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Draft Environmental Assessment

Fanny Project Area

Hell Canyon Ranger District, Black Hills National Forest
Custer County, South Dakota

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SUMMARY

The Black Hills National Forest proposes to move the Fanny Project Area toward the desired condition identified in the 1997 Revised Forest Plan, as amended (Forest Plan). Vegetative management activities are proposed that would enhance wildlife habitat, improve vegetative diversity, improve forest heath, and provide commodity products for commercial use. The project area consists of approximately 23,326 acres, and is located in the west central portion of the Black Hills National Forest, approximately 13 miles east of Newcastle, Wyoming, via US Highway 16 or approximately 26 miles west from of Custer, South Dakota, via US Highway 16 and is within the Hell Canyon Ranger District, Black Hills National Forest, South Dakota.

The Forest Service evaluated the following alternatives:

- ***Alternative 1 – No Action***. *Under this alternative no new management activities would occur. Management activities under previous decisions would continue. The current travel management strategy would continue unchanged. No new roads would be constructed, and no roads would be closed.*
- ***Alternative 2 – Modified Proposed Action***. *This alternative was developed to emphasize forest health improvement, timber production and a travel management strategy that maintains an open forest policy. Management activities would include commercial timber harvest on approximately 3,857 acres, non-commercial harvest treatments on approximately 1,709 acres, re-construct approximately 5.2 miles of existing road, close approximately 40 miles of road, convert approximately 0.6 miles of unclassified road to classified Forest System road, prescribe burn approximately 143 acres, and construct approximately 69 acres of 200-foot wide fuel breaks. This alternative would produce approximately 4.6 MMBF (million board feet) of commercial timber*
- ***Alternative 3 – Developed in response to initial scoping comments.*** *This alternative was developed in response to public concerns for wildlife habitat. It was designed to provide more security areas and thermal cover. Management activities would include commercial timber harvest on approximately 3,523 acres, non-commercial harvest treatments on approximately 1,522 acres, re-construct approximately 5.2 miles of existing road, close approximately 63 miles of road, prohibit off-road motorized use, prescribe burn approximately 143 acres, and construct approximately 69 acres of 200-foot wide fuel breaks. This alternative would produce approximately 4.1 MMBF of commercial timber.*

Based upon the information and analysis of effects of each alternative documented in this environmental assessment, the Black Hills National Forest Supervisor will make the following decisions related to accomplishing the goals and objectives of the Forest Plan within the Fanny Project Area.

- The first decision is whether or not vegetation management using commercial and non-commercial timber harvest methods should be used, and if so, in what manner and in what locations.
- The second decision to be made is to determine what level of public access is appropriate and desirable. This decision will include specifically which access routes will be open or closed and to what extent, and whether or not an area closure to off road motorized use should be implemented and to what extent.

CHAPTER 1.0 - PURPOSE OF AND NEED FOR ACTION

Introduction

This Environmental Assessment (EA) displays the environmental effects of proposed activities associated with timber harvest in the Fanny Project Area. Proposed activities include commercial and non-commercial vegetative treatment of ponderosa pine and aspen, prescribed burning, creation of snags for wildlife where they are limited, road construction/reconstruction, protect and/or develop spring areas, travel management for the area, and mitigation measures. This environmental assessment is not a decision document. This document discloses environmental consequences of implementing the proposed action and alternatives to that action. After public review of this document the Forest Supervisor will document his decision in a Decision Notice.

The Black Hills National Forest is implementing the Forest Plan, as amended by the Phase I amendment, as required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA, P.L. 93-378) and the National Forest Management Act of 1976 (NFMA, P.L. 94-588).

The environmental analysis documented in this assessment is tiered to the 1997 Revised Land and Resource Management Plan, as amended by the Phase I amendment, associated Phase I amendment EA, and associated Final Environmental Impact Statement (FEIS) for the Black Hills National Forest (hereafter referred to as the Forest Plan). The file titled "Analysis and Evaluation of the Fanny Project Area" (hereafter referred to as the Project File) is also referenced. The Project File documents the Interdisciplinary Team's (IDT) evaluation of this analysis and is located in the Hell Canyon District Office.

All numerical values presented in this document are based on the best available information. However, minor variations from these values are likely to occur during implementation due to: 1) changes in on-the-ground conditions, 2) use of more accurate measuring techniques, or 3) the occurrence of unforeseen obstacles and opportunities. Therefore, the values presented in this document are considered to be approximations. Minor variations occurring at implementation will be documented.

Background

The Record of Decision for the Black Hills National Forest 1997 Revised Land and Resource Management Plan (1997 Revised Forest Plan) and accompanying Final Environmental Impact Statement (1996 FEIS) was signed on June 24, 1997 by then Regional Forester Elizabeth Estill. The 1997 Revised Forest Plan and 1996 FEIS provide a programmatic framework for decision-making on the Forest for the next 10-15 years.

A number of groups and individuals appealed the Record of Decision for the 1997 Revised Forest Plan. On October 12, 1999, Deputy Chief James R. Furnish, the reviewing Officer for the Chief of the Forest Service, issued his decision (hereafter referred to as the 1999 Appeal Decision) on three of the appeals. His decision affirmed the Regional Forester's June 24, 1997 decision in part, with instruction for further actions concerning the issues of species viability and diversity.

In order to address the deficiencies identified in the 1999 Appeal Decision, the Forest will amend the 1997 Revised Forest Plan in two phases. The Phase I Amendment, which was signed on May 18, 2001, amends the Forest Plan for the short term (two to five years) until the Phase II process is complete. The Phase I Amendment revised some of the management objectives, standards, and guidelines in the Forest Plan. The Phase II process will re-evaluate the sufficiency of the 1997 Revised Forest Plan in relation to species viability and diversity.

Location

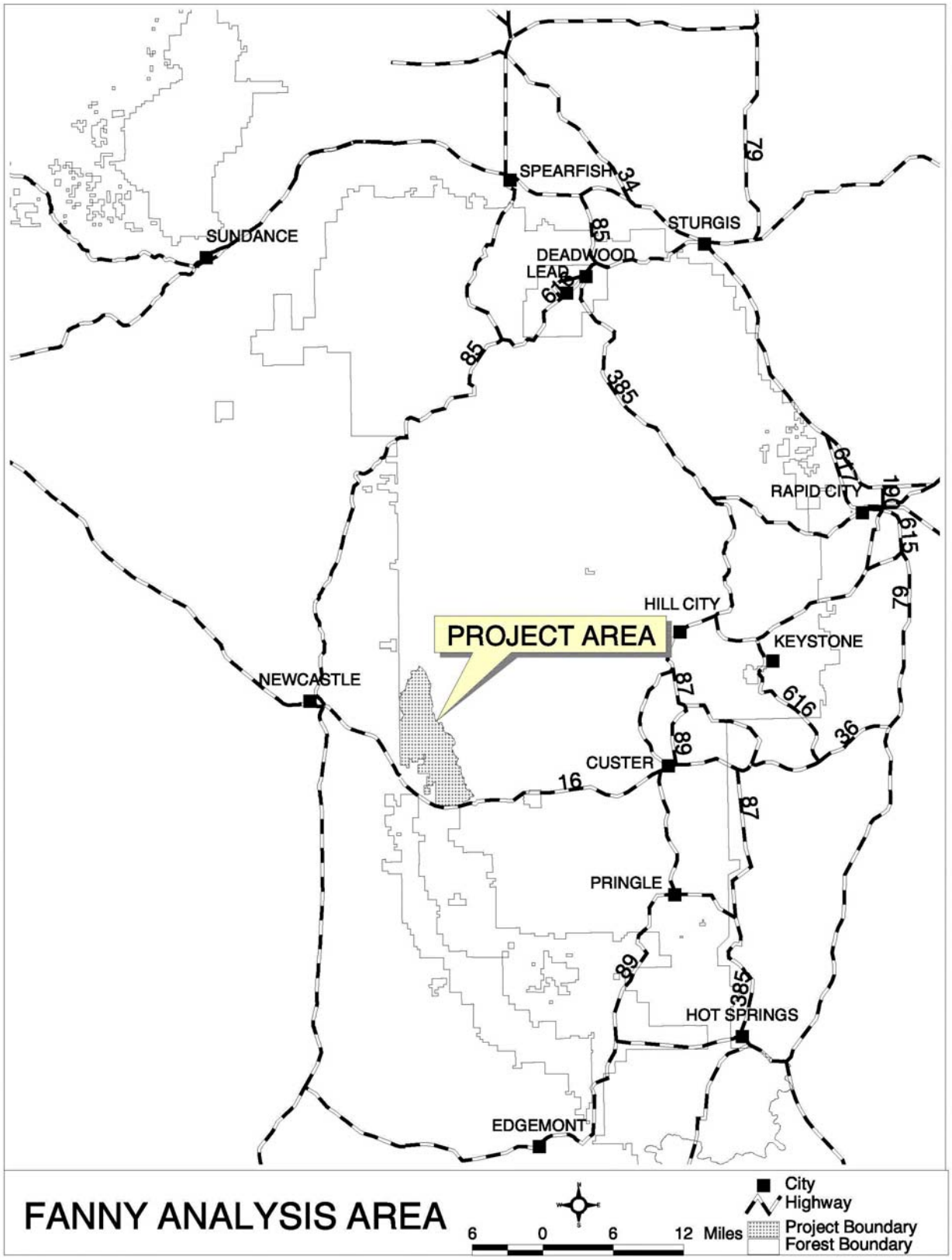
The Fanny Project Area consists of a 37 square mile area (23,899 acres), of which approximately 23,326 acres are lands managed by the Black Hills National Forest and approximately 573 acres are under private ownership. All proposed activities would occur on lands managed by the Black Hills National Forest. The project area is located in the west central portion of the Black Hills National Forest, approximately 13 miles east of Newcastle, Wyoming, via US Highway 16 or approximately 26 miles west from of Custer, South Dakota, via US Highway 16. The main access into the analysis area is provided via NFSR (National Forest System Road) 117, Boles Canyon Road. Additional access can be gained from NFSR 376, Redbird Canyon Road, NFSR 265, Summit Road and NFSR 280, Buck Springs Road. The Fanny Project Area is located in Custer and Pennington Counties, South Dakota within portions of T3S, R1E BHM. (See Project Area Location Map, page 3)

Forest Plan Direction

Goals and Objectives

Chapter 1 of the Forest Plan contains a description of multiple-use goals and objectives for integrated resource management across the forest. They provide a basis for developing the purpose and need for this project, resulting in the proposed action and alternatives to it. The goals are listed below. Associated objectives are described in Chapter 1 of the Forest Plan. Goals 1-4 are directed toward the natural resources of the Forest, while Goals 5-9 provide for socio-economic management emphasis for the Forest.

Goal 1 - Protect basic soil, air, water and cave resources.
Goal 2 - Provide for a variety of life through management of biologically diverse ecosystems.
Goal 3 - Provide for sustained commodity uses in an environmentally acceptable manner.
Goal 4 - Provide for scenic quality, a range of recreational opportunities, and protection of heritage resources in response to the needs of the Black Hills National Forest visitors and local communities.
Goal 5 - In cooperation with other landowners, strive for improved land ownership and access that benefit both public and private landowners.
Goal 6 - Improve financial efficiency for all programs and projects.
Goal 7 - Emphasize cooperation with individuals, organizations, and other agencies while coordinating planning and project implementation.
Goal 8 - Promote rural development opportunities.
Goal 9 - Provide high quality customer service.


SPEARFISH
STURGIS
SUNDANCE
DEADWOOD
LEAD
RAPID CITY
HILL CITY
PROJECT AREA
KEYSTONE
NEWCASTLE
CUSTER
PRINGLE
HOT SPRINGS
EDGEMONT
FANNY ANALYSIS AREA
6 0 6 12 Miles
City
Highway
Project Boundary
Forest Boundary

Management Area Direction and Desired Condition

The Forest Plan has assigned a management emphasis to each portion of the Forest to meet multiple-use objectives. The Forest Plan describes a desired future condition, goals, and objectives, and standards and guidelines for each management area. The IDT reviewed management area designations and determined that no new information existed that would require reconsideration of Forest Plan allocations. For the Fanny Project Area, the Forest Plan has designated approximately ***18,185 acres as 5.4 - Big Game Winter Range Emphasis***, and approximately ***5,141 acres as 5.1 – Resource Production Emphasis***.

Within Management Area 5.4, the desired condition includes providing for high quality big game winter range, while also maintaining healthy plant communities and recreational opportunities. Management activities emphasize vegetative diversity, with natural and created openings. Timber harvesting and prescribed burning are the primary tools used to improve wildlife habitat.

Within Management Area 5.1, the desired condition includes a mosaic of tree groups of different ages and size classes. Ponderosa pine is predominately observed, with aspen and other hardwood species occurring. There are few areas showing evidence of decadence, or outbreaks of insects or disease. Evidence of past and present harvest activities occurs, and logging traffic may be encountered.

Purpose and Need for Action

The purpose of and need for action in the Fanny Project Area is to improve and enhance vegetative diversity and wildlife habitat, provide for long-term stability of soil and water resources, improve forest health and to provide a sustainable supply of commercial timber consistent with Forest Plan standards and guidelines.

The purpose and need for action in the Fanny Project Area is derived from the Forest Plan goals listed above. For the Fanny Project Area analysis, the decision maker has decided to focus on goals 1-4. The purpose and need for action in the Fanny Project Area is to plan and conduct resource management activities that are needed to move the area toward meeting these goals. Associated with these goals are specific resource objectives, standards and guidelines outlined and discussed in the FEIS and Forest Plan (I-5 thru I-27, and II-1 thru II-102). In order to achieve these goals and associated objectives, vegetative management activities are needed. Listed below are the Forest Plan objectives associated with goals 1-4 listed above. Opportunities that exist within the Fanny Project Area are also identified.

Opportunities for Improvement Applicable to the Fanny Project Area

Goal 1 –Protect basic soil, air, water and cave resources.

Objective 104. Maintain or enhance watershed conditions to foster favorable soil relationships and water quality.

Objective 105. Prohibit motorized vehicle use in wetlands, wet meadows and riparian areas, except at specified locations and times of year.

Existing Condition: There are currently 105 miles of open road within the Fanny Project Area. Some of these roads are producing sediment through erosion and conflicting with wildlife objectives.

Opportunities: There is the opportunity to improve wildlife habitat and to reduce erosion and associated sediment on a number of these roads by improving drainage structures, or closing some roads.

Goal 2 -- Provide for a variety of life through management of biologically diverse ecosystems.

Objective 202. Conserve and manage existing mountain mahogany stands.

Existing Condition: There are currently 4,075 acres of mountain mahogany within the project area.
Opportunities: Opportunities exist to improve or enhance the growth of these stands.

Objective 205. Restore grassland (meadow and prairie) communities across the Forest by 10 percent over 1995 conditions.

Existing Condition: There are 3,260 acres of native grassland.
Opportunities: Meadow restoration opportunities have been identified on approximately 1,500 acres.

Objective 207. Manage at least 5 percent of the forested land base for late succession.

Objective 208. Provide smaller late-successional patches to meet specific resource elements.

Existing Condition: Within the Fanny Project Area, there are 833 acres of late successional habitat that was identified in the 1997 Forest Plan. There are currently no stands that have good old growth characteristics (Structural Stage 5)
Opportunities: There exists the opportunity to identify additional sites as future late successional habitat and improve the quality of the existing late successional habitat.

Objective 209. Manage at least 5 percent of a timber harvest project area for grass/forb structural stage.

Existing Condition: Currently, there are 3,260 acres (14%) identified as grass/forb.
Opportunities: Opportunities exist to further expand the acres of grass/forb habitat.

Objective 211. In ponderosa pine forested portions of a watershed, maintain an average of 2 hard snags per acre on south facing slopes and 4 hard snags per acre on north facing slopes, well dispersed across the watershed through the rotation. Calculate as a per acre average for the watershed; some acres may have no snags while others may exceed the average. In other forest types maintain an average of 6 hard snags per acre, well distributed across the watershed.

Standard 2301. Within the associated watershed for each vegetation management project, retain the following minimum densities of hard snags (unless snags are a safety hazard) at least 25 feet in height:

a. Ponderosa pine on north or east facing slopes or in protected areas which would have historically supported in infrequent, stand replacing fire regime: Retain an average of 4 snags per acre > 10” DBH, collectively 25% of which must be > 20” DBH. If 20” DBH or 25 feet high snags are not available, retain snags in the largest size class available.

b. Ponderosa pine on south or west facing slopes or on exposed areas which would have historically supported a more frequent, low intensity fire regime: Retain an average of 2 snags per acre, collectively 25% of which must be > 20" DBH. If 20" DBH or 25 feet high snags are not available, retain snags in the largest size class available.

c. Retain a minimum average of 6 snags per acre > 10" DBH for forest types other than ponderosa pine, unless snags pose a safety hazard.

d. Snags chosen for retention should represent the largest diameter class available.

e. Provide large diameter trees and snags along habitat interface zones.

Standard 2302. In watersheds not meeting the minimum hard snag direction, all vegetation management projects will be designed to move hard snag densities toward this objective.

Guideline 2303. Snags can be clustered or individual, but must be well distributed within the watershed. Focus on opportunities for leaving snags in clumps rather than individually.

Guideline 2304.

a. Prohibit cutting of standing dead trees for fuelwood, except in designated areas.

b. In areas where cutting restrictions are not effective, consider identifying roads to be closed or restricted from use to protect snags from removal.

Guideline 2306. During vegetation management activities in ponderosa pine, retain a sufficient number of green trees > 20" DBH or from the largest diameter class available, to move towards or maintain an average minimum density of one large green tree per acre within the associated watershed, for the purpose of recruitment of snags and large diameter down woody material.

> **Existing Condition:** The average snag density for the Fanny Project Area is 0.93 per acre on the west side of the project area, and 1.12 per acre on the east side of the project area.
> **Opportunities:** There exists the opportunity to maintain snag densities in the future by leaving some large trees in timber harvest areas to provide for future snags.

Objective 212. In conifer forested portions of a planning unit, provide at least once during a rotation (approximately 100 years) an average of 5 to 10 tons per acre of down, dead woody material at least 3 inches in diameter, provided there is no conflict with fire or pest management objectives.

> **Existing Condition:** Based on field observations, within the forested portions of the project area there is adequate down woody material.
> **Opportunities:** Timber harvest activities along with natural disturbances provide additional opportunities to provide dead and down material on sites that currently lack that material.

Objective 218. Conserve or enhance habitat for resident and migratory non-game wildlife. Increase habitat capability for species when recommended in project level analyses.

Objective 221. Conserve or enhance habitat for sensitive species and species of special interest.

Standard 3108. The following additional protective measures will apply relative to the northern goshawk for all projects involving the removal of trees in suitable habitat, except those done for the express purpose of enhancing goshawk habitat:

a. A goshawk nest survey must be conducted prior to any projects in forested areas.

b. If the project area includes a historically active nest or a replacement stand associated with a historically active territory, this acreage will be excluded from the project.

c. If a historically active territory occurs within one-half mile of the project area and protected acreage has not yet been identified, the project analysis will determine whether some of the protected acreage should occur within the project area.

d. If the pre-project survey identifies a previously unknown active nest, the project analysis will determine where protected acreage will be located.

Guideline 3114. Design silviculture prescriptions and manage activities to enhance prey species habitat by maintaining vegetative diversity and striving for a balance of structural stages, from stand initiation to late successional, within goshawk fledgling habitat (approximately 420 acres around each historically active goshawk nest and alternative nests).

> **Existing Condition:** Surveys for goshawk were conducted and completed during the early summer of 2002. There is one historic nesting site that is inactive and will be protected. No new nesting sites were located.
> **Opportunities:** There is an opportunity to improve wildlife habitat in the project area by closing roads, increasing grass/forb habitat and providing a more balanced structural stage distribution. Additionally, there are opportunities to protect historic nesting sites for goshawks that exist in the area, maintain snags for black-backed woodpeckers, and provide large down logs for red-bellied snakes and snails.

Objective 224. Reduce or otherwise treat fuels commensurate with risks (fire occurrence), hazard (fuel flammability), and land and resource values common to the area, using the criteria in Forestwide Standard 4110.

> **Existing Condition:** Currently there are some areas along private lands where hazardous fuels have built-up.
> **Opportunities:** There are opportunities to reduce the amount of fuels hazard that exists along some private boundaries by constructing fuel breaks and reducing the amount of biomass.

Objective 228. Within planning units where outbreaks of mountain pine beetle could threaten management objectives for ponderosa, maintain or reduce acreage of ponderosa pine stands that are in medium or high-risk condition for infestation.

> **Existing Condition:** The current risk of a mountain pine beetle epidemic in the project area is low to moderate. Some denser stands are susceptible to insect attack.
> **Opportunities:** There are opportunities to thin those stands that are susceptible to mountain pine beetle, and reduce the risk of insect attack.

Objective 231. Prevent new infestations and manage to reduce established infestations of noxious weeds. Treat 3,600 acres per year during the next ten years to limit noxious weed infestations.

Existing Condition: Currently there are approximately 295 acres of known noxious weed infestations.
Opportunities: As part of project design there will be the opportunity to include mitigation measures to limit the spread of noxious weeds and to treat infestations that currently exist.

Goal 3 -- Provide for sustained commodity uses in an environmentally acceptable manner.

Objective 303. Offer the allowable sale quantity (ASQ) of timber on suitable and available timberlands in the next decade:

Existing Condition: Most of the forested portion of the project area has been treated in previous entries. Treatments included overstory removal, shelterwood seed cuts, and commercial thins. Many of these stands are ready for subsequent treatments to reduce stocking levels, or to provide opportunities for future regeneration.
Opportunities: There is an opportunity to harvest timber from suitable timberlands that will contribute to the Forest's output of allowable sale quantity.

Goal 4 -- Provide for scenic quality, a range of recreational opportunities, and protection of heritage resources in response to the needs of the Black Hills National Forest visitors and local communities.

Objective 402. Provide natural appearing landscapes with diverse scenery and enhance opportunities to enjoy attractive settings.

Objective 420. Manage travel corridors for federal, state and county roads.
Meet a scenic integrity objective of high.

Objective 422. Provide a variety of off-road travel opportunities including: areas with no restrictions, areas with seasonal restrictions, areas with no off-road travel, areas with motorized travel restricted to designated trails, areas with OHV travel prohibited, areas for snowmobiles only, and areas with all motorized travel prohibited.

Existing Condition: The majority of the Fanny Project Area has a scenic integrity objective of low, with areas of moderate along Boles Canyon Road, and high along U.S. Highway 16.
Opportunities: There exists the opportunity to design treatment activities that will maintain and enhance scenery objectives within the project area especially along U.S. Highway 16. There are opportunities to provide more areas where off-road travel is restricted, increasing the range of recreational opportunities.

Management Area 5.4 - Goals and Objectives

5.4-201. Manage tree stands for wildlife habitat and vegetative diversity.

Existing Condition: The majority of the project area consists of ponderosa pine stands that have been managed for a variety of resources including timber, wildlife, and recreation. The southern portion of the project area consists mostly of mountain mahogany shrub, which is important habitat for mule deer.
Opportunities: There exists the opportunity to design treatment activities to provide wildlife habitat and vegetative diversity.

5.4-202. Manage at least 20 percent of planning units for forage production.

Existing Condition: Currently, 50% of the area provides forage within Structural Stages 1, 2, 3A and 4A.

Opportunities: There exists the opportunity to design treatments to provide additional acres of forage production.

5.4-205. Provide thermal cover for elk, deer and winter turkey habitat on at least 20 percent of the forested portion of this management area.

Existing Condition: Currently, there are 1,596 acres (14 %), which provide thermal cover in the forested portion of Management Area 5.4. Another 2,860 acres of the area could develop into thermal cover in the next 15-25 years.
Opportunities: There is an opportunity to protect all existing thermal cover as part of this project decision, and defer treatment in other areas that could develop into thermal cover in the future.

