tailed deer was selected as a Forest Plan MIS mainly for its link to understory shrubs. Deer are mainly browsers, feeding on the tender leaders of shrubs in riparian and other areas. In spring, deer feed heavily on forbs (wild-flowers) as these become available. White-tailed deer are widely distributed throughout most of North America. They occur year-round in the Black Hills, although they tend to use areas with higher elevation in summer more than in winter. In some areas, white-tailed deer may migrate from summer range to traditional winter range starting in August and then move back in the spring. They require a diversity of habitat types including forests, meadows, and riparian areas which provide not only forage, but also solitude, hiding cover, thermal cover and conditions which facilitate escape from predators.

Hardwood forests, meadows, and riparian areas are particularly important because these are the sites that produce the most forage (e.g., aspen and various shrubs). No shrubland cover types are listed in the database describing the Analysis Area, but many areas have inclusions or understory occupied by shrubs of various species.

About 44 acres of aspen cover type occurs within the project area. Currently, about 400 acres (approximately10%) in the project area are classified as grassland/meadow covertype. No riparian areas are identified in the project area vegetation data, but a few small inclusions do occur. See the Aspen, Meadow, and Riparian sections for more information about these important white-tailed deer habitats. The Battle Creek Fire has created an abundance of foraging habitat for big game. The loss of pine overstory has increased important winter browse species (e.g., chokecherry, service berry) in the fire area. However, the fire also reduced big game ability to find solitude from disturbance and predators. For much of the area, early seral communities would dominate the area for the next 10-20 years until pine regeneration returns to the area.

White-tailed deer can be sensitive to road traffic, especially where habituation does not readily occur (e.g., roads with sporadic traffic or low speed limits). Forest Plan Guideline 3203 recognizes this by directing the Forest to provide screening cover along at least 20% of arterial and collector roads. Screening cover is defined as any vegetation, topography (e.g., rock, ridges, steep slopes), or other features that would hide 90% of a deer standing within 200' of a road. Surveys in the project area were not conducted to determine if vegetation or topography provided screening cover along collector roads. There are very limited arterial and collector roads in the project area. However, field reconnaissance along miles of road in the project area demonstrated that if sufficient screening cover from topography alone was not present, then screening cover overall was insufficient to meet this criteria. Loss of vegetative screening cover can be attributed to the Battle Creek Fire. Therefore, the project area does not meet FP Guideline 3203.

Currently, Motorized Vehicle Use Map (MVUM) indicates National Forest System Roads in the project area are closed seasonally from Dec 15 to May 15. Off-road vehicle use is prohibited yearlong. Other roads and trail in the area are closed year-long. This reduces the effects of recreation and travel on wintering deer populations.

According to the FPMER, the Black Hills white-tailed deer population increased steadily between 2000 and 2006 to 54,000 and has declined slightly each year to 43,000 in 2009. Forest-wide habitat such as aspen, bur oak, grassland, meadow covertypes, and pine SS3A and 4A provide forage for white-tailed deer. All of these have increased over the past five years. Screening cover provided by SS3C has decreased over the last five years, while cover provided by SS4C has increased over the past five years (USDA Forest Service 2010a).

Direct and Indirect Effects

None of the alternatives would include specific treatments to improve white-tailed deer habitat (e.g., hardwood/meadow restoration). All alternatives would have negligible amounts of treatments in riparian areas, and therefore would fully maintain existing riparian characteristics, but probably would not increase riparian shrubs by an appreciable amount. In the action alternatives, the occasional removal of pine from riparian habitats could increase the quality of deer foraging habitat if it resulted in more riparian growth. As shown in the Riparian section, all alternatives would maintain riparian diversity, structure and size through application of Forest Plan Standards and Guidelines. This would ensure that deer habitat relative to riparian diversity would not deteriorate. All alternatives would be consistent with riparian Objective 213.

All action alternatives would maintain or increase foraging habitat for white-tailed deer by varying degrees. Riparian areas aside, vegetation would be cleared within the ROW, maintaining early seral stage communities such as grass, forbs, shrubs, and reducing pine encroachment in those treated areas thus increasing foraging habitat for deer. Actions under Alternative 1 would clear and maintain clear the most area (13 to 22 acres) compared to the other action alternatives (see Table 3-14). Outside of the ROW, pine encroachment would continue to occur in these important habitats, and over time, deer foraging habitat quality could decrease. Alternative 1 would reduce the most cover (1.2 acres) compared to the other action alternatives (0.2 acres or less).

Disturbance due to construction activities would likely cause some deer displacement short-term. The presence of humans may cause deer to avoid quality foraging areas until the activity stops. Alternative 2 is the longest route on NFS land and would cause the most short-term and long-term

disturbance (Table 3-14). Alternative 4 is the shortest route on NFS land and would have the least short-term disturbance due to construction activities. Alternative 2 and 3 would have the most short-term effect due to line construction activities occurring along preferred foraging areas (bottomlands and meadows), but there should be no long-term effects due to the presence of the line structure. Effects of disturbance to white-tailed deer may be exacerbated if the disturbance occurs during critical winter months causing white-tailed deer to flee, especially if deer energy reserves are already low. This un-expected expenditure of energy may affect the ability of individual deer to either survive the winter or their ability to reproduce. Design criteria and timing restrictions would reduce the effects of disturbance on over-wintering deer. Long-term, white-tailed deer eventually become habituated to structures and facilities such as fences and electric power lines. Line maintenance activity would have the same short-term effects on white-tailed deer.

The physical presence of the transmission line structure would likely cause little to no long-term avoidance of the vicinity by white-tailed deer. However, the corona (noise) effect of the flow of electricity may cause some propensity toward avoidance and cannot be separated from the over-all effect of the physical structure. The longer the line (route), the more habitat is potentially, adversely effected.

Because less than 0.1% of the Forest-wide big game winter habitat would be affected under any alternative, none of the alternatives would influence the Forest-wide population trend, Forest-wide habitat trend, or attainment of Objective 238a for white-tailed deer.

Species of Local Concern (SOLC)

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 Black Hills National Forest can be found in FSM 2620, Supplement r2_bh_2600-2011-1. The Phase II Amendment FEIS (USDA Forest Service 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 the project. The analysis for SOLC is tiered to that document, which is summarized in each species section. The most relevant Forest Plan objective for SOLC is Objective 221 which directs the BHNF to "conserve or enhance habitat" for SOLC and to maintain long-term persistence forest-wide. There are no specific standards or guidelines to further direct attainment of the objective for the SOLC group as a whole. However, species-specific guidance would be addressed as appropriate below. If a species is known or suspected to occur in the project area or if suitable but unoccupied habitat is present or adjacent to the area, then the species has been evaluated with respect to effects of the proposed project activities (See Table 3-17). The following SOLC species where analyzed further regarding the project:

Black-and-White Warbler	Mountain Goat	Pygmy Nuthatch
Cooper's Hawk	Northern Flying Squirrel	Bighorn Sheep
Meadow Jumping Mouse	Northern Saw-whet Owl	Sharp-shinned Hawk
Myotis Bats and Hoary	Butterflies	Snails

Effects disclosures typically center around changes to habitat, because this is invariably where the effects to wildlife are most certain and pronounced. Although project activities could cause injury or mortality to SOLC, the likelihood of such effects are low, and at most, only a few individuals would be affected (i.e., there would be no potential to affect populations).

Black-and-White Warbler

The Black Hills are at the western edge of the black-and-white warbler's distribution in the US, and support a small population that is disjunct from others (Kricher 1995). The species is considered uncommon and localized in the Black Hills (Tallman et al. 2002). According to the FPMER, the species had been observed on 33 occasions during formal bird monitoring efforts from 2001 through 2009. Two observations in ponderosa pine were recorded in 2009. Approximately 2/3 of the warbler sites were within the Black Hills proper and were almost exclusively at low elevations near the periphery of the Hills below 4,700 ft. elevation, and all but one were within two miles of the Forest boundary. Most were in riparian zones and/or drainages. The vegetative composition of these riparian habitats have not been analyzed, but it is suspected that bur oak, green ash, and other hardwoods are important, as is a dense understory of shrubs such as ninebark, chokecherry, hawthorn, and currants.

Small portions of the project area fit the typical habitat description above. The project area lies along the eastern boundary of BHNF, and most of the area is below 4,700' elevation. Rockerville Gulch has a semblance of riparian characteristics with aspen and bur oak and is shrubby in places. Other hardwoods can be found in more mesic site conditions and along draw bottoms. Therefore, it is possible that this provides some suitable habitat for black-and-white warblers.

Direct and Indirect Effects

The following analyses incorporate information previously disclosed in the Riparian section discussed above. Please see that section for additional rationale and analyses.

Project activities would be limited to the necessary vegetation clearing, slash treatment and conductor stinging (pulling rope through pulleys to string the conductor lines). All alternatives would have no pole pads installed in riparian areas; would fully maintain existing riparian characteristics. All alternatives would follow Forest Plan guidance set for riparian areas. Alternative 2 would treat the most acres (2.5) in bur oak; Alternative 1 would treat 1.1 acres. Alternatives 3 and 4 would treat less than one tenth acre each in bur oak. Construction activities and line clearing have the potential to cause mortality to individuals by crushing of eggs/nests and young, but effects would be short-term and isolated to treated areas. Line maintenance in suitable habitat may reduce habitat structure long-term.

All action alternatives would have little to no influence on warbler habitat. None of the alternatives would notably decrease the amount of these species habitat at the Forest-wide scale. Forest Plan direction would maintain riparian diversity, condition, and trend, therefore Objective 213 would be met. It appears that all alternatives would be consistent with Objective 221; therefore these species are likely to persist.

Cooper's Hawk

The Cooper's hawk is uncommon, but well-distributed in the Black Hills. The Forest's bird monitoring program has recorded the species in all of the major habitat types here, with no obvious affinity for any one. No observations were made in 2009 field season (USDA Forest Service 2010a).

The Cooper's hawk, a habitat generalist typically requires wooded areas for nesting. The bird nests in riparian, conifer, and aspen habitats. Range-wide, most pairs nest in patches of mature forest with moderate to high (60 to 90%) canopy closure near openings. Nest tree diameters are typically smaller than those used by nesting goshawks, larger than what is used by sharp-shinned hawks, and larger than what is randomly available. This coincides most closely with SS4B and 4C. The hawk hunts in a diversity of habitats, taking a variety of small to mid-sized birds and mammals. In general, the species is more tolerant of human presence and habitat fragmentation than either the goshawk or the sharp-shinned hawk. Adequate nesting habitat and prey availability are thought to be the most limiting factors to species persistence.

There are approximately 359,159 acres of SS4B and 4C pine on the Forest. The project area currently contains about 622 acres, which is less than 0.1% of the Forest-wide habitat, and about 16% of the project area. Acres of both SS4B and 4C exceed Forest Plan structural stage objective (5.4-206) for pine habitat forest-wide (USDA Forest Service 2011a).

Raptor nest walk-thru surveys were conducted in 2010 by R. Hoverman and W. Fertig. Additional surveys were conducted during the nesting season by L. Conroy in 2011. No Cooper's hawks or Cooper's hawk nests were observed (USDA Forest Service 2011b). Cooper's hawks are suspected to nest in the Elephant Trunk area (Rockerville Gulch). One old nest is recorded, but has not been active for some years. Records indicate a Cooper's hawk has been seen in the vicinity of the proposed corridor in the past. Attempts to locate the recorded nest during 2010 walk-thru surveys were unsuccessful.

Direct and Indirect Effects

The following analyses incorporate information previously disclosed in the section regarding ponderosa pine structural stages discussed above (see Table 3-15).

The No Action alternative would have no direct effect on the amount of SS4B and SS4C pine habitat. Alternative 1 would result in a loss of about 4.2 acres of Cooper's nesting habitat as a result of line construction and ROW clearing. Alternatives 2, 3, and 4 each would result in a loss of less than three acres. These alternatives would reduce the amount of nesting habitat by less than 0.7% in the analysis area. Foraging habitat would increase by varying degrees as a result of ROW clearing and maintenance.

Standard 3204 directs the Forest to protect known raptor nests. Project design criteria would protect newly discovered Cooper's hawk nest if project activities may affect nest or nesting activity. Design criteria for pole and conductor configuration would meet or exceed criteria for raptor protection which should minimize potential for electrocution. Potential for collision with powerline structures and electrocution could still occur (see Wildlife Report held in project file, Appendix 3-3).

All action alternatives would have little to no influence on Cooper's hawk habitat. None of the alternatives would notably decrease the amount of this species habitat at the Forest-wide scale. Forest Plan direction would maintain ponderosa pine structural stage diversity therefore Objective 5.4-206 would be met. It appears that all alternatives would be consistent with Objective 221; therefore these species are likely to persist.

Mountain Goat

The mountain goat is distributed from southeast Alaska through the Canadian Rockies to various mountain ranges in the northern US. The goat was introduced to the Black Hills in 1924. The mountain goat is typically found in alpine and subalpine habitats, which straddle natural tree line (i.e., the highest elevation at which trees can grow). Neither of these high elevation habitats (or a tree line) exists in the Black Hills. Here, the species occupies some of the highest and rockiest habitats available to it, including pine and spruce covered slopes.

Mountain goats utilize a variety of forage plants in the Black Hills, including chokecherry, buffaloberry, grasses and sedges, aspen, serviceberrry, wild rose, willow, and hazel (USDA Forest Service 2005). Usually the most available forage, rather than the most palatable forage is consumed. Regardless, most of the forage plants listed above require at least moderate levels of sunlight, such as is found under open or moderately open tree canopies. Limiting factors for this species include lack of preferred habitat and pine encroachment into foraging habitat.

The bulk of the mountain goat population in the Black Hills occurs largely within the Black Elk Wilderness and the Norbeck Wildlife Preserve, but also have moved to other suitable areas outside of the granitic core. The SDGF&P 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 300-400 animals by 1971, but a 2007 survey suggests a 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 (USDA Forest Service 2010a). The Forest 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. Steep terrain in the project area could provide habitat for this species. Mountain goats have been documented in the Battle Creek Drainage and it is likely that they may utilize the project area (USDA Forest Service 2010b). The SDGF&P's recommendation for improving goat habitat is to remove as many trees as possible, thereby increasing potential growth of goat forage plants. Desirable structural stages are 1, 2, 3A, and 4A. Mountain goats are sensitive to disturbance, depending on the perceived predator threat. Recreationists, especially rock climbers have been attributed to causing mortality by loss of footing during escape.

Direct and Indirect Effects

None of the alternatives would include specific treatments to improve mountain goat habitat (e.g., grassland restoration). NRIS data indicates the project area contains more than 2,266 acres of structural stages 1, 2, 3A, and 4A and approximately 400 acres of other covertypes, providing forage grasses, sedges, and shrubs for this species.

All alternatives would remove trees within the ROW, increasing mountain goat habitat by varying degrees. Alternative 1 would add about 4.8 acres of these preferred stages. The other action

alternatives add slightly less. Alternative 1 and 2 have the highest potential to affect mountain goat use areas due to their proposed routes being closest to known use areas and steep terrain. Disturbance caused by line construction and maintenance may cause mountain goat to temporarily leave suitable habitat. There is no information on whether the noise from the powerline would affect movement and dispersal patterns of mountain goats. It is assumed that mountain goats would eventually habituate to the presence of the powerline structure and the noise. However, it is doubtful that the goats would take advantage of additional forage acres, due to their proximity to areas of human activity.

The no action alternative would neither increase nor decrease the amount of mountain goat habitat that is currently present. None of the alternatives would notably decrease the amount of this species habitat at the Forest-wide scale. It appears that all alternatives would be consistent with Objective 221; therefore these species are likely to persist.

Northern Flying Squirrel

The flying squirrel resides in forested habitats over much of Canada and the western US (Higgins et al. 2000). It has been captured at multiple locations throughout the Black Hills, suggesting it may be widely distributed here (Duckwitz 2001, Krueger 2004, Hough 2008, Hough and Dieter 2009). The species is nocturnal, and has been found in a variety of forested sites, including pure ponderosa pine and pine mixed with aspen, birch, or spruce. Flying squirrels eat a varied diet, including fungi, lichens, seeds, insects, and bird eggs (Higgins et al. 2000). They nest and shelter in cavities of large trees and snags and in small structures (dreys) that they build from twigs, bark and roots.

Squirrel habitat is provided by mature pine stands that either have relatively open canopies (i.e., all SS4A and SS4B) or are characterized as having very large tree size (i.e., some SS4A, SS4B, and SS4C, and all SS5). Also important is relative close proximity to more mesic sites or riparian where flying squirrels may den in hardwood trees and forage in the mature and over-mature pine (Hough and Dieter 2009). These habitat components, as well as snag density, are the subject of the following effects analysis for the northern flying squirrel.

Within the project area, there are approximately 662 acres of SS4A and 4B. NRIS data show 24.5 acres of very large trees, 2.2% of the area pine cover type. This is slightly more than 0.1% of very large tree acres in MA 5.4. It should be noted that the large tree acres include a double count of some acres already given for SS4A and SS4B. Therefore, it is not accurate to sum the two types of habitat to determine the total acres of squirrel habitat. Snags are very lacking at 0.4 snag per acre. Due to recent large fires and bark beetle outbreaks, the BHNF is exceeding Forest Plan Objective 211 (snags) despite the imbalance of structural stage composition and areas which lack them (USDA Forest Service 2011a).

Direct and Indirect Effects

The following analyses incorporate information previously disclosed in the Environmental Consequences section regarding ponderosa pine structural stages (see Table 3-16) and in the Snags and Very Large Tree sections discussed above. See those sections for additional rationale and analyses.

All action alternatives would have little to no direct effect on the amount of very large tree habitat, snags, or open, mature forests. Alternative 1 would reduce SS4A, 4 B and 4C habitat by approximately 5.6 acres. The other action alternative would reduce this habitat by even less. Alternative 1 would reduce very large tree habitat by 0.2 acres. The each of the other action alternatives would reduce very large tree habitat by less than 0.1 acres.

As disclosed in the Snag section, the action alternatives would not notably affect snags except to potentially remove snags and decrease snag recruitment in or near the ROW. All alternatives would have little to no influence on the amount of flying squirrel habitat at the Forest-wide scale. Forest Plan direction would maintain ponderosa pine structural stage diversity therefore Objective 5.4-206 would be met. It appears that all alternatives would be consistent with Objective 221; therefore, these species are likely to persist.

Northern Saw-whet Owl

The saw-whet owl is distributed across much of the northern US, western US, and southern Canada. It is one of the most common forest-dwelling owls across most of its range (Cannings 1993). There are few documented observations of the saw-whet in the Black Hills, but this may be more attributable to the bird's nocturnal habits than to actual demographics (USDA Forest Service 2010a). No observations were recorded by White et al. (2010) during the 2009 field season. Drilling (2010) found that saw-whet owls are the most common and widespread owl in the Black Hills, detecting them at 15% of all survey points and 93% of all routes, and at all elevations and in all months.

The saw-whet is a habitat generalist, typically found in coniferous or riparian forests. The species nests in snag cavities originally excavated by flickers and other large woodpeckers. They tend to nest in mature forest. The saw-whet owl often forages along forest edges, where it preys upon small mammals and birds. The availability of mature forests (SS4A, B, and C) and nesting cavities (i.e., snags) appear to be the most limiting factors for this species.

Forest-wide, there are approximately 687,470 acres of mature conifer forest (pine and spruce) that could provide nesting habitat (USDA Forest Service 2010a, 2011a). Within the project area, there are about 1090 acres of SS4A, 4B and 4C in pine habitat and no SS5 or spruce. This is less than 0.2% of the Forest-wide total. No saw-whets or their nests have been observed. However, one was found dead on US Hwy 16 near the Rockerville substation.

Direct and Indirect Effects

The following analyses incorporate information previously disclosed in the Environmental Consequences section regarding ponderosa pine structural stages (See Table 3-16) and the Snags and Very Large Tree sections discussed above. Please see those sections for additional rationale and analyses.

All alternatives, including No Action, would have little to no direct effect on the amount of mature pine habitat or snags. Alternative 1 would reduce SS4A, 4B and 4C habitat by approximately 5.6 acres. The other action alternative would reduce habitat by even less. Alternative 1 would reduce very large tree habitat by 0.2 acres. The each of the other action alternatives would reduce very large tree habitat by less than 0.1 acre. As disclosed in the Snag

section, the action alternatives would not notably affect snags, except to potentially remove snags and decrease snag recruitment in or near the ROW. These owls may use the transmission line corridor for foraging, taking advantage of the edges in cover types. Design criteria for pole and conductor configuration would meet or exceed criteria for raptor protection which should minimize potential for electrocution. Potential for collision with powerline structures and electrocution could still occur (see Wildlife Report, Appendix 3-3).

All alternatives would have little to no influence on the amount of northern saw-whet owl habitat at the Forest-wide scale. Forest Plan direction would maintain ponderosa pine structural stage diversity, therefore Objective 5.4-206 would be met. It appears that all alternatives would be consistent with Objective 221; therefore these species are likely to persist.

Pygmy Nuthatch

Pygmy nuthatch distribution is patchy throughout much of western North America from southern British Columbia to central Mexico. The Black Hills are at the northeastern edge of the nuthatch's range (Kingery and Ghalambor 2001). In the Black Hills, the species is a rare, but regular and widespread year-round resident (USDA Forest Service 2010a).

Studies across the nuthatch's range show that the bird is often associated with old growth or mature pine stands. Trees and snags that are very large appear to be especially important. Very large trees are the only source of very large snags, and very large snags are preferred by nuthatches for nesting and roosting cavities (Kingery and Ghalambor 2001). Monitoring in the Black Hills has documented the nuthatch in a variety of ponderosa pine habitats, in white spruce forests and a recently burned area. Although individuals have been observed in late successional pine, the species does not appear to be limited to this habitat type in the Black Hills. Three were observed in the Black Hills in 2009 (USDA Forest Service 2010a). No pygmy nuthatches or their nests have been observed in the project area, but have been documented in surrounding areas.

Mature pine forests with abundant big trees and snags provide good habitat in the Black Hills. This equates to stands having very large tree size (>16" dbh) in SS4A, 4B, and 4C. It also includes SS5, which by definition is dominated by very large trees. There are approximately 227,138 acres matching this description in the five main MAs, Forest-wide (USDA Forest Service 2011a). Approximately 24.5 acres occur within the project area.

Direct and Indirect Effects

The following analyses incorporate information previously disclosed in the Environmental Consequences section regarding ponderosa pine structural stages (see Table 3-17) and the Snags and Very Large Tree sections discussed above. Please see those sections for additional rationale and analyses. Individuals may be killed if nest trees are removed during the breeding season. All alternatives, including the No Action, would have little to no direct effect on the amount of very large tree habitat, snags, or open, mature forests. Alternative 1 would reduce SS4A, 4B, and 4C habitat by approximately 5.6 acres. The other action alternative would reduce habitat by even less. Alternative 1 would reduce very large tree habitat by 0.2 acres. Each of the other action alternatives would reduce very large tree habitat by less than 0.1 acres.

The action alternatives would not notably affect snags except to potentially remove snags and decrease snag recruitment rates in the immediate vicinity of the ROW. All alternatives would have little to no influence on the amount of pygmy nuthatch habitat at the Forest-wide scale. Forest Plan direction would maintain ponderosa pine structural stage diversity therefore, Objective 5.4-206 would be met. It appears that all alternatives would be consistent with Objective 221; therefore these species are likely to persist.

Rocky Mountain Bighorn Sheep

The Rocky Mountain Bighorn Sheep was recently added to the R2 Sensitive species list. The bighorn sheep management area is located just north of the Rockerville substation and due to the steep rocky terrain of the project area habitat may be suitable for bighorn sheep.

Direct and Indirect Effects

To reduce redundancy, most life history, current condition, and predicted effects information are provided in the Project Biological Evaluation document, a summary of which is in Appendix D of this document. All alternatives would be consistent with Forest Plan standards and guidelines, and Objective 221, therefore this species is likely to persist.

Sharp-shinned Hawk

The sharp-shinned hawk is widely distributed throughout much of North America (Bildstein and Meyer 2000). The species also occurs widely within the Black Hills, but here, it appears to be one of the rarest hawks. From 2001-2009, the sharp-shinned hawk was detected only 24 times during the Forest-wide bird monitoring program (USDA Forest Service 2010a). The observations occurred in nearly all habitat types sampled, indicating no obvious preference for any one habitat.

Sharp-shinned hawks nest almost exclusively in conifers. Conifer stands of young age, high tree density and high canopy closure provide important breeding habitat range-wide. This equates to ponderosa pine and white spruce in structural stages 3B and 3C. It is thought that quality foraging habitat is provided where a variety of different vegetation conditions are present near nest stands because the hawk preys upon numerous species of small animals (primarily birds), and no single prey species or habitat is most important. Mature aspen may be particularly important foraging habitat due to the high wildlife diversity that it supports.

According to the FPMER, there are approximately 94,609 acres of white spruce and pine in structural stages 3B and 3C, Forest-wide (USDA Forest Service 2010a, 2011a). Approximately 380 acres of SS3B and SS3C pine occur within the project area. This is approximately 0.4% of the Forest-wide total. Except for SS3C in MA 5.4 and 5.43 (Big Game and Resource Production), existing amounts of SS3B and SS3C (combined) pine habitat are below Forest Plan structural stage objectives for all MAs. The overall deficiency suggests that sharp-shinned hawk habitat is expected to increase at the Forest-wide scale with full implementation of the Forest Plan. However, given the current Forest-wide deficiencies in structural stages that would grow into SS3B or SS3C quickest (i.e., stages SS2 and SS3A), this may take a lengthy time to achieve.

Raptor surveys were conducted within the project area in 2010 and 2011 (USDA Forest Service 2011b). No nests were found and no sharp-shinned hawks observed.

Direct and Indirect Effects
The following analyses incorporate information previously disclosed in the Environmental Consequences section regarding ponderosa pine structural stages (see Table 3-17).

All alternatives would have little effect on the amount of SS3B or 3C conifer habitat. Alternative 1 would result in a loss of about 4.9 acres of sharp-shinned hawk nesting habitat as a result of line construction and ROW clearing. Alternatives 2, 3, and 4 each would result in a loss of nesting habitat (<1 acres) by varying degrees. These alternatives would reduce the amount of nesting habitat by less than 0.1% of the Forest-wide total. Foraging habitat would increase by varying degrees as a result of ROW clearing and maintenance.

Standard 3204 directs the Forest to protect known raptor nests. Project design criteria would protect newly discovered sharp-shinned hawk nest if project activities may affect nest or nesting activity. Design criteria for pole and conductor configuration would meet or exceed criteria for raptor protection which should minimize potential for electrocution. Potential for collision with powerline structures and electrocution could still occur (see Appendix 3-3 of the Wildlife Report).

All action alternatives would have little to no influence on sharp-shinned hawk habitat. None of the alternatives would notably decrease the amount of this species habitat at the Forest-wide scale. Forest Plan direction would maintain ponderosa pine structural stage diversity therefore Objective 5.4-206 would be met. It appears that all alternatives would be consistent with Objective 221; therefore, these species are likely to persist.

Bats (Long-eared, Long-legged, Northern, and Small-footed Myotis)
Each of these bat species have similar limiting factors, response to management actions, and applicable Forest Plan direction. Because of this, they are summarized here as a group, with major similarities and differences discussed. All four SOLC bats have range-wide distributions that are much bigger than the Black Hills, encompassing portions of both Canada and the United States. The ranges of all but one (northern myotis) also include parts of Mexico. All appear to be widely distributed throughout the Black Hills region (Tigner and Stukel 2003). Abundance varies between the species. The long-legged myotis may be the most common in the Black Hills and the long-eared myotis is probably the most uncommon. All four bats use montane coniferous forests in the Black Hills and in other parts of their ranges. Mature conifer forests with abundant big trees and snags provide good tree roosting habitat in the Black Hills. This equates to pine stands having very large tree size (>16" DBH) in SS4A, 4B, 4C, and 5 and spruce communities. Approximately 817 acres of SS4 occur within the project area. No SS5 or spruce occurs in the project area (USDA Forest Service 2011a). This is less than 4.1% of the Forest-wide total for very large trees. Roosts, considered the primary limiting factor, include very large trees (live and dead), caves, mines, and rocks. Roosts provide relatively stable temperatures and moisture patterns compared to nearby external environments (Tigner and Stukel 2003, USDA Forest Service 2005). Flying insects, especially moths and beetles, are important prey items for these species.

Grasslands and hardwoods provide for diverse understory components that attract prey species. Water sources, especially ponds are important to bats in that they attract abundant numbers of prey species.

White-nose syndrome (WNS) is a disease responsible for unprecedented mortality in 45 species of hibernating bats in the northeastern United States. This previously unknown disease has spread very rapidly since its discovery in January 2007, and poses a considerable threat to hibernating bats throughout North America. The Fish and Wildlife Service has drafted a National Plan to aid in detection of WNS and conservation efforts (USDI Fish and Wildlife Service 2011a). In 2010, the Forest Service temporarily closed to the public, all caves and abandoned mines on NFS lands within the five-state Rocky Mountain Region to help slow the spread of WNS. Currently, little is known about WNS except that the fungus (*G. destructans*) is a common factor. To date, hibernating bat species that are considered "cave species" have mostly been affected by WNS. Northern Myotis bats have been documented as being affected WNS. In January 2010, the US Fish and Wildlife Service was petitioned to list the northern myotis as endangered and threatened. On June 29, 2011, the US Fish and Wildlife Service announced their 90-day finding that listing of this species may be warranted (USDI Fish and Wildlife Service 2011b). It is unlikely that the proposed actions would have any impact on the spread of WNS.

Caves and mines (collectively termed 'caverns' hereafter) are other important roost resources in the Black Hills. Although caverns are not as common as trees, they provide communal opportunities, meaning that any one suitable structure has the potential to host a greater number of bat species and individuals than any one tree typically does. Currently, there are three caverns known to house bats within the project area. Elephant Cave has been surveyed and a Townsend's big-eared bat has been found. The other two identified caves could not be located during field surveys due to poor location information (Township, Range, Section, quarter section).

Direct and Indirect Effects

The following analyses incorporate information previously disclosed in the Environmental Consequences section regarding ponderosa pine structural stages, Table 3-16 and the sections on Snags and Very Large Trees discussed above. See those sections for additional rationale and analyses. All alternatives would have little effect on the amount of very large tree habitat or snags.

All action alternatives pass west, but within 500 feet of Elephant Cave, located in the bottom of Rockerville Gulch. This cave has been surveyed for bat use and is considered a day/night roost, but there is no evidence it is being use as a hibernation/maternity roost (USDA Forest Service 2010b). The cave is easily accessed by the public and disturbance is high.

It is difficult to determine the need to treat vegetation in the ROW in the vicinity of this cave. Poles would be set at approximately mid-slope or higher on opposite sides of Rockerville Gulch with the conductors spanning the gulch well above trees and other vegetation. Some vegetation manipulation may be required in the ROW within the 500 foot buffer area, potentially impacting the cave microclimate. BHEC would be required to consult and coordinate with BHNF biologists to develop a mitigation strategy. Possible considerations may include:

- Where vegetation removal is minor and little change to the cave microclimate is expected, no mitigation is required during construction and subsequent maintenance;
- Where vegetation removal and/or disturbance from construction activities is expected to result in impacts above tolerance levels for cave inhabitants, the proposed route for the action alternative could be moved to the west sufficient to clear the 500 foot buffer. This

would likely result in little to no immediate change in the microclimate of the cave due to any vegetation manipulation in the ROW.

Two other small caverns are known to exist in the south ½ of the project analysis area, approximately one east and one west of Alternative 3 route. These caves were not relocated during field reconnaissance so only the approximate location is discussed. Whether either or both of these caverns provide hibernation or maternity roosts is not known as no surveys have been done. From aerial photography (see Wildlife Map 1, Appendix E), the general locations of both caverns appear to have been burned over during the Battle Creek Fire, likely resulting in a large change to their microclimates. The southernmost cavern, west of the nearest route (Alternative 3), is more than 500 feet from the ROW and is shielded by topography. The cavern east of the nearest route (Alternative 3) is likely within 500 feet and an estimated 200 feet higher in elevation than where ROW clearing may occur. Both sites encompassing the general locations of these caverns are currently classed as habitat SS1 and the ROW vegetation may not require clearing in the year of implementation. As vegetation on burned sites increases in height and density, vegetation manipulation may be required in the future (10-20 years).

Vegetation removal near cavern entrances could potentially change temperature or air flow patterns within them (Tigner and Stukel 2003). Standard 3102 recognizes this by mandating that microclimates be maintained in bat roosts. Standard 3207 restricts vegetative changes within 500 feet of cavernous maternity roosts and hibernacula unless the purpose is to improve bat habitat, or unless there are other features (e.g., topography) that would protect the openings from disturbance. Implementing Standard 3207 would serve two purposes: ensuring that microclimates are maintained, and preventing disturbance to roosting bats. If topographical or other features are used in lieu of a 500' buffer, it is recommended that a wildlife biologist evaluate the site and make the final determination of where management activities can occur. This would ensure that the standards are applied properly and that there are no effects that were not disclosed in this document.

Bat roosts would be protected and perpetuated in all alternatives through design criteria and mitigation measures. Forest Plan direction would maintain ponderosa pine structural stage diversity therefore Objective 5.4-206 would be met. It appears that all alternatives would be consistent with Objective 221; therefore these species are likely to persist.

Invertebrates (Atlantis fritillary, Tawny Crescent, Striate Disc, Frigid Ambersnail, Callused Vertigo, Mystery Vertigo)

Threatened, endangered, and candidate invertebrates are discussed in the BA/BE, a summary of which is in Appendix D. Three federally Endangered invertebrate species are known or reported from South Dakota: the American burying beetle (*Nicrophorus americanus*), scaleshell mussel (*Leptodea leptodon*), and Higgins' eye mussel (*Lampsilis higginsi*). One other species from the state, the Dakota skipper (*Hesperia dacotae*), is currently a Candidate for potential listing under the US Endangered Species Act (ESA). None of these species are known to occur in Pennington County, South Dakota, or the Black Hills region, and none are expected to occur in the Rockerville project area.

Additionally, three of the eight invertebrate species designated as Sensitive in 2009, by the US Forest Service's Rocky Mountain Region occur in Black Hills National Forest. Sensitive species are considered vulnerable to local extirpation due to predicted downward trends in population size and density or habitat conditions. These species could potentially be listed as Threatened or Endangered under the US Endangered Species Act if management actions by the Forest Service result in significant additional population or habitat losses. These are Cooper's Rocky Mountain snail (*Oreohelix strigosa cooperi*), butterfly ottoe skipper (*Hesperia ottoe*) and regal fritillary (*Speyeria idalia*). More information and the analysis for these species can be found in the Rockerville BA/BE and the BA/BE Summary in Appendix D.

Six invertebrate taxa are considered "Species of Local Concern" by the Black Hills National Forest. Unlike regional Sensitive species, the species of local concern may be vulnerable to extirpation on the Black Hills National Forest, but are not considered at risk range-wide and none would qualify for listing as Threatened or Endangered under the Endangered Species Act (ESA).

Two of the invertebrates of local concern are butterflies. Atlantis fritillary (*Speyeria atlantis pahasapa*) is endemic to the Black Hills, where it typically occurs in riparian areas, moist meadows, canyons, and boreal forests. Larvae of *Speyeria* feed exclusively on violets (*Viola* spp.), and so the distribution of the species may be limited to areas where violets are well established. The South Dakota Natural Heritage Program (2009) reports a population in the vicinity of Lakota Lake, approximately seven air miles south of Rockerville. Comparable habitats probably are not present within the proposed Rockerville powerline project area, particularly after the 2002 Battle Creek fire. The tawny crescent (*Phycoides batesii*) occurs widely across Canada, the Rocky Mountains, and eastern North America, but is disjunct in the Black Hills of South Dakota and Wyoming. This species occurs in meadows, along stream bottoms, and moist woodlands. Tawny crescent is known from the Mystic Ranger District in the Black Hills National Forest and suitable habitat probably exists in the Rockerville powerline area.

The other four invertebrates of local concern are all land snails. The callused vertigo (*Vertigo arthuri*), mystery vertigo (*Vertogp paradoxa*), frigid ambersnail (*Catinella gelida*), and striate disc (*Discus shimekii*) occur in undisturbed forests dominated by white spruce or ponderosa pine associated with limestone. These species tend to occur with well-developed leaf duff or downed woody debris and in shady sites with a dense understory of vegetation. They are all susceptible to disturbances that increase exposure to sunlight, compact soil, or reduce understory cover, such as wildfire, road-building, trampling by livestock, or timber harvest. No Frest (Frest and Johannes 2002) sites are located in the project area. Although limestone substrate is found in the project area, suitable habitat for these species in the vicinity of Rockerville is probably limited and fragmented or lacking, especially after the 2002 Battle Creek fire burned through wooded limestone canyon habitats over much of the area.

Frigid ambersnail was initially petitioned for listing under the Endangered Species Act in 2007 by the WildEarth Guardians. In June 2011, the US Fish and Wildlife Service issued a twelve-month finding on this petition and presented evidence questioning the taxonomic validity of *Catinella gelida*, and thus its qualifications for listing under the ESA (US Fish and Wildlife Service 2011c). Originally, *C. gelida* was described as a fossil from the Pleistocene that was later reported as being extant in South Dakota and Wisconsin (Frest and Johannes 2002).

Recently, some snail taxonomists have questioned whether specimens identified as *C. gelida* are the same as the fossil forms, represent an existing and more widespread species, or still need to be named as a new taxon. Until the taxonomic issues are resolved, the US Fish and Wildlife Service will not consider the Frigid ambersnail as a potential candidate for listing.

Alternative 1 Proposed Action

Direct and Indirect Effects
Alternative 1 would affect the most NFS land and would mostly be located along limestone ridges on Forest land, preferred by most snails. Potential direct effects to invertebrate species are mortality caused by crushing, trampling, and loss of eggs. Disturbance as a result of construction activities could increase the potential for invasive species spread and expansion that could out-compete native plant communities, affecting nectar and host plant species used by SOLC butterflies. Butterfly species could potentially benefit from the powerline project due to maintenance of early to mid-seral ecotone habitat and grassland conditions within the powerline corridor, provided that herbicides detrimental to their host and nectar plants are not used.

If present in the area, land snails might be negatively impacted by powerline construction through wooded habitats and colonies long-term. Each of these species is dependent on unfragmented, mesic forested limestone canyon habitats, which are uncommon in the Rockerville area following the 2002 wildfire (Fertig 2010). Some potential habitat might still exist, however, in the vicinity of the Elephant Trunk, although this area has extensive roads and ongoing mining and quarrying activity. Powerline construction and maintenance of the corridor could further fragment remnant snail colonies if they survived the effects of the wildfire. Riparian habitat and springs would not be affected by any of the action alternatives.

Indirectly, construction and maintenance of the powerline corridor could help spread noxious weed species into the area that would, if established, potentially out-compete native prairie plants used as hosts or nectar species for butterflies or their caterpillars. Cleaning vehicles and construction equipment before site visits could reduce this risk. Use of herbicides to control noxious weeds in the 40 foot powerline corridor could have negative impacts on food plants of rare butterflies.

Alternatives 2 and 3

Direct and Indirect Effects
Direct and indirect effects to invertebrate species would be similar to those discussed in Alternative 1. The route of Alternative 2 largely differs from that of Alternative 1 in following valley bottoms rather than ridge crests in the area from the Neck Yoke Road south to the vicinity of Deadman Gulch. Alternative 2 bypasses most of the potential limestone ridgecrest but would more likely affect butterflies (if present). Alternative 3 initially follows the same route as Alternative 2 before heading southwest through a small drainage across Sections 30 and 31 of Township 1S Range 7E. This part of the route cuts between two parallel NW-SE trending limestone ridges that might have potential habitat for snails and butterflies. Both of these alternatives would affect NFS land more than Alternative 4, but slightly less than Alternative 1. Valley bottoms with unburned ponderosa pine forest or hardwoods on limestone and with densely vegetated understories could provide habitat for several SOLC invertebrates due to

deeper soil profiles, more developed litter layer and moister site conditions. The bottomland habitat is primarily moist meadows dominated by smooth brome, Kentucky bluegrass, and other pasture grasses, or bur oak woodland suitable for butterfly host plants and snails.

Alternative 4

Direct and Indirect Effects
Direct and indirect effects to invertebrate species would be similar to those discussed in Alternative 1. The private land corridor was surveyed only along roads and other areas of public access. This area is already sufficiently fragmented that it is unlikely to provide sufficient amounts of undisturbed grassland for rare prairie butterflies, or undisturbed, rich forests to support populations of rare land snails.

The private land route largely follows existing roadways. Roadsides may contain populations or potential habitat for noxious weed species that might spread.

Alternative 5 No Action

Direct and Indirect Effects
Under the No Action Alternative, there would be no direct effects (either negative or beneficial) to any R2 Sensitive or Species of Local Concern invertebrate species since the proposed powerline construction project would not occur. Ongoing activities, such as recreation, road maintenance, grazing, and fire suppression would continue as directed by the Forest Plan. The No Action Alternative would maintain existing invertebrate species habitat, although over time there may be indirect effects that cause changes in habitat conditions (such as changes in the composition of vegetation from succession, lack of disturbance, or changes from wildfire or insect outbreaks). These changes may eventually increase or decrease the amount of suitable habitat for invertebrate species of management concern.

All action alternatives would have little to no influence on SOLC invertebrate habitat. None of the alternatives would notably decrease the amount of these species habitat at the Forest-wide scale. All standards and guidelines would be followed in all action alternatives. Furthermore, it appears that all alternatives are consistent with Objective 221, which is to conserve or enhance habitat for SOLC invertebrate species. Therefore, persistence of SOLC invertebrates would not be affected by any alternative of the project.

Migratory Birds

Osprey are known to use electric powerline/transmission line pole structures for nesting locations. In the recent past, BHEC, in cooperation with BHNF, has voluntarily provided nesting structures and physically moved osprey nests from pole structures (e.g., cross-arms between two poles) to these new nesting structures where the need occurred (USDA Forest Service 2011c). This relationship is expected to continue and would continue to reduce potential electrocution incidents for this species under the action alternatives, both short-term and long-term. However, the construction of a new transmission line would incrementally add to risk of raptor collision and electrocution, both short-term and long-term.

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, and the USFWS list of Birds of Conservation Concern (BCC; USDI Fish and Wildlife Service 2008). All of these sources and their respective species of concern except the BCC have been examined elsewhere in this or other specialist reports.

The BCC list includes 28 species that occur in the conservation region that includes the Black Hills. All but one of the species do not need to be addressed here because: 1) they have another status designation that is already included in this document or the BA/BE (e.g., MIS, SOLC, sensitive), or 2) no habitat exists for them in the project analysis area. The red-headed woodpecker is the sole species remaining, and it is evaluated below. See Wildlife Report Appendix 3-4 for the full list and specific disposition of all species.

Red-headed Woodpecker

This species is a habitat generalist over much of its range. In the Black Hills, it would likely favor open oak woodland, open riparian areas, upland meadows and woodland opened by fire, insects or disease (Smith et al. 2000). Rock Mountain Bird Observatory (2011) data indicates red-headed woodpeckers have been observed in the Black Hills National Forest 143 times between 2001 and 2009, mostly in recently burned habitats. The species nests in cavities it creates in large snags and generally favors areas with good mast crops, especially in the winter. It is the most omnivorous of the North American woodpeckers (Smith et al. 2000). The population of this species and many others linked to woodland and/or prairie habitat is in decline (Saurer et al. 2011).

Direct and Indirect Effects

The following analyses incorporate information previously disclosed in the Environmental Consequences section regarding ponderosa pine structural stages (See Table 3-16) and in the Snags and Very Large Tree sections discussed above. See those sections for additional rationale and analyses.

Habitat features most likely to affect red-headed woodpeckers are changes in the availability of large snags, open pine habitat, and open bur oak stands. The proposed action would treat the most acres in open or mature pine. Alternative 2 would treat the most bur oak acres.

Tree mortality from large fires and bark beetles has resulted in large numbers of snags. On a Forest-wide basis, the Forest Plan snag Objective 211 is met (USDA Forest Service 2011a). Very few acres of open pine habitat and bur oak habitat would be treated in any of the action alternatives. All alternatives would have little to no effect on red-headed woodpecker habitat. Forest Plan direction would maintain ponderosa pine structural stage diversity therefore Objective 5.4-206 would be met. It appears that all alternatives would be consistent with Objective 218, therefore these species are likely to persist.

Cumulative Effects—Wildlife Summary

The wildlife resource cumulative effects analysis area is set at the project buffer area. Unlike analysis of direct and indirect effects, cumulative effects include those incrementally accruing from project activities on adjacent private lands. The analysis area was chosen because it is

significantly larger than the home ranges of the majority of the wildlife species residing in the project area, excluding migrations that occur outside of the Black Hills. The timeframe evaluated varies among activities, but can be more than 100 years past, and up to ten years future. This range accommodates the period from Anglo settlement of the area to a time in which actions are reasonably foreseeable. Activities evaluated are those most relevant to the area and to the species, and include recreation (e.g., hunting, hiking, bird watching), fire suppression, fire occurrence, timber harvest, livestock grazing, roads, land development, and mining. With the notable exception of land development, all of the activities occur on both public and private lands. The Phase II FEIS (USDA Forest Service 2005) addresses cumulative effects of Forest management at the eco-regional (Black Hills) scale. See that document for effects appropriate to that scale.

Long-term noise effects associated with the proposed transmission line, or alternative routes, are limited to periodic noise generated by intermittent Aeolian (wind) noise and corona noise (powerline hum). Corona noise levels at the edge of the ROW for a 69kV transmission line are less than ambient noise in the average home. This would incrementally increase adverse noise disturbance in the corridor vicinity, but only slightly for humans. Disturbance impacts to wildlife would not be expected to be noticeable.