Proposed Action

The original proposed action was developed by selecting activities that would achieve some of the opportunities identified above. Activities included in the proposed action were chosen based upon the Interdisciplinary Team's, and decision maker's initial thoughts on the most important issues in the project area. However, further analysis showed that the original proposed action did not meet Forest Plan (Phase I) direction. A Modified Proposed Action was developed based on the intent of the original proposed action. The following activities were identified in the original proposed action, and mailed to the public for initial scoping and solicitation of comments.

Table 1.1. Original Proposed Action	
Commercial Treatments	***Acres (approximate)***
Overstory Removal (final harvest)	1,878
Shelterwood Seed-cut (regeneration harvest)	144
Shelterwood Prep-cut (commercial thin)	784
POL Thinning (post and pole harvest)	78
Meadow Restoration (pine removal from meadows)	11
Special Cut (pine removal from aspen)	5
Commercial Pine Encroachment	1002*
Non-Commercial Treatments	***Acres (approximate)***
Pre-commercial Thinning	3,859
Non-commercial Pine Encroachment	1002 *
Prescribed Burning	300
Travel Management	***Miles (approximate)***
Road Construction	0
Road Re-construction	12
Road Closure (either by berm or gate)	55

* Pine encroachment may include both commercial and non-commercial treatments.

Based on further analysis, the Modified Proposed Action included actions that would better met the objectives identified from the Forest Plan, as discussed above, and also meet Phase I direction. The following treatments are included in the Modified Proposed Action:

Table 1.2. Modified Proposed Action	
Commercial Treatments	***Acres (approximate)***
Overstory Removal (final harvest)	1,199
Shelterwood Seed-cut (regeneration harvest)	174
Shelterwood Prep-cut (commercial thin)	534
POL Thinning (post and pole harvest)	194
Special Cut (pine removal from aspen)	107
Commercial Pine Encroachment	1,502*
Non-Commercial Treatments	***Acres (approximate)***
POL Thinning (post and pole harvest)	194
Pre-commercial Thinning	1,709
Non-commercial Pine Encroachment	1,502 *
Prescribed Burning	143
200' Fuel Breaks	69
Travel Management	***Miles (approximate)***
Road Construction/Conversion	0.6
Road Re-construction	5.2
Temporary Road Construction	13
Road Closure (either by berm or gate)	40

* Pine encroachment may include both commercial and non-commercial treatments.

The original proposed action was considered but dropped from detailed analysis because it would have required at least three Forest Plan Amendments. The ID Team, with concurrence from the Decision Maker, developed the Modified Proposed Action into Alternative 2. Further discussion of this alternative, and other alternatives considered, can found in Chapter 2.

Decision Framework

Based upon the information and analysis of effects of each alternative documented in this environmental assessment, the Black Hills National Forest Supervisor will make the following decisions related to accomplishing the goals and objectives of the Forest Plan within the Fanny Project Area.

- The first decision is whether or not vegetation management using commercial and non-commercial timber harvest methods should be used, and if so, in what manner and in what locations.
- The second decision to be made is to determine what level of public access is appropriate and desirable. This decision will include specifically which access routes will be open or closed and to what extent, and whether or not an area closure to off road motorized use should be implemented and to what extent.

Public Involvement

The interdisciplinary team identified issues and concerns using input from Forest Service resource specialists and members of the public. Scoping is the process of determining the scope of issues to be addressed and determining the significant issues related to the proposed action. The first step in the scoping process was to identify members of the public who have an interest in decisions made in the area, or whom the proposed activities may affect. An initial scoping

letter that explained the proposed activities within the Fanny Project Area was mailed to a list of interested individuals, organizations and agencies in June 2002. There were 17 comment letters received. The Project File contains a list of individuals, groups, organizations, and agencies notified of the proposed activities. A copy of scoping letters and persons who commented is also available for review in the Project File.

Issues

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

Issue 1: Travel Management

There were public concerns on both sides of the travel management issue. Some persons did not want to see any more roads closed. Others would like to see more roads closed. The Revised Forest Plan identifies a travel management strategy for Management Areas 5.1 and 5.4 as part of the Desired Future Condition (pg III-67 and 97). A Roads Analysis Process (USDA Forest Service 1999, FS-643) was completed for the Fanny Project Area in June 2002. Recommendations from the roads analysis were used to develop the travel management strategy that was included as part of the Proposed Action identified in the June 2002 scoping letter. A copy of the Roads Analysis for the Fanny Project Area is located in the Project File and available for review at the Hell Canyon District Office. Key sub-issues related to travel management identified during that assessment were:

- **Wildlife Habitat.** South Dakota Game, Fish & Parks Department (SDGF&P) biologists consider the southern portion of the Fanny Project Area as suitable summer elk, white-tailed and mule deer habitat, and depending on snow depth can also be used during winter months. This project area is used as calving and fawning habitat. Analysis has shown that the existing road densities (2.9 mi/sq mi) could create conflicts if proposed management activities reduced cover habitat further.
- **Public Access.** Traditionally within the project area, and across most of the forest, there have never been any restrictions to off road travel. The public has been free to drive off road anywhere, unless posted otherwise. There is a concern by some individuals that any restriction to off road travel is not necessary and would prevent access to traditional recreational areas, especially during hunting season. Others, however, would like to see a reduction to public access ranging from a complete area closure with travel restricted to specific roads only, to no public access allowed except to private landowners.
- **Protection of Cultural Resources.** The history of the Black Hills National Forest includes pre-settlement Native American occupation. This includes not only artifacts, such as stonework, but also traditional cultural places that are still important today.

There is concern that public access in the project area could increase the probability that some areas could be damaged. However, there is also concern that restrictions to access could prevent use of traditional cultural places, which is important to many Native American's.

- **Economics.** Maintaining the large number of miles of road currently open to the public in the project area is very expensive. There is a concern that current and projected funding for road maintenance is decreasing, and will continue to do so in the future. Reducing the number of roads and the associated maintenance would alleviate some of these costs within the project area. However, reducing access could also reduce response time in the event of wildfires, and could hamper administrative access in the future for other multiple-use objectives.

Issue 2: Wildlife

- **Big Game Habitat**. There are public and Forest Service concerns about big game habitat needs, especially cover. The concerns over cover revolve around providing adequate thermal and hiding cover which are limiting factors in this area. Forage production and habitat on winter range is also a concern.

- **General Wildlife.** There are some general public issues about wildlife and the need to address wildlife habitat in management decisions. Species listed by the South Dakota Natural Heritage Program were of concern, in particular, the northern flying squirrel, mountain lion, northern goshawk, and sensitive woodpecker species.

Issue 3: Timber Harvest

There are public issues over timber harvest, both in support of and in opposition to. Some persons felt there was too much timber harvest and that it harmed wildlife and the ecosystem. Others felt that logging was necessary for maintaining a healthy forest and reducing fire risk.

Issue 4: Forest Health

There were public concerns about maintaining and improving forest health. Comments included concerns regarding the prevention of mountain pine beetle infestations and devastating forest fires.

Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) 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 and alternatives. The document is organized into four parts:

- ***Chapter 1.0 Introduction:*** The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how

the Forest Service informed the public of the proposal and how the public responded.

- ***Chapter 2.0 Comparison of Alternatives, including the Proposed Action:*** This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- ***Chapter 3.0 Environmental Consequences:*** This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.
- ***Chapter 4.0 List of Preparers:*** This section provides a list people who participated in the preparation and analysis of the Fanny Environmental Assessment.
- ***Literature Cited:*** The Literature Cited section provides a list of references that were used by resource specialists as a source of information.
- ***Appendices:*** The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the Project File located at the Hell Canyon Ranger District Office in Custer, South Dakota.

CHAPTER 2.0 - ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter includes a description of alternatives considered but eliminated from detailed study, the alternatives considered in detail including the Modified Proposed Action (Alternative 2), other action alternatives (Alternative 3), and the No Action Alternative (Alternative 1). This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative (i.e., closing roads versus leaving roads open) and some of the information is based upon the environmental, social and economic effects of implementing each alternative (i.e., the amount of erosion or cost of closing roads versus leaving them open).

The Interdisciplinary Team analyzed the No Action alternative and two action alternatives in detail for the Fanny Project Area. This Environmental Assessment displays these alternatives for consideration in the decision process. The action alternatives include mitigation measures, which are actions that would mitigate adverse environmental impacts. Most mitigation measures apply to all action alternatives.

Alternatives Considered But Eliminated From Further Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). In addition to internal comments, public comments received in response to the June 2002 scoping effort provided suggestions and requests for alternative methods of achieving all or portions of the purpose and need. Some of these alternatives may be outside the scope of the project intent, duplicative of the alternatives considered in detail, or determined to be components that could cause unnecessary environmental harm. Therefore, a number of alternatives were considered, but eliminated from detailed study for reasons summarized below. The alternatives studied in detail and those described in this section comprise the range of alternatives considered for this project.

Biodiversity Conservation Alliance and Brian Brademeyer – submitted a request to analyze and assess the following alternatives:

- ***An alternative that proposes no commercial timber harvest.*** The IDT considered this alternative, but dropped it from detailed analysis because the No Action, which will be analyzed in detail, already includes this proposal. Additionally, this alternative would not meet the purpose and need for action in that it would not improve wildlife habitat and diversity, or forest health.
- ***An alternative that proposes only prescribed burning.*** This alternative was considered by the IDT, but dropped from detailed analysis because burning in some stands without pre-treatment, such as thinning, could pose an unacceptably high risk of tree mortality, especially in areas that are considered important for wildlife security and cover.

Additionally, prescribed burning in stands considered to be moderate or high density could result in an escapement and wildfire situation.

- ***An alternative that would decommission the maximum number of roads and ways possible within the project area.*** The IDT considered this alternative, but dropped it from detailed study because it is addressed to some extent in Alternative 3, which proposes to close over half of the open roads in the project area. In addition, the project area includes private inholdings, which require access, and two grazing allotments, which require access to fence and water developments, as well as providing routes from which cattle can be moved.
- ***An alternative that proposes to change the Management Area 5.1 – Resource Production Emphasis designation to Management Area 4.1 – Limited Motorized Use and Forest Product Emphasis.*** This alternative was considered by the IDT, but was dropped from detailed analysis because it is outside the scope of analysis for this project. Changing Management Area emphasis is a Forest level planning decision. The IDT could have made a recommendation to consider changing management area emphasis to the decision maker, which would require a Forest Plan Amendment; however, the IDT did not see any need for change at this time.

South Dakota Department of Game, Fish and Parks requested the following alternative be developed:

- ***An alternative that meets or exceeds the goals identified for Management Area 5.4.*** They would like to see an alternative that significantly addresses early and late successional stages that are more desirable and beneficial to wildlife than in-between pole-sized ponderosa pine with an average 80 BA. Goals of Management Area 5.4 are incorporated into all of the alternatives, but to differing degrees for various components. For example, Alternative 3 closes more roads than does Alternatives 1 or 2, and Alternatives 1 and 3 leave more cover for wildlife than does Alternative 2. All alternatives leave adequate browse and forage habitat, and provides for both early and late successional stage habitat.

The Forest Service proposed the following alternative:

- ***The Interdisciplinary Team for the Fanny Project Area designed an alternative to address forest health issues concerning mountain pine beetle and wildfire risks.*** This alternative was the basis for the original Proposed Action that was sent to the public for initial scoping and solicitation of comments on June 21, 2002. This alternative was not considered in detail because further analysis showed that it failed to meet Forest Plan (Phase I) direction in that it did not consider thermal cover requirements within Management Area 5.4, and it did not identify Post Fledgling Areas (PFAs). A Forest Plan Amendment would have been required. Rather than amend the Forest Plan, a Modified Proposed Action was developed based on the intent of the original Proposed Action to address forest health issues, and is analyzed in detail as Alternative 2.

Alternatives Considered And Analyzed In Detail

The alternatives considered in detail by the ID Team are discussed below. During the analysis variations to these alternatives were considered, but changed slightly to meet Forest Plan Direction. This includes the Modified Proposed Action. The initial Proposed Action did not include identification of thermal cover areas within Management Area 5.4 or identification of Post Fledgling Areas (PFAs). In addition, further field review indicated that the prescribed burns proposed within the mountain mahogany would not meet the objectives identified by the wildlife biologist for forage and browse improvement.

This section provides a summary of activities that are proposed to occur during implementation of any action alternative. The amount (e.g., acres, miles) of any particular activity in any alternative is approximate (based on inventory and survey estimates). Actual figures may change during preparation of a timber sale, prescribed burn, or other projects based on such things as topography, non-uniform stand structure or fuels, refinement of the amount or standard of road needed, etc.

The law generally prohibits the harvest of stands before they reach their maximum growth rate (National Forest Management Act (NFMA), 16 U.S.C. 1604(m)). Exceptions in the law allow the harvest of individual trees, or even parts or whole stands of trees, before this time to thin and improve timber stands, and salvage damaged stands of trees (part 1604 m1 of the law). Further exceptions are allowed in order to achieve multiple-use objectives other than timber harvest (part 1604 m2).

The action alternatives would harvest some trees before the maximum potential growth rate of some stands in the project area has been reached. These harvest treatments are consistent with the exceptions provided in part m2 of the law, and include the following:

- Commercial Thinning
- POL Thinning
- Pre-commercial Thinning
- Meadow Restoration Treatments
- Hardwood Restoration Treatments
- Hardwood Retention Treatments
- Hardwood Regeneration Treatments

These treatments are designed to meet other than timber objectives, such as wildlife habitat improvement and vegetative diversity. These treatments are proposed to meet the Forest Plan multiple-use objectives stated earlier in this analysis. Also see Tables 3.2, 3.3, and 3.4 in Chapter 3 under the vegetative habitat condition section, which displays the existing structural stages and the changes that would occur under the action alternatives.

Alternative 1 (No Action)

The Forest Service Handbook requires the Forest Service to study the No Action Alternative in detail, and to use it as a baseline for comparing the effect of the action alternatives (Forest Service Handbook 1909.15, 14.1). Though this alternative does not respond to the defined purpose and need as identified previously from the goals and objectives of the Forest Plan, it represents a baseline against which to compare action alternatives. Under the No Action, no new

activities are proposed, but other activities approved under previous decisions would continue in the project area.

The No Action Alternative assumes that no commercial harvest, road construction, road closures, or any other elements of the modified proposed action would occur within the project area for the next 10 to 15 years. The existing transportation system would remain as is, with 105 miles of open road and an open road density of almost 3 miles/sq.mile. Issues concerning forest health and wildlife habitat improvement would not be addressed. (See Maps in Appendix G)

Alternative 2 (Modified Proposed Action)

Theme - This alternative is based on the original Proposed Action with the intent of addressing forest health issues. It represents a more aggressive approach toward the desired future condition, including commodity production of timber products. It emphasizes Goal 3 of the Forest Plan, as amended by the Phase I amendment. The objective is to maintain healthy productive timber stands and provide for commodity products while maintaining vegetative diversity associated with meadows, including browse production. Most sites, which are ready for silvicultural treatments are treated. It provides the highest commercial harvest volume. This alternative demonstrates the trade-offs between managing for forest health and timber production versus wildlife habitat. It was developed to respond to the Purpose and Need and to address Issues 1, 3 and 4.

This alternative was developed to emphasize forest health, timber production and a travel management strategy that maintains off-road motorized access. This alternative also responds more aggressively to the concerns associated with mountain pine beetle "high risk" stands and dense stands at risk for large wildfire events, especially within Management Area 5.1. Stands that are identified as thermal cover within Management Area 5.4 would not be harvested under any alternative. However, some stands that are identified as future thermal cover would be harvested under this alternative. Treating these stands could delay moving toward meeting the thermal cover objective (5.4-205) in Management Area 5.4, but would address issues concerning forest health. Cable logging would occur on steep slopes (greater than 35%). Approximately 1,500 acres of grasslands, hardwood stands and meadows would be maintained or improved by removing encroaching pine. Some large diameter trees would be left to provide for future snags. Prescribed burning would occur on approximately 143 acres, and fuel breaks would be constructed on approximately 69 acres to reduce fuel accumulations along roads and private property. Approximately 40 miles of unclassified roads would be closed permanently in order to reduce resource damage, since these roads do not receive any maintenance or improvements.

This alternative would commercially harvest approximately 4.6 MMBF of sawtimber from 3,857 acres utilizing the shelterwood even-aged silvicultural system. Other non-commercial activities including pine encroachment, pre-commercial thinning and POL thinning for stand improvement, wildlife habitat improvement and vegetative diversity would also be done on approximately 1,709 acres. Other activities include spring development repairs at Roby Spring, Hop Spring, Sawmill Spring, Corral Spring, and Barrel Spring.

Alternative 3

> ***Theme*** - This alternative is designed to meet the objectives associated with Goal 2 of the Forest Plan and the goals and objectives of Management Area 5.4. The issues of timber harvest, big game habitat improvement, vegetative habitat diversity, and habitat improvement for sensitive and MIS species and other wildlife are all blended into this alternative. It represents a balance between managing the area strictly for timber production and forest health issues, or wildlife habitat. It was developed to address a balance between Issues 1, 2, 3 and 4.

This alternative was developed in response to public concern for wildlife habitat. It was designed to provide for more security and thermal cover. Stands identified as thermal cover would not be treated in any of the action alternatives, however, this alternative also protects stands identified as future thermal cover. This alternative also addresses the concerns of high open road density by closing more roads and by providing an area closure, which restricts motorized travel to specified roads only. Under this alternative, no motorized "off-road" travel would be allowed within the project area. Cable logging would occur on steep slopes (greater than 35%). Approximately 1,472 acres of grasslands, meadows and hardwood stands would be maintained or improved by removing encroaching pine. Some large diameter trees would be left to provide for future snags. Prescribed burning would occur on approximately 143 acres, and fuel breaks would be constructed on approximately 69 acres to reduce fuel accumulations along roads and private property. Approximately 40 miles of unclassified roads and 23 miles of classified (system) roads would be closed permanently (berm) or administratively (gated) in order to reduce resource damage, improve wildlife habitat (security), and provide more opportunities for solitude in the project area.

This alternative would commercially harvest approximately 4.1 MMBF of sawtimber from 3,523 acres utilizing the shelterwood even-aged silvicultural system. Other non-commercial activities including pine encroachment, pre-commercial thinning and POL thinning for stand improvement, wildlife habitat improvement and vegetative diversity would also be done on approximately 1,522 acres. Variable density thinning would be utilized to in some areas identified for pre-commercial thinning to improve within stand diversity. Other activities include spring development repairs at Roby Spring, Hop Spring, Sawmill Spring, Corral Spring, and Barrel Spring.

Activities Common to All Alternatives

The following is a list of activities that are common to all action alternatives in terms of the type of action and in size or amount. These activities were designed to move the project area toward meeting the purpose and need, while also addressing many the issues and concerns identified during scoping.

Silvicultural Prescriptions Common to All Action Alternatives

A variety of silvicultural treatments would occur under all of the action alternatives. Although each action alternative proposes differing amounts of these prescriptions, stand conditions prior to, and following implementation would be similar.

Overstory Removal Cut (Final Cut)

A timber harvest method that removes the last seed-bearing trees after regeneration is considered established under a shelterwood method. The objective of this treatment is to remove the overstory trees so that the new regeneration in the understory that has developed can grow. Generally, at least 10 large trees (>9" dbh) per acre are left on site for snag recruitment

Shelterwood Seedcut

A timber harvest method in which a portion of the mature stand is retained as a source of seed and/or protection during the period of regeneration. The mature stand of trees is removed in two or more cuttings (commonly called seed cut and removal cut). The seed cut may or may not be preceded by a preparatory cut. The objective of this harvest method in the Black Hills National Forest is regeneration of ponderosa pine.

Preparation Cut (Prep Cut)

A timber harvest method that removes trees near the end of a rotation so as to open the canopy and enlarge the crowns of seed bearers to improve conditions for seed production and natural regeneration. The objective of this treatment is to prepare the stand for regeneration by improving the conditions of the crop trees (seed bearers) and the ground (seedbed).

POL Thinning

A method of timber harvest which removes trees that are generally between 5" and 8.9" dbh. These trees are usually large enough to provide a commercial product (post and pole). The objective of this treatment is to reduce stocking levels, improving growing conditions, and to remove diseased, damaged or stunted trees, leaving the best quality trees on site to develop into sawtimber. Residual spacing of the leave trees is generally 16 x16 feet, but depends on the stand conditions.

Pre-Commercial Thinning

A method of reducing the stocking level of a stand of trees; which usually consists of non-commercial size (< 8" dbh) trees. Reduction of stocking levels provides the best growing conditions for the development of sawtimber. Optimal stocking levels depend on stand conditions, but in general, treatments try to achieve stocking levels of approximately 302 trees per acre, or about 12 x 12 foot spacing. The objective of this treatment is to produce high quality sawtimber by the end of the rotation.

Pine Encroachment

A treatment that removes encroaching pine of all size classes from meadows. The objective of this treatment is to maintain or improve the meadow and grassland conditions by removing, or preventing the encroachment of conifers. This treatment may include both commercial and non-commercial trees sizes.

Aspen Release

A treatment prescribed to remove conifers (usually pine) from aspen stands. The objective of this treatment is to maintain or improve the condition of the existing aspen stand by removing, or preventing encroachment of conifers. Ground disturbing activities may also result in aspen regeneration.

Prescribed Burning

A controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions (specified in a written prescription), that allows the fire to be confined in to a predetermined area, and at the same time, to produce the fireline intensity and rate of spread required to attain planned resource management objectives.

Conifer Removal from Aspen

There are very few areas where aspen occurs within the Fanny Project Area. Most of the aspen clones occur as a component of pine stands, and are generally less than 2 acres in size. Five of these sites will be treated, in both action alternatives, by removal of all ponderosa pine within approximately 100 feet of the aspen clone. The purpose of this treatment is to remove the competing conifer vegetation, and prevent the gradual conversion of these aspen/birch stands to a pine stand and to, at a minimum, maintain the existing diversity in each of these stands.

Site Specific Fuels Treatments

Site-specific fuels treatments would occur under both alternatives to reduce existing fuels, or fuels created as a result of other activities. They consist of the following:

- Construction of fuel breaks along the east side of Boles Canyon Road (FSR 117.1) approximately 1.5 miles in length and 200 feet in width, south of the Summit Ridge Road (FSR 285). Additional fuel breaks will be constructed within 200 feet of some private lands, where the objective is to reduce or avoid excess fuel loading. Within these fuel breaks, materials would be piled and burned at a time when weather conditions permitted.
- Approximately 140 acres would be treated with whole tree skidding in four separate areas where timber harvests are proposed to occur.
- Broadcast burning would occur on approximately 143 acres to reduce natural fuels.

A brush disposal (BD) plan will be written prior to harvest activities, which will outline all potential fuels treatments needed to meet Forest Plan direction if an action alternative is selected. Treatments to remove fuels from timber harvested areas may include: lop and scatter of slash material, whole-tree removal, pile and burn, and fuel breaks. Piled slash would remain on site for a few years after piling, and would be burned when there is snow on the ground. The areas where piles are burned would be scarified to mix ash with soil, and provide a suitable seedbed for seed germination.

Noxious Weed Treatments

Noxious weed treatments will occur in known areas of infestation, and where ground-disturbing activities are proposed. Disturbed sites may require treatment for at least five years or more, until weeds are controlled.

Designated Late Succession/Old Growth

There are 830 acres of designated old growth within the Fanny Project Area. One 10-acre site would be treated under both action alternatives with a variable-density pre-commercial thinning. This treatment would reduce the understory density both to improve the growth of the overstory

trees and to improve the diversity of the stand. Removal of these understory trees would also reduce the risk of a stand replacing fire event. Varying the spacing of the leave trees will provide diversity in the understory and allow for the selection of the best trees to be left for future overstory trees.