Wildfire suppression has been very influential within the project area. Historically frequent, low-intensity fires maintained open pine stands interspersed with meadows, shrubs, and hardwoods. A century of fire suppression has increased pine density and dominance, and decreased early successional plant communities. Correspondingly, many wildlife species associated with meadows, shrubs, and hardwoods have decreased at the benefit of those associated with late successional conditions. Fire suppression would continue to influence animals and plant communities regardless of alternative. The action alternatives would incrementally add to wildfire suppression effects as the cleared corridor could function as a fuel break, provide access for firefighting equipment and crews, and would be used to protect the transmission line itself. This would tend to off-set suppression actions required elsewhere in the project vicinity.

The project area has been greatly affected by wildfire. Proposed activities have been specifically designed to minimize the risk of initiation or exacerbation of severe wildfire in that they would not add to the accumulated fuel load, long-term and pertinent fire safety precautions would be observed. Stand-replacing wildfire can drastically alter or eliminate wildlife habitat for most species for long periods (e.g., >50 years). The incremental reduction in potential for devastating wildfire as a result of proposed activities is small, but expected to benefit most wildlife species, with the notable exception of the black-backed woodpecker. The incremental reduction in risk of potential wildfire to those areas fortunate to have escaped the Battle Creek Fire, though small, would be very important and beneficial, both short-term and long-term.

Timber harvest has occurred within the project area since the late 1800s. Past, current, and future timber management activities result in periodic shifting of much of the dense, mature conifer forest that results from fire suppression toward younger, more open stands. The effects of individual treatments are relatively short-lived, because forest growth continues to occur, but treatments have been repeated in both space and time. A more persistent effect has been a reduction of stands in the very large diameter classes (i.e., old trees). After these stands were initially harvested, many mid-aged stands have been precluded from achieving late successional

character. No timber harvest is proposed, though vegetation clearing would occur. The no action alternative would not contribute to cumulative effects of past and current harvest, and forest maturation would continue in all areas. The harvest-induced shifts from mature, dense forest to younger, open canopy forest has benefited species associated with those habitats (e.g., deer and bighorn sheep). Conversely, species associated with mature, closed-canopy pine such as the brown creeper and black-backed woodpecker have been negatively affected. Past treatments have also affected snag densities by decreasing the number of low vigor trees available to become snags. Insect and disease control and firewood gathering have also reduced snag densities. Firewood gathering regulations on the Forest were modified in 2000 to restrict cutting of snags, which should result in increased snag densities throughout the Forest over time. The project would have little incremental effect on timber harvest in the short-term and on timber production in the long-term.

Livestock grazing has occurred in the project area for at least the past 100 years. Intensive grazing likely occurred initially, resulting in decreased shrubs and palatable grasses, degraded riparian habitats, and degraded meadows. The current, much improved grazing practices of the past 20-30 years have allowed most areas to recover from impacts of early intensive grazing, but impacts do still occur. Livestock grazing would continue in the same under all alternatives. The project would have no incremental effect, even though available forage may be increased slightly.

Roads can remove habitat, create barriers, or decrease habitat quality for some species (e.g., land snails). Their use by humans can also result in increased disturbance to wildlife, particularly to nesting raptors. High road densities increase accessibility, and can facilitate wildlife poaching and illegal removal of snags. Road densities have increased in the project area as a result of vegetation management activities, fire suppression, private land development, and recreation. No roads would be created by any action alternative. Current road densities and conditions would continue. None of the alternatives would close any existing roads unless they were temporarily opened or upgraded for line construction activities. Maintenance inspection of the ROW vegetation conditions and the transmission line would be restricted to the BHNF transportation plan in effect at the time, unless otherwise authorized in the permit process. With respect to cumulative effects of roads, Alternative 4 would be most favorable for wildlife because it would utilize the least road mileage on BHNF. Alternatives 1 and 2 would be least favorable. The project would cause a small incremental increase in access, just due to the nature of a corridor.

Rare invertebrates of the Black Hills National Forest are already impacted by habitat fragmentation of forest and prairie sites through natural and man caused actions. Habitats in the project area for these invertebrate species is limited and fragmented and may be non-existent, especially those habitats that experienced high intensity and severity burn from the Battle Creek Fire in 2002. Under the action alternatives, construction of the powerline could contribute additional fragmentation of habitats and the ROW corridor could become a barrier to dispersal for snails if site conditions are too dry. Loss of tree cover and fragmentation of existing forests could adversely affect rare land snails if they are present in the area. In the case of prairie-adapted species, however, maintenance of open grassland conditions in the powerline corridor would potentially increase the area of potential habitat. Removal of brush and tree cover that promotes prairie-like conditions could enhance habitat characteristics suitable for SOLC

butterflies. None of the action alternative would negatively impact riparian habitat, preferred by SOLC butterflies and some snails, therefore no additive effects would occur to these habitats.

Homesteading was prevalent in the late 1800s and early 1900s, and most often occurred along streams and in meadows. Today, these areas are dominated by community and rural housing developments. This has permanently supplanted many acres of prime wildlife habitat in riparian areas and meadows. These habitats are very limited in extent. Riparian-associated species are most affected by these developments, which includes the song sparrow, beaver, black-and-white warbler, meadow jumping mouse, and many others. Private land development is still occurring, and the trend is expected to continue into the future. The action alternatives would potentially contribute to these habitat losses by providing more reliable electrical power to rural property owners and increasing potential for more habitat loss through private development.

Mining, mainly placer mining for gold, prevalent in the 1800s, continues on small or recreational scale currently in the project area. Activities associated with mining cause disturbance to wildlife and habitat. Some amount of habitat is irretrievably lost and some has or would recover to some extent in the long-term. None of the alternatives contribute to the influence of mining in the project area.

Threatened, Endangered, and Region 2 Sensitive Species

A Biological Assessment/Biological Evaluation (BA/BE) has been completed for the project area and can be found in the project file (Summary BA/BE located in Appendix D). The effects of the various alternatives and activities proposed were evaluated for all Endangered Threatened, Proposed, and R2 Sensitive species, and their habitat. A BA/BE is prepared in accordance with legal requirement set forth under Section 7 of the Endangered Species Act of 1973 (19 U.S.C. 1536 (c)), and follows standards established in Forest Service Manual direction (2672.42) and the Code of Federal Regulations (50 CFR S401). The Regional Forester issued a Sensitive species list for the Rocky Mountain Region (FSM 2670), and a revised Sensitive species list under FSM Regional Supplement No. 2600-2011-1 (USDA Forest Service 2011d). The BA/BE tiers directly to the Final Environmental Impact Statement for the Phase II Amendment to the Forest Plan (USDA Forest Service 2005). The Biological Assessment/Biological Evaluation (BA/BE) does not address species listed as threatened or endangered by the state of South Dakota, species tracked by the South Dakota Natural Heritage Program, or US Fish and Wildlife Service candidate species, unless they have been identified as Region 2 Sensitive species.

The United States Department of Interior (USDI) Fish and Wildlife Service website (http://www.fws.gov/southdakotafieldoffice/endsppbycounty.htm) was accessed on March 9, 2012, to determine the current list of Threatened, Endangered, or Proposed species that occur or potentially occur in Pennington County (USDI Fish and Wildlife Service 2012). The bald eagle was removed from the list of Endangered and Threatened Wildlife effective August 8, 2007, therefore this species is now considered an R2 Sensitive species. No further analysis is needed for the whooping crane, least tern, and black-footed ferret because these species are not known or suspected to occur in the project area, and there is no suitable habitat in the project area.

The determinations of effects for Region 2 Sensitive species were made based on the information gathered in the pre-field review, field reconnaissance and using information provided in the Project EA. The basis for the determinations are potential habitat, species distribution, and

anticipated effects from proposed activities. The determination language is set forth in FSM Regional Supplement No. 2600-2011-1.

The Phase II Forest Plan Amendment FEIS (USDA Forest Service 2005) evaluated population viability, and determined that all federally listed and R2 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 Objective 221, which is to conserve or enhance habitat for R2 Sensitive species. Therefore, persistence of all federally listed and sensitive species would not be affected by any alternative.

SOCIAL ENVIRONMENT

This section describes the affected environment and environmental consequences for each alternative to the Social Environment. Resources discussed below include: Recreation Use, Travel, Heritage, Scenery, and Socio-Economic.

RECREATION USE

Affected Environment

Recreation. Recreation management in the Black Hills Electric Coop (BHEC) Project Area consists solely of dispersed recreation. The area is used mainly by local/regional users and nearby landowners for a variety of recreation opportunities and private land access.

The BHEC Project Area is located in MA 5.4, Big Game Winter Range Emphasis. Areas designated as such are managed to provide big game winter range while maintaining healthy plant communities and a variety of recreation opportunities. Typically, MA 5.4 is found in the foothills of the Black Hills or in old wildfire sites where the snow depths are less and there is better-than-average forage that provides the habitat sought by elk and deer during the winter.

The BHEC Project Area is categorized as Roaded Natural in the Recreation Opportunity Spectrum. The Recreation Opportunity Spectrum is a management tool that divides recreation opportunities into a spectrum of six settings: Primitive, Semi-primitive Non-motorized, Semi-primitive Motorized, Roaded Natural, Roaded Natural Non-motorized, and Rural. The Forest has five of these six categories within its boundaries in order to provide a diverse array of recreation opportunity settings. They are: Primitive, Semi-primitive Non-motorized, Semi-primitive Motorized, Roaded Natural, and Roaded Natural Non-motorized. Facilities such as a power line are an appropriate use within the Roaded Natural setting.

Activities such as hunting, hiking, horseback riding, and biking occur along roads that are either open year-round, closed to vehicle use year-round, or on those that are closed seasonally. ATV/OHV use is currently allowed on those roads and in those areas that permit that type of use, and is managed to allow low to moderate contact with other groups and individuals. Motorized use is regulated to mitigate adverse impacts on wildlife.

Developed Recreation. There are no developed recreation sites within the project area.

Dispersed Recreation and Special Uses. Dispersed recreation uses within the BHEC Project Area include big-game hunting (e.g., for deer, elk and turkey), hiking, biking, horseback riding, ATV use, sightseeing along open roads, target shooting, berry picking, photography, bird and other wildlife watching, and possibly some minor amounts of dispersed camping.

There are no major trail systems currently in the area. Hiking, horseback riding, and biking within the area takes place on existing roads, game and cow trails, or cross country. Motorized use is regulated by the Black Hills National Forest Travel Management Plan, Record of Decision (ROD), signed in March, 2010. Implementation of the plan began on December 1, 2010. With the implementation of the Travel Plan, there are a system of roads and trails in and around the project area, along with two new trailheads. All components of this system are on existing routes with no new construction.

There are two Outfitters and Guides under Special Use Permit to the USFS that operate in the BHEC Project Area. They are: Gman Outdoor Adventures and Turkey Track Club—both hunting outfitters/guides use this area as part of their special use permit with the Forest Service.

Roads and Trails. The main travel ways accessing the project area are US Highway 16 to the north, Rockerville Road to the west, Neck Yoke Road running basically east/west, and Pine Grove Road running north/south through the project area. There are also a total of 19 roads identified in the BHNF Travel Management Plan that traverse portions of the NFS lands in this project. The project area is heavily impacted by numerous private subdivision accesses and various forest logging roads. There are some unauthorized and/or closed user created roads in the project area.

Environmental Consequences

Effects Common to All Alternatives

Regardless of which alternative is selected, no National Forest System (NFS) land would change hands or change management prescriptions. Current roads and motorized trails would continue to be managed according to the BHNF Travel Management Plan ROD.

For all alternatives, the Forest Service would continue to repair and maintain legal (NFSR) roads and trails under its jurisdiction. New and existing user created roads and trails that are causing resource damage would be rehabilitated or removed as funding becomes available. Emergency restrictions would continue to be implemented as needed, such as temporary road closures during adverse conditions to prevent damage, or closing an area to motorized use during periods of extreme fire danger. The Forest Service would continue to patrol and enforce regulations to protect road and trail surface resources and vegetation. Current management of motorized vehicle use would continue under all alternatives on NFS lands in the same manner as they currently are in the BHNF Travel Management Plan.

Developed Recreation. There are no developed recreation sites within the project area so there would be no effect.

Dispersed Recreation and Special Uses. It is not anticipated that the proposed alternative would cause a change in either the type or amount of dispersed recreation use that currently occurs in the area; other than changes that would occur naturally over time or after the

implementation of the BHNF Travel Management Plan. Where the power line right of way (ROW) goes through forested areas and the larger trees are cut to accommodate the line (trees smaller than 9 feet tall would remain), there may be an increased concentration of hunters due to the potential for longer sight distances associated with the ROW. This ROW is limited to 40' wide on National Forest System land in Alternative 1. The ROW straddles both public and private lands in the other action alternatives but is less than 40 feet wide. Numbers of hunters would only increase if big-game populations increase in the area and/or if the SDGF&P increases the number of big-game tags for the area. Cross country hikers, bikers, horseback riders, and the outfitter/guides in the area may also use the cut ROW if it proves to be an easier route for traversing the area. These effects would also be the same in Alternatives 2 and 3.

Since Alternative 4 is primarily on private land, the type and amount of recreation use would be determined by what the private landowners allow or provide themselves along the power line location. In the Elephant Trunk area, seven feet of the 40 foot ROW would be on NFS land, and further south, (see Chapter 2 description) where the road/power line ROW leaves private land, the ROW would be 20 feet wide on NFS land and 20 feet on private. With this minimal width and length of ROW being on NFS lands, there should be negligible effects on NFS land and on the amount and type of use that is currently taking place on NFS land.

Roads and Trails. There are currently no system trails within the project area. The public would continue to use the designated roads within the project area and the Forest Service would continue to maintain and repair damage to any system roads at their current level. With the implementation of the BHNF Travel Management Plan, a system of road/trail routes and two trailheads are identified for future development. The Record of Decision for the BHNF Travel Management Plan determined the type of use and the season of use on these routes, so Alternative 1 would not affect the decision that was made regarding travel management. These effects would also be the same for Alternatives 2, 3, and 4.

Alternative 5 No Action

Direct and Indirect Effects

Developed Recreation. Same as Effects Common to all Action Alternatives.

Dispersed Recreation and Special Uses. There would be no anticipated effects on NFS lands since there would be no ground disturbance. Current uses would continue.

Roads and Trails. There would be no additional effects on NFS roads other than effects that are consistent with the use that is currently taking place with implementation of the BHNF Travel Management Plan.

TRAVEL

Affected Environment

Travel management on the BHNF takes into consideration all types of transportation, whether motorized or non-motorized. The spectrum of routes includes paved roads, gravel and dirt routes, and single-track trails. These routes are both system and/or user created that are used by

hikers, bikers, horseback riders or dirt bikers. The existing (and future) road and trail network facilitates all of the National Forest multiple uses that occur in a project area, in addition to access for private landowners and the general public. In this project area, the majority of uses by the public are considered either recreation activities or private landowner access. Long-term road use would be needed for future merchantable timber harvest.

The approximate miles of existing roads and trails are displayed in Table 3-19. The numbers shown are approximate because there is no defined project area such as that designated for a timber sale area boundary. In reality, the project area for travel management only covers a small area on either side of the alternative routes on NFS land. The information included here reflects what is found on the BHNF Travel Management Plan Designation Map (from the Record of Decision, ROD), for the north part of the forest.

Table 3-19 Road and trail information (USDA Forest Service 2010)

Road	Existing length	Travel Designation
NFSR 686	2.8 miles	HLO - seasonal
NFSR 686.1A	0.3 miles	HLO - seasonal
NFSR 686.1B	0.7 miles	HLO - seasonal
NFSR 641	4.4 miles	HLO - seasonal
NFSR 641.1A	1.7 miles	Closed YL (planned trail)
NFSR 641.1B	0.9 miles	HLO - seasonal (planned)
NFSR 718	10.5 miles	HLO – open YL
NFSR 718.1A	1.0 miles	Closed YL
NFSR 718.1B	0.7 miles	HLO - seasonal
NFSR 718.1C	0.9 miles	HLO - seasonal
NFSR 718.1I	0.6 miles	Closed YL (planned)
NFSR 718.1J	0.2 miles	Closed YL (planned)
NFSR 718.1K	1.1 miles	HLO seasonal (planned)
NFSR 718.1L	0.2 miles	Closed YL (planned)
U270038	0.7 miles	Closed YL (planned)
U270039	0.4 miles	Closed YL (planned)
U270040	0.6 miles	Closed YL (planned)
U270041	0.4 miles	Closed YL (planned)
U270050	0.2 miles	Closed YL (planned)
U270051	0.5 miles	Closed YL (planned)
U270052	0.2 miles	Closed YL (planned)
U270053	0.6 miles	Closed YL (planned)
U270067	0.8 miles	Closed YL (planned)
U270080	1.0 miles	Closed YL (planned)
U270083	0.9 miles	Closed YL (planned)
U270087	0.1 miles	Closed YL (planned)

HLO – Highway Legal Only; YL – Year-Long; ROTA – Road Open To All; U – Unauthorized roads or trails

The project's relationship to travel management is the same for all alternatives. There would be no change to the travel management designations that were selected for this area through the ROD that was signed and issued in March, 2010. This means that the effects of each alternative on travel management are the same or very similar.

The Forest Service would continue to maintain and repair National Forest System Roads under its jurisdiction. Even with the new BHNF Travel Management Plan regulations, emergency restrictions would continue to be implemented as needed--such as temporarily closing roads during wet conditions to prevent rutting and erosion, or closing an area to use during periods of extreme fire danger. The Forest Service would continue to patrol and enforce regulations to prevent damage to road surfaces, vegetation, etc. Management for motorized and non-motorized use in the area would continue for all alternatives as outlined in the BHNF Travel Management Plan and the BHNF LRMP.

Environmental Consequences

Alternative 1 Proposed Action

Direct and Indirect Effects
Although the Proposed Route Alternative would have a certain amount of ground disturbance and clearing on NFS lands, it would not affect motorized travel management within the project area. Motorized use within the project area would be governed by the recently implemented BHNF Travel Management Plan. There would be no motorized cross country travel in this area and the roads and trails that are designated would have controls such as season of use, and width or type of vehicle permitted. The only exception to this would be any administrative use by the Forest Service or by Black Hills Electric Coop for maintaining their power line. Non-motorized use numbers and distribution for activities such as hiking, biking, hunting, and horseback riding may change somewhat for the reasons given in the Recreation Use section (thinned ROW corridors, better sight distance, easier travel through ground vegetation).

Alternative 2

Direct and Indirect Effects
Same as Alternative 1.

Alternative 3

Direct and Indirect Effects
Same as Alternative 1, except that there would be less NFS land disturbed by construction of the power line.

Alternative 4

Direct and Indirect Effects
There should be no change and therefore, no effects on NFS lands since almost all construction would be on private property.

Alternative 5 No Action

Direct and Indirect Effects
There would be no effect and no change to NFS lands other than what occurs naturally over time.

Cumulative Effects

Cumulative effects are those that take into consideration the past, present, and reasonably foreseeable activities of the future. The minimal amount of acreage (less than 30 acres total ROW on private and NFS lands) affected by the power line ROW and the associated thinning through any forested area should not add appreciably to any effects on recreation and travel activities that currently take place within the project area, or any that are visualized for the near future. No new permanent system roads would be constructed and access to any alternative location would be on existing routes or along the power line ROW. Consistency with the Forest Plan would remain and no change to access is expected, Table 3-20.

Table 3-20 Effects to Key Issues by Alternative

	Alt 1	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Issue - Measurement Indicators	Proposed Action	Visual	Shorter FS Route	Mostly Private	No Action
Travel and access.					
Contributes toward achieving Forest Plan Goals, Objectives, and Guidelines relative to Access and Travel Management (FP Goal 4, Objectives 420-422, Standards or Guidelines 9101-9109, 9201-9205) (Yes, No).	Yes	Yes	Yes	Yes	Yes
Change in public motorized access (Yes, No).	No	No	No	No	No
Change in public non-motorized access (Yes, No).	No	No	No	No	No
Miles of permanent system roads constructed.	0	0	0	0	0

HERITAGE

Affected Environment

The Black Hills area has a rich and diverse cultural heritage. Numerous tribes have roots in the Black Hills. American Indian sites include open campsites, stone tool quarry sites, rock shelter locations, and spiritual and traditional use sites. Archeological evidence suggests the earliest known use of the area occurred about 10,000 years ago. American Indian sites are valued both for their ability to teach us about how these past peoples lived, and to help American Indian people today maintain their cultural and religious traditions. Historic sites (which date to about the last 125 years) also constitute a visible connection to past peoples on the Forest, and are valued both for their ability to enrich local family and community history and for their contribution to our understanding of environmental change since European-American settlement. For example, past activities such as water diversion, exclusion of fire, timber harvest, and grazing have caused changes to Forest biotic communities that continue today. Knowing when and how these changes occurred helps to create more effective management actions today. Historic land use in this area has occurred since the 1800s in the form of homesteading, trapping, livestock grazing, and mining,

as indicated by the GLO and Land Status plats. This activity primarily took the form of ranching from homesteads found along the better streams. Logging, mining, hunting, horsepacking, off highway vehicles, and other recreational uses continue to be popular in this area.

Prior to the proposal to build the transmission line, six previous heritage resource surveys had been undertaken within the BHEC transmission line and the associated access roads between 1984 and 2003 (Agard 1992; Garcia 2002; Garcia 2003; Hawthorne and Chevance 1986; Lennon et al. 1985; Weinberg 1997). A 750 foot portion immediately south of the Rockerville Substation and a 0.25 mile portion of an access road (National Forest System Road 449) were not previously surveyed prior to the current research and were examined during the Section 106 portion of this project.
A total of nine cultural resources were recorded on NFS lands within the 40 ft. corridor of the proposed transmission line routes and access roads between 1985 and 2012. Of this total, eight were determined to be Not Eligible and one was determined to be Eligible for listing on the National Register of Historic Places.

The Eligible cultural resource would be protected by following the compliance process mandated by the Section 106 of the NHPA and recommendations outlined in cultural resource reports. The regulations governing Section 106 review are contained in 36 CFR Part 800, which describes the compliance process. The Eligible site will be protected by following the site-specific mitigations identified by the District Archaeologist (see Appendix B).

Environmental Consequences

Heritage resource effects were qualitatively assessed through a presence/absence determination of significant cultural resources and mitigation measures/design criteria to be employed during the clearing of the transmission line, vehicle and equipment travel along the line during pole placement, and vehicle and equipment travel along designated access routes, as well as any necessary maintenance along the required access routes.

Effects Common to All Action Alternatives

Potential impacts to heritage resource sites under all alternatives include maintaining existing roads, placing utility poles, non-commercial vegetation thinning activities to clear the construction corridor and travel by construction and maintenance vehicles.

As a whole, any ground disturbing activity, such as road grading or boring holes for the placement of utility poles, has the potential for disturbing recorded and unrecorded heritage resources. The chance of this happening for this project is lessened due to the previous archeological inventory work conducted on NFS lands, but heritage resources do not always have a surface manifestation. Even light soil disturbance can impact heritage resources, as most of the recorded resources in the region were shallow in depth.