Mitigation Measures Common to All Alternatives _____

In response to public comments on the proposal, mitigation measures were developed to ease some of the potential impacts the various alternatives may cause. The mitigation measures may be applied to any of the action alternatives.

The Black Hills National Forest has a set of standard mitigation measures applied to all silvicultural and related road management activities: Best Management Practices (BMPs) for the Control of Non-point Pollution from Silvicultural and Related Road Activities and BMPs found in the Watershed Conservation Practices Handbook. These BMPs, as well as applicable mitigation from 33CFR 320, Forest Plan requirements, and mitigation designed specifically for the Fanny Project Area will be applied to all action alternatives for this project (see Appendix B and C). The measures listed below are in addition to, and not replacements for, the standard BMPs.

Timber Resource

The practices outlines in "Best Management Practices for the control of Non-Point Pollution from Silvicultural and Related Road Activities" will be followed.

Stand/cutting unit boundaries, with the exception of meadow or aspen treatment edges, should not be of sharp visual contrast, or appear as straight lines. Changes in stocking level between stands (shelterwood seed cut to thin, or thin to untreated private, etc) will be gradual. Transition zones of 1.5 times the tree height will be used in areas receiving contrasting treatments.

Shelterwood seed cut treatments on south to west aspects with slopes greater than 30% will retain a minimum stocking of 40 sq. ft. basal area.

Activity fuels will be lopped, scattered, and slash piles (other than those created for wildlife habitat) burned within one year of completion of the unit (weather permitting). This will reduce the risk of tree mortality from *Ips* beetle.

Stabilize, scarify or re-contour temporary roads, constructed skid trails and landings prior to seeding (Guideline 1111).

Within harvest units, trees identified as diseased or insect infested would be removed in order to prevent any future infestations.

Wildlife Resource

Snag Dependent Species

Protect standing dead trees (>10" DBH) during prescribed fires whenever possible to maintain snag densities (Standard 2301 and 2302).

To provide for future snags and in order to move the project area toward meeting the Forest Plan snag objective (Guideline 2304), the following mitigations will be applied:

- All trees greater than 20" DBH will be retained within the project area. Within cutting units, if trees greater than 20" DBH do not exist, retain at least 1 tree/acre in the largest diameter class available.
- Within the following sites proposed for overstory removal, specific mitigation will apply:

Table 2.1. Snag Retention Mitigation Measures	
Location/Site	***Mitigation***
41001/0018	Leave an additional 4 trees/acre 10" DBH or greater
41002/0007	Leave an additional 4 trees/acre 10" DBH or greater
41003/0016	Leave an additional 4 trees/acre 10" DBH or greater
41202/0030	Leave an additional 5 trees/acre 10" DBH or greater
41303/0004	Leave an additional 4 trees/acre 10" DBH or greater

Retain all existing snags in harvest units, especially those greater than 10" DBH, not representing a safety hazard (Guideline 2305). All hard snags should be designated as leave trees prior to treatment.

Dead and Down Woody Debris

On conifer forested sites maintain the following:

- In ponderosa pine sites, maintain large course debris on average at least 50 linear feet per acre and a minimum diameter of 10" DBH (Standard 2308a).

Turkey

Mark or designate and protect at least one turkey roost tree group on treated sites, which have layered horizontal branches with 2-3' vertical spacing. These trees should be clumped and located on the upper third of east-facing slopes where suitable trees exist and topography permits. Two to six clumps should be left at a minimum of 0.25 acre in size and should exceed 80 sq.ft/ac. BA and include at lease 5 mature trees of 12" DBH or larger (Guideline 3205).

Protect turkey roost trees identified during sale preparation by a buffer zone of at least 0.25 acre (Guideline 3205).

Most sections will continue to provide sufficient turkey roost trees due to areas that will not be treated, however in these proposed harvest sites additional roost tree groups should be provided. Select two (¼ + acre) roost tree groups in the following sites, depending on the selected alternative:

Table 2.2. Turkey Roost Tree Groups	
Alternative 2	
Location	***Site***
041202	20,30
040902	6,7,8
041002	54,55,56
041003	16,9,4,6,17
Alternative 3	
Location	***Site***
041202	20
040902	6,7,8
041002	54,55,56
041303	9,4,6,17

Big Game

Where treatments are planned in stands providing big game screening along arterial and collector roads, maintain a strip of dense pine regeneration 200' wide along the road where available. This will apply to all treatment sites along Highway 16, FSRs 117, 265, 376, 281 and 280 (Guideline 3203).

Endangered, Threatened, and Sensitive Species

Sensitive species located after contract or permit formation will be appropriately managed by active coordination between permittee, contractor or purchaser, Forest Service line officer, project administrator, and biologist. Viable solutions need to be based on circumstances surrounding each new discovery and must consider the individual sensitive species needing protection, contractual obligations and costs, and mitigation measures available at the time of discovery (Standard 3115).

Bald Eagle - Protect any roost and perch trees identified during project layout and implementation.

Spring Developments

Locate new water developments outside of the water influence zone where possible (Guideline 1304).

Construct/reconstruct fences around the following springs to protect riparian habitat: Roby Spring, Hop Spring, Sawmill Spring, Corral Spring, and Barrel Spring. Provide protected buffers around water bodies (springs/seeps) to protect amphibian habitat, and water quality (Guideline 3104).

Goshawks

From March 1st through August 31st, minimize additional (new) human caused disturbances and disruption beyond that occurring at the time of nest initiation (e.g. road traffic, timber harvest, construction activities) within ¼ mile of active goshawk nests (Standard 3111).

From March 1st to September 30th, avoid timber harvest schedules that cause simultaneous, widespread disturbance across active goshawk post fledgling habitat. Fledgling habitat should include areas without constant human disturbance (Guideline 3113, to be treated as a Standard).

Other Raptors

Any active raptor nest discovered during sale layout, sale operations, or post sale treatments will be reported to the District Biologist for evaluation. Modifications to Forest Service contracts, and or mitigation measures such as seasonal or other restrictions may be required to protect the nest (Guideline 3204, to be treated as a Standard).

Noxious Weeds

Initiate re-vegetation as soon as possible, not to exceed 6 months, after termination of ground-disturbing activities. Re-vegetate all disturbed soils with native, or non-persistent, annual grasses and/or forbs. This mix must be certified noxious weed free. On acres needing immediate establishment of vegetation, non-native non-aggressive annuals, non-aggressive perennials, or sterile perennial species may be used while native perennials are becoming

established. Any mulch used for re-vegetation of disturbed areas must also be noxious weed free. To promote re-vegetation of prescribed burned areas:

1. Seed to initiate re-vegetation if ground cover is 60% or less and slopes are 30% or more.
2. If piled and burned fuel creates ash piles deeper than 3 inches, scatter the ash, scarify and mix in with mineral soil, or bury it (Guideline 4106).

Integrated Pest Management (IPM) treatment following sale activities will include spraying and use of host specific insects to control noxious weeds. Spraying will be maintained for five years, if needed. Biological control will be implemented for leafy spurge and Canada thistle control.

Fire and Fuels

Defer prescribed burned areas from livestock grazing for a portion or all of the following growing season to ensure re-growth of forage species (Guideline 4107, to be treated as a Standard).

Reduce the threat of wildfire to public and private developments by following standards in the National Fire Protection Association Publication 299, Protection of Life and Property from Wildfire, and reduce fuel loading to acceptable standards (Forest Plan Standard 4113). Treatments will include reducing fuel concentrations and ladder fuels near structures and along roads that serve as primary access routes to structures.

Throughout treated areas, slash heights shall not exceed 18 inches. Post-sale fuel loading will be calculated and treatments done as necessary to meet Forest Plan direction and BMPs. Slash treatments may include piling and burning (Guideline 4110).

Prepare Brush Disposal (BD) Plans in conjunction with projects that create activity fuels. Implement using collected deposits. Anticipated costs for additional treatments will be calculated in the BD deposits for the timber sales or other activities. Additional funds will be collected for expected treatment of landings after the harvest activities are completed. This will include burning of the piles, ripping and seeding as needed.

Locate slash piles that are scheduled for burning out of meadows that contribute to Waters of the United States. Use a buffer distance designed to keep sediment, ash and debris out of channels (Forest Plan Guideline 4111).

Prescribed Burn Plans for the proposed prescribed burning will be prepared in accordance with Forest direction. These prescribed burn plans will address the issues associated with public safety and involvement, adjacent landowner concerns, protection of adjacent private and public property, airshed protection, prescribed burn safety, logistics, operations and costs. Coordinate with and involve the County Commissioners, other appropriate public officials, adjacent landowners, volunteer fire departments, other federal and state agencies, and other interested individuals/groups during the burn planning process.

Soil and Water

Mitigation measures will be required to reduce the impacts of the proposed project on the soils and watersheds. All mitigation measures are needed and designed to insure compliance with BMPs and Water Conservation Practices (WCPs), which are Forest Plan management requirements (Appendix B). BMPs are designed to protect water quality and soil productivity.

Protected stream courses will provide a buffer in the WIZ (Water Influence Zone) with a 100 ft. width. Protected stream courses will include Gillette Canyon, Buck Spring Canyon, Redbird Canyon and Boles Canyon (Appendix B).

Soil mitigations will be required in order to prevent excessive erosion and protect long-term site productivity.

- Machinery operations must be restricted to dry or frozen soil conditions on soils subject to compaction when wet and on slopes greater than 20% on soils with severe erosion or moderate or high mass wasting potential.
- Ground skidding must be avoided on soils with severe erosion potential and moderate or high mass wasting potential and slopes steeper than 40 percent.
- Retain 50% or more of fine (less than 3 inches in diameter) logging slash in the stand on soils with low organic matter.
- Prescribed fire must be conducted when soils are moist or frozen. Most of the soils under the proposed prescribed fire have severe prescribed fire hazards.

BMP Effectiveness

BMPs are implemented to control or limit non-point source pollution. The general thought is that if BMPs are correctly implemented, then the project will comply with the Clean Water Act and protect water quality. The question has been brought up, how do we know the BMPs are effective or work. There have been several reviews of BMPs for timber sales. The States of South Dakota and Wyoming conducted the most recent BMP reviews in 2001. The South Dakota reports states, "The team concluded that South Dakota's Silviculture BMPs are being properly installed and are effective." "On the average, the BMPs met or exceeded 82 and 84 percent of the total rated points for application and effectiveness, respectively. Instances of gross neglect were not identified at any of the audited sales." The Wyoming report states "On average, audited sales were found to meet or exceed the standard set forth in the BMP handbook on 91.4 percent of the total application points, and 93.3 percent of the total effectiveness points." These reports show that BMPs are implemented and effective.

The Fanny Project Area will have BMPs and mitigations measures prescribed and implemented. There are no perennial streams in the planning area, and intermittent streams that are present only flow during high intensity storm event, so water quality is not a concern. The main concern is soil productivity, which the BMPs will protect.

Recreation

Harvest activities that occur adjacent to the Summit Ridge Recreation Area should be scheduled to occur outside the primary recreation season of April to November.

Scenery Resources

Utilize whole tree harvesting or hand pile and burn logging activity slash/fuel, within the immediate foreground of primary roads (i.e. Hwy 16). This will reduce the amount of slash and enhance the scenic integrity of the area.

Within the immediate foreground of primary roads (i.e. Hwy 16) vary harvest prescriptions for diversity in tree spacing, tree age, and unit shapes to mimic natural appearing areas, comparable to the ecosystem the management activity unit is found in. This is particularly important in the overstory removal units along Highway 16.

Due to the unnatural form of the overstory removals, the edges of units in foreground & middleground views should have the edges feathered. A transition zone of 1.5 times the overstory is recommended.

Treatments around private lands, in forested areas, must blend with the current condition on those lands. Do not create strong lines between private and Forest Service boundaries. The transition zone width is dependent upon management and use of private lands, slope, and variety of vegetation. A transition zone of 1.5 times the overstory is recommended.

Skid trails and landings, which are located along Highway 16 must be returned to a natural condition (seeding) within the immediate foreground (150 - 300 feet or sight distance of the main roads) within 1 year of the completion of all management activities.

Under burning adjacent to travel corridors, roads & trails, should be burned **toward** the road or trail to limit scorch height to 1-2 feet above the ground, where possible. Where this is not possible, due to terrain, cooler firing conditions and firing techniques, should be considered, and used, to limit scorch heights.

Design Water developments, if constructed under these alternatives, so cut/ fill slopes are laid back such as a 1:3 or 1:4 ratio. This allows for access by animals, aids in re-establishing vegetation, limits erosion and sedimentation. Site the development near small trees, where possible - and protect those trees, to provide a natural setting. In addition, design the impoundment in an irregular shape so that the form appears natural in the landscape. (Square shapes do not meet any SIO for any area.) Have Landscape Architect review plans prior to construction, as needed.

Heritage

Measures for protection of known heritage properties will be enforced and monitored. However, damage to previously undetected sites can occur prior to recognition of the resource. A special contract provision, *Protection of Heritage Resources*, would be included to assure that such resource damage during harvest operations is minimized. This provision would require the purchaser to protect all known and identified or discovered historic or prehistoric sites, buildings, and properties related to American History, architecture, and culture against destructions obliteration removal or damage during purchaser's operations.

All identified historic and prehistoric properties will be protected by following the heritage resource compliance process mandated by Section 106 of the National Historic Preservation Act (NHPA). The regulations governing 106 reviews are contained in 36 CFR Part 800, which describes how to carry out each step in the compliance process. If the property is determined eligible, the project's effects to the property would be determined and compliance with Section 106 of the NHPA completed to mitigate the adverse effects. Subsequent mitigation measures would be formulated which would include, but not be limited to, site stabilization, additional testing, data recovery, and continued protection requirements.

To protect heritage resources, the following measures will be taken:

- Report completion and consultation with the State Historic Preservation Officer (SHPO) would be completed following the procedure outlined in the Memorandum of Understanding between the Forest Service and the SHPO. If any property is determined eligible to the National Register of Historic Places (NRHP), effects to the property would be determined and compliance with Section 106 of the NHPA completed to mitigate the adverse affects. Mitigation measures would be formulated which would include, but not be limited to, site stabilization, subsurface testing, data recovery, and continued protection requirement.
- Prior to project implementation, all known prehistoric and historic sites within potential harvest areas would be revisited by the District Archeologist. If needed, all site boundaries would be re-flagged/painted to national standards for on-the-ground identification and protection. Sites would be photographed to document their condition prior to harvest activities.
- During and after harvest activities, the District Archeologist and Sale Administrator would monitor site conditions to ensure that the protection measures prescribed are adequate.
- In order to protect known sites and mitigate damage to sites that may be discovered during ground disturbing activities, Contract Standards would be included in the timber sale contract. This provision would require the purchaser to protect all known and identified, or discovered historic, architecture, or prehistoric sites, buildings, objects and properties related to American History, archeology, and culture against destruction, obliteration, removal or damage during purchaser's operations. The purchaser shall immediately notify the Forest Service if damage occurs to any heritage resource and immediately halt operations in the vicinity of the resource where damage occurred until the Forest Service authorizes the purchaser to proceed. If such damage is negligently or willfully caused by the purchaser's operations, the purchaser shall bear the costs of an investigation and restoration in accordance with 36 CFR 296.14(c), provided that such payment shall not relieve the purchaser from civil or criminal remedies otherwise provided by law. The Forest Service may unilaterally modify or cancel a contract to protect an area, object of antiquity, artifact, or similar object, which may be entitled to protection.

Under the Programmatic Agreement regarding prescribed burning developed with the Advisory Council on Historic Preservation and the State Historic Preservation, the following actions will be carried out by the Forests *after* the NEPA decision is made:

- The Forest will develop a specific burn plan. The burn plan will define the proposed level of severity (low, moderate, and/or high) for the project. Project areas or burn units designated for a short duration, low and/or moderate level of fire severity will be subjected to a sample survey as defined in Appendix B of the Programmatic Agreement. Those project areas or burn units, which will have a long duration, moderate, and/or high level of fire severity will be subjected to intensive surveys.
- If so requested by the SHPO, or an Indian Tribe, the Forest will conduct additional consultation for the identification of properties of traditional cultural and religious significance to Indian Tribes, or other interested parties.

- The Forest will document the results of the field inventory, consultation with Indian Tribes regarding properties of traditional religious and cultural value, and any proposed measures to avoid adverse effects to historic properties in a Report, as defined in Stipulation IV.A. The Forest will submit the Report for review and comment to the consulting parties pursuant to the requirements of Stipulation IV.A. The Report will document a finding of either no historic properties affected pursuant to 36 CFR 800.4(d)(1), or no adverse effect, pursuant to 36 CFR 800.5 (b) for the prescribed fire project(s); or that if avoidance is not possible, the Forest will apply the criteria of adverse effect in the Councils' regulations, 36 CFR 800.5(a), to determine if recorded historic properties in the Area of Potential Effect may be adversely affected by the proposed prescribed fire(s). If effects may be adverse, the Forest will consult with the SHPO and other appropriate parties in accordance with 36 CFR 800.6.
- If the Forest Service determines that adverse effects cannot be avoided, or if the SHPO objects to a finding of no adverse effect, the Forest will rescind the portion of the Decision Notice which implements the Prescribed Fire Activity for the analysis area and consult further in accordance with 36 CFR 800.6 to resolve the adverse effects.

Roads and Travel Management

Road closure devices, including barriers, slash or other devices needed to prohibit or eliminate use, will be located on the ground to provide the most effective means of accomplishing the desired travel management strategy.

Physical closures, such as slash, stumps, rocks and re-vegetation are to be used to eliminate use. Earthen barriers may be used when there is not adequate material available for slash, stumps or rock closures. This may be done after the sale, to allow use of a road by the purchaser, or as funds become available. Closure gates will be utilized where administrative access is needed.

Whenever possible, roads shall be relocated or constructed out of draw bottoms to improve drainage and protect soil and water resources. Abandoned roadbeds shall be re-vegetated and returned too as natural a state as possible.

All temporary roads and newly constructed system roads used to access harvest units will be closed or obliterated after management activity is completed.

Where sod has effectively stabilized existing roadbeds, efforts will be made to minimize disturbance to the sod layer during maintenance and reconstruction activities.

Reduce steep (greater than 10%) grades where possible and relocate roads out of bottoms to minimize impact in intermittent draws. Marshy, wet areas are avoided where possible. Rocky fills and geotextiles are used in marshy, wet areas when avoidance is not possible. Highly erodible soils, steep grades and flat areas may be protected by placement of aggregate on the roadbed. Depth of aggregate may vary depending on type of soil but 4" is generally the minimum depth applied to ensure proper bearing strength and soil protection. Where crossings of intermittent drainages, draws and valleys are proposed, 1' to 2' of rocky material may be used to protect the soil. Cut and fill slopes are seeded as soon as possible following completion of road template. Natural re-vegetation also occurs to supplement specified seeding.

Minimize crossings of perennial streams. Consult with Forest hydrologist and fisheries biologist to develop the proper structure required for the stream characteristics, flow volume, soil type and

drainage area. Ensure fill slope protection with riprap, gabions, prompt seeding of slopes and/or other methods approved by the hydrologist, fisheries biologist and soil scientist. Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including placement of fill and measures to control sedimentation. Routinely maintain bridges and culverts to ensure unrestricted flow. Immediately repair damaged or eroded fill slopes.

Maintain a buffer zone (in accordance with South Dakota Best Management Practices) between streams and parallel roads sufficient enough to eliminate movement of soil to the stream. Catchment basins are used where terrain permits. Fill slopes and other disturbed areas are re-vegetated. Construction equipment will not operate in buffer zones except as necessary to construct fills.

Monitoring

The Forest Plan, as amended by the Phase I Amendment, contains a section that describes a strategy for monitoring and evaluating management of the Black Hills National Forest, and is incorporated here by reference. It lists items to be monitored at several levels including the project level. The purpose of monitoring is to determine if management practices are achieving the desired conditions. Also incorporated here by reference is the Black Hills National Forest 2001 Annual Monitoring Report (May 2002) and the South Dakota Silviculture BMP Audit of Projects Final Report, June 2001.

The Hell Canyon Ranger District personnel will monitor implementation of the selected alternative. The District will ensure that the objectives and mitigation measures identified in this Environmental Assessment are implemented appropriately prior to commercial timber sale offer and after implementation.

Project-wide BMP Monitoring

BMP monitoring will occur during implementation of the selected alternative, and after management activities are completed. (Appendix B and C)

Timber

Stands receiving shelterwood seed cuts will be examined three and five years after harvest to certify the establishment of pine regeneration. Third and fifth year regeneration surveys will be conducted to determine if regeneration requirements are met and if additional treatments will be necessary to regenerate stands. Stands treated with shelterwood removals will be examined one year after harvest. First year regeneration surveys will be conducted to determine what thinning treatments are needed.

All stands treated with partial and final removals will be examined one year after harvest to determine if planned treatments are appropriate, or if additional treatments are needed to reforest the stand. The District Silviculturist is responsible for these examinations.

Wildlife and Sensitive Species

The District Biologist will monitor the goshawk historic nest site and post fledging areas during vegetative treatment activities to ensure mitigation measures identified are adequate to ensure protection from disturbance, should an active nest be discovered.

Noxious Weeds

The District Range staff will monitor the effectiveness of noxious weed treatments and Integrated Pest Management treatments. Monitoring may include photos and mapping locations to determine spread or reduction of noxious weeds. Range staff will determine whether noxious weed treatments are effective, and if other actions are necessary to control noxious weeds.

Fire and Fuels

The District Fire Management Officer will monitor smoke dispersal and air quality on site and at receptor areas during prescribed burn implementation to insure that air quality remains within identified parameters.

Soils and Water

The District Hydrologist and/or the District Wildlife Biologist will monitor riparian areas for impacts due to project activities for BMP effectiveness of resource protection during and after treatments are completed.

Roads and Travel Management

The Timber Sale Administrator and/or Project Engineer will monitor road conditions in the project area to insure the minimum standards are being met and to identify any unacceptable resource impact. If unacceptable resource damage occurs, or is likely to occur, roads will be restricted from motorized use until road conditions improve.

District personnel will monitor effectiveness of road restrictions and area closures (if applicable) to determine if roads have been signed/gated at scheduled times (seasonal closures). District personnel will determine whether restricted access has achieved resource protection goals or whether additional/different restriction measures need to be implemented. Road monitoring will occur on an annual basis during the life of the timber sale, and continue post treatment.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table below is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives. Post sale (non-commercial) treatments may overlap with commercial treatments, such as where POL and pre-commercial thinning are proposed after a commercial harvest in order to accomplish objectives. Therefore, the total area treated may not equal total acres of treatment.

The acres of post sale treatments and associated activities proposed may differ from actual acres implemented (i.e. reduction) due to the availability of funding. A prioritized list of projects, which could be funded with Knutson-Vandenberg (KV) funds collected from timber sale

receipts, is included in the project file. Some of these treatments/activities may be accomplished with other fund sources, such as partnerships or cooperative agreements, or through other National Forest programs.

Table 2.3. Key Issues and associated effects or outputs by Alternative.			
Key Issues	**Alternative 1 – No Action**	**Alternative 2**	**Alternative 3**
Issue 1. Travel Management (miles)			
Open roads Yearlong	105	72	52
Seasonal Closures (Dec. 1st – May 1st)	4	4	4
Yearlong Closures (includes yearlong/admin. use)	8	2	23
Decommission	0	40	40
Open Road Density	2.87 mi/sq mi	1.99 mi/sq mi	1.41 mi/sq mi
Construction	0	0.6	0.6
Reconstruction	0	5.2	5.2
Pre-use maintenance	0	66.2	66.2
Temporary Road Construction	0	13.0	13.0
Area Closure across project area (no off road travel)	No	No	Yes
Issues 2. Wildlife Habitat (acres)			
Old Growth	833	833	833
Thermal Cover (5.4)	1,596 (15%)	1,596 (15%)	1,596 (15%)
Future Thermal Cover (5.4)	3,561	2,643 (24%)	2,947 (27%)
Hiding Cover	31%	Maintained with mitigation	Maintained with mitigation
Meadows/Grass-Forb	3,260	3,260	3,260
Structural Stage 1 (within forested acres)	1,940	1,940	1,940
PFA 1 (5.4)	0	633	633
PFA 2 (5.1)	0	744	744
Issue 3. Timber (acres)			
Overstory Removal (OSR)	0	1,199	950
Shelterwood Seedcut	0	174	174
Shelterwood Prep Cut	0	534	500
Aspen Release	0	107	107
POL	0	194	194
Pre-commercial thin (PCT)	0	1,709	1,522
Pine Encroachment (PE)	0	1,502	1,633
Total Acres Treated	**0**	**5,295**	**4,797**
Sawtimber Volume Harvested	**0**	**4.6 MMBF (9,200 CCF)**	**4.1 MMBF (8,200 CCF)**
POL Volume Harvested	**0**	**1,060 CCF**	**1,060 CCF**
Issue 4. Forest Health			
Acres Rated Moderate for Mountain Pine Beetle Risk	4896	3702	3819
Acres Rated High for Mountain Pine Beetle Risk	917	808	842
Prescribed Burn (ac.)	0	143	143
200 Foot Wide Fuelbreaks	0	69	69

CHAPTER 3.0 – ENVIRONMENTAL CONSEQUENCES

This chapter presents relevant resource descriptions of the existing condition, or baseline environment, and the environmental consequences of each action alternative to that environment. The discussion of environmental consequences includes direct, indirect and cumulative effects. This chapter also presents the means to mitigate adverse impacts to the environment. (A list of mitigation measures for all resources can be found in Chapter 2.0) It also presents the scientific and analytical basis for comparison of alternatives presented in the chart above. Resource elements that are not affected, or are only minimally affected, by the action alternatives are not discussed. These include elements such as topography, climate and noise.

Analysis of cumulative effects includes past, present, proposed and reasonably foreseeable activities that could affect the biological, physical or social environments. Reasonable foreseeable actions include management activities that are on going, or are scheduled to occur (under previous decisions) within the next five years. These activities may occur regardless of which alternative is selected for implementation. The area analyzed for cumulative effects will vary by resource. For the soil and water analysis, the sixth level watersheds in which those activities occur portray the geographic boundary. The time frame is based upon any past activity from which ground disturbance is still evident in the form of sedimentation to any foreseeable actions that will occur prior to disturbance from the proposed activity disappearing. For other resource elements, including wildlife, the geographic boundary is based upon the project area boundary itself. The area is selected based upon its large size and the fact that it will encompass the impacts and any trends reflected by the proposed activities.

Past activities that were considered in the cumulative effects analysis include timber harvests, livestock grazing, wildfires and fire suppression, insect infestations, storm events, and residential development. Some of these activities/events have been occurring in the project area for over 100 years, while other activities/events are more recent. The most significant recent event seen on the landscape is the burned areas from Jasper and Elk Mountain II wildfires during the summers of 2000 and 2001. These areas are located just south and east of the project area. While some areas within the burned areas were completely consumed, other areas were burned such that a mosaic of vegetative patterns and types were left.

Other activities such as livestock grazing, timber harvest and residential development have been occurring since the early 1900's. Water is a limiting factor in the project area, so initial settlement (homesteading) took place along streams and riparian areas. Therefore, most of the private ownership/development and travel routes are along streams. These activities can affect water quality in some locations. Roads, human disturbance, and livestock grazing can also influence the distribution of wildlife. Weather related events (storms, flooding, and drought) have affected the project area more recently. Following the Jasper and Elk Mountain II wildfires, heavy thunderstorms occurred during July and August of 2001. These thunderstorms caused extensive flash flooding in these fire areas. Damage occurred to some roads and drainage systems along roads both inside and outside the fire areas, including areas within the Fanny Project Area.

Present activities are those activities currently occurring within the project area (6th level watershed boundary for hydrologic analysis). Present activities include livestock grazing,

recreational activities such as hunting, and timber management activities associated with past decisions (pre-commercial thinning). In addition, the Summit Ridge Recreation Area, which consists of a cabin that sleeps up to seven people, one outhouse, and the Summit Ridge fire lookout (decommissioned), is available for lease year-round.

Reasonably foreseeable actions include those management activities that are on going or are scheduled to occur within the next five years. These activities may occur regardless of the alternative selected for implementation under this analysis. These actions include livestock grazing and residential development on private land. An increase in off-road motorized recreation use, especially during hunting seasons, is likely to increase. Suppression of wildfires is also likely to continue, especially considering the recent wildfires in adjacent areas.

Analysis of direct, indirect and cumulative effects of the action alternatives on the biological, physical and social environment was completed by the ID team and presented here. Analysis was accomplished with and by use of field observations, surveys and review, aerial photography, resource modeling, literature review, past experience and professional recommendations, information obtained thru monitoring, Forest Plan direction and associated analysis described in Chapter III of the Forest Plan Environmental Impact Statement, and public participation. Direct and indirect effects were analyzed over a 10-year planning period.

In addition to the project level, cumulative effects are measured at the Forest Plan level to assess impacts of similar treatments on adjacent areas and across the entire Forest. This scale of cumulative impacts analysis is available in the FEIS for the Revised Forest Plan, as amended by the Phase I amendment.

Timber Resource

Introduction

This section displays an overview of the analysis and effects to timber resources within the Fanny Project Area. The Silviculturist for this project has completed the field review and analysis, which is documented here and in the Project File.

Forest Plan Direction

Goal 3 – Provide for sustained commodity uses in an environmentally acceptable manner.

Objective 303 – Offer the following allowable sale quantity (ASQ) of timber on suitable and available timberlands in the next decade: 838 MMBF of sawtimber and 21 MCF of roundwood (POL).

Guideline 2411 (Treat as a Standard) – Regeneration harvests of even-aged timber stands should not be undertaken until the stands have generally reached (or surpassed 95 percent of the) culmination of the mean annual increment measured in cubic feet. Exceptions may be made where resource management objectives or special resource considerations require earlier harvest. Exceptions include serving specific management objectives such as forest health, wildlife diversity, and ecosystem restoration and management.

Standard 2416 – The following restocking requirements apply on lands identified as suitable and available for timber production.

a. When trees are harvested to meet timber production objectives, the cutting should be made in such a way that there is assurance that the technology and knowledge exists to adequately restock these areas with trees within 5 years after final harvest.

Goal 5.1-201 – Manage tree stands to emphasize timber products, forage production, and water yield.

Objective 5.1-202 – While meeting other objectives for this management area, provide variety in stand sizes, shape, crown closure, age structure and interspersion.

Standard 5.1-2101 – Suitable lands are available for timber production and contribute to the allowable sale quantity.

Existing Condition

The vegetation in the Fanny Project Area is dominated by ponderosa pine on the ridges and side slopes, and bluegrass meadows dominating the drainages and lower elevations. Aspen is a very minor component in portions of the ponderosa pine cover types. Ponderosa pine is the dominant vegetative cover type (68%), grass and meadows (14%), the remainder (18%) is Rocky Mountain juniper and mountain mahogany. Ponderosa pine and aspen are intermixed in small areas of a few sites, but cover type classification is based on the predominant overstory species.

Many of the ponderosa pine cover types vary in structure with many multi-aged or uneven-aged sites. The predominant classifications are storied, and irregular with many age classes represented in small relatively even-aged groups. Regeneration of stands is generally successful in the project area, but can be complicated in areas with dense sod-forming grasses. Prescribed fire should be discouraged in stands with regeneration treatment prescriptions.

Aspen comprises a very minor component of the vegetative cover in the Fanny Project Area with none of the stands classified/typed as aspen. The aspen component in the project area consists of scattered, small clones present in a few ponderosa pine stands. The aspen is present in clones less than 1 acre.

The most abundant shrub species is mountain mahogany, which is the dominant cover in the dryer, lower elevation sites of the project area. Rocky Mountain juniper is the dominant cover in dry, rocky sites with steeper slopes and is found generally in small canyons or drainages that are slightly protected and not as dry as sites dominated by mountain mahogany.

Approximately 68% (15,770 acres) of the project area is forested with ponderosa pine cover type. This excludes small openings in forest stands for grass/forbs structural stage. Approximately 30% of the forested stands are dominated by sawtimber-sized trees (trees greater than 9 inches DBH), 65% by sapling/poletimber-sized trees (5-9”DBH), and 5% by seedlings (1-5”DBH).

Wildfire has played a dominant role in determining vegetative compositions and structure in many areas of the Black Hills National Forest. Recently the Jasper Fire, along the east boundary, and the Sheldon Canyon Fire, on the northwest boundary has changed the forest cover condition in those areas, which are adjacent to the Fanny Project Area. These two fires have changed forest cover types from ponderosa pine to grass in some areas, with an abundance of snags. Lightning caused fires are prevalent in the Fanny area, but until recently, fire suppression efforts and weather conditions have been successful containing the fires to less than one acre with low fire intensity.

The potential for mountain pine beetle (MPB) in ponderosa pine is rated low, medium, and high. The risk rating system was developed for the Black hills to measure a forest stands susceptibility for MPB infestations based on three factors: stand structure, average stand DBH, and average basal area per acre. In the Fanny Project Area approximately 917 acres (4%) are rated as high risk for MPB, and 4,896 acres (21%) are rated as medium risk for MPB.

Timber sales and silvicultural treatments prior to the 1980's were designed to salvage and treat MPB infestations, or reduce the risk of infestation by thinning. Silvicultural treatments in the late 1980's emphasized thinning to increase tree vigor and reduce susceptibility to MPB attack. Generally, when the average stand diameter exceeds 100 square feet/acre the potential for MPB infestation increases significantly, particularly if average stand DBH exceeds 12 inches. The potential for MPB infestation in the Fanny Project Area is low to medium for the next 10 years. Continued forest management can maintain that low rating. If forest management is not continued, the potential for infestation will increase as stands gradually become denser, loose vigor, and tree diameters increase above 12 inches DBH.

Culmination of Mean Annual Increment

The National Forest Management Act, Code of Federal Regulations, and Forest Service direction generally require even-aged stands attain culmination of mean annual increment (CMAI) prior to regeneration harvest. Shelterwood seed cut is the only regeneration harvest treatment prescribed for even-aged stands in the Fanny Project Area. Only sites prescribed for shelterwood seed cuts need to meet CMAI requirements for this project. The use of sound silvicultural treatments to meet stand vigor, salvage damaged timber, or vegetative treatments to meet stand vigor, salvage damaged timber, or vegetative manipulation to help attain multiple uses of the forest for recreation, wildlife habitat, range, and other uses do not require attainment of CMAI.

All of the sites proposed for shelterwood seed-cut have achieved or exceeded CMAI. The shelterwood seed-cut is usually not implemented over an entire site. In many areas overstory removal, and thinning will be utilized to help maintain health and vigor in younger, immature components within the site.

The majority of the sites in the Fanny Project Area are multi-aged, containing many age classes. Many of these sites have harvest prescriptions that are not subject to meeting CMAI. Those prescribed treatments include overstory removal, shelterwood prep-cut (commercial thinning), cleaning (aspen release), and meadow restoration (pine encroachment). These treatments are proposed to maintain or improve forest health and vigor, while also meeting wildlife objectives and maintaining vegetative diversity in the project area.

Direct and Indirect Effects By Alternative

Alternative 1 – No Action

Under this alternative no vegetative treatments would occur. The no action alternative would defer vegetative treatment for approximately 10 years. The MPB risk for infestation would increase as well as the potential for MPB caused mortality as stands become more densely stocked and average diameters increase. The potential for decline in timber growth rates increases as stand densities increase. The opportunity to regenerate stands is delayed, as well as the opportunity to release regeneration from competing overstory. Also deferred is the opportunity to increase the amount of vegetative diversity in the project area.

Alternative 2

Alternative 2 treats the largest number of acres and harvests the most timber, approximately 5,295 acres commercially for 4.6 MMBF (million board feet). Non-commercial treatments include pre-commercial thinning on approximately 1,709 acres. POL (products other than logs) thinning would occur on approximately 194 acres for 1,060 ccf (cubic feet). Possible mechanical site preparation could occur within shelterwood seed-cut units, if necessary to ensure successful regeneration of ponderosa pine.

Alternative 2 treats approximately 12% of those stands (109 acres) identified as high risk for Mountain Pine Beetle (MPB) infestation. Approximately 25% of those stands rated as medium risk for MPB are being treated under Alternative 2. The remaining stands that are rated as high or medium risk for MPB are not treated because of inaccessibility or they are being maintained for other than timber objectives, such as old growth or thermal cover for wildlife. This alternative reduces the threat of MPB infestation the most, compared to Alternatives 1 and 3. Deferring treatment in some of these stands could increase the potential for MPB infestations or catastrophic wildfire events, and demonstrates the trade-offs between reducing the potential risks for MPB infestations, and other objectives valued by wildlife.

Alternative 3

Alternative 3 treats fewer acres and harvest less timber than Alternative 2, treating approximately 4,797acres for 4.1 MMBF. Treatment of some stands was deferred to provide additional security areas and cover for wildlife. Timber stand improvement includes 1,522 acres of pre-commercial thinning, 194 acres of POL thinning, and possible mechanical site preparation.

Alternative 3 treats approximately 8% of the stands identified as high risk for MPB infestation, 75 acres. Deferring treatment in some of the high-risk stands is desired to help provide thermal cover for wildlife. Deferring treatment or thinning in high risk stands increases the potential for MPB populations to increase in the untreated sites and successfully infest or increase mortality in adjacent stands. Approximately 22% of those stands rated as medium risk of MPB infestation are being treated under Alternative 3.

Cumulative Effects

The Fanny Project Area has been harvested in the past. Various portions of the project area fall within previous timber sale areas. The following table displays past timber harvest information. Other post sale activities/projects were also performed following these timber sales and include pre-commercial thinning, noxious weed control, prescribed burning, site preparation, and pine removal from meadows and hardwoods.

Table 3.1. Past Timber Sales in the Fanny Project Area.

Sale Name	Year Sold	Volume Harvested (MMBF)
Buck Springs	1983	4.8
East Boles	1970	2.9
Meadow	1973	8.2
Surveyor Hill	1969	9.9
Hop	1987	1.4
Barrel	1986	14.6
Bolsby	1992	6.8
Scott	1988	8.5
Motel	1988	5.5

Activities proposed under the Fanny Environmental Assessment and their effects will resemble those of past and present activities. Vegetative treatments will help create a more balanced dispersal of size and age classes, as opposed to no action, which will decrease diversity over time. Timber harvest will set back natural succession, but will create a younger, more vigorous ecosystem with increased resistance to insect and disease attacks. Stocking control in forest stands not only promotes tree growth and vigor, but also decreases risk of large, wind driven crown fires allowing firefighters ability to keep wildfires small and minimize resource damage. The no action alternative will increase the risk of large landscape consuming crown fires over time. Ponderosa pine acres will decrease slightly, while meadows will increase slightly. Fewer acres of conifer stands will be allowed to reach a late successional condition, but sufficient late successional stands are available to meet Revised Forest Plan direction.

Wildlife Resources, Including Fisheries

Introduction

This section displays an overview of the analysis and effects to wildlife habitat, including fisheries, within the Fanny Project Area. The Wildlife Biologist for this project completed the field review and analysis, which is documented here and in the Wildlife Report located in the Project File.

Vegetative Habitat Conditions

Shrubs

Forest Plan Direction

Objective 202 – Conserve and manage existing mountain mahogany stands.

a. Manage a minimum of 10 percent of the site in cover (mature and over-mature shrubs).
b. Manage a minimum of 40 percent of the site in forage (young shrubs) by treating when root reserves are high or immediately prior to growing season.
c. Maintain ponderosa pine in mountain mahogany stands for vegetative diversity.

Guideline 2208 (Treat as a Standard) – Alter age classes of shrubs in a planning unit by no more than 25 percent within a 10-year period.

Hardwoods

Forest Plan Direction

Objective 201 – During the planning period conserve existing hardwood communities and restore historic hardwood communities by 10 percent over 1995 conditions on sites capable of supporting these communities.

Existing Condition

The Fanny Project Area consists of a mix of ponderosa pine, upland dry grass meadows, mountain mahogany shrub land, and Rocky Mountain juniper habitat types. This area has been harvested most recently in the Bolsby Timber Sale (1992). In the past decade other vegetation management activities have also occurred (i.e. prescribed fire, meadow restoration, pre-

commercial timber thinning, livestock grazing, aspen enhancement) and, depending on the site conditions and management emphasis, will continue to occur.

As shown in Table 3.2, two habitat types dominate the project area. The northern portion is dominated by ponderosa pine habitat, while the southern portion contains large areas of mountain mahogany/juniper shrub land, with a blending of these habitats throughout. Aspen in not common within the Fanny Project Area, but does occur in small clones within stands of ponderosa pine.

Table 3.2. Existing Cover Type and Structural Stages by Acres based on stand exam data (NFS lands only).

Structural Stage (SS)	Ponderosa Pine	Mountain Mahogany	Rocky Mountain Juniper	Grasslands	Total Acres by SS
Meadow/Grasslands	0	0	0	3,260	3,260 (14%)
SS 1	2,329	0	0	0	2,329 (10%)
SS 2	445	4,075	100	0	4,620 (20%)
SS 3A	1,034	0	35	0	1,069 (5%)
SS 3B	1,180	0	48	0	1,228 (5%)
SS 3C	677	0	20	0	697 (3%)
SS 4A	5,481	0	0	0	5,481 (23%)
SS 4B	3,240	0	17	0	3,257 (14%)
SS 4C	1,384	0	0	0	1,384 (6%)
Total Acres by Cover Type	15,770 (68%)	4,075 (17%)	220 (1%)	3,260 (14%)	23,325

The area is considered winter range primarily for mule deer, and summer range for mule deer, and small groups of elk and white-tailed deer. Sites within the project area serve as fawning habitat for mule deer. This area also serves as both winter and summer habitat for Merriam's turkey. The southern portion (from Roby Spring south) has been found to be summer habitat for Virginia's warbler, which prior to 1997 was not known to breed in the Black Hills.

Alternative 1 – No Action

Under the no action alternative, no new management activities would occur. Natural succession would continue to occur, pine would continue to encroach on existing meadows, and pine stands that are at high risk for mountain pine beetle infestations and catastrophic wildfire would become more dense. Although the project area currently has adequate acres of open meadows and grasslands, pine will eventually encroach into these areas reducing the amount of forage production in the future. The small clones of aspen that currently exist would be reduced, as pine would eventually take over these sites.

Late succession habitat would increase over time as stands become older and continue to develop old growth characteristics. This alternative would provide the greatest opportunity for increases in late succession habitat and cover for various wildlife species.

Alternative 2

Alternative 2 treats the largest number of acres and harvests the most timber. The following table displays the anticipated changes to structural stages across the project area as a result of the proposed treatments.

Table 3.3. Existing Cover Type and Structural Stages by Acres Expected Under Alternative 2.

Structural Stage (SS)	Ponderosa Pine	Mountain Mahogany	Rocky Mountain Juniper	Grasslands	Total Acres by SS
Meadow/Grasslands	0	0	0	3,260	3,260 (14%)
SS 1	1,869	0	0	0	1,869 (8%)
SS 2	445	4,075	100	0	4,620 (20%)
SS 3A	1,801	0	35	0	1,836 (8%)
SS 3B	1,362	0	48	0	1,410 (6%)
SS 3C	630	0	20	0	650 (3%)
SS 4A	5,825	0	0	0	5,825 (25%)
SS 4B	2,751	0	17	0	2,768 (12%)
SS 4C	1,087	0	0	0	1,087 (5%)
Total Acres by Cover Type	15,770	4,075	220	3,260	23,325

This alternative proposes to treat the most acres by timber harvest that would decrease dense mature pine stands by about 6%. Meadows and grassland acres would not increase under this alternative, however, proposed pine encroachment treatments will improve the forage production and slow down the encroachment of pine into these areas. All stands identified as late succession/old growth and thermal cover will be maintained under this alternative.

Alternative 3

Alternative 3 treats fewer acres and harvests less timber. This alternative provides more cover for wildlife than does Alternative 2, but less than Alternative 1. Although this alternative does treat many stands that are considered to be at risk for insects and wildfire, it does maintain the most acres for future old growth and thermal cover for wildlife. Alternative 3 treats more acres with pine encroachment in order to improve grassland and meadow habitat than does Alternative 2. As in Alternative 2, Alternative 3 maintains all late succession and thermal cover habitat. This alternative provides the greatest opportunity for future increases in meadow/grassland, late succession, old growth, and thermal cover habitat. These acreages were used in the HABCAP model to evaluate effects on various wildlife species.

Table 3.4. Existing Cover Type and Structural Stages by Acres Expected Under Alternative 3.

Structural Stage (SS)	Ponderosa Pine	Mountain Mahogany	Rocky Mountain Juniper	Grasslands	Total Acres by SS
Meadow/Grasslands	0	0	0	3,260	3,260 (14%)
SS 1	1,869	0	0	0	1,869 (8%)
SS 2	445	4,075	100	0	4,620 (20%)
SS 3A	1,801	0	35	0	1,836 (8%)
SS 3B	1,396	0	48	0	1,444 (6%)
SS 3C	630	0	20	0	650 (3%)
SS 4A	5,660	0	0	0	5,660 (24%)
SS 4B	2,882	0	17	0	2,899 (12%)
SS 4C	1,087	0	0	0	1,087 (5%)
Total Acres by Cover Type	15,770	4,075	220	3,260	23,325

Cumulative Effects

All action alternatives would improve or maintain vegetative diversity by removing pine from meadows, grasslands, hardwoods, and shrubs. Forest health and vigor would be improved by thinning some stands.

Snag and Down Woody Habitat

Forest Plan Direction

Standard 2301 – Within the associated watershed, for each vegetation management project, retain the following minimum densities of hard snags (unless snags are a safety hazard) at least 25 feet in height:

a. Ponderosa pine on north or east-facing slopes or in protected areas which would have historically supported an infrequent, stand replacing fire regime: Retain an average of 4 snags per acre >10" DBH (diameter at breast height), collectively 25% of which must be > 20" DBH. If 20" DBH or 25 feet high snags are not available, retain snag in the largest diameter class available.

b. Ponderosa pine on south or west-facing slopes, or in exposed areas which would have historically supported a more frequent, lower intensity fire regime: Retain an average of 2 snags per acre > 10" DBH, collectively 25% of which must be > 20" DBH. If 20" DBH or 25 feet high snags are not available, retain snags in the largest size class available.

c. Retain a minimum average of 6 snags per acre > 10" DBH for forest types other than Ponderosa pine, unless snags are a safety hazard.

d. Snags chosen for retention should represent the largest diameter class available.

e. Provide large diameter trees and snags along habitat interface zones.

Standard 2302 – In watersheds not meeting the minimum hard snag direction, all vegetation management projects will be designed to move hard snag densities toward this objective.

Guideline 2303 (Treat as a Standard) – Snags can be clustered or individual, but must be well distributed within the watershed. Focus on opportunities for leaving snags in clumps rather than individually.

Guideline 2304 (Treat as a Standard) – Prohibit cutting of standing dead trees for fuelwood, except in designated areas. In areas where cutting restrictions are not effective, consider identifying roads to be closed or restricted from use to protect snags from removal.

Guideline 2305 (Treat as a Standard) – All soft snags should be retained unless they are a safety hazard.

Guideline 2306 (Treat as a Standard) – During vegetation management activities in ponderosa pine, retain a sufficient number of green trees > 20" DBH or from the largest diameter class available, to move towards or maintain an average minimum density of one large green tree per acre within the associated watershed, for the purpose of recruitment of snags and large diameter down woody material.

Guideline 2307 (Treat as a Standard) – Leave large woody debris on harvested or thinned sites to help retain moisture, trap soil movement, provide microsites for the establishment of forbs, grasses, shrubs, and trees, and to provide habitat for wildlife.