Off road travel would only be allowed subsequent to case-by-case consultation with the Mystic Ranger District Heritage Department on a case by case basis (see Appendix B). Off road travel can impact recorded and unknown heritage resources, as well. Travel overland causes

compaction of the soil under the tires or tracks of a vehicle. This pressure compacts the soil more than what occurs naturally, which can crush artifacts and distort features, such as fire hearths. Multiple instances of traveling over a certain area often results in the creation of a two-track road. Even if the maintenance and construction crews travel in these off road areas occasionally, evidence of previous travel can entice others to travel in the same areas.

In the event that damage occurs to the transmission line, there is the potential for a wildfire to occur. Fires can damage and/or destroy heritage resources through high temperatures, carbon alteration, soil erosion, and subsequent exposure. Wildfires also have the potential to expose unknown archeological sites and destroy Traditional Cultural Properties.

Wildfires also remove overlying vegetation, which can lead to increased erosion in burned areas. This has the potential to erode cultural resources thus moving or completely destroying them. Fires also add carbon to the environment and this can affect radiocarbon dating of archeological remains. In addition, high fire temperatures can crack, discolor, or break artifacts, completely burn up organic archeological materials, and/or melt or deteriorate glass or metal.

The effects of wildfire itself are compacted by the various suppression techniques that are often used, such as the construction of fire lines by heavy equipment or by hand. Further compounding the ground disturbances caused by construction of these breaks is that they are often later used as roads by recreationists using OHVs or hikers, thus providing increased access to both recorded and undiscovered heritage sites. While this is not a major detriment to heritage resources, it provides a broader opportunity for vandalism and disturbance by artifact collectors.

The removal of vegetation by transmission line crews has the potential to create similar impacts as vegetation removal by fire. The loss of vegetation has the potential to increase the amount of erosion, and the associated risks of moving or destroying cultural resources. And, similar to fire, the removal of vegetation along the line may cause the line to be used as a road by recreationist, thus, possibly magnifying afore mentioned effects.

Construction or maintenance crews, including those not directly employed by BHEC (i.e., line inspection contractors or construction contractors) may find artifacts or other heritage resources components during their work and would have the opportunity to remove them illegally. The potential use of OHVs within the corridor by personnel periodically inspect the power line for maintenance issues would also provide access to heritage resources, and the resulting two-track trail would entice others to use the area, as well.

This project proposes minimal ground-disturbing activity and vehicle travel that could increase the chances of damage to known and/or unrecognized heritage sites.

There is a potential for a transmission line caused fire which could result from a line break, or if vegetation (i.e., trees) came in contact with the wires. The likelihood of such a fire occurring is small as built in safety measures, such as switches in modern transformers that break the local circuit in the case of a short or line break, and vegetation clearing within powerline corridors to keep vegetation away from the wires. Also, much of the area around the transmission line corridor has burned in wildfires since the 1980s, with little re-growth other than mixed grasses.

Alternative 1 Proposed Action

Direct, Indirect, and Cumulative Effects
Under Alternative 1, direct, indirect, and cumulative effects are consistent with those discussed under "Effects Common to All Action Alternatives above. There are no expected additional direct, indirect, or cumulative effects to cultural resources from this alternative.

Alternative 2

Direct, Indirect, and Cumulative Effects
The effects would be the same as Alternative 1, although the route's location along valley floors and mountain meadows may increase the likelihood of finding buried, unknown heritage resources as these are preferred locations for prehistoric occupation sites.

Alternative 3

Direct, Indirect, and Cumulative Effects
These are the same as Alternative 1.

Alternative 4

Direct, Indirect, and Cumulative Effects
These are the same as Alternative 1, although, as part of this route travels on private lands that have not been previously inventoried, there is a greater potential for unknown cultural resources to be discovered during construction of the transmission line.

If there are unknown cultural resources located on the private lands through which the transmission line will travel, there is a potential for any or all Direct, Indirect and Cumulative effects to impact the resources. These may specifically include damage by a wildfire caused by the transmission line to sites that are potentially eligible to the NRHP; possible vehicle impacts caused by construction and maintenance crews, as well as trespass by recreationists using the corridor to access NFS lands; and possible impacts to unknown Traditional Cultural Properties.

However, although there is an increased potential for damage to unknown cultural resources under Alternative 4, the Forest Service has no jurisdiction over non-federal, privately held lands. Therefore, any recommendations made by the Forest Service are not legally binding, and do not have to be considered by private land owners.

Alternative 5 No Action

Direct, Indirect, Effects and Cumulative Effects
If there is no federal action, then there is no undertaking as defined in 36 CFR Part 800.16(y) for Section 106 of the NHPA (16 U.S.C. 470f).

Consultation

The Heritage Resources Report was sent to the South Dakota SHPO for Review and Compliance and comment for the project and mitigation measures. The SHPO letter dated July 13, 2012, has

concurred with the determination of ***"No Historic Properties Affected."*** The report was also sent to Tribal Historic Preservation Officers and tribal groups requesting reports, for their review and comment, and additional recommendations for the protection of American Indian traditional use sites. Thirty-one people from 18 tribes were contacted by scoping letter and the Forest Service made follow-up phone calls to tribal representatives to see their input.

SCENERY

Background

Visual resources on the BHNF are managed by the Forest Service Scenery Management System (SMS), which served as a basis for this scenery inventory and impact assessment. By its nature, overhead power lines affect the scenic integrity of an area. To minimize effects, alternative locations that could block visibility with landforms or screening should be considered. Field reviews of the project area were conducted between July 2010 and November 2010. The following sections describe components of the visual resource inventory.

Scenic Class measures the relative importance of or value of discrete landscape areas having similar characteristics of scenic attractiveness and landscape visibility. Scenic Class is used to compare the value of scenery with the value of other resources. The components of Scenic Class are Scenic Attractiveness (which is based upon human perception of the intrinsic beauty of landform, water characteristics, vegetative pattern and cultural land use) and landscape visibility (which is based upon the distance zones from the observer and the concern level for scenery) (USDA Forest Service 1995).

The higher the Scenic Class, the more important it is to maintain the highest scenic value. The inventoried Scenic Class Values, on the BHNF, are 1 (highest), 2, 3, and 4 (lowest). The scenic class values demonstrate the importance of the views in different areas.

Inherent Scenic Attractiveness is obtained by classifying the landscape into different degrees of variety. This determines which landscapes are most important and those that are of lesser value from the standpoint of scenic quality. The classification is based on the premise that all landscapes have some value, but those with the most variety or diversity have the greatest potential for high scenic value. The combination of valued landscape elements such as landform, water characteristic, vegetation, and cultural features are used in determining the measure of scenic attractiveness (USDA Forest Service 1995).

Scenic Attractiveness classifications are: A – Distinctive, B – Typical and C – Indistinctive. A – Distinctive refers to those areas where landform, vegetative patterns, water characteristics, and cultural features combine to provide unusual, unique, or outstanding scenic quality. These landscapes have strong positive attributes of variety, unity, order, harmony, uniqueness, pattern, and balance. B – Typical refers to those landscapes where landform, vegetation patterns, water characteristics, and cultural land use combine to provide ordinary or common scenic quality. C – Indistinctive refers to those landscapes where landform, vegetation patterns, water characteristics, and cultural land use have low scenic quality. Often water and rock form of any consequence are missing in class C landscapes (USDA Forest Service 1995).

Landscape Visibility is the portion of landscapes visible from travel ways and use areas and are important to constituents for their scenic quality, aesthetic values, and landscape merits. Travel ways and use areas are identified and classified during the Forest-wide planning process, in order to determine, which observer locations and their importance, to use in the landscape visibility analysis. Sensitivity Level 1 travel ways lead to important scenic features, residential areas, resorts, recreation areas, unique natural phenomena, wilderness trailheads, national parks, state and county recreation areas, and attract high percentage of users having high concern for scenic quality, thus increasing the importance of these travel ways (USDA Forest Service 1995).

Landscape Distance Zones

Immediate foreground	(0' to 300')
Foreground	(300' to ½ mile)
Middle ground	(1/2 mile to 4 miles)
Background	(4 miles to horizon)

Within the Analysis Area Boundary, the proposed powerline would be viewed from US Hwy 16, a Sensitivity Level 1 Corridor – where a high number of people have a high concern for scenery; and South Rockerville Road, Neck York Road, and Pine Grove Road, Sensitivity Level 2 Corridors, where a lower number of people have a high concern for scenery.

Scenic Integrity Objectives (SIO) 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 (USDA Forest Service 1995).

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 Level that refers to 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 (USDA Forest Service 1995).

Existing Scenic Integrity represents the current status of a landscape. It is determined on the basis of visual changes that detract from the scenic quality of the area. Direct human alterations may be included if they have become accepted over time as positive landscape character values. Existing scenic integrity is the current visual state, which is measured in degrees of deviation from the natural appearance of the landscape character type. These ratings give an indication of the present level of visual quality and visual evidence of management activities. The frame of reference for measuring achievement of scenic integrity levels is the valued attributes of the existing landscape character unit being viewed. In natural or natural appearing character, this is limited to natural or natural appearing vegetative patterns, features of water and rock and landforms (USDA Forest Service 2006).

The visual resources inventory addressed the existing visual conditions, scenic quality of the landscape, and sensitive viewpoints (Scenic Integrity Objectives, SIO). A visual contrast analysis was conducted to determine vegetative contrast, landform contrast, and structure location contrast that could potentially result from this project. These components were combined to determine potential visual effects.

Affected Environment

The scope of this analysis applies to the transmission line routes considered in detail, within and adjacent to the BHNF, that begins at Rockerville substation and ends where the alternative routes finally exit the NFS land boundary. Where the route bisects private lands, private landowners may be affected. The Black Hills National Forest (BHNF) Land and Resource Management Plan, Scenery analysis, does not include private lands (as the BHNF has no management authority over private lands). However, the view of NFS lands from private lands is discussed, and a brief description and visibility of the powerline route thru private lands is provided.

The affected environment for the proposed transmission line project is discussed as the "study area" unless a resource is known to be affected beyond the limits of the study area. The study area includes all areas within ¼ mile on either side of each assumed center line of the action alternatives. The affected study area includes portions of BHNF land and private lands. Beyond the affected construction corridor visibility, concerns of project implementation are not only within the foreground viewing area, but also middleground distances specifically from private lands. The land type association for this project, or study area, typically has narrow flat-topped ridges, steep to very steep side slopes, narrow shallow valleys with rock outcroppings of slate and schist along with some sandstone, limestone, and shale (USDA Forest Service 1997). Within the project area, the vegetative setting north of Neck Yoke road is forested, to the south, the vegetative condition is that of a post –

high intensity wildfire – predominantly an open grassland with few remnant scattered trees. The open landscape is in stark contrast to the forested pre-fire condition. Existing National Forest Service roads are apparent only in immediate foreground viewing locations, and do not dominate the landscape in appearance or quantity. Overall, the project area, on NFS lands has a moderate to high existing scenic integrity condition, as there are few intrusions beyond those created by nature (USDA Forest Service 2009).

Existing cultural modifications in the area (including private lands), are dispersed residential sites occurring along Neck Yoke Road and Pine Grove Road. Lower voltage electrical transmission distribution lines occur throughout the area. Lower voltage distribution poles are generally 30 ft. tall and shorter than the surrounding trees, so they are generally not visible beyond the immediate foreground in forested areas. In open areas, these power lines dominate foreground views, but blend into the landscape in distant foreground and middleground views because of the dark color of the wooden poles and lower height. There is an electrical substation in the immediate foreground of US Hwy 16, which is partially screened by vegetation. Power lines cross US Hwy 16 at right angles. The use of non-reflective wire in these overhead utility lines limits their visibility within the travel corridor and the area.

Environmental Consequences

Effects Common to All Action Alternatives

New construction of long-term or temporary vehicle access for equipment to set poles and string wire on NFS land should result in minimal visual impact because of the minimal amount of surface disturbance, vegetative screening, distance, and angle of the viewer.

Construction of lay down yards for stock piling poles and electrical wire on NFS land is expected to result in minimal visual impact because ground disturbance of these sites is temporary (construction time only) with an emphasis on locating in existing open areas. During the implementation/construction phase equipment and vehicles would be evident moving across the landscape. After construction is complete, vehicles may periodically be evident in the landscape for maintenance purposes. New long-term, or temporary, access may be necessary in some locations which should have only minimal effect on the overall Scenic Attractiveness of the existing landscape because of minimal ground disturbance and its short duration.

Vegetative removal would occur with trees greater than nine feet high within the established corridor. Ground disturbance would be reclaimed and tree harvesting debris treated, or removed, within one full growing season after project completion.

The new 69kV power line development would be particularly evident to local residents where the route is located on open grass-covered ridges, but less obvious when the corridor is located in forested areas – where the shade of the sun and the texture of the trees can help screen and conceal it. Depending upon the viewers' location, the cleared powerline corridor thru forested areas should be obvious when the ground is snow covered.

Within the Analysis Area boundary, roads and homes are generally located in lower elevation areas, and are generally accepted human elements in the landscape. Electrical power lines, on shorter power poles (than those proposed in this project) follow the existing roads. The NFS lands are generally the highpoints in the local area and provide the focal point, or backdrop to views from these homes and roadways. The environmental tradeoff of human made elements introduced into the landscape – that do not easily blend in (other than homes), is a perceived reduction in the "natural" appearance of the area. This proposed power line, depending upon the viewer's location, would not easily blend into the landscape where it crosses open ridges with limited vegetation that can screen the powerline or power poles.

From the Substation (mile post 0.0) to Neck Yoke Road (mile post 1.6) the visual effects of the proposed power line are the same on the scenic resource under all the action alternatives. In this portion of the corridor, along NFS lands, approximately 10% have a High Scenic Integrity Objective (SIO), 80% have a Moderate SIO, and 10% have a Low SIO.

There are existing utility lines in this section, as well as a small electrical substation – that is partially screened by vegetation. In addition, there is an existing utility line that extends north, crossing US Hwy 16 at a right angle. Although the existing structures do not strongly stand out, they currently do not meet the High SIO of the area. In regard to LRMP Guidelines 8304 and 8310, and the additional new utility line, there should not be a great difference from the existing condition directly adjacent to US Hwy 16, but the new powerline would make it that much more difficult to meet the High SIO prescribed for the area in the future.

<u>Sensitivity Level l Corridors</u> – East and west travelers on US Hwy16 can view the beginning of the BHEC project area at the Rockerville substation, mile marker 0.0 (see Appendix E, Maps 8-11, Mile Marker Maps). The substation site is located approximately 250 ft. south of the highway, but is partially screened by trees up to approximately 50 feet in height. Note: There is an existing powerline line that crosses Hwy 16 at a right angle to the highway. In addition to the existing powerline, a vegetation-cleared right-of-way (ROW) extending to the north is evident. There is an existing powerline that runs south from the substation for approximately 0.1 miles, before is veers off to the southwest. The new 69kV line would be placed alongside the current powerline heading south – until the existing line veers off to the southwest. The existing corridor, cleared of vegetation, would be widened to allow for the addition of the new power line. The wider corridor would be evident from the highway, but predominantly only when the observer is looking directly down the corridor. This brief view should have limited effect on the High Scenic Integrity Objective in this location.

When traveling along US Hwy 16 from the east (Rapid City), when the traveler(s) crest the hill at Sitting Bull Road, the first opportunity to view the new power line is present, approximately 1.2 to 1.7 miles distant in the Middleground distance zone. The substation is hidden from view due to distance and vegetative screening. The existing powerline that crosses Hwy 16, power poles, and cleared ROW are not evident due to the distance, screening, and backdrop of the vegetation covered ridgeline. Comparably, we could expect a similar level of visibility of the proposed powerline within the middleground distance zone. As the traveler moves into the foreground distance zone, the tops of the proposed power poles and power lines to the south are expected to be evident above the tree tops, just like the existing powerline to the north. The only time the

cleared corridor is evident is when the observer is looking directly down the corridor. Given the speed of the travelers thru this area (the posted speed limit is 65 mph), the duration of view is very short, and the visual impact of the cleared corridor does not leave a lasting impression.

Another area viewed from US Hwy16 (westbound traffic) is the ridge south of the substation (at approximately mile post 0.5 to 1.0) which can be seen from approximately 0.5 to 1.7 miles away (middleground view). All four proposed alternatives align their corridors along the same section line location while traversing this ridge slope and top. A 90 degree exposure of the 40 ft. wide corridor runs up the slope and tops the ridgeline for 1,100 ft., visible for a short period of time. Tree vegetation, smaller than nine feet, remaining within the corridor will reduce the visibility of the corridor thru color, texture, and distance. When viewed from the west (eastbound traffic on US Hwy 16), the power line would be lower than the ridge top and screened by 45 ft. trees below and above the wire and poles. A few transmission pole tops and transmission wire would be visible from the vantage point of travelers on US Hwy16, depending on the time of day or angle of the sun. This portion of the proposed route has a Moderate Scenic Integrity Objective.

NFS land within this one mile section would be affected by placement of nine to 20 poles on the side slope and two to eight poles possibly exposed on the extreme south ridge line. As long as vegetative screening remains in place, this Scenic Integrity Objective should be met. In the event that the mountain pine beetle, or other insects attacks the vegetation screening the proposed powerline route (as is evident in other portions of the forest), the visibility of the powerline would increase, and Scenic Integrity Objectives would likely not be met – further moving away from Guideline 8304.

The next segment, from mile post 1.1 to 1.6, traverses private lands. There are no NFS lands in this segment. Effects would primarily to adjacent land owners. Looking north into the corridor on NFS land from Neck Yoke Road, the transmission line would present a sky line view from the road and some private residences at an immediate foreground, foreground, and middleground distance, with approximately 2,700 ft. of line exposed. The open meadow along Neck Yoke Road, would present a highly sensitive view of a new power line. The meadow extends approximately 1,000 ft. along Neck Yoke Road. Driving at 30 mph, the line and structures would be evident for 20 seconds in the immediate foreground view. The scale of the poles in the open meadow, following the section line, would be obvious due to their dominance in size. Homes along the edge of the meadow and along the ridge adjacent to the ROW would have this installation in their foreground view.

<u>Sensitivity Level 2 Corridors – South Rockerville Road, Neck Yoke Road, and Pine Grove Road</u>. There are no National Forest travel ways that are Sensitivity Level 2 Corridors in the area. Travelers on Neck Yoke and Pine Grove Roads, and residents in the area would be able to view portions of the proposed powerline route in the foreground and middleground distance zones. Public concern is high as the project area is viewed daily during commutes into and out of the area. Under all alternatives, the powerline would be readily apparent where it crosses Neck Yoke Road.

North of Neck Yoke Road, on NFS lands, the proposed powerline would be mostly hidden from view by the vegetation. From mile post 1.1 to mile post 1.6, the power line crosses only private lands, and would be highly evident in the landscape.

The width of the ROW, whether on public versus private lands, has no difference in effect on the scenic resource. Additional effects would be approximately 2.5 acres of vegetative manipulation for pole placement, development of laydown yard sites for equipment, installation supplies, and stringing wire within the 1.6 mile section between the substation and Neck Yoke Road.

South of Neck Yoke Road the visibility and effects to the scenery would vary by Alternative.

Alternative 1 Proposed Action

Direct and Indirect Effects
Alternative 1, from mile post 1.6 (Neck Yoke Road) south to mile post 5.8 (the Forest Boundary), proposes a 40 ft. wide corridor on NFS lands.

From Neck Yoke Road, mile post 1.6 south to mile post 2.2, the new line would strongly dominate the existing landscape character because the corridor alignment crosses an open grass-covered ridge. In this portion of the corridor, along NFS lands, 100% have a Moderate SIO. The ridge had been tree-covered in the past, but the Battle Creek Fire changed the vegetation from a dense forest to an open prairie with scattered trees and clumps of trees. The power poles would present vertical lines in the landscape which are in contrast to the horizontal form of the ridge. The transmission line would also insert horizontal lines in the landscape. With locations along slopes, and ridge top, both the power poles and the transmission lines could be silhouetted against the skyline and thus more visible still. Depending upon the viewers' location, and the lighting conditions, the powerline would dominate the natural landscape as an obvious human constructed element.

This is especially valid for residences within the Analysis Area Boundary, and homes on ridge tops within a three mile radius of the proposed project area.

From mile post 2.35, south to mile post 2.7, the powerline is located down in a valley, and hidden from view from private lands. In this portion of the corridor, along NFS lands, 100% have a Low SIO. The powerline would be evident from National Forest Service roads, and to individuals traveling cross county through the area – where the fewest numbers of viewers will be impacted.

From mile post 2.7, south then southeast to mile post 5.5, the powerline is located on/or near the ridge top. In this portion of the corridor, along NFS lands, approximately 80% have a Moderate SIO, and 20% have a Low SIO. This portion of the powerline should not be evident from Neck Yoke Road. However, it would be evident from roads and individual homes in the Pine Grove area, depending upon their elevation and orientation. In this section, the powerline should be silhouetted on the distant ridge line.

From mile post 5.5, east to mile post 5.8, the powerline is located in a valley bottom. In this portion of the corridor, along NFS lands, 100% have a Low SIO. This portion of the powerline would be evident from roads and individual homes, depending upon their elevation and orientation in relation to the powerline.

Alternative 2

Direct and Indirect Effects
Alternative 2, from mile post 1.6 (Neck Yoke Road) south to mile post 6.1 (the Forest Boundary), proposes a 40 ft. wide corridor on NFS lands.

From mile post 1.6 (Neck Yoke Road) south to mile post 2.1 (a saddle) the corridor is on NFS lands. In this portion of the corridor, approximately 100% has a Moderate SIO. This route traverses a forested slope. Views of this segment would be limited to the immediate foreground, and foreground distance zones along Neck Yoke Road, and a few homes in the area. The vegetation should breakup the outline of the powerline and power poles. When traveling west on Neck Yoke Road, the traveler would be in near alignment with the power line corridor, briefly providing a view up the cleared corridor. In conditions when the ground is snow-covered, this would be a brief, though dominant view.

From mile post 2.1 (the saddle) south to mile post 3.7, the corridor is on NFS lands. In this portion of the corridor, approximately 50% has a Moderate SIO, and 50% has a Low SIO. The powerline is located down in a valley, and hidden from view from private lands. The powerline will be evident from forest service roads, and to individuals traveling cross county through the area – where the fewest numbers of viewers would be effected.

From mile post 3.7, south then southeast to mile post 5.2, the powerline is located on/or near the ridge top. In this portion of the corridor, along NFS lands, approximately 60% have a Moderate SIO, and 40% have a Low SIO. This portion of the powerline should not be evident from Neck Yoke Road. However, it would be evident from roads and individual homes in the Pine Grove area, depending upon their elevation and orientation. In this section, the powerline should be silhouetted on the distant ridge line.

From mile post 5.2, east to mile post 5.8, the powerline is located in a valley bottom. In this portion of the corridor, along NFS lands, 100% have a Low SIO. The powerline is located down in a valley, and hidden from view from private lands. The powerline would be evident from local forest service roads, and to individuals traveling cross county through the area – where the fewest numbers of viewers would be affected.

From mile post 5.8, east to mile post 6.1, the powerline is located in a valley bottom. In this portion of the corridor, along NFS lands, 100% have a Low SIO. This portion of the powerline would be evident from roads and individual homes, depending upon their elevation and orientation in relation to the powerline.

Alternative 3

Direct and Indirect Effects
Alternative 3, from mile post 1.6 (Neck Yoke Road) south to mile post 4.6 (the Forest Boundary), proposes a 40 ft. wide corridor on NFS lands.

From mile post 1.6 (Neck Yoke Road) south to mile post 2.1 (a saddle) the corridor is on NFS lands. In this portion of the corridor, approximately 100% has a Moderate SIO. The effects on this segment are the same as Alternative 2.

From mile post 2.1 (the saddle) south and southeast to mile post 4.1, the corridor is on NFS lands. In this portion of the corridor, approximately 10% has a Moderate SIO, and 90% has a Low SIO. The powerline is located down in a valley, and hidden from view from private lands. The powerline would be evident from forest service roads, and to individuals traveling cross county through the area – where the fewest numbers of viewers would be affected.

From mile post 4.1, east to mile post 4.6, the powerline is located in a valley bottom. In this portion of the corridor, along NFS lands, 100% have a Low SIO. This portion of the powerline would be evident from roads and individual homes, depending upon their elevation and orientation in relation to the powerline.

Alternative 4

Direct and Indirect Effects
Alternative 4, from mile post 1.6 (Neck Yoke Road) south to mile post 4.7 (the Forest Boundary), proposes various corridor widths on NFS lands – specified by mile post.

From Neck Yoke Road, mile post 1.6 south to mile post 1.8, to the section line, 7 feet of the ROW is on NFS lands. In this portion of the corridor, approximately 100% has a Moderate SIO. The power line would dominate the existing landscape character, with the same effects as Alternative 2 in this section.

From mile post 1.8 east then south to mile post 3.6, along the section lines, the ROW is on private lands. The first segment, mile post 1.8 to mile post 2.2, would have the same effect as the previous segment (mile post 1.6 to mile post 1.8) in how visible it would be in the landscape. The remainder of this segment, from mile post 2.2 to mile post 3.6, is at low elevation (for the surrounding area). Landforms and vegetation have limited ability to partially block and screen views, in this area due to the slightly rolling terrain and lower height of the trees. The addition of power lines and poles visible above the tree tops, and in areas of only grass/shrub vegetation, would be readily apparent in the foreground view from Neck Yoke and Pine Grove Roads, as well as some private residences. This segment would have no effect on NFS lands.

From mile post 3.7 south to mile post 4.7, the corridor is on the National Forest boundary, with 20ft. of the ROW on NFS lands and 20ft. on private lands. In this portion of the corridor, approximately 10% has a Moderate SIO, and 90% has a Low SIO. The powerline is located down in a narrow drainage; the view of the powerline would be readily apparent in the foreground view from Pine Grove Road, and private residences directly adjacent to the powerline.

Alternative 5 No Action

Direct and Indirect Effects
This alternative assumes no implementation of a transmission line or elements of any alternatives on NFS land. There would be no direct or indirect effects to the Scenic Resource. No change in the scenic condition or other scenic attributes would occur.
Cumulative Effects

Understanding past, present, and reasonably foreseeable actions is necessary in order to evaluate potential cumulative effects of the various alternatives.

Methodology includes:

1) Review activities that are known to have occurred, or planned, within the planning area.
2) Review aerial photos of the area to compare areas where activities have occurred, with areas that activities are not known to have occurred.
3) Review past activities in the field and determine their effect on scenery.
4) Review planned activities – the location both on aerial photos and in the field, then determine the potential cumulative effects.

The boundary on the ground for analyzing cumulative effects is primarily that of the planning area. This identified area is the landscape that extends out approximately one mile from the various alternative routes of the proposed powerline.

The time boundary for this analysis extends from 2002 to 2043. This time boundary begins prior to the Battle Creek Fire that changed the majority of the vegetation south of Neck Yoke Road. The Battle Creek Fire changed the vegetation from forest to open grasslands with scattered trees. The current condition allows 5 years for pine seedlings to become established, and approximately 25 years for trees to grow up and visually "fill" open areas. This time period includes known management activities.

Fire suppression over the past century has played a role in the increased density of the vegetation on the forest. Likewise, much of the Forest was pre-commercially thinned by the Civilian Conservation Corp in the 1930s and 1940s, however we do not know if that effort included any or all of this planning area. The construction of the Mount Rushmore National Memorial in 1930s, and amenities in the Black Hills, draws the recreating public from around the region, and to a lesser extent across the nation and internationally. US Hwy 16 is the main access corridor from Rapid City and Interstate 90, to the central Black Hills Area and Mount Rushmore. The proximity of the National Forest, with views of the forest, and the ease of access to Rapid City (via US Hwy 16) has made the Pine Grove and Neck Yoke Road area a desirable location from private residences.

Prior to 2002, the NFS lands were predominantly forested, with few open meadows in the planning area. In August of 2002, a large wildfire (Battle Creek Fire) moved through the area, burning with enough intensity that the majority of trees were killed, leaving an open grass covered landscape, with few, scattered trees. As a result of the fire and the large distances between remaining trees, the natural regeneration of ponderosa pine trees (with seed cast of approximately 125 feet with wind) will take decades. The vegetation pattern, that is an important component of the scenic condition, will not change significantly for decades. Due to the open condition of the landscape, any activity that occurs along the upper half of the ridges (NFS lands) is readily apparent to the private lands to the east.

Since 1998, the mountain pine beetle has been very active in the Black Hills, expanding exponentially. Recent surveys have shown infestation has expanded at a rate of approximately 40,000 acres per year. Although the planning area does not readily display evidence of mountain pine beetle activity, it should be expected to affect this area. The remaining groups of pine trees could be readily affected, reducing the ability of existing vegetation to screen the proposed

powerline. Hence, an alternative that utilizes landforms would have the greatest potential, both now and in the future, to limit the visibility of the powerline in all areas.

Although, the ridges are devoid of vegetation, there is no visual evidence of past management activities from private lands. Old roads in the area are grown over and further access has been limited by National Forest Motorized Use rules. Overall, the area still has a natural appearing condition, although one that has dramatically been changed by natural forces.

All Action Alternatives

Segment from US Highway 16 to Neck Yoke Road. The addition of a powerline would have limited visibility. Lighting/shadows, screening will all play a part in lowering the visibility of this powerline in the landscape. With signing (billboards), businesses, and existing power lines along US Hwy. 16, there is a strong commercial presence. The clearing of a corridor in the forest canopy and the addition of structures reduce the natural appearance of the landscape. Should mountain pine beetles affect this area, the visibility of these structures and powerline would increase along this section of the route.

There are existing utility lines in this section, as well as a small electrical substation – that is partially screened by vegetation. In addition, there is an existing utility line that extends north, crossing US Hwy 16 at a right angle. Although the existing structures do not strongly stand out, they currently do not meet the High SIO of the area. In regard to LRMP Guidelines 8304 and 8310, and the additional new utility line, there should not be a great difference from the existing condition directly adjacent to US Hwy 16.

For the segment south, between US Hwy 16 - currently where there is no powerline (approximately mile post 0.18) - to Neck Yoke Road (approximately mile post 1.14). For the section where the powerline would traverse a steep north-facing slope, approximately 0.2 miles in length, this segment would move away from LRMP Guideline 8304 (a) – as it would be highly visible from the highway. South of this slope, where the powerline is located along the ridge top, trees would screen the powerline. In event of insect, disease, or fire activity, the powerline in this segment would be silhouetted on the skyline – when viewed from US Hwy 16. In the current vegetation condition, this segment would meet LRMP Guideline 8304 (a) – as it would not be highly visible from the highway. Overall 75% of this segment is seen from the Level 1 and 2 Highways, in all alternatives.

For portions of Alternatives South of Neck Yoke Road. As previously noted, there are no Sensitivity Level 1 or 2 corridors south of US Hwy 16 within the project area. However, portions of the different alternative routes, primarily along ridge tops where the powerline would be silhouetted, are seen from surrounding Level 1 and 2 Corridors, and are noted below by alternative. In relation to LRMP Guideline 8304 (a) – the higher the percentage, the more visible the alternative route is from Level 1 and 2 Highways, and the higher the number of homes that could also be affected.

Alternatives 1 Proposed Action

The ridge top route of the powerline would dominate the surrounding landscape, both when viewed from NFS and private lands, in the immediate foreground, foreground, and middle

ground views. The overall natural appearing condition of the National Forest landscape would be changed to an altered condition. The ridge top location for the majority of this segment of the powerline. For this alternative, 36% of this segment is seen from the Level 1 and 2 Highways.

Alternative 2
The limited ridge top route of the powerline would provide mainly only middleground views from NFS and private lands. However, NFS lands would still have immediate foreground, foreground, and middle ground views, depending upon the observers' location. The overall natural appearing condition of the National Forest landscape would be changed to a slightly altered condition. For this alternative, 23% of this segment is seen from the Level 1 and 2 Highways.

Alternative 3
With no ridge top locations, this alternative would have minimal visibility from private lands, essentially only along Neck Yoke Road, and where the powerline exists on NFS lands. The view within NFS lands is also limited to immediate foreground and foreground views, within the narrow drainages that this route would follow. The overall natural appearing condition of the National Forest landscape would be maintained through this alternative. For this alternative, 22% of this segment is seen from the Level 1 and 2 Highways.

Alternative 4
The section line route of the powerline will dominate the interface/boundary between private and NFS lands. When viewed from NFS lands, the powerline would be near the leading edge of an altered landscape (homes, roads, power lines) – delineating the outer edge of the NFS lands. The National Forest would maintain a Natural appearing condition. In some cases, this "boundary" location may be in the immediate foreground, or foreground viewing distance from private residences. The lower elevation of the route would reduce the visibility of the powerline in the landscape, and reduce the number of private residences that would likely be able to view it, but it would be closer to those private residences that could view it. The overall natural appearing condition of the National Forest landscape would be maintained through this alternative. Though the private lands, that are already developed, they would appear in a further altered condition. For this alternative, 28% of this segment is seen from the Level 1 and 2 Highways.

Alternative 5 No Action
This alternative assumes no implementation of a transmission line or elements of any alternatives on NFS land. There would be no cumulative effects to the Scenic Resource. No change in the scenic condition or other scenic attributes would occur.

Summary

Due to the Battle Creek Fire, and the resulting change in the vegetation pattern, any alternative that would locate a powerline on the upper half of the ridges, on NFS lands, would be highly evident, and dominate the surrounding landscape. As the mountain pine beetle continues to move through the forested landscape of the Black Hills, what vegetation that currently screens the alternative routes, cannot be relied upon to screen views of the powerline in the future.

A large portion of business in the Black Hills is built around tourism. The scenic beauty of the Black Hills is one of the key reasons why people come here to visit (*USDA-Forest Service. 2009b. pg. 26-29)* and live. When utilities and structures can be located in such a manner that their visibility is kept to a minimum, the benefit of the utilities (etc.) can still be realized, while the natural appearance of the landscape, and the resulting tourism and commerce can also be maintained.

When analyzing new constructed features in the landscape, visibility, form, line, color, texture, contrast, dominance, and viewing duration, are all important factors in determining the effects on scenery. Visibility is key when determining how wide a viewing area will be impacted. Only topography is considered in analyzing visibility as vegetation can be influenced by natural forces that can dramatically change the appearance of vegetation from one year to the next. As a result, none of the Action Alternatives meet the High & Moderate Scenic Integrity Objectives (LRMP Guideline 5612 & 8304) along US Highway 16 and south to Neck Yoke Road. The presence of existing power lines and the Rockerville substation are evident, but do not dominate the landscape due to the existing vegetation component that is present. The addition of a new powerline and a wider cleared corridor would increase the overall visibility of these structures along the highway. It would be critical to maintain the limited amount of vegetation that is between the substation and the highway to minimize the level of visibility.

From Neck Yoke Road south to the end of the project, Alternatives 1 and 4 would be the most visible crossing an open slope adjacent to Neck Yoke Road, and not meet the Moderate Scenic Integrity Objective for this area (LRMP Guideline 5612 & 8304). Overall Alternative 1 and 4 have the greater level of visibility in this segment - 36% and 28% respectively, of their length viewed from Level 1 & 2 road corridors. Alternative 2 and 3 have a lower level of visibility in this segment, 23% and 22% respectively. Alternative 3 has the potential to have the least impact on Scenery, and the greatest potential to meet LRMP Guideline 8304.

Alternative Tables

The tables below provide a comparative summary of effects from a scenery resource perspective. The first table (see Table 3-21) displays alternative differences between measurement indicators selected to compare effects to scenery issues. The second table (see Table 3-22) displays a subjective numerical rating of alternatives relative to scenery conditions developed during the analysis process.

Table 3-21 Effects to the Scenery Resource by Alternative

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Proposed Action	**Visual**	**Shorter FS Route**	**Mostly Private**	**No Action**
Contributes toward achieving MA 5.4 Scenery Integrity Objectives (SIO) (FP Guidelines 5601 and 5.4-5601) (Yes, No).					
Mile Post 0.0 to Mile Post 1.6 (Neck Yoke Road)	No*	No*	No*	No*	Yes
Mile Post 1.6 (Neck Yoke Road) to End of Project	No	Yes	Yes	No	Yes
Transmission line design and construction effects scenery (Low, Moderate, High level of impact).					
Mile Post 0.0 to Mile Post 1.6 (Neck Yoke Road)	H	H	H	H	NA
Mile Post 1.6 (Neck Yoke Road) to End of Project	H	M	L	L	NA
Visibility from travel corridors (None/Low, Moderate, High).					
Mile Post 0.0 to Mile Post 1.6 (Neck Yoke Road)	H	H	H	H	NA
Mile Post 1.6 (Neck Yoke Road) to End of Project	H	L	L	M	NA
Visibility from residences or subdivisions (1-None/Low, 2-Moderate, 3-High).	H	L	L	H	NA
Scenery—other comparison variables					
Total miles of transmission line on NFS land	5.3	5.6	4.1	2.6	0.0
Total miles of transmission line on private land	0.5	0.5	0.5	2.2	0.0
Miles of transmission line within ¼ mile of private land.	2.90	3.00	2.40	4.90	0.0
Miles of transmission line within ¼ mile of residences.	1.70	1.50	1.80	4.10	0
Total Transmission Line Miles	5.8	6.1	4.6	4.8	0
Acres of ROW on NFS lands	25.8	22.9	15.3	4.2	0
Acres of ROW on Private lands	2.5	6.9	6.9	19.3	0
Total ROW Acres	28.3	29.8	22.2	23.5	0

* Approximately 0.4 miles interspersed along Neck Yoke Rd between mile posts 0.0 and 1.6 do not meet SIO.

Table 3-22 Numerical Rating of Effects to Key Issues by Alternative

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Proposed Action	**Visual**	**Shorter FS Route**	**Mostly Private**	**No Action**
Contributes toward achieving MA 5.4 Scenery Integrity Objectives (SIO) (FP Guidelines 5601 and 5.4-5601) (1-Yes, 2-No).					
Mile Post 0.0 to Mile Post 1.6 (Neck Yoke Road)	2	2	2	2	1
Mile Post 1.6 (Neck Yoke Road) to End of Project	2	1	1	1	1
Transmission line design and construction effects scenery (0-None, 1-Low, 2-Moderate, 3-High level of impact)[1].					
Mile Post 0.0 to Mile Post 1.6 (Neck Yoke Road)	3	3	3	3	0
Mile Post 1.6 (Neck Yoke Road) to End of Project	3	2	1	1	0
Visibility from travel corridors (0-None, 1- Low, 2-Moderate, 3-High)[1].					
Mile Post 0.0 to Mile Post 1.6 (Neck Yoke Road)	3	3	3	3	0
Mile Post 1.6 (Neck Yoke Road) to End of Project	3	1	1	2	0
Visibility from residences or subdivisions (0-None, 1-Low, 2-Moderate, 3-High)[1].	3	2	1	3	0
Scenery—other comparison variables					
Total miles of transmission line on NFS land (0-None, 1-Low, 2-Moderate, 3-High).	3	3	2	2	0
Total miles of transmission line on private land (0-None, 1-Low, 2-Moderate, 3-High).	1	1	1	2	0
Miles of transmission line within ¼ mile of private land (0-None, 1-Low, 2-Moderate, 3-High).	2	2	1	3	0
Miles of transmission line within ¼ mile of residences (0-None, 1-Low, 2-Moderate, 3-High).	2	2	2	3	0
Total miles of transmission line (0-None, 1-Low, 2-Moderate, 3-High).	3	3	2	2	0

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Scenic class value TOTAL	30	25	20	27	2

SOCIO-ECONOMIC

This section addresses the socio-economic environment associated with the Black Hills Electric Cooperative, Inc. (BHEC) Rockerville Transmission Line Project. The discussion summarizes the environmental analysis of the project proposal and associated alternative transmission line routes from a socio-economic perspective. The scope of this analysis covers transmission line routes considered in detail within and adjacent to the Black Hills National Forest (BHNF) that begin at Rockerville substation and end where the proposed routes finally exit the National Forest System land boundary. Assessments and findings were focused on providing a relative comparison of alternative routes being analyzed across and adjacent to the Black Hills National Forest.

Affected Environment

General location and conditions. The project area lies in Pennington County, South Dakota. The Rockerville substation is located along US Hwy 16 about 10 miles southwest of Rapid City, the regional trade center and second largest city in South Dakota. The town of Rockerville is approximately one mile west of this substation where the project transmission line is proposed to begin. The private lands along and within a mile of the proposed and alternate routes contain developed ownership parcels of varying size from lots with homes to ranches of hundreds of acres. These private lands have a populated semi-rural setting. Local land managers call it the wildland-urban interface.

Mt. Rushmore National Memorial, which lies to the southwest of the project area (approximately six air miles), receives nearly three million visitors every year. A majority of these visitors travel the US Highway 16 corridor through the Rockerville area. Forest resources play an important role for the people living in and adjacent to the project area. The project area within the National Forest provides dispersed recreation opportunities such as hiking, hunting, horseback riding, bird and animal watching, etc. in a setting that is close to town, or for some, right out their back door. The transmission line is proposed to begin at Rockerville substation which lies just east of Rockerville, and is partially (briefly) visible in the forest adjacent to US Highway 16. The proposed route traverses National Forest System (NFS) lands and some private lands as it heads south and east for approximately six miles before it exiting the Black Hills National Forest.

Demographics. Examination of population trends is important to the understanding of the overall nature of an area. The use and occupation of the Black Hills is increasing due to population growth and a fairly diverse and flexible economy. Communities and outlying development and subdivisions have had the greatest impact on land use trends in Pennington County, with the majority of growth occurring in or near Rapid City. Approximately 30% of the increase in population has been located outside of Rapid City, near smaller communities and in subdivision developments. The population increase is due in part to growth in the tourist, service and manufacturing industries, the military and an influx of retirees to the Black Hills.

The Rapid City Planning Department projects that by 2025, Rapid City would have a population of 103,000. Some of this residential growth would result from the annexation of existing residential developments on the outskirts of the city and growth in the forested areas to the south and west of Rapid City. The Rockerville area lies in this general vicinity. Subdivisions and home construction building permits on private lands within and adjacent to the project area continues. The average household size in the vicinity of the project area is between 2.4 and 2.5 persons (US Census Bureau 2005-2009). Demands for public access roads, trails, and utility lines across the Black Hills National Forest continues to exert additional pressure on Forest uses and resources.

Labor force data indicates employment in the Rapid City area continues at a higher rate than much of the country. Unemployment as of November 2011 is 4.5 percent, one of the lower rates in the country during this period (SD Department of Labor & Regulation 2011).

Tourism officials have described the Black Hills National Forest as a 'friendly forest.' A designated road/trail system allows easy access into the Forest and, in most places, the topography is gentle enough to invite casual walking, berry picking, and other dispersed recreational activities.

Wildland-Urban Interface. The wildland-urban interface (WUI) refers to the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland and associated vegetation and vegetative fuels. The project area can be categorized as wildland-urban interface.

Individuals that choose to live within the WUI are lured by solitude and the opportunity of being close to nature. Infrastructure and other socio-economic needs brought about by the influx of people within the project area include the needs for highways and roads, transmission and other utility lines, viewsheds and proximity to National Forest. New residents moving to the WUI carry expectations of urban services with them. Many residents have a strong tradition of multiple-use of resources and expect a balance of goods and services from these resources.

Lifestyles. Although population growth is bringing in more people with new and different ideas, there is little evidence that attitudes or lifestyles are changing in a major way. The beauty of the area brings in new residents and those with tenure are tied to the way the Forest is already managed, either by employment such as the logging/ranching industries or people are outdoor-oriented and have developed varied and specific outdoor user expectations (hunting, fishing, biking, off-road use and tourist based activities). Some residents in the area consider the forest resources and forest health as an important part of their quality of life. Visitors, both local and non-local use the area for a wide range of dispersed recreation activities including, hunting, fishing, camping, wildlife viewing, and on and off-road vehicle use.

Human Health and Safety. Public safety is more often affected by the choices people make on their own while visiting the project area, or by the consequences of natural events, like wildfires, flooding or wind, and hail storms. Despite being in close proximity to Rapid City, the project area is rural forested and in places semi remote. Hazards exist in the form of natural and human-caused conditions. Wild animals and insects are plentiful. Ticks exist which may carry lime disease and Rocky Mountain spotted fever. Poison ivy grows throughout the area. Forest users need to be aware of the presence of Prairie rattlesnakes--poisonous. Weather-related events can

be life threatening, and probability of a wildfire is a risk every month of the year. Most human activities in the Forest, including hunting, hiking, mountain biking, and driving a vehicle, carry some inherent risk.

Currently, there is an extensive road system throughout most of the project area. Use of these roads by the public is subject to regulation as provided by the Forest Travel Management Plan. Other roads in the area are private or under the jurisdiction of Pennington County. A main concern is the ability of the Forest Service and local volunteer fire departments to have access, and that important arterial and access roads are not closed in order to facilitate wildfire suppression efforts in this WUI area.

Issues and Concerns. During the public involvement comment period on the project proposal, some of the public expressed concerns relating to the effects of the proposal on certain socio-economic factors. These factors are summarized as follows:

- Quality of life – Comment concerns included: impacts to quiet, peaceful lifestyle; transmission line would bisect subdivision; individuals chose to live in area for beauty, quiet, feel that is threatened by proposal; change in lifestyle concerns related to peace, quiet, health, beauty, wildlife, privacy, no thrufare between US Hwy 16 and SD Hwy 40; infringement of individual rights; chose to live near National Forest limited access portion.
- Property values – Comments expressed concerns with property, growth and land values. To paraphrase the comments: There would be a growth promoting effect to the south; it would decrease property values; most of the area around is already developed—no increase in demand for power expected; effect on productive value of NFS lands; loss of real estate values.
- Health and Safety – Some respondents had public health and safety related concerns: effects of low frequency electromagnetic fields on public health; human health and safety impact from transmission line.
- Costs – Other responses received from the public comments had cost related questions and concerns: Cost projections of new line vs. Maintaining old lines; impact on future management and revenue from wildlife, hunting, grazing; would BHEC compensate for loss due to proximity of lines; returns to BHNF for granting access to area.