Standard 2308 – Prescriptions shall be developed prior to timber harvest to identify the amount, size(s), and distribution of down logs to be left on-site. On conifer-forested sites, retain an average of at least 50 linear feet per acre of coarse woody debris with a minimum diameter of 10 inches (where materials are available).

Existing Condition

Snag density surveys were conducted in the Fanny Project Area during October 2002. The project area falls into two 6th order watersheds (HUC 6-101201070-404 and 405). Transects were taken within both of these watersheds (within the project area boundary).

These watersheds generally support a more frequent, low intensity fire regime, and following Forest Plan Standard 2302 (b), would need to support at least 2 snags per acre > 10" DBH, or within the largest diameter classes available. Snag densities within both watersheds are currently below this standard. The average snag density within watershed 404 is currently at 0.93, while the average snag density for watershed 405 is 1.12. However, portions of both watersheds fall into areas where the Jasper wildfire burned during the summer of 2000. These burned areas within both watersheds contain a higher number of snags as a result of the fire. Forest Plan standard 2303 states that snags can be clustered or individual, but should be well distributed within the watershed. Currently, distribution of snags within both watersheds is not even; the majority of snags are located in the burned areas, which fall outside of the project area. When looking at the watersheds as a whole, the average density of snags within both watersheds exceeds Forest Plan direction, and is considered heavy within the burned areas (outside the project area), while snag densities in the portions of the watershed that fall within the Fanny Project Area are considered to be low and below Forest Plan standards. Within the project area, some green trees should be protected so that future snag densities are more evenly distributed. In order to determine the number of live green trees that should be maintained in order to assure adequate snag densities in the future, the Snag Retention Simulator Model was used. This model considered only ponderosa pine as future snag trees.

Alternative 1 – No Action

Under this alternative no new management activities that would remove large diameter trees would occur. All existing snags would continue to provide habitat for snag dependent species. As stands become denser, trees will become susceptible to insects and disease providing an increase in the number of snags over time. As these trees decay and fall to the ground, there will also be an increase in the amount of down woody debris.

Alternatives 2 and 3

Both action alternatives are similar in the types of treatments planned. Under both action alternatives, treatments are proposed that would remove large diameter trees from the watershed. The Jasper burn area will continue to provide snag habitat over time. However, existing snags in the burned areas will eventually decline and fall to the ground. It will be many years before any new growth of trees can provide for future snags, since there are very few large diameter green trees that exist in the burned areas of the watersheds. Therefore, mitigation measures are in place

that would maintain all trees larger than 20“ DBH within the project area. Within site-specific stands where larger overstory trees are proposed to be harvested, some trees from the largest diameter classes would be retained in order to provide enough green trees for future snags (see Chapter 2, Mitigation Measures Common to all Alternatives). Planned harvest treatments under both alternatives will leave a sufficient number of green trees in order to move the area towards meeting Forest Plan direction over time. In addition, the proposed road closures in both alternatives and the area closure proposed under Alternative 3 would reduce the number of unauthorized incidences of firewood cutting.

Cumulative Effects

Forest Plan direction (Guideline 2304) prohibits the cutting of standing dead trees for firewood. High open road densities can increase the incidences of removing standing dead trees. However, recent large fires and an increase in insect activity have provided an increase in the number of standing dead trees across the Forest.

Grass/forb – Early Successional Habitat

Forest Plan Direction

Objective 209 – Manage at least 5 % of a timber harvest project area for the grass/forb structural stage.

Objective 5.4-202 – Manage at least 20 % of planning units for forage production (includes meadows, and SS 1, 3A, and 4A).

Existing Condition

There are approximately 1,940 acres (8%) of grass/forb structural stage 1 within the ponderosa pine cover type, and approximately 3,260 acres (14%) classified as meadow/grasslands. There are no proposed treatments, which would create any new grass/forb habitat within forested areas. However, there are treatments proposed that would remove encroaching pine from existing meadow/grasslands, improving forage production in those areas.

Approximately 11,863 acres, or 51 %, within the Fanny Project Area is already classified as early succession habitat. This includes areas within meadow/grasslands, and structural stage 1, 3A and 4A, which are considered producers of a substantial grass/forb understory biomass.

Alternative 1 – No Action

Under this alternative no new management activities that would improve the grass/forb habitat would occur. Activities designed to improve the quantity and quality of browse for wildlife would not occur.

Alternatives 2 and 3

Under both action alternatives, treatments are proposed that would improve the quantity and quality of early succession habitat. This includes pine encroachment treatments designed to remove encroaching pine from existing meadows and grasslands, and commercial and non-commercial thinning designed to reduce the stocking levels of pine stands. The project area currently exceeds Forest Plan direction for providing grass/forb production and early succession habitat.

Cumulative Effects

The Fanny Project Area has been harvested in the past and will continue to be managed for timber production and a variety of wildlife habitats, including early succession. Without these treatments, pine would continue to encroach into meadows and grassland areas, reducing the availability of browse to wildlife and grazing livestock.

Old Growth/Late Successional Habitat

Forest Plan Direction

Objective 207 – Manage at least 5 % of the forested land base for late succession.

Existing Condition

The Forest Plan objective for late succession habitat applies to the Forest overall, and not to individual project areas. There are 830 acres of designated as old growth, or late succession habitat, within the Fanny Project Area. These sites were selected on the basis of tree size and age. Canopy cover varies within these sites as well as understory densities. The Fanny Project Area does contain areas where the terrain is steep and rocky, and trees were inaccessible for harvest. Trees on these sites are relatively old (+200 years). These areas also have high snag densities, more down woody material, and in some areas, dense pine regeneration in the understory due to the lack of fire within the last 60+ years.

Alternative 1 – No Action

Under this alternative no new management activities are proposed. This alternative would provide the greatest opportunity for increasing the amount of last succession habitat.

Alternatives 2 and 3

Under both action alternatives, one 10-acre site, designated as old growth, will be treated with a pre-commercial thin, which is designed to mimic a low-intensity fire without the risk of losing the entire stand to a crown fire. The pine regeneration in the understory of this stand is very dense, and could create ladder fuels if a wildfire event occurred here. No other designated old growth/late successional site will be treated.

Cumulative Effects

Old growth and late succession stands have been treated in the past within this project area. However, the Revised Forest Plan has designated specific stands across the Forest, including the Fanny Project Area, that will not be treated under this assessment and are not likely to be treated in future timber sales. Although timber harvests proposed under this assessment would reduce the acres of mature forest, other untreated sites within the project area will continue to grow and develop the characteristics that are consistent with late succession habitat.

Fragmentation

Forest Plan Direction

There is no specific management direction for fragmentation, however, a discussion of fragmentation can be found in the Forest Plan FEIS, pages III-247 thru III-275.

Existing Condition

Edge habitat is created when two different vegetative conditions meet. This can also be true for forested stands with distinctly different canopy density or structure (e.g. SS3A and SS4C). Creating this 'edge habitat' through timber harvest will reduce 'interior' forest conditions. The term 'forest fragmentation' is often applied in these situations. As a general rule the more edge habitat, the less interior habitat, and higher degree of forest fragmentation. Depending on animal (or plant) some will benefit, while others will lose habitat.

The Fanny Project Area is naturally fragmented with a high degree of edge habitat. The area contains large components of shrub (mountain mahogany), upland meadows, and ponderosa pine in various structural stages. In addition to this naturally occurring fragmentation, past management activities have combined to create an area with a high degree of edge habitat. Depending on the species, some wildlife will benefit from this, while others will not.

Alternative 1 – No Action

Under this alternative no new treatments would occur, and therefore no additional fragmentation from management activities would occur. Activities under previous decisions may still occur.

Alternatives 2 and 3

Proposed activities under both action alternatives would increase fragmentation slightly over existing conditions (alternative 2 more than alternative 3). Proposed management activities would change vegetation structure, but is not likely to result in a loss of species viability.

Cumulative Effects

Forests of the Black Hills have evolved with heavy influences of fire and insect activity. During the early part of the 19th century, settlement and development of the Black Hills included the use of roads and railways to provide access for agricultural and urban uses. This, combined with the natural topography of the area, have resulted in a variety of natural and man-made communities that include dense stands of timber, open meadows, and scattered developments across the landscape. Timber harvests can change the size and structure of vegetation; however, this degree of change across the landscape is not likely to result in the loss of species viability. A full discussion of fragmentation and connectivity can be found in the Forest Plan EIS, pages III-247 to 276.

Management Indicator Species (MIS)

The Forest Plan, as amended, lists management indicator species to be considered during project level planning. The amended list includes Threatened and Endangered Species, Sensitive Species and Species of Interest. Threatened and Endangered Species and Sensitive Species for this project area are discussed later in their respective sections later in this report. MIS for the Fanny Project Area were selected on the basis of potential habitat within the project area.

Monitoring of MIS is accomplished through coordinated efforts involving Forest Service biologists, research, contracted monitoring surveys, and State agencies. MIS population trends are reported in the Forest Plan Annual Monitoring Report. Forest monitoring of land bird species (***brown creeper and black-backed woodpecker***) is accomplished currently by an Agreement with the Rocky Mountain Bird Observatory (RMBO). Results from the 2002 RMBO

monitoring are reported in the Forest Plan Annual Monitoring Report. South Dakota Game, Fish & Parks Department biologists monitor Big Game species (***mule deer and turkey***). The ***mountain lion*** (South Dakota State threatened species) is monitored by a combination of research (SDSU), South Dakota, and Wyoming State biologists, and reported observations. The ***bald eagle*** is monitored largely by incidental observations (Monitoring Implementation Guide, May 2001) and is coordinated with the U.S. Fish and Wildlife Service.

The Phase I Amendment to the Forest Plan not only amended the list of MIS to be considered, but also changed some of the direction for MIS. Former Guideline 3201 that limited the magnitude of change for habitat capability was deleted and replaced by additional protective measures to reduce adverse impacts to specific species' habitats. The HABCAP model (USDA Forest Service 1992) was used to estimate changes by alternative to habitat. Specific new standards and guidelines that were added or changed under the Phase I Amendment are addressed in the applicable sections below, or above in the Vegetative Habitat Condition section. This analysis will still use this model to show relative changes in habitat capability among alternatives. The HABCAP model has been updated since the original model was developed based on local research (Mills et al. 1996, Rumble and Anderson 1996b).

Big Game Habitat

Mule deer, white-tailed deer, elk and turkey all utilize the Fanny area. The area is utilized more by mule deer than white-tailed deer. The topography, mild snow depths, mountain mahogany shrubs and isolated meadows make this area not only good winter range, but also good spring and summer range as well. Water is the most limiting factor.

Thermal Cover

Forest Plan Direction

Objective 5.4-205 – Provide thermal cover for elk, deer and winter turkey habitat on at least 20 % of the forested portion of this management area.

Guideline 5.4-2101 (Treat as a Standard) – Do not harvest thermal cover if the planning area does not meet Objective 5.4-205. Consider harvest treatments to produce thermal cover in the future.

Existing Condition

There are currently 1,596 acres identified as thermal cover (SS 3C and 4C) within the Management Area 5.4 portion of the project area. Forest Plan Guideline 5.4-205 is to provide thermal cover for big game on at least 20% of the forested portion of the project area that lies within Management Area 5.4. This equates to approximately 2,225 acres. Current conditions do not meet this objective. Therefore, no thermal cover stands within Management Area 5.4 will be harvested.

Hiding (Screening) Cover

Forest Plan Direction

Guideline 3203 (Treat as Standard) – Provide big game screening along at least 20% of the edges of arterial and collector roads.

Existing Condition

There are approximately 34 miles of arterial or collector roads within the Fanny Project Area. Many of these roads pass through large open meadows, private land, and areas where previous timber sales have occurred. Providing screening cover along portions of these roadways is not always possible. Despite these constraints, approximately 31% of these roads have screening cover. Screening cover is defined as vegetation, landforms, or slopes that can hide a deer or elk standing at a distance of 200 feet from the road (Thomas 1979).

Habitat Effectiveness

Forest Plan Direction

Guideline 5.4-3203 (Treat as a Standard) – Deer and elk habitat effectiveness in a planning unit should at least meet the following values. Vegetative management projects in planning units currently below these values should result in increased habitat effectiveness.

Elk summer = 54 %
Elk winter = 47 %
Deer summer = 45 %
Deer winter = 46 %

Guideline 5.1-3201 (Treat as a Standard) – Deer and elk habitat effectiveness values in a planning unit should at least meet the following values. ***Vegetative management projects in planning units currently below these values should result in increased habitat.***

Elk summer = 43 %
Elk winter = 34 %
Deer summer = 40 %
Deer winter = 35 %

Existing Condition

The computer model R2 ARC-HABCAP was used as a tool to evaluate and compare habitat effectiveness for big game species by alternative. Vegetation structural stage data was derived from stand exam data, with field verification by the wildlife biologist. Road information, including open road density, was based on digital orthoquad digitizing and corrected, as needed using GPS data road inventory. The ARC-HABCAP model evaluates the spatial arrangement of habitat based on patch size and habitat quality. Open roads are considered to adversely impact habitat quality within 60-180 meters. Closed roads have no adverse impacts. The model produces a habitat effectiveness (HE) value from 0.0 to 1.0 (highest). Values that are closest to 1.0 indicate better habitat effectiveness.

Effects of Alternatives

Thermal Cover

Alternative 1 (no action) would provide the most 'potential' thermal cover. Alternatives 2 and 3 would maintain the existing amount of thermal cover *(SS 4C &3C)* within Management Area 5.4. Both alternatives would retain approximately 784 acres of Structural Stage 3B stands, which could develop into future thermal. However, Alternative 2 would treat more acres in Structural Stage 4B habitat within Management Area 5.4-winter range, and could reduce potential thermal cover more than Alternative 3.

Hiding (Screening) Cover

Under Alternative 1, no vegetative treatments would occur. Vegetation along roadways would continue to grow and become denser. However, no roads would be closed under this alternative. Alternatives 2 and 3 could slightly reduce the amount of cover habitat along roads where vegetation treatments are proposed. Under all action alternatives, areas along roads planned for thinning will be modified to provide cover habitat. These 'buffer strips' would be used to maintain any existing cover habitat.

Habitat Effectiveness

The limiting factors for deer and elk in summer are forage quality and quantity. Large areas of preferred browse species for white-tailed deer and elk are lacking in the project area. A large portion of the project area is made up of mountain mahogany, a shrub species favored by mule deer. The primary limiting factors in winter are poor forage availability, lack of thermal cover, and high open road densities. The following table reflects the overall habitat effectiveness by alternative and management area for the Fanny Project Area.

Table 3.5. Habitat Effectiveness values by Alternative for Management Areas 5.4 and 5.1 within the Fanny Project Area.

Management Area 5.1 – Resource Production Emphasis				
Species	**Alternative 1**	**Alternative 2**	**Alternative 3**	**MA 5.1 Direction**
Elk summer	.500	.520	.537	**.43**
Elk winter	.420	.381	.393	**.34**
Deer summer	.488	.492	.509	**.40**
Deer winter	.396	.370	.383	**.35**
Management Area 5.4 – Big Game Winter Range Emphasis				
Species	**Alternative 1**	**Alternative 2**	**Alternative 3**	**MA 5.4 Direction**
Elk summer	.393	.419	.430	**.54**
Elk winter	.360	.372	.384	**.47**
Deer summer	.387	.400	.411	**.45**
Deer winter	.336	.349	.361	**.46**

Habitat effectiveness values within Management Area 5.1 meet Forest Plan direction under all action alternatives. This is primarily due to the proposed road closures. Alternative 3 proposes more road closures than does Alternative 2. Within Management Area 5.4, habitat effectiveness values for deer and elk are below Forest Plan objectives for all alternatives, including the No Action. Although these values are below Forest Plan direction, proposed vegetative management actions and road closures result in an upward trend, which meets Forest Plan direction for Standard 5.4-3203 (see previous page). The low habitat effectiveness values under Alternative 1 (existing condition) is due in part to the number of open roads, but is also due to the amount of shrub habitat (mountain mahogany – SS 2) within this management area. Mountain mahogany makes up approximately 22% of this management area. The HABCAP Model is imperfect with respect to mountain mahogany, and under represents (does not give value to) this cover type. (Details of the HABCAP model and how it values mountain mahogany are located in the project file - Wildlife Specialist's Report.) However, research has shown that deer and elk (especially mule deer) utilize mountain mahogany as critical winter range during winter months. Despite this model flaw, the habitat effectiveness values can still be used to compare alternatives, since the flaw applies to all alternatives, without bias. This cover type is a naturally occurring component of the project area, which should be considered. Although the HABCAP Model does

not adequately value this habitat type as good winter cover, it does provide good cover and forage habitat, which is very important to these species during winter months.

Cumulative Effects

This project area lays on the western most edge of the southern Black Hills. Portions of this project area consist of transition zones (prairie to mountain habitats). Forested pine habitat becomes sparse in the southern portions of the project area, changing to drier mountain mahogany shrub. Any actions to maintain and enhance this habitat type over time would be beneficial to big game. All alternatives currently provide at least 20% screening cover along roads, and also provide adequate amounts of forage. The most limiting factors to big game in the Fanny Project Area are lack of water and open roads. Proposed actions will improve water developments and close some roads.

Mule Deer

The Fanny Project Area provides better habitat for mule deer than it does for white-tailed deer, and maintains a higher population of mule deer than white-tailed deer. This area not only provides good winter range habitat (rough topography, generally mild snow depth, mountain mahogany shrub sites and isolated meadows), but also good spring and summer range habitat as well. Water can be a limiting factor in some years and many wildlife guzzlers have been installed in this area over the last 20 years. Past activities to improve mountain mahogany shrub forage condition (burning, crushing, cutting) have been somewhat successful.

Forest Plan Standard 3203 for deer Habitat Effectiveness is based on white-tailed deer habitat requirements. However, a high open road density (i.e. human disturbance) will adversely affect mule deer just as it does with elk and white-tailed deer. Reducing ponderosa pine encroachment will improve conditions for shrub growth and expansion. Mule deer are also the primary prey species for mountain lion.

Monitoring of mule deer populations by SDGF&P shows annual fluctuations, but there has been an overall population decline of almost 30% since 1997. Suspected causes are many, and vary from place to place, however comments from the SDGF&P continually emphasize conducting forest management actions that improve foraging habitat (quality and quantity), while decreasing open road density.

Alternative 1

Under this alternative, no new management activities would occur. No new areas of forage production would be created and therefore HABCAP forage values are lowest under this alternative. In addition, no roads would be closed. The existing open road density of 2.9 miles/sq.mile would remain unchanged.

Alternatives 2 and 3

Both action alternatives are expected to slightly improve forage habitat potential and decrease (slightly) potential cover habitat for this species. Alternative 2 treats more acres, but closes fewer roads and is not as potentially beneficial for mule deer as Alternative 3. Alternative 3 treats fewer acres and would close the most roads. HABCAP forage values are highest under Alternative 2 because of increased forage habitat; however, hiding cover and future thermal cover habitat (winter) declines the most under Alternative 2. Alternative 3 would improve

forage habitat conditions more than Alternative1 and would reduce potential cover habitat less then Alternative 2.

Table 3.6. Habitat capability (HC) values for Mule Deer under all alternatives.

Species	Alternative 1 – No Action	Alternative 2	Alternative 3
Mule Deer (winter)	.667	.679	.677

Cumulative Effects

Mountain mahogany makes up about 17% of the project area. Mule deer use this area especially during winter months, but also during summer months. Any activity that would enhance this cover type would also benefit the mule deer. Past management activities in this cover type have increased and improved the mountain mahogany component. Activities include prescribed burning and pine encroachment treatments to remove encroaching pine from mountain mahogany stands. It is expected that these types of treatments will be prescribed in the future in order to improve and enhance this cover type, which is preferred by mule deer, and also used by elk and white-tailed deer.

Merriam's Turkey

Forest Plan Direction

Guideline 3205 (Treat as Standard) – Provide at least two to six turkey-roost sites per section, (mature trees with an average diameter of 10-14", with widely spaced, horizontal branches). Sites should be ¼ acre in size and not isolated from adjacent forested stands. Emphasis should be on the upper third of east facing slopes.

Existing Condition

The Fanny Project Area provides both summer and winter habitat for turkeys, and they are common in the project area. These birds roost in larger diameter, horizontally branched ponderosa pine trees, usually within ½ mile of water. Hens nest on the ground, using downed logs, common juniper, or other tall ground cover to hide their nests. During summer months, hens with broods prefer more open forest habitats where insects are plentiful. Population trends for Merriam's turkeys appear to be increasing in the Black Hills. Roost trees are abundant within structural stage (SS) 4B, 4C and some 3C sites, providing mature trees that fill the criteria for a preferred roost tree. While not all sites are east facing slopes, (¼ acre+) pockets of mature-over mature trees are scattered throughout the project area. The east facing slopes along Boles Canyon, Roby Canyon, and Redbird Canyon roads are prime examples.

Alternative 1

Under this alternative, no vegetative treatments would occur and therefore no large diameter, mature trees would be harvested.

Alternatives 2 and 3

Alternative 2 would reduce roost tree potential most since it would harvest the most acres of structural stage 4B and 4C habitat. Alternative 3 would also reduce turkey roost tree potential compared to (no action) Alternative 1. All alternatives will meet Forest Plan direction with mitigation (see pages 22-23). Also important to wintering turkeys is winter (thermal) cover, and is provided most in Alternative 1 (no action), and least with Alternative 2. Some of the proposed

pre-commercial thinning will reduce turkey winter (thermal cover) habitat. The HABCAP index (winter) reflects these habitat changes. Alternative 1 (no action/existing condition) is at .656, with Alternative 2 it drops 8% to .601, and is only slightly higher with Alternative 3 at .605 (-7.7%).

Table 3.6. Habitat capability (HC) values for Merriam's turkeys under all alternatives.

Species	Alternative 1 – No Action	Alternative 2	Alternative 3
Merriam's turkeys	.656	.601	.605

Cumulative Effects

Turkeys are most susceptible to hunting pressure and inclement weather conditions in the spring. Any activity that reduces the amount of herbaceous vegetation will also impact turkeys. Alternative 1 provides the best habitat values for turkey. All alternatives meet Forest Plan direction for turkey habitat management. All alternatives will provide these birds with an adequate number of roost trees, down woody material for nest sites, and herbaceous vegetation.

Brown Creeper

Forest Plan Direction

There is no specific management direction for the brown creeper.

Existing Condition

The brown creeper occurs in low abundance throughout the Black Hills. This small forest bird is associated with mature and late succession forest habitat conditions. Optimal habitat is mature/late succession (seral stage 4 or 5) spruce and pine, although pine is the preferred habitat type. Nests are usually constructed in the bark cracks and folds of large diameter (>20"dbh) ponderosa pine.

Monitoring has begun recently for the brown creeper. Population trend data is not yet available, but the Rocky Mountain Bird Observatory (RMBO) observed a total of 122 brown creepers during first year monitoring across the Forest. This species should be effectively monitored in late-successional pine and white spruce habitats as part of the ongoing monitoring being done by the RMBO (USDA Forest Service 2002 Monitoring Report). This species has been recorded in the project area by the District Wildlife Biologist and during RMBO surveys.

Alternative 1

Under this alternative, no vegetative treatments would occur. The current habitat capability value for the brown creeper is .252. There are currently 4,804 acres classified as structural stage 4B and 4C in the Fanny Project Area. There are no acres classified as structural stage 5, and no spruce habitat available in the project area..

Alternatives 2 and 3

Both action alternatives propose harvesting in some habitat that could provide cover/forage habitat for the brown creeper. Treatments that move more acres into a younger, more open forest condition would decrease habitat potential for this species. Both alternatives result in a reduction of less then a 5% from the existing condition. However, pre-commercial (under-story) thinning

is also proposed in both action alternatives and this activity has the potential to improve (long term) habitat for this species by improving diameter growth of the remaining trees.