Discussion of the effects to these factors of concern follows below for the proposed transmission line route, as well as alternative routes.

Each alternative route is also analyzed in terms of specific measurement indicators directly and indirectly related to socio-economic issues of concern. These measurement indicators (both quantitative and qualitative) provide a basis from which the reader and decision maker can make further relative comparison between the proposed action and alternative actions regarding their effects. The Socio-economic measurement indicators are listed as follows:

- Consistent with Forest Plan Standards and adheres to Guidelines relative to utility corridors (FP Standards or Guidelines 8303-8310) (Yes, No).
- The cumulative cost of respective alternatives (Cost-$).

- Length of transmission line within ¼ mile of private land (Miles).
- Length of transmission line within ¼ mile of residences (Miles).

The analysis of effects discussion that follows discloses the effects (environmental consequences) of the proposed transmission line route and alternative routes relative to the factors discussed above. This NEPA analysis is focused on the part of the transmission line proposal and alternatives that are located on NFS lands. The transmission line routes cross private land within and adjacent to NFS lands. Effects to the environment in those areas are also discussed.

Environmental Consequences

The discussion that follows focuses on disclosure of the environmental consequences that the proposed transmission line route and alternative routes is projected to have on the socio-economic environment including the factors raised by the public during the scoping period. Also, to assist in providing a relative comparison between alternative routes considered during the analysis, socio-economic measurement indicators for each alternative are displayed in Table 3-23 and discussed. See also Table 2-1 in Chapter 2 of this EA.

Socio-economic effects are generally quite similar across all action alternatives. So the bulk of the discussion of effects is provided under the section below called: Effects Common to All Action Alternatives. Following this section is a discussion of the effects unique to or somewhat different for each respective alternative.

Effects Common to All Action Alternatives

Constructing and operating the proposed transmission line (and alternatives), routed across or adjacent to NFS lands, modifies the general location and conditions within and along the transmission line right-of-way. The effect on demographics: population, jobs, and general economy of the area is expected to be minor. The proponent expects to contract with existing power line construction businesses within or outside of the western SD area to facilitate construction. BHEC expects to hire no additional employees to help with operations and maintenance (BHEC 2011). To the extent that the company contracts locally there could be a small related boost to the local economy and associated tax benefit to Pennington County.

As stated previously, the project proposal area lies within the wildland-urban interface. As such, construction of a new transmission line would add more urban infrastructure to this area. Land managers, fire management authorities, and the local populace would need to take into consideration these additional improvements relative to the dynamics of what takes place in the wildland-urban interface.

Lifestyles of most people living in the area and users of the National Forest (NF) in that area are not expected to be influenced or changed appreciably with the construction and presence of a new power line. To the extent that quality of life and lifestyle are closely related, the effect of a new transmission line on quality of life should be recognized and is discussed below.

The health and safety of people living in the area and users of the NF in that area has both positive and negative effects. Health and safety was a factor raised by some during the public comment period. This concern is also discussed in detail below.

Quality of life. Quality of life generally refers to the level of satisfaction or degree of well-being experienced by an individual or group of individuals partly as a result of physical surroundings or setting, although a variety of factors contribute to an individual's overall experience of quality of life. Quality of life is unique to each individual. Thus, the experiences and physical surroundings which contribute to quality of life may vary greatly between individuals. Quality of life can be considered a multi-dimensional and intangible concept which generally cannot be evaluated using quantitative measures. For the purpose of this analysis, quality of life is discussed in terms of various aspects of the environment which are perceived to contribute to quality of life and may be affected or altered through implementation of the proposed project transmission line route (or alternative routes). These aspects of the environment include a number of the resource areas, which are analyzed and discussed in detail in their respective sections of the EA: Scenery, Wildlife, Travel and Access, Cultural, Noise, Recreation, etc.; and applicable Resource Specialist Reports.

Implementation of the proposal would include construction activities that would introduce temporary impacts to the project area. Impacts would have both a favorable and an adverse effect to a varying degree on quality of life of individual users and residents of the area. Once the transmission line is constructed, operation and maintenance activities would have the potential to affect the project area and affect quality of life depending on the individual and user attitudes toward the presence of transmission line infrastructure.

Temporary impacts associated with construction of the proposed project could result from the use of heavy machinery, equipment, and vehicles generating effects associated with noise, air quality, traffic, and scenery. These factors may have an adverse effect on quality of life for individuals who choose to live in quiet or undeveloped locations within or near the project area associated with the lack of noise, traffic, and construction related aesthetics normally evident in developed areas. Construction activities and construction-related traffic may result in temporary access restrictions to the area, which could have an adverse effect on quality of life for individuals who have chosen to reside in the project area due to the accessibility and availability of dispersed recreation opportunities.

Following construction activities, operation and maintenance related to the proposed project would have characteristics and potential for impacts that may have an adverse effect on quality of life. For example, during public scoping of this project, some public comments expressed concern regarding the potential health and safety effects of Electric and Magnetic Fields (EMF) that would be introduced with a new transmission line. EMF could have an indirect adverse effect on quality of life by resulting in an alteration of the perception of safety and/or security that members of the public would have living and recreating in the area. Further discussion of EMF follows in the Health and Safety section.

Implementation of the proposed project (or alternative routes) would also change the visual landscape as observed from certain viewpoints through the introduction of new transmission line infrastructure. This could have an adverse effect on quality of life for individuals who value the

present lack or minimal effect of such features in the visual landscape of the area. The effects relative to scenery are discussed in detail under the Scenery Resources section of the EA and in the Scenery Assessment Specialist Report.

The proposed transmission line would be expected to introduce some level of noise. This could have an adverse effect on quality of life for individuals who value the lack of noise in the area. Long-term noise effects associated with the proposed transmission line, or alternative routes, are limited to periodic noise that would be generated by maintenance activities, intermittent aolian noise (wind flow around conductor wires and structures) and corona noise. Noise associated with maintenance activities or windy weather is generally minor and only occurs for a short time between long intervals of time. Corona noise is localized and only affects receptors in close proximity to the transmission line. Corona noise levels for a 69kV transmission line varies due to many factors such as the voltage of the line, the diameter of the conductors, the locations of the conductors in relation to each other, the elevation of the line above sea level, the condition of the conductors and hardware, and the local weather conditions. Typically for transmission lines of 138kV and less, the maximum corona noise during wet weather conditions is usually less than 40 decibels (dBA) at the edge of the ROW (AEG 2004). Corona noise typically becomes a design concern for transmission lines at 345kV and above and is less noticeable from lines like those in the proposal or alternatives that are operated at lower voltages (County of San Diego, CA 2010). As a comparison, noise levels for other common sounds are noted: ambient noise in an average home—50 (dBA); normal conversation at three feet—60-65 dBA; vacuum cleaner—60-82 dBA; interstate traffic at 165 feet—70 dBA. Pennington County has no ordinance standards or requirements related to noise.

Although the proposed project and action alternatives would be expected to introduce impacts that may have an adverse affect on quality of life, as described above, the project would also have the potential to positively affect quality of life in the area by providing more reliable electrical service to users in the area. It should be noted that residents in the vicinity of the proposed transmission line are members of the cooperative and obtain their electrical service from BHEC, the project proponent. Completion and implementation of the proposed project would significantly increase the reliability and improve electrical service to cooperative customers in the area. This is an aspect of quality of life that is important and critical to most people who depend on reliable electrical service to support their lifestyles.

Positive effects on quality of life should be realized by providing more reliable electrical power necessary to accommodate the growth and development (see demographics discussion) in this general area south and west of Rapid City. Furthermore, the project would be expected to introduce a positive impact to the overall cost picture of the company relative to reduced operational and maintenance costs (see cost discussion below) with higher reliability in this area. Any cost efficiencies realized by the company, a cooperative serving its membership, could be realized as a direct benefit to the cooperative members/users and beneficial to their quality of life.

The proposed project and action alternatives would introduce impacts which could affect certain aspects of quality of life to a varying degree, for some individuals. For those that value the current condition (limited transmission line presence in the vicinity) construction of a new line would be a change in the current setting and may adversely affect the quality of life of those that like it the

way it is. For others, the construction and operation of this project would be considered or expected as a necessary development to meet the growing demand and improve service reliability for Cooperative electric customers—considering it a necessary part of quality of life enhancement and the change in setting as a positive or necessary change. It is not expected that the proposed project or alternatives would have the potential to adversely impact the overall concept or experience of quality of life for most individuals who live or recreate near the project area.

Property values. Concern was expressed by some during the public scoping period related to the potential effect of the proposed transmission line on the value of private property in proximity to the transmission infrastructure. Basically, the proposal (and action alternatives) would introduce an impact to private property value if any aspect of construction or operation would be reasonably expected to cause a substantial change in existing property values. A number of studies and reviews have evaluated this concern.

During recent transmission line projects, the CPUC (California Public Utilities Commission) has noted a high level of public concern associated with the potential effects of transmission line sighting on property values. The California Energy Commission (CEC), in its review and licensing of several power plant projects between 2000 and 2003, received similar public interest and concern regarding the potential impacts of transmission lines on property values. As a result, CEC Staff researched the literature on proximity impacts analysis for property values. The CEC cited Kinnard and Dickey (1995), as a comprehensive study on this topic. The CPUC used this literature-review approach in addressing concerns regarding property values in four recent transmission line Environmental Impact Reviews (EIR). Claims of diminished property value through decreased marketability are based on the reported concern about potential hazards to human health and safety, as well as the potential for increased noise, traffic, and visual impacts associated with living in proximity to unwanted land uses such as power plants, freeways, high-voltage transmission lines, landfills, and hazardous waste sites. (USDA Forest Service 2010)

Kinnard and Dickey (1995) identify useful procedures in measuring differences in property sales prices, marketing periods, and/or comparative property sales volume (considering properties in close proximity to transmission or distribution lines versus competitive properties that are not in close proximity to such infrastructure). Kinnard and Dickey (1995) conclude that proximity to a transmission line does not necessarily cause a reduction in the value of surrounding private properties and that other physical and neighborhood qualities have a greater impact on property value determination.

A 2003 Electric Power Research Institute (EPRI) study entitled "Transmission Lines and Property Values: State of the Science," states that differences in location and time of data collection, as well as research design, make direct comparisons of results from the various studies very difficult. Although quantitative generalizations from studies cannot be reliably made, the following conclusions from studies seem to be similar across the board:

- There is evidence that transmission lines have the potential to decrease nearby property values, but this decrease is usually small (6.3 percent or less).
- Lots adjacent to the ROW often benefit; lots next to adjacent lots often have value reduction.

- Higher-end properties are more likely to experience a reduction in selling price than lower-end properties.
- The degree of opposition to an upgrade project may affect size and duration of the sales-price effects.
- Setback distance, ROW landscaping, shielding of visual and aural effects, and integration of the ROW into the neighborhood can significantly reduce or eliminate the impact of transmission structures on sales prices.
- Although appreciation of property does not appear to be affected, proximity to a transmission line can sometimes result in increased selling times for adjacent properties.
- Sales-price effects are more complex than they have been portrayed in many studies. Even grouping adjacent properties may obscure results.
- Effects of a transmission line on sale prices of properties diminish over time and all but disappear in five years.
- Opinion surveys of property values and transmission line may not necessarily overstate negative attitudes, but they understate or ignore positive attitudes.

The EPRI (2003) study points out that one of the difficulties in determining the potential impact of transmission line siting on property values is the wide range of methodologies used to measure impacts. It is extremely difficult, if not impossible, to predict the likely impacts on property values of [a] proposed project, let alone differences between alternative routes and/or with tower removal/consolidation.

A Pacific Consulting Services (1991) study of the area around Vallejo, CA which is entitled "A Statistical Analysis of Transmission Line Impacts on Residential Property Values in Six Neighborhoods" found that overall, the presence of a transmission line within a neighborhood has less than a one-percent effect on the sales prices of most properties in the neighborhood. Under some specific conditions, however, there can be as much as a 12 percent adverse effect or a 10 percent positive effect on selling price. In the Pacific Consulting Services study, six neighborhoods with transmission lines were selected for review, reflecting a variety of transmission line and ROW conditions. The study concluded that factors linked with adverse property value effects include: (1) ROW passage through adjacent property, and (2) modification to (upgrading) the line after development of the neighborhood. Factors linked with favorable price impacts include: (1) integration of the ROW design into the neighborhood with unobstructed access, and (2) planned landscaping of the ROW. Visibility of transmission lines located outside the neighborhood appears to have no effect on selling prices in the neighborhood (Pacific Consulting Services 1991). Like the studies cited above, the Pacific Consulting Services study also found that adverse impacts associated with transmission line upgrading diminish over time and nearly disappear within five years of reconstruction. It may be that both the size of these effects and the amount of time until they dissipate depend on the level of community opposition to construction and how the utility such as BHEC handles such opposition.

The California Energy Commission (CEC) reviewed the Analysis of Property Value Impacts of the Crockett Cogeneration Project, submitted by the Applicant for the Crockett Cogeneration Project. The Crockett analysis cites several studies that examine the impacts on property values of very large industrial facilities. Such facilities include nuclear power plants, industrial waste incinerators, and landfills. The findings of previous studies in the Crockett analysis *"yield an equivocal conclusion.*

Under some conditions facilities result in negative economic impacts and under other conditions they do not. Thus, even for very large facilities that are extreme in terms of their potential health, safety, and aesthetic impacts, there is no clear association with diminished economic impacts. Indeed, economic impacts are not clearly and reliably observed even for nuclear power generation facilities near residential properties." Further, the Crockett analysis states that *"there are many factors involved in purchasing a new home: affordability; age; size; schools; location; and so on, and it has simply not been demonstrated that a view obstruction would be a major factor in a property value decline" (*Crockett 1992) (USDA Forest Service 2010).

The Kinnard and Dickey (1995) paper and the Crockett (1992) analysis cite several examples of proximity impact analyses, methodologies used to measure impacts, and types of possible proximity impacts on residential property values. Both studies conclude that differing and sometimes conflicting findings have emerged from market studies. While it is possible that property owners near the proposed BHEC project route may believe that their homes would diminish in value because of project implementation, the actual loss of property value and potential effects can only be tested through data from home sales. The studies cited have shown that there is evidence that transmission lines have affected property values in some cases, though the effects are generally smaller than anticipated and difficult to quantify. The numerous studies discussed above additionally conclude that the potential for other environmental issue areas associated with transmission line projects (including aesthetics and noise) to have an effect on property value is usually smaller than anticipated and very difficult to quantify due to the individuality of properties and their respective neighborhoods, as well as differences in the personal preferences of individual buyers/sellers, and the weight of other factors that contribute to a person's decision to purchase a property. Studies such as those cited indicate that other property-specific factors such as neighborhood features, square footage, size of lot, and irrigation potential are substantially more likely than the presence of overhead transmission lines to be major determinants of the sales price of property. These studies have generally concluded that over time, potential adverse effects to property value tend to diminish to a point of being negligible within five years. The studies determined that this decreasing effect is most likely due to increased screening of transmission lines over time, as trees and shrubbery increase in size, as well as diminished public sensitivity to the transmission line proximity, particularly resulting from the absence of adverse publicity. While it is possible that property owners, near the project route (or action alternative routes), may have the perception that their homes would diminish in value, potential property value issues associated with the project can only be tested through real data from actual home sales (USDA Forest Service 2010).

Increase in development or growth-inducing effects of a new transmission line, as it relates to property value and for some their quality of life, was a concern expressed by a few during the public comment period. Typically, the growth-inducing potential of a project such as this may be considered adverse to some if it fosters growth and development or a concentration of population above what is expected by local planning authorities. In contrast, others may view regulated growth as a real boost to the local economy, property values, etc. Growth caused indirectly by project related employment could occur at a modest level if local contractors are involved in construction. The Cooperative does not plan to add new employees to conduct operations and maintenance of the new line. Considering the limited magnitude of this project, no appreciable growth in the local labor force is anticipated.

The project area, generally located south and southwest of Rapid City in Pennington County, is experiencing steady growth and development as discussed earlier. It continues to be a desirable place to live. This growth, primarily in up-scale residential housing, is expected to occur with or without implementation of the project proposal or action alternatives. The project is timely in that it enables the Cooperative to provide increased service reliability for expected future load growth as well as existing customers. The project would necessarily be consistent with local planning requirements and policies. Any growth and development influenced by the availability of additional service provided by the project would need to conform to these local policies. Although the project would not directly result in area growth, implementation would remove future obstacles to growth related to availability of adequate, reliable electrical service. Responsible, regulated growth, whether influenced by a new transmission line or not, should positively benefit property values in the area.

Based on review of the studies cited above, it is evident that many factors and perceptions affect property value. It seems reasonable to assume that some aspect of project construction and/or operation and maintenance would potentially affect private property values in the area of BHEC's proposed route (or other action alternative routes). The degree of effect appears to lack certainty and evidently, based on the studies cited, can be both positive or negative depending on many variables. Moreover, these studies and findings suggest the effects of transmission lines on property value in a project area have generally a lesser effect on property values than other factors. Physical and neighborhood qualities have a greater impact on property value determination.

Health and Safety. The discussion that follows presents several health and safety related topics associated with electrical transmission lines. Topics include: Electric and magnetic fields (EMF); Interference with radio, television, communications, or electronic equipment; Induced currents and voltages; Wind hazard; and Fire hazard.

Electric and Magnetic Fields (EMF) effects on individual and public health and safety. Some public scoping comments expressed concern regarding the potential health and safety effects of low frequency electric and magnetic fields (EMF) associated with a new transmission line. Published literature on the subject indicates that there remains a lack of consensus in the scientific community regarding public health impacts of EMF at the levels expected from electric transmission line facilities (USDA Forest Service 2010). There are no Federal or State of South Dakota standards limiting human exposure to EMF from transmission lines.

In October 2005, the World Health Organization (WHO) convened a Task Group of scientific experts to assess any risks to health that might exist from exposure to extremely low frequency (ELF) electric and magnetic fields in the frequency range >0 to 100,000 Hz (100 kHz). In the United States, electricity is usually delivered as alternating current that oscillates at 60 cycles per second (Hertz, Hz) putting fields generated by this electrical energy in the ELF range. The Task Group reviewed evidence for a number of health effects, and updated the evidence regarding cancer. The conclusions and recommendations of the Task Group are presented in a WHO Environmental Health Criteria (EHC) monograph (WHO 2007). Following a standard health risk assessment process, the Task Group concluded that there are no substantive health issues related to ELF electric fields at levels generally encountered by members of the public.

Regarding the health issues associated with ELF magnetic fields, the Task Group studied a number of adverse health effects for possible association with ELF magnetic field exposure. These include childhood leukemia and other childhood cancers, cancers in adults, depression, suicide, cardiovascular disorders, reproductive dysfunction, developmental disorders, immunological modifications, neuro-behavioral effects, and neuro-degenerative disease. The WHO Task Group concluded that scientific evidence supporting an association between ELF magnetic field exposure and all of these health effects is much weaker than for childhood leukemia. In some instances, (i.e., for cardiovascular disease or breast cancer) the evidence suggests that these fields do not cause them.

The evidence related to childhood leukemia is not strong enough to be considered causal (WHO 2007). This conclusion by WHO is made in light of considerable scientific research examining long-term risks from ELF magnetic field exposure focused on childhood leukemia. In 2002, the International Agency for Research on Cancer (IARC), established under the auspices of WHO, published a monograph classifying ELF magnetic fields as "possibly carcinogenic to humans." This classification is used to denote an agent for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence for carcinogenicity in experimental animals (other examples include coffee and welding fumes). This classification was based on pooled analyses of epidemiological studies demonstrating a consistent pattern of a two-fold increase in childhood leukemia associated with average exposure to residential power-frequency magnetic field above a certain level. The Task Group concluded that additional studies since then do not alter the status of this classification. However, the epidemiological evidence is weakened by methodological problems, and the fact that there are no accepted known biophysical mechanisms that would suggest low-level exposures are involved in cancer development. Also, animal studies have been largely negative. Thus, on balance, WHO considers the evidence related to childhood leukemia not strong enough to be considered causal.

Basically, the research to date has uncovered only weak and inconsistent associations between exposures and human health. The research has not been able to establish a cause and effect relationship between exposure to magnetic fields and human disease, nor a plausible biological mechanism by which exposure to EMF could cause disease. The magnetic fields produced by electricity do not have the energy necessary to break chemical bonds and cause DNA mutations (PSCW 2010).

Based on the conclusions cited above, there appears to be no conclusive findings in scientific literature that definitively demonstrates an adverse causal effect to a number of public health conditions associated with ELF/EMF. This suggests that any adverse effect related to EMF on public health from transmission lines, such as the BHEC proposal or other action alternatives, can be characterized as ranging from no effect to uncertain.

<u>Interference with radio, television, communications, or electronic equipment.</u> Electric and magnetic field interference from power lines occurs at a frequency level that is substantially below the frequency range of communications systems and does not typically pose interference problems for communication equipment, as can be seen from the number of cell phone arrays that are mounted directly on or near transmission line structures. Corona or gap discharges related to high frequency radio and television interference impacts are dependent upon several factors, including the strength of broadcast signals and are anticipated to be very localized if it

occurs. Individual sources of adverse radio/television interference impacts can be located and corrected on the power lines. Magnetic field interference with electronic equipment such as computer monitors can be corrected through the use of software, shielding, or changes at the monitor location. To reduce the potential impacts of radio, television, communications, or electronic interference there are measures that can be applied, such as limiting the conductor surface electric gradient and, practically speaking, having the power company document and resolve individual electronic interference complaints (USDA Forest Service 2010).

Electromagnetic interference (EMI) from EMF with implantable medical devices such as cardiac pacemakers and cardioverter defibrillators (ICDs) is becoming increasingly common. Sources of EMI documented by medical personnel include radio-controlled model cars, slot machines, car engines, digital cellular phones, anti-theft security systems, radiation therapy, and high voltage electrical systems and devices. Manufacturers' recommended threshold for modulated magnetic fields is 1 gauss which is 5 to 10 times greater than the magnetic field likely to be produced by a high-voltage transmission line—including the proposed 69kV line. Transmission lines are only one of a number of external EMI sources. All pacemaker and ICD patients are informed of potential problems associated with exposure to EMI and must adjust their behavior accordingly. Moving away from a source is a standard response to the effects of exposure to EMI. Patients can shield themselves from EMI with a car, a building, or the enclosed cab of a truck (PSCW 2010).

Induced currents and voltages. Induced currents and voltages on conducting objects near the proposed transmission line such as fences, metal buildings, and pipelines within or near the ROW that have the potential for induced voltages is a potential safety hazard. This can be avoided if nearby conducting objects are properly grounded. Also adherence to established grounding and other regulatory safety measures by BHEC regarding the transmission line infrastructure would significantly reduce the potential for this hazard to occur (USDA Forest Service 2010).

Wind hazard. Wind hazards related to high wind weather events effecting transmission line infrastructure stability is possible, as well. However, transmission line structures used to support overhead transmission lines must meet regulatory requirements for overhead transmission line construction. Regulatory design code and the National Electrical Safety Code (NESC) include loading requirements related to wind conditions. Transmission support structures are designed to withstand different combinations of loading conditions including extreme winds. These design requirements include use of safety factors that consider the type of loading as well as the type of material used (e.g., wood, steel or concrete). Failures of transmission line support structures are rare and generally result from extreme loading conditions that occur during tornadoes or ice storms (USDA Forest Service 2010).

Fire hazard. Wildfire ignition from a downed conductor, tree leaning into a conductor or lightning poses opportunity for fire ignition if fuels and weather conditions are favorable. Design requirements pertaining to ROW width; removal of hazard trees; installation of overhead lightning protection line above conductors are all design criteria that can reduce the potential for ignition. Periodic inspection and maintenance by the company, as well as vigilance by the company, agency and public, can help reduce the potential for wildfire development caused by transmission lines.

Costs. Costs associated with the project are borne by the project proponent, BHEC. Costs incurred by BHEC include not only construction, operation and maintenance of a potential

transmission line facility, but also the costs associated with the environmental planning, analysis and decision process (NEPA) that must be conducted for the proposed route and alternative routes that traverse National Forest System lands.

Projected costs associated with adding a segment of new transmission line to complete a loop versus just maintaining the existing line can be extremely variable and subjective at best. Basically, other than testing for ground line deterioration or decay of poles, there is no way to do maintenance on the existing line without de-energizing the line. Line maintenance tasks such as checking and tightening hardware, changing insulators, repairing frayed conductors, replacing crossarms, replacing poles, repairing broken ground wires, etc. all require personnel and equipment to work in close proximity to normally energized parts. The safest, most efficient, and least costly way to accomplish that work is with the line de-energized and grounded. Without a looped system as proposed, de-energizing the transmission line would be disruptive to as many as 2,500 consumers who would be without power for the duration of the maintenance work (six to eight hours per day for up to four days depending on the line segment). Regardless of the amount and frequency of maintenance to the existing line, a well-placed ice storm or tornado could take out a line segment, leaving consumers without power 24 hours per day for several days until the line could be rebuilt. The true cost comparison cannot really be measured in dollars and cents, but rather, the inconvenience or hardship to consumers left without electricity for an extended period of time (BHEC 2011).

There is minimal cost or benefit realized by the Forest Service for this project. Should the proposed transmission line, as presented in Alternative 1 (or any of the action alternatives), be approved, constructed and operational, the Forest Service would receive no monetary benefit. The agency does not assess a fee from Rural Electric companies. Costs associated with Forest Service administration of the amended utility special use permit would be covered by U.S. Government agency appropriated funding. The Forest Service office located along US Hwy 16 is provided electricity from BHEC. The benefit to the Forest Service is better electrical service without extended periods of time with no electricity.

Cumulative Effects Common to All Action Alternatives

The geographic "footprint" of this project is the same as the project setting described earlier. It basically covers about a mile on either side of the action alternatives on both NFS lands and adjacent private land. Past development and population expansion on private land and use of NFS lands within or near the project area has impacted (both positively and negatively to varying degree) the local population, housing demand, property values, quality of life and user experiences in the area. As regulated development continues (as expected), more infrastructure, impact to local property values, quality of life effects, etc. would occur.

The construction of the proposed new transmission line, or action alternative, would add more infrastructure to the National Forest, which presently consists mostly of roads in this general area. Construction and operation of utility lines is permitted on the National Forest as discussed earlier. As population and development continues to increase in areas within and surrounding National Forest, prudent development of services to support this growth is necessary. The National Forest would continue to evaluate and accommodate such growth service needs within the constraints of its management authority and policy requirements.

There exists a short (estimated 600 feet) segment of BHEC distribution line that runs partially on NFS lands, parallel to all action alternatives, from the Rockerville substation southward before veering southwestward fully on private land. The proposed route and all action alternatives also cross an existing distribution line just north of Neck Yoke Road on private land. Other than those segments, no other utility corridor currently exists in proximity to the proposed route (Alternative 1) or Action Alternatives 2 and 3. However, for Alternative 4, about one mile of the route parallels an existing distribution line along Pine Grove Road from where they meet starting less than a quarter mile south of Neck Yoke Road and running southward.

So construction of the proposed line or alternatives would add an additional 4.6 to 6.1 miles of new transmission line infrastructure to the National Forest and adjacent private lands in this area. The effects of the new line would be cumulatively additive to any effects associated with the existing distribution lines in the area. These effects would be similar to those discussed in this section. Additional infrastructure on National Forest is limited to existing NF system and non-system roads. See Travel Specialist Report for discussion of those roads. Existing Pennington County roads and private roads associated with residences and local travel are numerous in the project area.

Of note is that the broader area south and southwest of Rapid City, in which the general project area is located, appears to be experiencing additional growth and residential development. This trend indicates that this area continues to be a desirable place for new homes and possibly businesses—which typically leads to increased property values. Nevertheless, some individuals would continue to have the perception that the project would have the potential to adversely affect their property values and quality of life in general.

No similar developments or any other infrastructure on NFS lands in this area are currently proposed or expected in the foreseeable future. Furthermore, additional new roads are not anticipated in the short-term on private land barring any new development or subdivision of the private in-holdings in the area.

Revenues associated with other uses on NFS lands, such as grazing, firewood gathering, etc., are expected to remain unchanged regardless of which alternative is implemented. Likewise, it is anticipated that no changes in revenues realized by the State of South Dakota for hunting licenses associated with hunting in this area would occur.

It is expected that the cumulative and incremental increase in infrastructure and associated effects would be of limited impact to the majority of residents and users of the area. There would be some who remain opposed and perceive to be adversely affected regardless of the alternative implemented. Some would not accept or appreciate the benefits associated with a new transmission line: improved reliability; expected reduced down-time and lower maintenance costs. Others who expect and are dependent on reliable, efficient electrical service would be supportive and appreciative or simply accept it.

No matter the action alternative selected, construction is planned to occur on private property between the exiting point from NFS land to the final destination point of Hermosa, SD. BHEC will work with individual landowners to gain ROW through their property.

Existing distribution lines are aligned or cross short segments of the project alternative alignments. With additional infrastructure crossing or paralleling in those segments, public awareness and cautionary behavior would be prudent from a health and safety standpoint. This should be the case regardless of whether a new line is constructed or not. For the various alternatives, EMF from adjacent lines would interact cumulatively such that the magnetic field would either increase or decrease in field strength. The literature cited in the EMF discussion above indicates that there appears to be no conclusive scientific findings that definitively demonstrate an adverse causal effect from EMF to public health.

No other adverse cumulative health and safety effects are anticipated.

Alternative Comparison Tables

Alternative comparison, summarized in Table 3-23 and Table 3-24, is based on comparable route and length of the respective alternatives. The route for all action alternatives begins at the Rockerville substation. All action alternative routes cross or run adjacent to private land within or adjacent to the National Forest boundary. The routes exit at the National Forest boundary where the respective alternatives proceed eastward away from the National Forest along a route undetermined at this time. For Alternatives 1 and 2 the exit point is the quarter corner common to Sections 5 and 8, T2S, R7E. For Alternatives 3 and 4 the exit point is the section corner common to Sections 31 and 32, T1S, R7E; and Sections 5 and 6, T2S, R7E (see Project Area Map in Appendix E). It is expected that as the proposed or alternative routes proceed eastward, away from the National Forest boundary on private land, there would be a larger number of residences in proximity to the transmission line until the route(s) exit the developed residential areas further to the east.

Socio-economic effects of the proposal and alternatives were determined to be a key issue category by the Forest Service deciding official. As such, a number of measurement indicators were developed by the Project Analysis Team and approved by the deciding official (see Table 3-23). These are also displayed in Chapter 2, Table 2-2. Use of measurement indicators applicable to the socio-economic issue provides a basis from which the reader and deciding official can make a relative comparison between the proposed action and alternative actions regarding their effects.

Table 3-23 Socio-economic Effects--Measurement Indicators

	Alt 1	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Issue - Measurement Indicators	Proposal	Visual	Shorter NF Route	Mostly Private	No Action
Consist with Forest Plan Standards and adheres to Guidelines relative to utility corridors (FP Guidelines or Standards 8303-8310) (Yes, No).	Yes	Yes	Yes	Yes	Yes
Cost ($/Mile). The unit cost of respective alternatives.	370,000	370,000	370,000	370,000	0
Total Cost ($). The total cost of alternatives.	2,146,000	2,257,000	1,702,000	1,776,000	0
Miles of transmission line within ¼ mile of private land.	2.9	3.0	2.4	4.8	0
Miles of transmission line within ¼ mile of residences.	1.7	1.5	1.8	4.1	0

Table 3-24 below displays additional variables associated with the transmission line routes to further facilitate comparison of Alternatives.

Table 3-24 Socio-economic Effects--Other Comparison Variables

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Other Comparison variables	Proposal	Visual	Shorter NF Route	Mostly Private	No Action
No. of residences within ¼ mile of transmission line.	16	16	15	30	0
No. of residences within 500 feet of transmission line.	2	2	3	6	0
Total miles of transmission line to National Forest exit.	5.8	6.1	4.6	4.8	0
Total miles of transmission line on fully private land.	0.5	0.5	0.5	2.2	0
Total miles on National Forest[1]	5.3	5.6	4.1	2.6	0
Acres of ROW on NFS land	25.8	22.9	15.3	4.2	0
Acres of ROW on Private land	2.5	6.9	6.9	19.3	0
Total ROW Acres	28.3	29.8	22.2	23.5	0

[1]Note: Total miles on National Forest includes those segments where the ROW corridor is partially on National Forest and partially on private land.

The following narrative discloses the effects unique to or different for each of the respective alternatives analyzed.

Alternative 1 Proposed Action

Direct and Indirect Effects

This alternative is the transmission line route proposed by the project proponent, Black Hills Electric Cooperative, Inc. (BHEC). This route covers about 5.8 miles between the Rockerville substation to where it exits the National Forest boundary just south of Jackson Springs (see Project area map). The route crosses about 5.3 miles of National Forest and 0.5 miles of fully private land.

Quality of life. This alternative (the proposal) covers a total of about six miles of NFS lands and private lands. Some of this length straddles both National Forest and private land—west side of the "Elephants Trunk" (see Glossary) area and just south of Neck Yoke road. This route crosses about 0.5 miles of fully private land just north of Neck Yoke road. With about 5.8 total miles of proposed line, it is second to Alternative 2 (6.1 miles) in terms of total line length within or near the National Forest. As such, it would have 5.8 miles of transmission line infrastructure that would change the setting that currently exists on the National Forest.

Property values. The effect of this alternative on property values in the area adjacent to National Forest would likely be similar across all action alternatives. These effects are discussed under the section: Effects Common to all Action Alternatives. Generally, because location of this route is located on ridgetops, it would be more visible from a distance, including private

lands to the east of the NF boundary. Thus, this increased visibility could be perceived as an adverse effect on property value. Also, the Scenery section of this EA discusses effects of this proposal on scenic resources of the area.

Health and Safety. The effect of Alternative 1 on public health and safety in the vicinity of the route would likely be similar across all action alternatives. These effects are discussed under the section: Effects Common to all Action Alternatives.

Costs. The unit cost of implementing and operating this proposed transmission line is similar to the other action alternatives. Discussion of costs is provided under the section: Effects Common to all Action Alternatives.

Issue measurement indicators. Discussion of the measurement indicators relative to Alternative 1 follows. Also, see Table 3-23.

Forest Plan direction. The BHNF LRMP, as amended by Phase II, contains management standards and guidelines 8303 through 8310 that apply to utility corridors on the Black Hills National Forest (USDA Forest Service 2006). Alternative 1 has been evaluated relative to the management direction provided by these standards and guidelines and has been determined to be in accordance with Forest Plan direction. This finding applies to action Alternatives 2-4 and the No Action Alternative, as well.

Cost per mile. Over a period of 35 years, the cumulative cost of the proposed action (and action alternatives) in terms of cost per mile is estimated at $370,000 to design, plan, construct, maintain, and amortize. BHEC plans to obtain financing for the project through the USDA Rural Utility Service (RUS). Payment of principle and interest on this financing would be borne by the Cooperative. The cost of overhead transmission line contrasts with the 35-year expenditure for underground or buried transmission line, which is estimated at $1,211,000 per mile to design, plan, construct, maintain, and amortize. The greater cost of buried line is associated with insulated cables and materials; labor for burying, splicing, and terminating the cables; and trenching, bedding, back-filling, reclamation of the disturbed area, and periodic maintenance (Pers. Communication w/ BHEC, December 2010 & January 2011). The estimated total cost for Alternative 1 overhead transmission line as proposed (5.8 miles x $370,000/mile) would be $2,146,000. For comparison purposes, the total cost of buried line for this 5.8 mile route would be (5.8 miles x $1,211,000/mile) $7,023,800.

Miles of transmission line near private land and residences. The proximity of the transmission line to private land and residences provides a relative indication of the potential for the line or poles being in more immediate view or increased potential for impact associated with construction, maintenance, noise and/or other effects discussed above. As Table 3-23 indicates, the proposed route in Alternative 1 has 2.9 miles of transmission line and associated infrastructure within ¼ mile of private land. Moreover, 1.7 miles of this route lies within ¼ mile of residences on private land.

Cumulative Effects

These effects from Alternative 1 are similar across all alternatives and are discussed above under the section: Effects Common to All Action Alternatives.

Alternative 2

Direct and Indirect Effects
This alternative is the transmission line route developed in response to public comments concerned about the prominent visibility of the proposal (Alternative 1) on ridgetops for much of its projected route. The Alternative 2 route roughly parallels Alternative 1, but deviates away from prominent ridgetops along some segments so that it runs below ridges and in draws to make it less visible on the landscape. It covers about 6.1 miles between the Rockerville substation to where it exits the National Forest boundary just south of Jackson Springs (see Map 1 Project Area Map, Appendix E).

Quality of life. This alternative extends across approximately 5.6 miles of National Forest lands. Some of this length straddles both National Forest and private land—west side of "Elephant Trunk" area. This route crosses about 0.5 miles of fully private land just north of Neck Yoke road. Alternative 2 is the longest of the action alternatives in terms of line length within the National Forest boundary. As such, it would have 6.1 miles of transmission line infrastructure that would change the setting that currently exists on National Forest area.

Property values. The effect of this alternative on property values in the area adjacent to National Forest would be similar across all action alternatives. In contrast to Alternative 1, because this route is planned to run primarily below ridgetops and in draws and valley bottoms, it would be less visible from a distance—including private lands to the east of the NF boundary. This reduced visibility could be perceived as having less of an effect on property value--in the opinion of those who feel the value of their properties are reduced by a visible transmission line from their property. Further discussion of property value effects related to transmission lines is presented in the section: Effects Common to All Action Alternatives. Also, the Scenic Resources section discusses effects of this alternative on scenery in the area.

Health and Safety. As with Alternative 1, the effect of this alternative on public health and safety in the vicinity of the transmission line route would be similar across all action alternatives. These effects are discussed under the section: Effects Common to All Action Alternatives.

Costs. The unit cost of implementing and operating the Alternative 2 transmission line route is the same as the other action alternatives. Discussion of costs is provided under the section: Effects Common to All Action Alternatives. Also see applicable parts of the cost discussion under Alternative 1 of this section.

Issue measurement indicators. Discussion of the measurement indicators relative to Alternative 2 follows. Also, see Table 3-23.

Forest Plan direction. The BHNF LRMP, as amended by Phase II, contains management standards and guidelines 8303 through 8310 that apply to utility corridors on National Forest (USDA Forest Service 2006). See discussion under Alternative 1 of this sectionregarding accord with Forest Plan direction.

Cost per mile. The unit cost of Alternative 2 is the same as the proposed action in terms of cost per mile. See cost discussion under Alternative 1. However, because Alternative 2 is a longer route, the estimated total cost for overhead transmission line (6.1 miles x $370,000/mile) would be $2,257,000. The total cost of buried line for this 6.1 mile route would be (6.1 miles x $1,211,000/mile) $7,387,100.

Miles of transmission line near private land and residences. The proximity of the transmission line to private land and residences provides a relative indication of the potential for the line or poles being in more immediate view or closer disturbance associated with construction, maintenance, noise and/or other effects discussed above. As Table 3-23 indicates, Alternative 2 has three miles of transmission line and associated infrastructure within ¼ mile of private land. 1.5 miles of this route lies within ¼ mile of residences on private land.

Table 3-24 displays additional comparison variables associated with the transmission line routes. Alternative 2 has 16 residences within ¼ mile of the transmission line; two residences within 500 feet of the line; and 6.1 miles of total line, of which 0.5 miles cross private land in-holdings within the National Forest boundary and 5.6 miles cross NFS lands.

Cumulative Effects
The effects from Alternative 2 are similar to all alternatives and are discussed under the section: Effects Common to All Action Alternatives.

Alternative 3

Direct and Indirect Effects
This alternative is the transmission line route developed in response to the Forest Service desire to consider a route that is shorter in length on National Forest lands, yet still accomplishes loop design objectives and potentially lessens effects to the environment. The Alternative 3 route roughly parallels Alternative 2 through the large meadow roughly in the center of the project area. From there Alternative 3 deviates southeastward down a drainage to the NF boundary exit point, which is the section corner common to Sections 31 and 32, T1S, R7E; and Sections 5 and 6 T2S, R7E (see Map 1 Project Area Map, Appendix E).

Quality of life. This alternative covers about 4.1 miles of National Forest lands. Some of this length straddles both National Forest and private land—west side of "Elephant Trunk" area. This route crosses about 0.5 miles of fully private land just north of Neck Yoke road. Alternative 3 has less line length (4.1 miles) than Alternatives 1 and 2 within the National Forest boundary. It would have a total of 4.6 miles of transmission line infrastructure affecting the setting and potentially the quality of life in this area.

Property values. The effect of this alternative on property values in the area adjacent to National Forest would be similar across all action alternatives. In contrast to Alternative 1, because this route is planned to run primarily below ridgetops and in draws and valley bottoms, it would be less visible from a distance—including private lands to the east of the NF boundary. Also, this route would be shorter than Alternative 2, but still retains the less visible characteristics of Alternative 2. This reduced length and visibility could be perceived as having less of an effect on property value--

in the opinion of those who feel the value of their properties are reduced by a visible transmission line from their property. Further discussion of property value effects related to transmission lines is presented in the section: Effects Common to all Action Alternatives. Also, the Scenery Resources section discusses effects of this alternative on the visual resources of the area.

Health and Safety. As with Alternatives1 and 2, the effect of this alternative on public health and safety in the vicinity of the transmission line route would be similar across all action alternatives. These effects are discussed under the section: Effects Common to All Action Alternatives.

Costs. The unit cost of implementing and operating the Alternative 3 transmission line route is the same as the other action alternatives. Discussion of costs is provided under the section: Effects Common to All Action Alternatives. Also see applicable parts of the cost discussion under Alternative 1 in this section.

Issue measurement indicators. Discussion of the measurement indicators relative to Alternative 3 follows. Also, see Table 3-23.

Forest Plan direction. The BHNF LRMP, as amended by Phase II, contains management standards and guidelines 8303 through 8310 that apply to utility corridors on National Forest (USDA Forest Service 2006). See discussion under Alternative 1 in this section regarding accord with Forest Plan direction.

Cost per mile. The unit cost of Alternative 3 is the same as the other action alternatives in terms of cost per mile. See cost discussion under Alternative 1. Alternative 3 is a shorter route than Alternatives 1 and 2 at 4.6 miles. Thus, the estimated total cost for overhead transmission line (4.6 miles x $370,000/mile) would be $1,702,000. The total cost of buried line for this 4.6 mile route would be $5,570,600 (4.6 miles x $1,211,000/mile).

Miles of transmission line near private land and residences. The proximity of the transmission line to private land and residences provides a relative indication of the potential for the line or poles being in more immediate view or closer effect associated with construction, maintenance, noise, and/or other effects discussed above. As Table 3-23 indicates, Alternative 3 has 2.4 miles of transmission line and associated infrastructure within ¼ mile of private land. 1.8 miles of this route lies within ¼ mile of residences on private land.

Table 3-24 displays additional proximity variables associated with the transmission line routes to further facilitate comparison of Alternatives. Alternative 3 has 15 residences within ¼ mile of the transmission line; three residences within 500 feet of the line; and 4.6 miles of total line, of which 0.5 miles cross private land in-holdings within the National Forest boundary and 4.1 miles cross NFS lands.

Cumulative Effects
These effects from Alternative 3 are similar across all alternatives and are discussed under the section: Effects Common to All Action Alternatives.

Alternative 4

Direct and Indirect Effects
This alternative is the transmission line route that focuses on staying on private land as much as possible along open section lines unencumbered or not closed by other entity rights. This route still maintains loop design objectives and meets the purpose and need for the project. The alternative route covers approximately 4.8 miles between the Rockerville substation to where it exits the National Forest boundary at the same location as Alternative 3 (see Map 1 Project Area Map, Appendix E).

Quality of life. This alternative covers about 2.6 miles of NFS lands. Some of this length straddles both National Forest and private land—west side of "Elephant Trunk" area; just south of Neck Yoke Road; and parallel to Pine Grove Road along the National Forest boundary. This route crosses about 2.2 miles of fully private land--just north of Neck Yoke road; south of Neck Yoke Road; and east of Pine Grove Road. Alternative 4 has less line length (2.6 miles) than Alternatives 1, 2, and 3 within the National Forest boundary. It would have a total of 4.8 miles of transmission line infrastructure affecting the setting that currently exists within and adjacent to the National Forest.

Property values. In general, the effect of this alternative on property values in the area adjacent to National Forest would be similar across Alternatives 1-3. However, because much of the Alternative 4 route runs primarily adjacent to or fully on private land, the line would be more noticeable to a broader number of residents and users/travelers in the area. The greater immediate visibility and presence of this route provides a contrast between a route focused more on private lands versus the other alternative routes primarily on NFS lands. It is expected Alternative 4 would be perceived by a greater number of local residents as having an adverse effect on property value--in the opinion of those who feel the value of their properties are reduced by a visible transmission line from their property. Further discussion of property value effects related to transmission lines is presented in the section: Effects Common to All Action Alternatives. Also, the Scenery section discusses effects of this alternative on visual resources of the area.

Health and Safety. As with Alternatives 1, 2, and 3, the effect of this alternative on public health and safety in the vicinity of the transmission line route would be similar. However, because much of the Alternative 4 route runs primarily adjacent to or fully on private land, the line would be closer to a broader number of residents and users/travelers in the area. It is expected Alternative 4 would be perceived by a greater number of people as having higher potential for adversely affecting public health and safety. Further discussion of health and safety is provided under the section: Effects Common to All Action Alternatives.