Under the action alternatives, some mature stands would be harvested. Alternative 2 would leave approximately 2,410 acres of SS 4B and 1,087 acres of SS 4C. Alternative 3 would leave approximately 2,617 acres of SS 4B and 1,106 acres of SS 4C. Habitat capability values would be .239 and .240 for alternatives 2 and 3 respectively.

Table 3.7. Habitat capability (HC) values for the brown creeper under all alternatives.

Species	Alternative 1 – No Action	Alternative 2	Alternative 3
Brown creeper	.252	.239	.240

All action alternatives reduce the habitat for the brown creeper. Alternative 2 reduces habitat more than Alternative 3.

Cumulative Effects

Management activities (including no action) that maintain dense closed canopy conditions would benefit this species. However, these conditions also provide high risk for stand replacing wildfires and mountain pine beetle infestations. Past timber harvests have removed large diameter trees and thinned dense stands. However, natural succession will continue to provide large diameter trees over time, especially in untreated stands. All alternatives will leave some large diameter trees for future snag replacement.

Mountain Lion

Forest Plan Direction

There is no specific management direction for the mountain lion.

Existing Condition

Mountain lions have very large home territories and prey primarily on deer, but will take smaller animals as well (Chapman and Feldhamer 1982). Lions use caves in cliffs and rock crevices for shelter. They are generally solitary, preferring areas with little human disturbance. The fanny area does provide good mountain lion habitat, and they are known to occur in the area. Management actions that improve deer habitat will benefit mountain lions.

Approximately 40-50 breeding adults are estimated to occupy the Black Hills (USDA Forest Service 2002). Research is currently being conducted by SDGF&P and SDSU on mountain lions in the Black Hills using radio-collared animals. The purpose of the study is to estimate the current population size and structure of mountain lions, and to analyze territory sizes. This information will be used to estimate future population trends and guide future management of lions (USDA Forest Service 2002).

Alternative 1

High road densities may affect mountain lions, although traffic levels are generally low (except during the fall hunting season) within the Fanny Project Area. Under this alternative no changes to the transportation system would occur, and therefore no road closures would be implemented.

Alternative 2

Road closures would occur under this alternative, which would reduce the open road density from the existing 3.1 miles per square mile to approximately 2.0 miles per square mile. These closures would benefit both the prey habitat (deer) and habitat for mountain lions.

Alternative 3

Under this alternative mountain lions would benefit the most. Road closures and area closures for motorized use would reduce the open road density from 3.1 miles per square mile to approximately 1.4 miles per square mile, and would reduce the potential for disturbance by human activity/conflicts.

Cumulative Effects

Actions that reduce open road densities and improve habitat for deer will also benefit mountain lions in the long-term. Timber management activities could cause short-term disturbance, but would provide improved forage habitat for deer, which would also benefit the mountain lion over time.

Other Species of Interest

Northern Flying Squirrel

Forest Plan Direction

There is no Forest Plan direction specific to this species.

Existing Condition

The northern flying squirrel has been receiving additional attention in the Black Hills the last few years. Since this species is chiefly nocturnal, information regarding flying squirrel biology and habitat preferences is lacking. This species is inhabits conifer and deciduous (mixed forest) conditions. It's known to den in natural (and artificial) cavities that are excavated by other species (i.e. woodpeckers). It forages primarily on fungi, lichens, fruit, seeds, nuts, and insects. A recent study (Duckwitz, 2000) in Wind Cave National Park (Custer, SD) found that flying squirrels seem to prefer open pine forest conditions with large diameter trees and sufficient large diameter snags for locating nest/den sites. Stands of dense 'dog-hair' regeneration were avoided. Drainages with steep slopes also appeared to be selected. A literature review found that the home range for this species tended to be between 2-5 ha (5-13 acres) but that was variable and depended on proximity of den site to food sources. These animals have been found to be important in dispensing (fungi) spores maintaining the mycorrhizal symbiotic relationship necessary for water/nutrient uptake in conifer trees.

The northern flying squirrel is not known to occur in the Fanny Project Area, but presumed suitable habitat does exist. Surveys for this species have not been conducted in this area. The HABCAP model lists both conifer and aspen mature forests as optimal habitat. The existing condition HABCAP index is .478

Alternative 1

Under this alternative no vegetative treatments would occur and therefore no impacts to this species are expected.

Alternatives 2 and 3

Habitat capability values decrease under both action alternatives. Alternative 2 decreases the most by 8% to .442, and by 7% to .444 under Alternative 3. However, action alternatives propose pre-commercial thinning activities, which are expected to improved habitat conditions for this species in the long-term.

Table 3.8. Habitat capability (HC) values for the northern flying squirrel under all alternatives.

Species	Alternative 1 – No Action	Alternative 2	Alternative 3
Northern Flying Squirrel	.478	.442	.444

Cumulative Effects

Management activities that maintain mixed forest conditions, including open pine forest, would benefit this species. Both action alternatives would provide areas of open pine canopy, as well as areas with closed canopy. No cumulative effects are expected for this species.

Snails

Forest Plan Direction

Standard 3103 – Ensure that all identified colonies (as indicated in Frest 1993, 2002) of the following two regionally sensitive snail species: *Dicus shimeki* (Pilsbry, 1890; *Oreohelix strigosa cooperi* (Binney, 1958); and the following five snail species: *Vertigo arthuri* (von Martens, 1882); *Vertigo paradoxa* (Serki, 1990); *Catinella gelida* (Baker, 1927); *Oreohelix strigosa n. subsp.; Oreohelix strigosa berryi* (Pilsbry, 1915), are protected from adverse effects of livestock use and other management activities.

Existing Condition

Frest surveyed five sites within the Fanny Project Area. Three sites contained live or dead remnant evidence of three snail species: *Vertigo arthuri, Catinella gelida,* and *Oreohelix, sp.1*. There is no evidence that either of the two R2 sensitive snail species (*Dicus shimeki* or *Oreohelix strigosa cooperi*) exist within the Fanny Project Area.

Alternative 1 – No Action

Under this alternative, no management activities would occur that would affect the microsites of these species. No additional impacts are expected.

Alternatives 2 and 3

Under the action alternatives, no adverse impacts are expected to occur to the microsites of these species. There are no management activities (including timber harvest and road construction) on or adjacent to these sites.

Cumulative Effects

No cumulative effects are expected to occur, since no direct or indirect effects are anticipated.

Virginia's Warbler

Forest Plan Direction

There is no specific Forest plan direction for this species.

Existing Condition

While this species is considered common in other parts of it's range it was not known to be present in the Black Hills region prior to 1994. This species prefers scrubby brush interspersed with juniper or pine. The rocky, arid, mountain mahogany habitat unique to this southern 'hogback' portion of the Black Hills seems to provide suitable habitat for this species. The RMBO have monitored sites located in mahogany shrub cover type and have recorded the Virginia's warbler. They have found it to be restricted to a small area in the southwestern Black Hills (southern portion of the Fanny PA). It occurs in low to moderate abundance.

Alternative 1

Under the no action alternative, no vegetative treatments would occur. No adverse impacts are expected to this species under Alternative 1

Alternatives 2 and 3

Actions proposed under Alternatives 2 and 3 are not expected to have an adverse affect on this species. Preferred habitat for the Virginia's warbler would only be slightly affected and any conifer removal would likely aid shrub growth, which would be expected to have a positive affect.

It is possible that additional prescribed fire would pose a short-term adverse effect on the Virginia's warbler. The Jasper, Elk Mountain II, Yellow Butte, and Redbird Canyon wildfires (2000-2001) have all occurred in the Fanny Project Area vicinity and a significant amount of acres have been treated with prescribed fire. Large scale prescribed burning in this shrub habitat type and its effects on this species are largely unknown at this time. It is expected that more information will be gathered concerning this species, and will include habitat preferences and abundance.

Cumulative Effects

No cumulative impacts are expected.

Sensitive Species – Biological Evaluations

Northern Goshawk

Forest Plan Direction

Standard 3108 – The following protective measures will apply relative to the northern goshawk for all projects involving the removal of trees in suitable habitat, except those done for the express purpose of enhancing goshawk habitat:

a. A goshawk nest survey must be completed prior to any projects in forested areas.
b. If the project area includes a historically active nest or a replacement stand associated with a historically active territory, this acreage will be excluded from the project.

c. If a historically active territory occurs within one-half mile of the project area and protected acreage has not yet been identified, the project analysis will determine whether some of the protected acreage should occur within the project area.

d. If the pre-project survey identifies a previously unknown active nest, the project analysis will determine where protected acreage will be located.

Standard 3109 – In all cases, protected acreage will include 180 acres best suited for nesting habitat within one-half mile of the historically active or currently active nest or within the goshawk territory. The acreage need not be contiguous but must occur in 30-acre units or larger. If these conditions cannot be met, then the acreage will include stands that are not currently suitable but that could be managed to meet nesting conditions over time. Activities within these stands should be limited to those that aid in maintaining or enhancing the stand's value for goshawks.

Guideline 3110 (Treat as a Standard) – Activities should not reduce the structural and compositional integrity of active and alternate conifer-forested goshawk nest stands.

Standard 3111 – From March 1st through August 31st, minimize additional human-caused noise and disruption beyond that occurring at the time of nest initiation (e.g. road traffic, timber harvests, construction activities) within one-fourth mile of all active goshawk nests.

Guideline 3112 (Treat as a Standard) – From March 1st through September 30th, avoid timber harvest schedules that cause simultaneous, widespread disturbance across active goshawk fledgling habitat. Fledgling habitat should include areas without constant human disturbance.

Guideline 3114 (Treat as a Standard) – Design silvicultural prescriptions and manage activities to enhance prey species habitat by maintaining vegetative diversity and striving for a balance of structural stages, from stand initiation to late successional, within goshawk fledgling habitat (approximately 420 acres around each historically active goshawk nest and alternate nests).

Existing Condition

Goshawk surveys were conducted in June-July 2002 within potential nesting habitat, with no new nesting goshawks discovered. One 'fly-by' observation of an adult goshawk (presumed foraging) was made in June 2002, by a Rocky Mountain Bird Observation staff conducting a forest bird monitoring survey (refer to RMBO report, and 2002 Forest Plan Monitoring Report – Item 18i) within the Fanny Project Area.

Suitable nesting habitat is limited in the project area due to natural conditions and past timber management activities. However, there is one historic nest site located in the southwest corner of the project area. During the summer of 2000, the Jasper Fire burned up to the eastern edge of this nest stand. No activity has been documented in this nest stand since 1992. Although no confirmed goshawk nests have been found recently, it is likely that goshawks nest and forage within this general vicinity. In the northern portion of the project area, there are pockets of potentially suitable nesting habitat.

Habitat management for goshawks under the Forest Plan, as amended under the Phase I amendment directs the Forest Service to manage for nest stands (including historical nests), surrounding PFAs (Post Fledgling Areas), and territories rather than just the nest stands. Two PFAs were established in the Fanny Project Area. There is one known historic nest in the

southern portion of the project area. Therefore, a 633-acre PFA (Motel - PFA #1), and associated nest stands, were established around this nest site, utilizing the best habitat available (see PFA map). Any vegetative management activities within this area would be designed to conserve or enhance habitat conditions for goshawks. Table 3.9 displays the existing balance of structural stages, and the expected balance of structural stages under all action alternatives within 20 years. Only one non-commercial treatment is proposed for this PFA. The proposed treatment would pre-commercially thin a 117-acre site using a variable density thinning strategy to reduce the density of the understory and improve prey habitat for the goshawk. No other treatments are proposed under any alternative that would immediately (post harvest) change the existing structural stages. Vegetation within the Motel PFA will move toward a more desired balance of structural stages over time.

Table 3.9. Existing and Projected development of structural stages within Motel - PFA (#1) in the Fanny Project Area.

Vegetative Structural Stage (diameter range)	Acres	Existing % of PFA	Desired % of PFA	Projected 20-year % of PFA for all alternatives
VSS 1 (0-1”) Grass/forb/shrub	118	18	10 (7-13)	5%
VSS 2 (1-5”) Seedling/sapling	0	0	10 (7-13)	13%
VSS 3 (5-9”) Young forest	360	57	20 (15-25)	46%
VSS 4-50 (9-14”) Mid-age forest	30	5	13 (8-18)	12%
VSS 4-60 (9-14”) Mid-age forest	75	12	7 (2-12)	14%
VSS 5 (14-20”) Mature forest	50	8	20 (15-25)	9%
VSS 6 (>20”) Old growth forest	0	0	20 (15-20)	1%

Another PFA was designated in the northern portion of the project area where the best potential suitable habitat was identified. This second PFA (Summit - PFA #2) consists of 744 acres, and includes one forested site outside of the Fanny Project Area (site # 0409020183 – 61 acres). Table 3.10 below, displays the existing balance of structural stages, and the expected balance of structural stages under all action alternatives within 20 years. Only one non-commercial treatment is proposed for this PFA. The proposed treatment would pre-commercially thin one 48-acre site using a variable density thinning strategy to reduce the density of the understory and improve prey habitat for the goshawk. No other treatments are proposed under any alternative that would immediately (post harvest) change the existing structural stages. Vegetation within the Summit PFA will move toward a more desired balance of structural stages over time. As succession occurs over time, trees will become larger, increasing the number of trees in the larger diameter classes.

Table 3.10. Existing and Projected development of structural stages within the Summit - PFA (#2) in the Fanny Project Area.

Vegetative Structural Stage (diameter range)	Acres	Existing % of PFA	Desired % of PFA	Projected 20-year % of PFA for all alternatives
VSS 1 (0-1") Grass/forb/shrub	147	20	10 (7-13)	5%
VSS 2 (1-5") Seedling/sapling	86	12	10 (7-13)	15%
VSS 3 (5-9") Young forest	127	17	20 (15-25)	25%
VSS 4-50 (9-14") Mid-age forest	190	26	13 (8-18)	24%
VSS 4-60 (9-14") Mid-age forest	100	13	7 (2-12)	15%
VSS 5 (14-20") Mature forest	94	13	20 (15-25)	15%
VSS 6 (>20") Old growth forest	0	0	20 (15-20)	1%

Alternative 1

No treatments would occur under this alternative. Natural succession would allow trees to grow larger and denser. Pine in the understory would become denser and larger overstory trees would become larger in diameter. Suitable nesting habitat would increase over time. The distribution of structural stages would gradually increase for VSS 4, 5 and 6, and gradually decrease for VSS 1, 2 and 3. Trees currently in VSS 4 and 5 would gradually develop late successional/old growth characteristics, while trees in the VSS 1, 2 and 3 would grow into the next structural stage gradually reducing the number of acres in early successional stages.

Alternatives 2 and 3

Both action alternatives propose to pre-commercially thin (variable density thinning) approximately 169 acres within two stands (48 acres in PFA 2, and 117 acres in PFA 1). These treatments are needed in order to reduce the understory density, and to improve forage and prey habitat for the goshawk. Overstory conditions (currently at structure stage 4A) within both stands would not change. Treatments would improve the growth and vigor of overstory trees since competition would be reduced. The two-track roads would be closed under both action alternatives, minimizing disturbance. Mitigation measures (seasonal restrictions) would also limit disturbance near nest stands during critical periods of the year.

Cumulative Effects

Recent large wildfire events have destroyed many acres of habitat adjacent to the project area. Activities that reduce the potential for large stand-replacing wildfires will help to maintain habitat for this species over time. This project will establish two PFAs totaling 1,377 acres. Treatments planned within the PFAs are designed to improve the habitat for the goshawk. Mitigation measures are included to provide protection for the goshawk and its habitat if nests are found during harvest and/or post sale activities.

Determination

All action alternatives may adversely impact individuals. This is not likely to result in a loss of species viability in the project area. The Fanny Project Area contains very few areas that currently provide suitable nesting habitat for goshawks and most of these acres will not be treated in the action alternatives.

Merlin

Forest Plan Direction

There is no specific Forest Plan direction for this species other than those standards and guidelines regarding snags.

Existing Condition

This species can be found from Alaska and Labrador south to Nova Scotia, Michigan, and Oregon. This species winters from British Columbia and Newfoundland to northern South America (Bull and Farrand Jr. 1977). The Black Hills is on the southern periphery of their breeding range (Udvardy 1977, Sodhi et. al. 1993). The Merlin inhabits open areas such as forest edges, bogs, lakes in boreal and coastal forests and prairie-parkland of the northern Great Plains. Some individuals remain in prairie habitat even in winter; others will use almost any habitat type encountered in its winter range. This species nests mostly in trees, often in old magpie, crow and other raptor nests. In South Dakota, this species nests in open pine forest and woodland edges, from April through June. The Merlin preys on small to medium sized birds; also takes large insects, spiders, crayfish, toads, small snakes, bats and small mammals (DeGraaf et al. 1991, Sodhi, et.al.1993).

In the Black Hills, this species is considered an uncommon summer resident (Peterson, 1993). Potentially suitable habitat is present in the project area, associated with burned areas and post-fire grass/forb structural stage. Breeding records for Merlin are from Custer and Fall River Counties in South Dakota (Peterson, 1995) and in Crook County, Wyoming (Luce et.al. 1997). Populations of the prairie subspecies of Merlin appear to be stable (Sodhi et. al. 1993). There are no local population trend data.

Alternative 1 – No Action

Under this alternative no new management activities would occur. Therefore, no direct or indirect impacts are expected.

Alternatives 2 and 3

Prey habitat for this species would likely benefit from all action alternatives (thinning, prescribed burning). Snags that have raptor nests should be protected through project mitigation. Suitable habitat for this species (Jasper burn area) has increased in this vicinity. Indirectly, nests could be affected by harvesting equipment and ground disturbance.

Cumulative Effects

There would be no adverse cumulative effects as a result of this project.

Determination

The proposed action may have a beneficial effect to this species. Merlin are considered an uncommon species but not generally adversely affected by forest management activities. This species is closely tied to nesting in snags, raptor nests and magpie nests, which are limited in the Black Hills. However, the Fanny Project Area and adjacent Jasper Fire area should provide suitable foraging (open areas) and nesting habitat for this species. The project proposal could further enhance foraging habitat.

Black-backed woodpecker

Forest Plan Direction

There is no specific Forest Plan direction for this species other than those standards and guidelines regarding snags.

Existing Condition

The black-backed woodpecker prefers coniferous forests, especially spruce in the boreal zone, swampy conifer stands, burned over areas, and areas with epidemic insect populations. This species of woodpecker eats wood boring insects and their larvae underneath loose bark on dead trees. This species is a cavity nester and prefers a hard snag greater than 15" DBH, but will nest in smaller diameter snags. Since the Jasper fire (2000) more black-backed woodpecker sightings are being reported. RMBO (2001, Final Report) have record the majority of these observations in burned areas, followed by late successional pine stands. However, these wood-boring insect feeders will utilize a variety of habitat types. They generally select larger diameter (15"+) snags as nest sites. Since this species takes advantage of 'events' like large, stand replacing wildfires, or wood-boring insect outbreaks, population fluctuations are to be expected.

The proximity of the Fanny Project Area to the Jasper burn, and the pine sites designated for management to a late succession condition within the Fanny area provide suitable habitat for this species. While snag survey transects for watershed #405 (north/northwest portion of Fanny) recorded a snag density that was below FP standards (.97/acre), snag densities within the Jasper burn were as high as 38 snags per acre. HABCAP index for current condition is .478.

Alternative 1 – No Action

No timber harvest activities would occur under this alternative. Natural succession would continue, allowing trees to grow larger. The potential for insect attack and infestation would be greatest under this alternative, which would provide food and snags for nesting. This alternative would provide for the greatest increase in habitat over time.

Alternatives 2 and 3

Both action alternatives propose timber harvests, which would remove large, commercial trees from overstocked stands. This creates more open stands, which are less susceptible to mountain pine beetle attacks and to stand-replacing wildfires. Removal of large, mature trees has the potential to reduce snags and reduce future nesting (potential) habitat. Since Alternative 2 would harvest more acres then Alternative 3, the potential negative effects would be greater in Alternative 2, and least in Alternative 1 (No Action). HABCAP index drops by 7.5 % (.442) with Alternative 2, and by 7% (.444) with Alternative 3. Mitigation measures are included to retain most of the largest diameter trees. The cutting of standing dead trees for firewood is

prohibited by Forest Plan Direction (Standard 2304), and Forest Plan Standard 2306 maintains a sufficient number of large diameter green trees for future snags (green tree retention).

Table 3.11. Habitat capability (HC) values for the Black-backed woodpecker under all alternatives.

Species	Alternative 1 – No Action	Alternative 2	Alternative 3
Black-backed woodpecker	.478	.442	.444

Cumulative Effects

The project area is adjacent to one of the largest fire areas in the Black Hills. The Jasper fire area lies to the east of the project area, and the Elk Mountain fire area lies just to the south of the project area. Both areas currently provide excellent habitat for this species. Snags and wood boring insects are very abundant. Although past timber harvests within the project area have removed large diameter trees, natural succession will produce more large trees over time. Due to recent large fires and an increase in mountain pine beetle infestations, habitat for this species appears to have expanded.

Determination

All action alternatives may adversely impact individuals, but are not likely to result in a loss of species viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability range-wide.

Lewis's Woodpecker

Forest Plan Direction

There is no specific Forest Plan direction for this species other than those standards and guidelines regarding snags.

Existing Condition

This species breeds from central British Columbia, east to the Black Hills, south to northern Arizona and southern New Mexico. This species has limited occurrence throughout western United States (Tobalske, 1997). The Lewis' requires large diameter snags (>19" DBH) for nesting and foraging (Tobalske 1997), and can excavate it's own cavity, but requires wood to be mostly soft. It will also use nests started by northern flickers, and other woodpeckers.

In the Black Hills, this species is considered an uncommon, summer resident (locally common in large burns or insect outbreaks). This species has been documented in all counties in the Black Hills of South Dakota and Wyoming (Peterson 1995, Luce et. al. 1997). The regional population trend is downward. This species is vulnerable to loss of large snags, salvage timber harvest and fire suppression. Prior to the Elk Mountain II wildfire (2001) there was a small breeding population of Lewis' woodpeckers near Elk Mountain Fire Lookout Tower (Weston County, Wyoming) approximately six (6) miles south of the Fanny Project Area. That fire burned back through the old 'Elk Mountain fire area (1983)' consuming the residual large diameter standing dead (snag) trees. Potential suitable habitat is present in the project area with respect to large

dead trees, snags created by mountain pine beetle activity or wildfire, and late succession pine stands.

Alternative 1 – No Action

Under this alternative no new management activities would occur. Therefore, no direct or indirect effects are expected.

Alternatives 2 and 3

Habitat for this species could be reduced by the proposed action. Removal of commercial wood (large dead trees > 9") will reduce future nesting habitat created by insects and disease in the proposed cutting areas. Removal of logging slash to landings could also reduce the prey base. However, areas of late succession forest will be left untreated. Chemical treatment of noxious weeds and for insects and disease could also affect prey species.

Cumulative Effects

Recent large, wildfires in the vicinity of the project area has created a large area of suitable habitat (snags) for the Lewis's woodpecker. In addition, the increase in beetle activity throughout the forest will likely increase suitable habitat in the Planning Area.

Determination

All action alternatives may adversely impact individuals, but are not likely to result in a loss of species viability in the planning area, cause a trend to federal listing, or cause a loss of species viability range-wide.

Pygmy Nuthatch

Forest Plan Direction

There are no specific Forest plan directions for these species.

Existing Condition

This primary cavity nester is generally associated with large snags in pine forests: prefers open, park-like forest, especially among ponderosa pines in the lower coniferous zone. The nuthatch feeds on insects and conifer seeds (DeGraaf et. al. 1991), and requires large diameter snags (> 17" DBH) for excavation of nest sites (Raphael and White 1984). This species sometimes is communal in nature, especially in winter.