Costs. The unit cost of implementing the Alternative 4 transmission line route is the same as the other action alternatives. Discussion of costs is provided under the section: Effects Common to All Action Alternatives. Also see applicable parts of the cost discussion under Alternative 1.

Issue measurement indicators. Discussion of the measurement indicators relative to Alternative 4 follows. Also, see Table 3-23.

Forest Plan direction. The BHNF LRMP, as amended by Phase II, contains management standards and guidelines 8303 through 8310 that apply to utility corridors on NFS land (USDA Forest Service 2006). See discussion under Alternative 1 for discussion regarding accord with Forest Plan direction.

Cost per mile. The unit cost of Alternative 4 is the same as the other action alternatives in terms of cost per mile. See cost discussion under Alternative 1. Alternative 4 is a shorter route (at 4.8 miles) than Alternatives 1 and 2, but a bit longer than Alternative 3. Thus, the total cost for overhead transmission line (4.8 miles x $370,000/mile) would be $1,776,000. The estimated total cost of buried line for this 4.8 mile route would be $5,812,800 (4.8 miles x $1,211,000/mile).

Miles of transmission line near private land and residences. The proximity of the transmission line to private land and residences provides a relative indication of the potential for the line or associated infrastructure being in more immediate view or closer to potential effects associated with construction, maintenance, noise, and/or other effects discussed above. As Table 3-23 indicates, Alternative 4 has 4.8 miles of transmission line and associated infrastructure within ¼ mile of private land. 4.1 miles of this route lies within ¼ mile of residences on private land.

Table 3-24 displays additional proximity variables associated with the transmission line routes to further facilitate comparison of Alternatives. Alternative 4 has 30 residences within ¼ mile of the transmission line; six residences within 500 feet of the line; and 4.8 miles of total line, of which 2.2 miles cross private land and 2.6 miles straddle both National Forest and private lands.

Cumulative Effects
Effects from Alternative 4 have potential for greater cumulative socio-economic impact than the other action alternatives. This is due to the location of the potential line focused more on private land. See the discussion under the section: Effects Common to All Action Alternatives.

Alternative 5 No Action

Direct and Indirect Effects
This alternative represents the scenario where no new transmission line route, as proposed by the proponent BHEC (or alternative routes), would take place on NFS lands at this time. This scenario does not preclude the company from planning and constructing a transmission line solely on lands other than NFS lands. The US Forest Service has no authority over what takes place on non-National Forest System lands. Nevertheless, effects to the socio-economic environment, regarding any fully private land route, are expected to be similar or potentially greater relative to those socio-economic effects for the action alternatives disclosed above. This is because the location of a line fully on private land is closer to more people, residents, and development. Proximity and degree of effects would of course be influenced by the location of the private land route.

Quality of life. Under this alternative, there would be no new transmission line routed on NFS lands as proposed. Should BHEC decide to proceed with a new route fully on private lands, the effects to quality of life and setting to residents and others in the area would be similar to those effects disclosed for the action alternatives above. However, it is anticipated that a greater number of people would perceive such a route to be adverse to their quality of life. Location and proximity

of such a transmission line route, as well as opinions of residents and users would influence the level of direct and indirect effects on quality of life wherever a new route is located.

Property values. The effects to property values of no action on National Forest would be consistent with the effects disclosed for the action alternatives should the company decide to proceed with a new route on private land. It is also likely that a greater number of locals would perceive a fully private route as having an adverse direct or indirect effect on property values.

Health and Safety. Effects regarding health and safety of residents and others in the area under a no action scenario would be consistent with the effects disclosed for the action alternatives should the company decide to proceed with a new route completely on private land. It is likely that a greater number of locals would perceive a fully private route as having an adverse direct or indirect effect on public health and safety.

Costs. There would be no costs associated with non-implementation on NFS lands. Unit costs per mile of transmission line for any implementation on fully private lands would be similar to those disclosed for the action alternatives. This does not consider other potential costs related to land condemnation, acquisition, legal costs, etc., that the Cooperative could encounter.

Issue measurement indicators. Not applicable.

Cumulative Effects

The population of Rapid City and the surrounding area would continue to grow in the future. The growth is expected to be on private lands within NFS land boundaries and near NFS lands adjacent to established towns and communities. The vicinity of the project area is considered representative of such a growth area near Rapid City. Under a no action scenario, the company would have to construct a new transmission line solely on private lands. As discussed under the action alternatives, this would be additional utility infrastructure development. The effects associated with this development would be consistent with those disclosed for the action alternatives. Such impacts would be cumulatively additive to the expected and foreseeable growth and development dynamic occurring in this area south and west of Rapid City.

Environmental Justice

Executive Order 12898 (February 11, 1994) directs Federal agencies to focus attention on the human health and environmental conditions in minority communities and low-income communities. 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.

None of the communities in the project area contain low-income or minority populations as defined by Executive Order 12898. During the course of this analysis, no alternative resulted in any identifiable effects or issues specific to any minority or low-income population or community. At both the project level and broader Forest level, the agency has considered all input from persons or groups regardless of age, race, income status, or other social and economic characteristics (USDA Forest Service 2005).

Civil Rights

At both the project level and broader Forest level, the agency has identified no civil rights effects associated with age, race, creed, color, national origin, or sex (USDA Forest Service 2005).

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CHAPTER 5 GLOSSARY

Access The opportunity to approach, enter and make use of public or private lands.

Air Quality Classes Classification established under the "Prevention of Significant Deterioration" portion of the Clean Air Act, which limits the amount of air pollution considered significant within an area. Class I applies to areas where almost any change in air quality would be significant; Class II applies to areas where the deterioration normally accompanying moderate, well-controlled growth would be permitted; Class III applies to areas where industrial deterioration would generally be allowed.

Anchor (screw) A rod having one or several curved plates attached in a spiral fashion from one end along the length of the rod and an eyelet at the other end for attachment of a guy support wire; installed deep into the ground by a power-operated rotating shaft; uses bearing and friction of earth to support power line structures against forces of wind and wire tensions.

Anchor (plate) A rod having two flat plates attached perpendicular to each other at one end and an eyelet at the other end; installed deep into the ground by excavation of a hole together with a slot for the rod, angled from the hole bottom to the surface, then backfilled and tamped; uses bearing and friction of earth to support power line structures against forces of wind and wire tensions.

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.

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 (game bird), 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.")

Cavity Nesting Species Wildlife species that depend on cavities in trees for their shelter and/or nesting. These species include primary cavity nesters, such as woodpeckers, which excavate cavities in soft or decayed wood for nesting, and secondary cavity nesters that typically nest in natural cavities or those excavated by another species.

CFR Code of Federal Regulations.

Closed Road An intermittent service road in Maintenance Level 1 that is closed to all vehicular traffic for more than one year. The closure may be ordered under 36 CFR 261.

Community (Social) The people who reside in one locality and are subject to the same laws or

who have common interests, etc.

Community Life-styles The ways in which residents conduct their everyday routines and how the "way they live" is associated with the National Forest.

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.

Connectors A metal fitting used to connect electrical conducting wires together either by compression or by tightening a bolt or bolts.

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.

Construction (Roads) The displacement of vegetation, soil, and rock and the installation of human-made structures involved in the process of building a complete, permanent road facility. The activities occur at a location, or corridor, that is not currently occupied by a road.

Controlled explosives Intentional, pre-calculated amount, placement, and detonation of exploding material (e.g. dynamite) to fracture rock in a defined configuration such as a trench or hole, to facilitate removal of the fractured material, and to limit scatter of the fractured pieces.

Cost Effective Achieving specified outputs or objectives under given conditions for the least cost.

Cost Efficient A comparative measure of economic efficiency determined by maximizing the present net worth or value of an alternative, subject to meeting the objectives of the alternative.

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.

Critical Ecosystems Specific areas, including riparian areas, wetlands, winter range, and habitat for threatened and endangered species.

Crossarm A wood timber with a rectangular cross section mounted at the top of and perpendicular to a power line pole and supported with braces; used for mounting insulators, wire, and other power line equipment.

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.

Cutover Area Timber stands or other vegetation that have been cut.

DBH (See "Diameter at Breast Height.")

Dead Fuels (Fire Management) Fuels with no living tissue within which moisture content is governed almost entirely by solar radiation and available moisture.

Decision Documents Documents that provide the criteria and information used in the

formulation and evaluation of alternatives and the preferred alternative.

Desired Future Condition, Desired Ecological Condition

1 A portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved.

2 A description of the landscape as it could reasonably be expected to appear at the end of the planning period if the Plan's goals, objectives, standards, and guidelines for that landscape are fully achieved.

Desired Landscape Character Appearance of the landscape to be retained or created over time, recognizing that a landscape is a dynamic and constantly changing community of plants and animals. It is a combination of landscape design attributes and opportunities as well as biological opportunities and constraints.

Dielectric material A material that does not conduct electric current; insulator.

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."

Down and Dead Woody Material, Down Logs, Down Woody Material (Vegetation) Woody material from any source that is dead and lying on the forest floor.

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.

Ecosystem Management A concept of natural resources management where-in National Forest activities are considered within the context of economic, ecological, and social interactions within a defined area or region over both short-and long-term.

EA (See "Environmental Assessment")

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 Assessment (EA) 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 predecisional or review form and then in a final form. An assessment 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.

Ephemeral Streams 1) A stream or portion of a stream that flows briefly in direct response to precipitation in the immediate vicinity and whose channel is at all times above the water table. 2) Ephemeral areas drain water to intermittent or perennial stream channels. Any sediment created by soil erosion during logging or road-building activities can be carried by way of the ephemeral, intermittent, and perennial stream channels to the watershed outlet. Ephemeral areas generally occur above the upper reaches of intermittent or perennial streams. Since they can direct water into intermittent or perennial stream channels, care should be taken to minimize disturbing soil in these areas.

Erosion The wearing away of the land surface by running water, wind, ice, gravity, or other geological activities.

Existing Road System All existing roads owned or administered by various agencies that are wholly or partly within or adjacent to and serving the National Forests and other Forest Service-administered areas or intermingled private lands. These roads may or may not be included on the current Forest Transportation Inventory but are evident on the ground as meeting the definition of a road.

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 Interior Habitat That portion of the stand not affected by edge is termed interior habitat. The value of forest stands in providing interior habitat depends on the effects of edge on the microclimate of the stand. In the Black Hills, forest interior is defined as that portion of a forest stand more than 300 feet from an opening.

Forest Supervisor Official responsible for administering the Black Hills National Forest. The Forest Supervisor reports to the Regional Forester.

Forest System Roads Roads that are part of the Forest Development Transportation System that includes all existing and planned roads as well as other special and terminal facilities designated as part of the Forest Development Transportation System.

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.

Framing Crew Personnel who install the crossarms, crossarm braces, insulators, guy wire attachments, pole ground wires, etc. on the pole in the designated configuration with associated bolts, washers, nuts, locknuts, and other hardware.

FPMER Forest Plan Monitoring and Evaluation Report.

FSH Forest Service Handbook.

FSM Forest Service Manual.

Fuel Breaks Generally wide strips of land 60 to 1,000 feet in width on which native vegetation has been modified so that fires burning into them can be more readily controlled. Some fuel breaks contain fire lines such as roads or hand lines that can be widened.

Fuel Loading The volume of the available or burnable fuels in a specified area, usually expressed in tons per acre.

Fuel Treatment Any manipulation or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control, including lopping, chipping, crushing, piling, and burning (synonym for fuel modification).

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.

Fuelwood Round, split, or sawed wood cut into short lengths for burning as fuel.

Goal Broad, general statement that encompasses the desired future conditions that the U.S. Forest Service seeks to attain.

GRA Grassland and meadow covertype.

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.

Heavy Fuels Fuels of large diameter, usually 3 inches or more, like snags, logs, large branchwood, and peat that ignite and burn more slowly than fine fuels (synonym for coarse fuels).

Herbicide A chemical substance used for killing or suppressing plants.

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.

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.

Inholdings Lands within the proclaimed boundaries of a National Forest that are owned by some

other agency, organization, or individual.

Insect and Disease Epidemics High population levels of insect-or-disease pests that cause substantial injury to plant or animal hosts.

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.

Integrated Resource Inventory (IRI) Forest Service integrated resource inventory data base. Now combined with RIS into FSVeg--the comprehensive Forest Service GIS/resource data base.

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 Applies to losses of production or use of renewable natural resources for a period of time. 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, Irreversible Commitments Decisions causing changes that cannot be reversed. For example, if an area is mined, that area cannot, at a later date, be allocated to some other resource activity, such as Wilderness. Once mined, the ability of that area to meet Wilderness criteria, for instance, has been irreversibly lost. Irreversible commitments often apply to non-renewable resources, such as minerals and heritage resources.

Kilovolt (kV) 1000 volts (see Volt).

Land Unit (Watershed) A mapped land type polygon; or a mapped soil unit.

Landline (Land Survey) For Forest Plan purposes, National Forest property boundaries.

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.

Landscape Scale A heterogeneous land area composed of a cluster of interacting ecosystems that are repeated in similar form throughout. Landscapes vary in size from many thousands of acres to only a few acres.

Late Succession Ecosystems distinguished by old trees and related structural features. This term encompasses the later stages of stand development that typically differ from earlier stages in structure, composition, function, and other attributes.

Lightning Arrester A device comprised of a material that conducts electrical current at a pre-defined high voltage level but which does not conduct at normal operating voltage; its purpose is to remove overvoltages before they damage insulators and equipment by quickly conducting the associated electrical currents to ground.

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.

Meadow An area of perennial, herbaceous vegetation, usually grass or grass-like. A natural opening in a forest, generally at higher elevations, that produces exceptional levels of herbaceous plants, which is usually a consequence of high soil/water content or a perched water table. Generally, a prairie grassland will occupy a convex surface while a meadow will occupy a concave surface.

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.

Moisture Regime (Soils) The presence or absence of groundwater or water held at a tension of less than 15 bars in the soil or in specified horizons by periods of the year.

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.

Multi-storied Stands (Vegetation) Plant communities having two or more recognizable canopy layers or height levels.

Multiple Use According to the Multiple-use Sustained-yield Act of 1960, multiple use is the management of all the various renewable surface resources of the National Forest System (NFS) so that they are utilized in the combination that will best meet the needs of the American people; such management makes the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions. Some lands will be used for less than all of the resources. Harmonious and coordinated management of the various resources is employed, each with the other, without impairment of the productivity of the land. Consideration is given to the relative values of the various resources and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

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 stimulate 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 U.S. Forest Service.

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.

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.

Obliteration (Transportation) The reclamation and/or restoration of the land occupied by a transportation facility for purposes other than transportation.

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.

Operating Voltage The electrical pressure at which a power system normally functions and for which it is designed and insulated.

Overhead Ground Wire A system conductor wire that is intentionally grounded to protect or shield underlying charged conductor wires from lightning.

Piling and Burning (Timber Management) Piling slash resulting from logging and subsequently burning individual piles.

Plant Associations A grouping of plants that has reached dynamic equilibrium with the local environmental conditions and is equivalent to climax. On site, there is no evidence of replacement by other dominant plant species (and there is no evidence of serious disturbance.)

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.

Predecisional Environmental Assessment (EA) 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.

Pole Setting Crew Personnel who augur and prepare the hole in the ground, set, align, and plumb the pole in the hole, then place and tamp backfill material in the opening around the pole.

Prescribed Fire A fire burning within prescription resulting from planned or unplanned ignition.

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.

Raptor Habitat Habitat required by hawks, falcons or owls, especially for nesting.

Reforestation Reestablishment of a tree crop on forested land.

Resistance A property of a material or wire that opposes the flow of electrons (current); all electrical conductors have resistance, and it is indirectly proportional to wire size, the larger the

wire, the lower the resistance.

Resource Values The tangible and intangible worth of forest resources.

Responsible Official (Deciding Official) The Forest Service employee who has the delegated authority to make a specific decision.

Resource Information System (RIS) Forest Service resource information data base. Now combined with IRI into FSVeg--the comprehensive Forest Service GIS/resource data base.

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 or Habitat (See "Riparian Ecosystem.")

Riparian Communities Repeating, classified, defined, and recognizable assemblages of plant-or-animal communities associated with riparian areas.

Riparian Ecosystem The moist transition zone between the aquatic ecosystem and the relatively drier, more upland, terrestrial ecosystem(s). This transition zone can extend both laterally and longitudinally away from aquatic ecosystems, sometimes into headwater swales that have no defined stream channel. The riparian ecosystem is the area whose soil is relatively more moist than the adjacent upland and whose vegetation growth reflects the greater accumulation of available water.

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.

Road Functional Classification The way in which a road services land and resource management needs and the character of service it provides. Functional classifications for roads are forest arterial, forest collector, and forest local.

> **Forest Arterial Road:** Provides service to large land areas and usually connects with public highways or other Forest arterial roads to form an integrated network of primary travel routes. The location and standard are often determined by a demand for maximum mobility and travel efficiency rather that specific resource management service. It is usually developed and operated for long-term land and resource management purposes and constant service.
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> **Forest Collector Road:** Serves smaller land areas than a Forest arterial road and is usually connected to a Forest arterial or public highway. Collects traffic from Forest local roads and/or terminal facilities. The location and standard are influenced by both long-term multi-resource service needs, as well as travel efficiency. May be operated for either constant or intermittent service depending on land use and resource management objectives for the area served by the facility.
>
> **Forest Local Road:** Connects terminal facilities with Forest collector or Forest arterial roads or public highways. The location and standard are usually controlled by a specific resource activity rather than travel efficiency. Forest local roads may be developed and operated for either long- or short-term service.

Road Prism Equivalent to the term "roadway." The portion of the road within the limits of

excavation and embankment, including slope rounding. A similar term is "road template," the shape and cross-sectional dimensions of the roadway to be constructed as defined by the construction staking notes and the characteristics of the typical sections.

Roadside Corridors A passageway that frames a road or travelway. The corridor includes the viewing area and facilities, which may be within the immediate roadside area or part of a sweeping distance panorama.

Rural Utilities Service (RUS) RUS is an agency of the United States Department of Agriculture (USDA), one of the Federal executive departments charged with providing public utilities (electricity, telephone, water, sewer) to rural areas in the US via public-private partnerships.

Sawtimber Trees suitable in size and quality for producing logs that can be processed into lumber. For planning purposes, trees with an 8-inch diameter or more are classified as sawtimber.

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.

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.

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 An area considered in terms of its physical and/or biological environment; for example, a riparian zone, a homogenous stand of vegetation, or a campground.

Site Index A measure of the relative productive capacity of an area for growing trees. Measurement is based on height of the dominant trees in a stand at a given age.

Site Productivity Production capability of specific areas of land.

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.

Softwood A conventional term for both the timber and the trees belonging to the evergreen group, as the pine, spruce, fir, etc.

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.

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.

Stand-replacing Fire A fire that kills all or most living overstory trees in a forest and initiates secondary succession or regrowth.

State Historic Preservation Officer (SHPO) A person appointed by a state's governor to administer the State Historic Preservation Program.

Stream Health The condition of a stream relative to robust health for that stream type and landscape, considering indicators such as channel pattern; slope; particle size; pool frequency and depth; bank vegetation; and woody debris that reflect the stability and habitat quality of the stream.

Stringing Crew Personnel who unwrap wires from the reels and pull (string) them from one end of a line segment to another, position them on the insulators in the pole top assembly, then tighten the wires to the pre-engineered tension and secure them to the insulators.

Stringing Rollers A grooved wheel mounted in a frame assembly for hanging at the top of a pole or on a crossarm and used to pull bare electrical wire into position along a segment of power line.

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. They include

> **Structural Stage 1 (Grass/Forb)**: An early forest successional stage during which grasses and forbs are the dominant vegetation. At the RIS site level, Structural Stage 1 is defined as nonstocked, with an AMD less than 10 percent. Small-scale Structural Stage 1 within RIS sites are at least one acre in size, do not meet the seedling stocking criteria, and contain no saplings, poles, or mature trees.
>
> **Structural Stage 2 (Shrubs/Seedlings):** Developmental stage dominated by tree seedlings (less than one inch dbh) and shrub species.
>
> **Structural Stage 3 (Sapling/Pole):** Developmental stage dominated by young trees 1 to 7 inches dbh, 10 to 50 feet tall, and usually less than 50 years old. This stage is subdivided into three canopy closure classes: A (less than 40 percent); B (40 to 70 percent); and C (greater than 70 percent).
>
> **Structural Stage 4 (Mature):** Consists of trees larger and older than structural stage 3. Also classified by the same canopy closure categories as structural stage 3.
>
> **Structural Stage 5 (Late Succession):** This structural stage is characterized by trees 160 years of age and older.

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.

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.

Transportation/Utility Corridor A linear strip of land identified for the present location of transportation or utility rights-of-way within its boundaries.

Travel Corridor A strip of land that includes up to a maximum of 1,000 feet for major roads (500 feet either side of the road's centerline) or 500 feet for major trails (250 feet either side of the trail's centerline); travel corridors form a passageway that allows travelers to experience and interact with the quality and character of the landscape.

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.

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.

Viable Population Group of individuals of a particular species that produces enough offspring for long-term persistence and adaptation of the species or population in a given place.

36 CFR 219.19 defines a viable population for planning purposes as one that has the estimated numbers and distribution of reproductive individuals to insure that a continued viable population is well distributed in the planning area. Planning area is further defined by 36 CFR 219.3 as the "area of the National Forest System covered by a regional guide or forest plan." Direction from the Forest Service Manual (FSM) defines a viable population as one that has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range (or range required to meet recovery for listed species) within the planning area.

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.

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.

Water Influence Zone The land next to streams and lakes where vegetation plays a major role in sustaining the long-term integrity of aquatic ecosystems. Includes the geomorphic floodplain, riparian ecosystem, and inner gorge, and has a minimum horizontal width (from top of each bank) of 100 feet or the mean height of mature dominant late-seral vegetation, whichever is greater.

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.

Wildland-Urban Interface (WUI) In applying Title I of the HFRA, this term means:

- An area within or adjacent to an at-risk-community (ARC) identified in recommendations to the Secretary in a Community Wildfire Protection Plan

OR

- In the case of any area for which a Community Wildfire Protection Plan is not in effect:
    - an area extending ½ mile from the boundary of an at-risk community (ARC)
    - An area within 1-1/2 miles of the boundary of an at-risk community (ARC), including any land that
        - Has a sustained steep slope that creates the potential for wildland fire behavior endangering the at-risk community (ARC)
        - Has a geographic feature that aids in creating an effective firebreak, such as a road or ridgetop

OR

Is in Condition class 3 as documented by the Secretary in the project-specific environmental analysis

AND

An area that is adjacent to an evacuation route for an at-risk community (ARC) that the Secretary determines—in cooperation with the at-risk community (ARC)—requires hazardous-fuel reduction to provide safer evacuation.

CHAPTER 6 LIST OF PREPARERS

Project Team (US Forest Service)

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