The pygmy nuthatch is found from southern interior British Columbia, northern Idaho, western South Dakota, south to Mexico and western Texas. In the Black Hills, this species is an uncommon-rare, permanent resident and thought to generally prefer the southern and lower elevations of the hills (Luce et. al. 1997, SDOU 1991). Regional population trend is slightly upward (BBS). Local Population trend is not available due to its rarity (RMBO, 2001).

Potential suitable habitat is present in the project area in respect to large dead trees, snags created by mountain pine beetle activity and late succession stands. There are no records for this species in the Fanny Project Area.

Alternative 1 – No Action

Under this alternative no new management activities would occur. Therefore, no direct or indirect effects are expected.

Alternatives 2 and 3

Potential habitat for this species may be reduced by the removal of large diameter (trees > 9"DBH) trees. Removal of any standing dead (hazard trees) could reduce potential nesting sites, and removal of logging slash could decrease the prey base. Chemical treatment of noxious weeds may also impact prey species.

Cumulative

A large area of potentially suitable (snags) habitat for the pygmy nuthatch has been created by the Jasper Fire, Rodger Shack and Elk Mountain wildfires. However, recent surveys (RMBO, 2001) have not detected an increase in observations. This increase in snags may not benefit this species as much as other cavity nesters as they are not known to favor these large, open burned areas.

Determination

All action alternatives may adversely impact individuals, but are not likely to result in a loss of species viability on the project area, nor cause a trend to federal listing or a loss of species viability range-wide.

Golden-crowned Kinglet

Forest Plan Direction

There are no specific Forest plan directions for these species.

Existing Condition

The golden-crowned kinglet prefers larger blocks of coniferous forest and woodland, especially spruce. The nest is typically found in evergreens, most often in the crown. The golden-crowned kinglet feeds primarily on insects, tree sap and sometimes fruit and seeds. This species is susceptible to timber management activities, spruce die-off, wildfires and extreme winters (Natureserve 2001).

Disjunct populations are found South Dakota, Illinois and Indiana. In the Black Hills, this species is an uncommon resident (Luce et. al. and SDOU 2001), and distribution seems strongly tied to the occurrence of white spruce (RMBO, 2001). However, during the winter months in the Black Hills, this species is occasionally observed foraging with other species such as chickadees and brown creepers in the lower elevations of ponderosa pine, including within the Fanny Project Area (District Data). Regional population data indicate a stable trend, but local population data shows variation and these could be at least partly due to winter weather conditions.

Potential suitable (winter) habitat is present in the project area. This species has been recorded within the project area (District records). Mature pine stands with heavy under-story regeneration are also used by this species as wintering habitat. However, breeding habitat (spruce) is not present in the project area.

Alternative 1 – No Action

Under this alternative, no new management activities would occur. Therefore, no direct or indirect impacts to this species are expected.

Alternatives 2 and 3

Loss and fragmentation of habitat due to timber harvest activities and road re-construction may impact this species negatively either through removal of dead trees, canopy cover and changes in microclimate around nesting or wintering areas.

Fence line construction, fuel breaks, and chemical treatment for insects and weeds could impact this species negatively

Cumulative Effects

Loss of habitat due to timber harvest, large wildfires, insect and disease outbreaks, storm events, and private land development will continue to reduce the habitat for this species in the project area.

Determination

All action alternatives may adversely impact individuals, but are not likely to result in a loss of species viability, cause a trend to federal listing, or cause a loss of species viability range-wide.

Flammulated Owl

Forest Plan Direction

There are no specific Forest plan directions for these species.

Existing Condition

Documented breeding range includes southern British Columbia, Washington, Cascade and Sierra Nevada mountain ranges, forests of Nevada, New Mexico and Colorado, and recently found in forests of Idaho and Montana. Until last year, this species had not been confirmed to occur in the Black Hills.

This species primarily inhabits open ponderosa pine, dry montane conifer, or aspen forests, often with dense saplings, oak or other brushy understory. This owl is primarily insectivorous (moths, crickets, grasshoppers, and beetles), but is known to prey on small mammals and birds as well. They hunt exclusively at night. Flammulated owls nest are in natural cavities or old woodpecker cavities and are known to re-use nests year after year. Nest sites that provide open, mature canopy conditions (open flight path to nest) appear to be preferred (McCallum, BNA#93, 1994).

No owl surveys were done for the Fanny Project Area. Based on published information, and the recent Black Hills sightings, it is reasonable to expect that suitable habitat for this species is present in project area.

Alternative 1 – No Action

Under this alternative, no new management activities would occur. Therefore, no direct or indirect impacts to this species are expected.

Alternatives 2 and 3

All action alternatives have the potential to reduce preferred habitat for this species by removing large over-story trees. However, an increase in the owl's prey population may occur from harvesting that releases under-story vegetation thus improving insect and small mammal habitat.

Cumulative Effects

Large areas of snag habitat have been made available from the Jasper, Elk Mountain, Rodgers Shack, and other recent wildfires in this vicinity. Although open areas are not considered preferred flammulated owl nesting habitat, they may improve prey species abundance on a general scale. Mature trees, relatively open, park-like, stands are considered more suitable habitat. Timber harvesting that removes mature over-story trees and any reduction in the number of snags will reduce potentially suitable habitat.

Determination

All action alternatives could adversely impact individuals and potential suitable habitat for this species, if present. This is not likely to result in a loss of species viability, cause a trend to federal listing, or cause a loss of species viability range-wide.

Townsend's Big-eared Bat and Fringe-Tailed Myotis

Forest Plan Direction

Guideline 3102 (Treat as a Standard) – Where caves and mines are nurseries or hibernacula for bats, protect the caves and mines and their microclimates when designing management activities (e.g., timber harvest, road construction, recreation facilities). Protect known bat day and night roosts.

Standard 3207 – Protect known bat nursery roosts and hibernacula.

Guideline 3208 (Treat as a Standard) – Use seasonal closures for known nursery roosts and hibernacula where there are conflicts with people. Work with interested groups to design closures and recreation opportunities that will not inversely impact bats.

Existing Condition

There are no known caves, abandoned mines, or other structures that could serve as significant bat roost sites within the Fanny Project Area. No sites have been identified where bats are known to roost. However, this area does have many cliffs and rock out-crops, as well as snags and large trees that could be used as roost sites for many species of bats. Bat surveys (acoustical or mist-net) have not been conducted within the project area, but have been conducted in similar habitat over the past 10 years. Ten of the eleven species of bats known to occur in the Black Hills, including Townsend's Big-eared bat and Fringe-Tailed Myotis, have been found to occur in the vicinity of the project area.

Surveys of caves on forest, conducted by both Forest Service and SDGF&P personnel, and coordinated monitoring at Jewel Cave National Monument indicate that populations of bats have declined somewhat in 2000/2001, possibly a short-term effect of the Jasper fire event during the summer of 2000.

Alternative 1

Under this alternative no additional management activities would occur, including the closure of roads. No impacts are expected under this alternative, since no additional activities would take place. However, disturbance from open roads would continue, although this is considered to be minimal in this area.

Alternatives 2 and 3

There are no known caves or mine roost sites within the Fanny area. The rocky out-crop habitat that occurs in this area may provide roosting habitat for some bat species, and no change in this habitat is expected under any of the action alternatives. It is possible that the proposed timber harvests would remove trees that serve as day/night roost sites, although there is no evidence of 'traditional' tree roosts. If bats are using these trees, they should be able to move to another tree in the area. However, if timber harvest activities occur during maternity season before juvenal bats are able to fly, there could be some incidental mortality. Mitigation measures are included in all alternatives that would protect any roost sites discovered during project layout or implementation.

Cumulative Effects

No caves or abandoned mines are known to occur in the project area. However, there are many areas other areas where bats could roost, such as cliffs, rock outcrops, large trees and snags. Roosting habitat in cliffs and rock outcrops would not be impacted over time as a result of the proposed activities. Roosting habitat in large trees and snags may be impacted, however, mitigation measures are included that prohibit the removal of standing dead snags (Guideline 2304), and retention of large trees for future snags. Recent increases in forest insect activity and the availability of snags in adjacent burn areas ensure available habitat for this species over the long term.

Determination

It is possible that action alternatives may adversely impact individuals, but this is not likely to result in a loss of species viability on the project area, nor cause a trend to federal listing or a loss of species viability range-wide.

Northern leopard frog and Tiger salamander

Forest Plan Direction

There are no specific Forest plan directions for these species.

Existing Condition

The northern leopard frog prefers small ponds and lakes without fish, and other permanent water sources such as marshes, springs or seeps. In the Black Hills this species is common where habitat exists. The tiger salamander is frequently found in the same habitat types as the leopard frog, but generally habitats are drier. Both are susceptible to overgrazing, predation and low water quality and quantity. Within the Fanny Project Area, suitable habitat is limited to small springs and seeps. There are two known sites where leopard frogs and tiger salamanders are present. Actual breeding success at these sites is unknown. Both sites are susceptible to livestock grazing, however, fencing around the sites do provide some protection.

Alternative 1 – No Action

Under this alternative no treatments would occur. No adverse impacts are expected, however, no improvements would occur to the springs where these species are known to occur.

Alternatives 2 and 3

All action alternatives propose treatments that are designed to improve the quality of riparian habitats. Mitigation measures are included for road reconstruction and timber harvest activities to minimize or eliminate sources of sedimentation that could affect water quality. In addition, both action alternatives propose water development improvements that are designed to improve the water quantity and quality around the springs where these species are known to exist.

Cumulative Effects

Any activity that could cause degradation of the water quality or quantity within riparian areas could impact these species. However, since there are no direct or indirect impacts expected under any alternative, no cumulative impacts are anticipated.

Determination

All action alternatives may adversely impact individuals but are not likely to result in a loss of species viability in the planning area, nor cause a trend to federal listing or a loss of species viability range-wide.

Tawny Crescent Butterfly and Regal Fritillary

Forest Plan Direction

There are no specific Forest plan directions for these species.

Existing Condition

The tawny crescent butterfly is associated with riparian areas and moist areas. It forages on asters, and lays eggs on the underside of leaves. It is considered uncommon to rare, but known to exist in the Black Hills. Habitat is limited in the project area.

This regal fritillary is associated with meadows and grasslands where violets are present. This butterfly lays its eggs on vegetation near violets.

There have been no observations or other evidence that suggest either of these species exist in the project area. Upland meadow habitat does exist in the project area and there are very limited riparian/moist sites in the project area. In addition, the Jasper Fire Area directly to the east of the project area, has provided a significant increase in early succession, grass/forb production that may improve breeding habitat. Therefore, some butterflies could be present in the project area.

Alternative 1 – No Action

Under this alternative, no vegetative treatment would occur. Any activities that would improve the habitat for either of these species, such as pine removal from hardwoods or meadows, would not occur.

Alternatives 2 and 3

Potentially suitable habitat for the regal fritillary butterfly may exist in or adjacent to the project area (post Jasper burn), but this species has not been documented in the Fanny Project Area. Documented preferred habitat for the tawny crescent butterfly is not present in the Fanny project Area.

All action alternatives will benefit these species by increasing native grass/forb seral stage in meadows where pine removal is proposed. Thinning the canopy in forested stands may also benefit the tawny crescent butterfly by increasing aster in the understory. Protection of riparian habitat at springs and seeps would also occur under all action alternatives, which would benefit the tawny crescent butterfly. While no direct or indirect impacts are anticipated, herbicide treatment for noxious weeds may negatively impact host plants for these species if present.

Cumulative Effects

Loss of native prairie habitat and host plants due to non-native species expansion may negatively impact these species. Habitat loss due to development (subdivisions and conversion to blue grass lawns) and agriculture practices (crops and spraying of hay meadows) will continue to increase the cumulative negative impacts to these species. Despite this trend, habitat on public lands within the project area appears to be stable at this time. There is little likelihood of the Fanny proposed actions contributing to adverse cumulative effects for either of these species

Determination

The proposed action is expected to have 'no impact' on the tawny crescent butterfly or the regal fritillary butterfly.

Black Hills Red-bellied Snake

Forest Plan Direction

Standard 3116 – Avoid creating barriers (i.e. new open roads) between red-bellied snake hibernacula and wetlands.

Existing Condition

The Black Hills Red-bellied snake is considered to be an isolated population, with the nearest population approximately 300 miles away (Expert Interview Summary, BHNF, 2000). Preferred habitat includes riparian habitat, wetlands, and wet ponds and meadows. Limited survey data indicate that this species is uncommon, but has been found in all counties within the Black Hills. Habitat does exist within the Fanny Project Area, but is limited to wet areas along springs and seeps.

Alternative 1 – No Action

No treatments are proposed under this alternative, and therefore, no adverse impacts are expected to occur.

Alternatives 2 and 3

All action alternatives are expected to improve the habitat of this species by opening dense stands of pine and by expanding hardwoods. Disturbance to loss of individuals may occur from road use and skidding operations. Red-bellied snakes also benefit from an increase in large,

down woody material, which would likely increase following timber harvests. Prescribed burning, which reduces down, woody materials, is prescribed on approximately 300 acres within the project area. However, mitigation measures are included that ensure adequate amounts of down, woody materials are retained across the project area. No new roads are proposed adjacent to any wetland, or riparian area within the Fanny Project Area, so no new barriers to hibernacula are expected to occur.

Cumulative Effects

Maintaining and/or protecting large down woody debris and any known hibernacula would provide the best protection for this species over time. Adverse impacts from human caused mortality (road kills) are considered to be the biggest concerns within this project area. Since there are no direct or indirect impacts expected from the proposed actions under any alternative, no cumulative impacts are anticipated.

Determination

All action alternatives may adversely impact individuals but are not likely to result in a loss of species viability on the project area, nor cause a trend to federal listing or a loss of species viability range-wide.

Marsh muhly

Forest Plan Direction

There are no specific Forest plan directions for these species.

Existing Condition

This species is widely described as being a facultative wetland species (Van Bruggen 1985; Fertig 1993; USDA NRCS 1999). However, occurrences in the Black Hills have been in drier habitats, often adjacent to streams, or in the bottom of draws that are subject to seasonal flooding. Habitats in the Black Hills range from open meadows, to pine and spruce dominated open forest, usually with a hardwood component; ledges and slopes along creeks; and open, grassy, hardwood draw bottoms.

This species is considered rare in the Black Hills; however, many new locations have been identified in recent years. No local population trend data is available. The marsh muhly is vulnerable to livestock over-grazing, herbicide treatments, non-native species competition, and ground disturbance. Potential habitat may exist in the Fanny Project Area; however, recent surveys failed to detect this species.

Alternative 1 – No Action

No new management activities are planned under this alternative. No direct or indirect effects are expected to occur under this alternative.

Alternatives 2 and 3

Ground disturbance and harvest activities may affect localized populations of this species if they are present. Treatment of noxious weeds with herbicide spraying may decrease species diversity in the area, and could affect local populations if they occur. However, there are no known populations of this species in the Fanny Project Area, so no negative effects are expected.

Cumulative Effects

Mining activity, road construction, indiscriminate herbicide treatment and evasive plant species may impact this species where it occurs.

Determination

This species has not been found in the Fanny Project Area. Potential habitat may exist since this species has been found to occur in a wider range of habitat conditions then previously thought. If present there is the potential to adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability range-wide.

Northern arnica

Forest Plan Direction

There are no specific Forest plan directions for these species.

Existing Condition

This perennial herb is unevenly distributed from Newfoundland to British Columbia and south to northern Minnesota. Populations in the Big Horn Mountains in Wyoming, and the Black Hills are considered to be disjunctive. Based on sensitive plant inventories this species is widespread across the Black Hills. Often associated with violets, it is found on moist, north/northwestern slopes often with spruce or birch habitat type, and generally on a sandy, or well-drained limestone substrate.

Potential suitable habitat is not believed to be present in the Fanny Project Area. Surveys of the few 'moist' sites failed to detect this plant.

Alternative 1 – No Action

No new management activities would occur under this alternative. Therefore, no direct or indirect effects are anticipated.

Alternatives 2 and 3

Both action alternatives would open the forest canopy in treated areas reducing shade and moisture in the microclimates of ponderosa pine sites. This may impact individual plants if they occur.

Cumulative Effects

Since there are no direct or indirect impacts expected under any alternative, no cumulative impacts are anticipated.

Determination

Based on what is known about this species it is unlikely that this species is present in the Fanny Project Area. All recorded observations for this species are located in the north and north central portions of the Black Hills in the vicinity of the Norbeck area. A determination of 'no impact' is made for this species for the Fanny Project.

Threatened and Endangered Species – Biological Assessments

Bald Eagle

Forest Plan Direction

Standard 3101 – To protect endangered and threatened species:

a. Chlorinated hydrocarbons will not be used as chemical agents on the Black Hills National Forest.

b. Prohibit new disturbances, not existing at the time of Bald Eagle or Peregrine Falcon nest initiation that may detrimentally influence nest success during the nesting season (approximately February 1st through September 1st).

c. Protect traditional Bald Eagle winter roost sites; human activities should be prohibited within 100yards of roosting areas between November 15th and March 1st.

d. In stands being used by Bald Eagles on a transitory basis, avoid timber harvest activities when in use. Harvest may resume when birds have vacated the stands.

Existing Condition

In the Black Hills, this species is a winter resident only (SDOU, 1991). Bald Eagles have been documented in all counties in the Black Hills (USFWS 2001, District Files). They feed on carrion along roadsides and gut piles left by hunters. Bald Eagles have been sighted within the Fanny Project Area. These sightings occur seasonally in the fall and winter months. There are no known nest sites in the Black Hills, and there are no known communal winter roost sites. Some large trees or large snags within the project area may be used as occasional perch or roost sites.

The population trend nationwide for the Bald Eagles is upward as evidenced by the proposal (64 FR 36453) to remove the species from the Endangered Species List.

Alternative 1 – No Action

This alternative will have no effect on the Bald Eagle. All large diameter trees and snags will be maintained.

Alternatives 2 and 3

This project is designed to retain and enhance the number of large diameter trees (>20” dbh) and snags used for roosting. No direct or indirect effects are expected under any of the action alternatives.

Cumulative Effects

No cumulative effects are expected.

Determination

This project should have no effect on Bald Eagles.

Consultation with the U.S. Fish and Wildlife Service

Since all determinations were “No Effect”, no further consultation is required.

Black-footed Ferret

Forest Plan Direction

There is no specific Forest Plan direction for this species.

Existing Condition

Habitat for this species does not exist in the Fanny Project Area.

All Alternatives

No direct or indirect effects are anticipated since habitat for this species does not exist, and there are no known occurrences of this species in the project area.

Cumulative Effects

No cumulative effects are expected.

Fisheries and Riparian Habitat

There are no known perennial streams within or adjacent to the Fanny Project Area. Intermittent stream flows occur infrequently during "flash-flood" rain events, and last for brief periods. These types of stream flows do not support the habitat needed for fisheries, and therefore there are no known fisheries within the project area. The potential for this habitat would not change under any alternative.

Cumulative Effects

No cumulative effects are expected.

Range Resources

Introduction

This section displays an overview of the analysis and effects to range resources within the Fanny Project Area. The Range Conservationist for this project completed the field review and analysis, which is documented here and in the Project File.

Existing Condition

The Fanny Project Area is characterized by ponderosa pine covered slopes, grassy draws and open meadows. Primary range occurs mainly in the grassy draws and open meadows. There are approximately 8,830 acres of primary range within the project area. Portions of two allotments lie within the Fanny Project Area. These allotments are grazed as follows:

Lower Beaver Allotment:
Roby and Lower Boles Unit
The Roby and Lower Boles units are grazed in a two pasture deferred rotation system. The Roby unit is generally grazed for about 6 weeks, with the Lower Boles unit making up the rest of the grazing season. The season of use alternates with one unit being grazed early one year and the other being grazed early the next year. The grazing season is 6/11 thru 9/30. The Roby unit is poorly watered, with the main source of water being a

pipeline in the bottom of Roby Canyon, which results in a concentration of cattle in the bottom of the canyon.

Summit Ridge Unit
The Lower Summit Unit of Lower Beaver is one unit of a two-pasture deferred rotation grazing system. It is grazed for approximately 7 weeks each year, early one year, (starting 6/11) and then late the next year (ending 9/30). An additional water source in this unit would help distribute livestock more evenly.

Buck Springs and Wilson Place Units
The Buck Springs and Wilson Place units are grazed in a two-pasture deferred rotation system, with the grazing season of 6/11 – 9/30 being split evenly between them. Again, one pasture is grazed early one year and then late the next.

Tepee Allotment:
Deadhorse and Gillette Canyon Units
The Deadhorse and Gillette Canyon units are rotated with the Antelope unit in deferred rotation grazing system. The cattle all run together in the Antelope unit and then are split into two separate herds to go into the Deadhorse and Gillette Canyon units. The next year the rotation is reversed with the cattle starting in two herds and then combining into one in the Antelope unit. The grazing season is 6/1-10/31.

Direct and Indirect Effects By Alternative

Impacts to the range resource are mainly centered around changes in forage amount and quality resulting from a timber harvest. The current stocking rates are based on forage production on primary range. As pines encroach upon the primary range, less forage becomes available, and areas of available forage are utilized more heavily. Conversely, as timber is harvested transitory range becomes available to grazing animals, lessening the grazing impacts on the primary range.

Although no changes in the number of animal months (AMs) or permitted livestock use are expected, the amount of available forage is expected to increase, temporarily, with timber harvest. Lowering the level of use will aid in maintaining or improving the satisfactory condition of the range. In areas where the range is in unsatisfactory condition, lessening the impact of grazing by making more forage available or improving livestock distribution, will help move the rangeland towards the desired condition.

Openings created with timber harvest will aid in distribution of domestic livestock on the allotments. Open grassland communities will have a stable and diverse mix of grass and forb species, without tree encroachment.

The total amount of herbaceous and shrub production in the area varies as a result of the basal area and overstory density changes after various harvest and other management treatments are applied. Management activities that reduce the tree density of the forested stand will increase the amount of available forage. An increase in forage production is expected because of increased sunlight and available water resulting from decreased competition from pine and shade tolerant species. The quality of forage is expected to improve as plant composition shifts from shade tolerant species to shade intolerant species.

Although not all the increased forage will be available to livestock, an increase in livestock distribution can be expected. The limiting factors for livestock use of forage are the availability of water and topography.

Alternative 1 – No Action

Under this alternative no vegetative treatments would occur. The no action alternative will eventually result in a decrease in the amount of available forage as forested stands become denser and pine continues to encroach upon meadow areas. This will eliminate the possibility of improving livestock distribution. The proposed KV improvement projects will not occur.

Alternative 2

Alternative 2 will increase the amount of available forage by decreasing the tree density. Increasing the amount of forage available may result in improved livestock distribution, which aids in maintaining or improving the desired condition on primary livestock range. There may be some short-term loss of grazing access during the timber harvest and/or the burning activities.

Alternative 3

The effects of Alternative 3 are the same as Alternative 2, except that fewer acres are being treated, resulting in less of an increase in available forage.

In addition, closing the area to off-road motorized travel may make it more difficult to maintain some of the range improvements currently in place. However, eliminating off road travel can be beneficial when it comes to livestock management. The likelihood of gates being left open, which increases the chance of livestock being outside the permitted area, increases as the number of roads increase and with off-road travel.

Cumulative Effects

No cumulative effects are expected as a result of the proposed activities. Activities proposed under the action alternatives are expected to benefit the long-term condition of the range resources, by maintaining or improving forage production and by improving spring developments.

Noxious Weeds

Introduction

Noxious weeds reduce the grazing capacity and forage value of rangeland for wildlife and livestock. The Fanny Project Area contains weeds that are considered noxious due to their ability quickly spread (Canada thistle), and because of the toxicity of the plant if ingested by livestock (Houndstongue).

Existing Condition

Past disturbance from skid trails, logging decks, construction of temporary roads in prior timber sales, and burning slash piles after the timber sale closes causes soil disturbance from which noxious weed seeds tend to germinate and take over a site. In the Fanny project are there are approximately 295 acres of infestation. The majority of infestation consists of Canada thistle,

Houndstongue, Common mullein and Musk thistle. Biological controls used on Musk thistle has worked very well in the past, to the point where Musk thistle is not of much concern today.

Inventories were taken in the early 1990's during initial treatment with herbicides. No treatments have taken place since that time in the project area. With no treatment, the Forest can expect an increase of 30 percent per year with plants that contain seeds with a pappus (Canada thistle). Canada thistle will also spread through extensive creeping horizontal root systems up to 16 feet long and 2 to 22 feet deep. The Forest can expect a 15 to 20 percent increase in noxious weeds that do not contain a pappus, such as Common mullein.

Direct and Indirect Effects By Alternative

Alternative 1 – No Action

Under this alternative no vegetative treatments would occur. Noxious weed expansion would be limited to existing disturbed areas, or disturbance resulting from natural events. This small amount of expansion would be offset by the existing control measures that are currently conducted. Past experience indicates that ground disturbance has the potential to result in the spread of noxious weeds.

Alternatives 2 and 3

Under both Alternatives 2 and 3, where ground-disturbing activities are proposed, there is a possibility of increasing weed infestation by 227 acres (1 percent). Mitigation measures are designed to re-vegetate disturbed sites in order to limit noxious weed expansion. Current weed control efforts will be expanded to any new infestations that result from activity related disturbances.

Prescribed Fire and Fuels

Introduction

The Fanny Project Area is located in Management Area 5.1 - Resource Production Emphasis and Management Area 5.4 - Big Game Winter Range Emphasis. The Appropriate Suppression Response for these areas may utilize confine, contain, or control suppression strategies with the aim of limiting wildfire size to less than 5 acres in area 5.1 and less than 15 acres in area 5.4.

Management ignited prescribed fires are an appropriate activity in both management areas, while prescribed natural fires are not.

As in other areas of the Black Hills, fire suppression activities within the Fanny area have altered natural fire regimes and natural fuel loadings over the last 100 years. Active suppression of wildfires throughout the Black Hills region has resulted in more contiguous, uniform stands of younger trees with fewer openings and higher natural fuel loadings. Past timber management activities have added significantly to the natural fuel loading in the project area.

Existing Condition

Fuels

Existing fuels in the project area form a mosaic with four of the Fire Behavior Fuel Models represented. (Reference NFES Publication 1574 "Aids to Determining Fuel Models For Estimating Fire Behavior" - Anderson 1982):

- Fuel Model 1 - Short Grass
- Fuel Model 2 - Grass With Timber Overstory
- Fuel Model 9 - Timber Litter
- Fuel Model 11 - Light Slash

Fuel Model 1 predominates on the private land within the project area while Models 2, 9, and 11 comprise most of the area on National Forest lands. In addition, pure stands of Mountain Mahogany (*Cercocarpus montanus*) are found in the southern portions of the project area. These stands are found on rocky sites with shallow soils, and little or no ground fuels, and act as natural fuel breaks. Mountain Mahogany is a non-volatile shrub in this area, and will not normally carry a ground fire unless other fuels are present.

Fuel breaks have been constructed in the project area in conjunction with past harvest and thinning activities. These investments should be maintained.

Wildfire Hazard and Values at Risk

An analysis of site conditions and historical fire frequency for the project area determined that wildfire risk is moderate. Values that could be threatened by any uncontrolled wildfire are also moderate. Values potentially threatened by uncontrolled wildfires include: private residences, outbuildings, and vehicles; a historic lookout and cabin at Summit Ridge; hay fields; commercial timber stands; power lines; range improvements such as fences and spring developments; and investments in timber stand improvement and reforestation. In addition, any cultural resources located within the project area could be negatively impacted by wildfire and wildfire suppression activities. The existing transportation system in the project area provides good access for fire suppression operations and fuels management activities. One hundred and two wildfires have been recorded in the project area since 1952.

As in other areas of the Hell Canyon District, the trend toward ranch lands being subdivided and developed for housing sites is continuing, bringing new cabins, summer homes, and trailers into forest. Structural protection will be a growing concern during wildfire suppression operations in this area. Reconstruction and maintenance of the existing road system as part of the timber sale contract will help make the area more accessible for the larger engines, which could be needed for structural protection on a large wildfire. The Hell Canyon District continues to retain responsibility for suppressing wildfires on private land within the project area as well as the Bureau of Land Management lands bordering the project area to the west.

Direct and Indirect Effects By Alternative

Alternative 1- No Action

Selection of this alternative would not change the existing conditions from a fuels management perspective. The only changes that would occur on the landscape would be those that occur as a

result of natural occurrences, or those relative to wildfire suppression. Any management direction that calls for manipulation of the forest environment, such as treating of fuels on 8,000 acres per year, would not be met unless those objectives can be made up in other areas. Stands that are currently overstocked would continue to be more susceptible to mountain pine beetle infestation at a more rapid rate than if the trees were thinned. Fuel loadings would increase over time if trees falling to the forest floor were left untreated. In relation to the original purpose and need for this proposal, this alternative does the least in that it does nothing to alleviate the domination of the landscape by overstocked multi-aged ponderosa pine stands (National Fire Plan Managing the Impact of Wildfires on communities and the Environment pages 13-14).

Modeling of the existing situation in the Fanny area shows what impact implementing the no action alternative would have on the fuels situation. Fuel model 9 would develop into fuel model 10 in the next 5-10 years, and fuel model 10 would develop more compact ladder fuels and heavier ground fuels. Using the BEHAVE SYSTEM, *(Andrews, Andrews and Chase)*, it can be shown that a fire start in fuel model 10 stands cannot be contained under the 90th percentile weather conditions at or below the forest standard suppression objective of 5 to 15 acres (Depending on which management area 5.1or 5.4). The same fire would generate more than 300BTUs/ft/sec, which also exceeds forest plan standards. Fuel model 10 stands would exhibit similar numbers over the next 5-10 years. Table 1 illustrates this modeling. It also illustrates that flame lengths of a fire in this fuel type preclude suppression with hand crews that are not supported by air suppression tactics, as flame lengths would exceed 5 feet in length with mid-flame wind speeds over 5 MPH.

Table 3.12. Fire predictions based on fuel model 10.

MIDFLAME WIND SPEED	RATE OF SPREAD	HEAT PER UNIT AREA	FIRELINE INTENSITY	FLAME LENGTH
MI/HR	***CH/HR***	***BTU/SQ FT***	***BTU/FT/SEC***	***FT***
4	8	1378	194	5.1
6	13	1378	317	6.4
8	18	1378	459	7.5
10	24		618	8.6

Alternative 2

This alternative would affect the fuels resource in several ways. Forest direction for generated slash would be met. Residual slash would be left at less than 10 tons per acre, except in isolated occurrences. Suppression objectives of less than 5 acres under 90th percentile weather conditions for wildfires would theoretically be attainable. Based on fuels modeling using the BEHAVE program, *Andrews, Patricia L; Chase, Carolyn H.* fire-line intensities in treated areas would not likely exceed 300 BTUs /ft/sec. Continuous crown closures/densities would be reduced, thereby reducing the risk for large crown fires in the project areas. Losses to bugs in overstocked stands would be reduced as stocking levels are reduced to below threshold levels identified by silvicultural personnel, thus reducing fuel loadings in the long- and short-term. The following treatments are proposed to reduce fuels under alternative 2.

Table 3.13. Proposed Treatments

Broadcast Burning	143 Acres
Cut and Pile 200' Wide Fuelbreaks	69 Acres
Whole Tree Skidding	140 Acres

Prescription recommendations made here would be tempered with fuels analysis done following harvest operations, and changes made to better meet resource objectives identified in the Forest Plan, as amended by the Phase 1 Amendment. Treatment of created fuels slash by either jackpot or broadcast burning would have the effect of lowering existing fuel levels. In many cases, especially in broadcast burned areas, the fuel model would be changed to one having lower fuel loadings. Fuel model 10 profiles would be changed to fuel model 9 in many cases. There would still be pockets of higher fuel loadings due to inconsistent fuel consumption and initial spatial arrangement of created slash. In general, treatment of created slash would result in the treatment of natural slash. Risks for catastrophic fire, as well as fire intensities, would drop with increases in fuel treatments.

Stands that are currently fuel model 10 will be treated and reduced to a fuel model 9 where suppression objectives are more readily attainable. Many stands that are fuel model 9, and would move into fuel model 10 in the near future, are treated now, setting back the timeframe in which they would move into a fuel model 10. This will result in stands being less susceptible to catastrophic fire as well as stands burning at lower intensities. Reductions in the existing level of fuel models 9 and 10 would reflect this.

Road access for fire suppression efforts would be changed as part of this proposal. Open road density would be reduced from 2.9 miles/section to 2.0 miles/section. This could reduce the availability of some roads in the Fanny area for use in fire suppression. Historically, fire suppression efforts have been successful in this area. In addition, fuels treatments proposed under this alternative would reduce fuels loadings, and fuel continuities. Therefore, no significant increase in wildland fire size is expected under this alternative as a result of road closures/obliterations.

Coordination between the states of Wyoming and South Dakota would have to occur in order to determine how and when smoke particulates could be released. It is likely that forest roads in the local area would have to be patrolled and/or signed to keep forest visitors informed on what is happening. It is unlikely there would be any significant health or environmental impacts of particulate emissions, and the intent of the Clean Air Act would be met.

Alternative 3

Fuels treatments for this alternative would not differ substantially from Alternative 2. Road access for fire suppression efforts would be reduced under this alternative. Open road density would be reduced from 2.9 miles/section to 1.4 miles/section. This could reduce the availability of some roads in the Fanny area for use in fire suppression. Historically, fire suppression efforts have been successful in this area. In addition, fuels treatments proposed under Alternative 3 would reduce fuels loadings, and fuel continuities. This could impact fire suppression response times if needed access routes were closed, and ground personal may have to rely on additional air support (helicopters and airtankers). This could increase suppression costs (airtankers costing about $1.00 per gallon delivered to the fire and each airtanker averaging 2000 gallons per load delivered).

Coordination between the states of Wyoming and South Dakota would have to occur in order to determine how and when smoke particulates could be released. It is likely that forest roads in the local area would have to be patrolled and/or signed to keep forest visitors informed on what is happening. It is unlikely there would be any significant health or environmental impacts of particulate emissions, and the intent of the Clean Air Act would be met.

Cumulative Effects

In the Fanny Project Area past, present, and reasonably foreseeable future actions are applicable to interpreting changes in fuel conditions. Past timber management activities have both increased the risk of catastrophic fire and reduced the risk of catastrophic fire. Thinning and fuel treatments have reduced the risks of wildfire. Wildfire suppression that leads to a buildup in down woody material, increased stocking, or ladder fuels, increases risks. Lack of thinning in dense stands has contributed to an increase in wildland fire risk. High stand densities, the presence of ladder fuels, and dense crown closures contribute to higher risks.

In the absence of vegetation treatments, tree densities would continue to increase, as would crown cover, ladder fuels, losses to insect and disease, all resulting in higher risks of wildland fire. This trend would continue until interrupted by a natural disturbance such as a catastrophic fire or insect epidemic outbreak.

Alternatives 2 and 3 would reduce fuels in the project area by reducing stand densities, reducing ladder fuels, improving individual stand conditions and treating created and existing fuels. Both alternatives would allow suppression objectives to be met, and allow fires to be controlled within 90th percentile weather conditions on stands proposed for treatment, and would therefore decrease chances of a catastrophic fire taking place.

The cumulative impacts of alternative 1 on air quality in the surrounding area would mirror the impacts on the other elements of fuels management. In the short term, air quality would not be impacted. If a catastrophic event occurs, there would be no control over the timing or amount of emissions released into adjacent airsheds, as there would be under controlled events under the action alternatives.

High levels of fuels in the project area can be stabilized over the long-term. Activities in the project area that reduce the amount slash/fuels will prevent build-ups from occurring. Managed stands that reduce stocking levels are more likely to reduce losses to disease and insects. In the short-term, until fuels prescriptions can be implemented, risks for catastrophic fires following harvest activities are increased, but implementing an action alternative with appropriate fuels treatments minimizes long-term risks.

- The predicted fuel model and subsequent fuel profiles for harvest units in the project area have been analyzed for conformance to fire intensities and maximum fire sizes under 90th percentile weather conditions for the project area. It is anticipated that a worst condition scenario of fuel model 9 would describe harvest units following treatment. The following weather conditions were used, as provided by Back Hills National Forest personnel:
    - 1 hr fuels- 4%
    - 10 hr fuels-6%
    - 100 hr fuels-8%
    - 1000 hr fuels-12%
    - Max air temp-87

- Minimum relative humidity-12%
- Windspeed-10 mph (This translates to mid-flame wind speed of 4 mph)
- 1:00 p.m. weather observation.

The Forest Plan calls for a suppression objective of 5 to 15 acres (depending on the management area - 5.1 or 5.4). Assuming a mid flame wind speed of 6 mph, an elapsed time to attack of 0.5 hours, 20% ground slopes, and the above conditions, a crew would have to have the capability to construct 18 chains of fire-line an hour to keep a fire below 5 acres. This represents a hand-crew composed of 10 individuals, or two type-6 engine crews with 6 people. The presence of a light sized helicopter to deliver people and/or water would reduce the need for personnel or equipment. A presence of a heavy airtanker and dozers would also support suppression efforts. These suppression responses are within the capabilities of the Black Hills National Forest

Analysis of predicted fuel intensities shows that 6 mph winds in fuel model 9, which is the Fuel Model that describes the goal of fuel treatments in this proposal, would generate intensities of about 112 BTUs/ft./sec. This is well within the Forest Plan standards of 300 BTUs/ft/sec for this area.

(Analysis was done using the "BEHAVE: Fire behavior prediction and fuel modeling system—BURN subsystem, Parts 1 and 2", Andrews, Patricia L., and Chase, Carolyn H. and National Wildfire Coordinating Group Fireline Handbook.)

Soil and Water Resources

Introduction

This section displays an overview of the analysis and effects to the soil and water resources within the Fanny Project Area. The hydrologist for this project completed the field review and analysis, which is documented here and in the Project File.

Existing Condition

Watershed

The Fanny Project Area boundary was developed from the Forest watershed GIS layer based on Hydrologic Unit Code (HUC) 7th level watersheds. These watersheds are generally 5,000 to 10,000 acres in size. The Fanny Project Area lies within portions of eight watersheds (see table below). The project area is bound on the east by the Jasper fire area, and on the west and south by the Forest boundary.

Table 3.14. Seventh Level Watersheds.

HUC 7 Number	Name	Acres	% Within Project Area
10120107040204	Sheldon Canyon	9,368	2%
10120107040205	Lak Draw	4,871	2%
10120107040405	Boles Canyon	6,107	100%
10120107040406	Lower Redbird Canyon	8,502	56%
10120107040407	Roby Canyon	5,385	81%
10120107040505	Hay Draw	9,431	42%
10120107040506	Buck Springs Canyon	8,081	43%
10120107040507	Lower Gillette Canyon	5,999	10%
Total		57,744	

The project area also lies within three HUC 6 watersheds, which are the next larger watersheds. HUC 6 watersheds are generally 10,000 to 50,000 acres in size (see table below).

Table 3.15. Sixth Level Watersheds

HUC 6 Number	Name	Acres	% Within Project Area
101201070402	Lower Stockade Beaver Creek	36,718	1%
101201070404	Redbird Canyon	52,048	29%
101201070405	Gillette Canyon	51,070	16%
Total		139,836	

Streams

There is an estimated 68 miles of drainages within the Fanny Project Area. Thirty-two percent are intermittent and 68% are ephemeral. There are no perennial streams within the Fanny Project Area or associated watersheds.

Floodplains

There are 350 acres of mapped 100-year floodplains within the Fanny Project Area. A floodplain is any area susceptible to inundation by floodwaters. The 100-year flood is a flood having a one percent chance of being equaled or exceeded in magnitude in any given year. It is not a flood occurring once every 100 years.

The 100-year floodplain acres are listed in the table below by watershed.

Table 3.16. 100-year floodplain acres by 7th level watershed.

HUC 7 Number	Name	Floodplain Acres in Fanny Project Area	Floodplain Acres in Watersheds
10120107040204	Sheldon Canyon	0	ND
10120107040205	Lak Draw	0	ND
10120107040405	Boles Canyon	0	0
10120107040406	Lower Redbird Canyon	54	90
10120107040407	Roby Canyon	7	62
10120107040505	Hay Draw	188	270
10120107040506	Buck Springs Canyon	101	172
10120107040507	Lower Gillette Canyon	0	206
Total		350	800

ND=No Data

Table 3.17. 100-year floodplain acres by 6th level watershed.

HUC 6 Number	Name	Floodplain Acres in Fanny Project Area	Floodplain Acres in Watersheds
101201070402	Lower Stockade Beaver Creek	0	ND
101201070404	Redbird Canyon	61	517
101201070405	Gillette Canyon	289	1,091
Total		350	1,608

ND=No Data

Lower Redbird Canyon – The mapped floodplains are along Redbird Canyon. They only include a portion of the canyon and go about two miles up the canyon from the Forest Boundary.

Roby Canyon – The mapped floodplains are along Boles Canyon. They stop at the Forest Boundary.

Hay Draw – The mapped floodplains are along the entire lengths of Gillette Canyon and Hay Draw within the Fanny Project Area.

Buck Springs Canyon – The mapped floodplain are along the entire length of Buck Springs Canyon within the Fanny Project Area.

Wetlands

There are 1.55 acres of mapped wetlands within the project area. They are classified as Palustrine. "Palustrine" comes from the Latin word "palus" or marsh. Wetlands within this category include inland marshes and swamps as well as bogs, fens, tundra and floodplains. Palustrine systems include any inland wetland, which lacks flowing water and contains ocean derived salts in concentrations of less than .05%. Below is a description of the mapped Palustrine wetlands in the Fanny Project Area.

Not all mapped wetlands are true wetlands and some may be missed during the mapping process. The Corps of Engineers Wetlands Delineation Manual states, "Caution: Since not all delineated areas on NWI maps are wetlands under Department of Army jurisdiction. NWI maps should not be used as the sole basis for determining whether wetland vegetation is present." It goes on to say, "Wetlands classified as having a temporarily flooded or intermittently flooded water regime should be viewed with particular caution since this designation is indicative of plant communities that are transitional between wetland and non-wetland." A determination has not been made as to whether or not the mapped areas within the Fanny Project Area are true wetlands.

The acres of wetlands are listed in the table below by watershed.

Table 3.18. Mapped wetlands known to occur within each watershed.

HUC 7 Number	Name	Wetland Acres in project area	Wetland Acres in Watersheds
10120107040204	Sheldon Canyon	0.00	135.23
10120107040205	Lak Draw	0.00	33.33
10120107040405	Boles Canyon	0.61	0.61
10120107040406	Lower Redbird Canyon	0.10	0.23
10120107040407	Roby Canyon	0.84	1.30
10120107040505	Hay Draw	0.00	0.16
10120107040506	Buck Springs Canyon	0.00	0.00
10120107040507	Lower Gillette Canyon	0.00	8.55
Total		1.55	179.41

Beneficial Uses

The South Dakota Department of Environment and Natural Resources (DENR) assigns water quality standards based on the beneficial uses of each water body. All stream in South Dakota are assigned beneficial uses of irrigation, wildlife propagation, and stock waters. There are no streams within the Fanny Project Area that have been assigned any other additional beneficial uses.

The Wyoming Department of Environmental Quality also assigns Surface Water Classes and Use Designations. The Fanny Project Area is in South Dakota but the drainages within the

project area flow into Wyoming. Gillette Canyon and Redbird Canyon come together in Wyoming three miles below the project area to form Whoopup Creek. Whoopup Creek has assigned Use Designations for recreation, wildlife, agriculture, industry, scenic value, and other aquatic life.

Water Quality and Quantity

No streams or waterbodies within the project area are listed in the South Dakota 303(d) Waterbody List. This list is a list of waterbodies that need the development of Total Maximum Daily Loads (TMDLs) because they do not meet water quality standards. TMDLs are a tool for the management of water quality.

The following statements were taken from the 'The 2000 South Dakota Report To Congress.' "The Black Hill Region traditionally has some of the best surface water quality in the state. This is due in large to a cooler climate during the growing season, and higher rainfall than the surrounding plains as a result of greater elevation and forest cover. Also contributing importantly to better water quality in this region is the nature of local bedrock formations which are much less erodible that the highly erosive and leachable marine shales and badlands on the surrounding plains.

"Black Hill streams usually have good to satisfactory water quality and fulfill their fishable/swimmable designated uses. They are, however, relatively small streams vulnerable to losses of flow exacerbated by periodic droughts in the Black Hills and the increase in size and density of the ponderosa pine forest canopy; the latter being the natural result of forest fire suppression in the long term. Recent studies suggest a management regime that would maintain an intermediate level (e.g. 40-60% canopy cover) rather than a dense or open ponderosa pine canopy would benefit soil moisture, ground water, and therefore, improve stream flow during drier years. Establishing this level of forest cover would represent a good compromise between maintaining a forest ecosystem and increasing the water production potential of the Black Hills."

There is no perennial flow in Boles Canyon, Redbird Canyon, Buck Springs Canyon or Gillette Canyon. These streams primarily flow in response to thunderstorms but can also flow during snow melt. This is because of the geology of the area. This area is generally a ground water recharge area and most of the precipitation infiltrates into the ground water systems. Flows are more frequent in Redbird Canyon, Buck Springs Canyon and Gillette Canyon since the Jasper Fire. More runoff is occurring because of the loss of the organic layer that helps the water to infiltrate into the soil. This is expected to occur three to five years after the Jasper Fire.

Connected Disturbed Area

Connected Disturbed Areas (CDAs) are identified areas that contribute sediment to streams or wetlands causing degradation of physical function, water quality and increased peak flows that may alter physical channel processes. When a disturbed area flows into a waterbody without sufficient delay from vegetated filter strips or sediment detention structures, it is connected to the waterbody. CDAs may include bare soil patterns, compacted soils, roads, severely burned areas or mine spoils.

The Fanny Project Area does have areas that are eroding due to water being concentrated. Most of these are road related. Because of the lack of perennial or prolong intermittent stream flows, these areas are not being called CDAs since they are not degrading water quality.

During field inventory of the area, approximately 70 road and stream/drainage crosses were not hardened. There were about 10 sites where sediment was being deposited in well-vegetated drainage bottoms, and about 6 sites where the road is the bottom, and a couple of spots where there are gullies down the road. Although the main drainages in the Fanny Project Area were labeled intermittent, they do not have a defined channel with continuous evidence of flow. They are generally well vegetated with upland species and tend to filter out sediment from these sources. Therefore, no CDAs have been identified in the Fanny Project Area.

Roads

Roads are generally the most probable cause of problems in a watershed or project area. They tend to concentrate water, and put it where it is not designed to go. The tables below display roads with a Composite Watershed Rating of Extreme and High for the Fanny Project Area. This information was gathered during the roads analysis process. These roads have a potential for causing problems with soils and streams. The composite score is obtained by adding up the scores for Severe Erosion and Mass Wasting Soils Combined, Roads within 50' of stream and Road and Stream Crossings. With the exception of Forest Service Road 376 (Red Bird Canyon Road) all of these roads are proposed for closure in at least one action alternative.

Table 3.19. Roads within the Fanny Project Area with a Composite Watershed Rating of Extreme or High.

Road Number	Soil & Stream Composite Score	Composite Watershed Rating	Road Number	Soil & Stream Composite Score	Composite Watershed Rating	Road Number	Soil & Stream Composite Score	Watershed Rating
U790052	127	E	U280029	109	E	U280028	98	H
U340023	125	E	281.1D	109	E	376	88	H
281.1U	120	E	U790001	108	E	U790018	87	H
U790050	115	E	U790024	106	E	U790056	86	H

E=Extreme – Road due to its location has an extreme probability of causing resource damage.
H=High – Road due to its location has a high probability of causing resource damage.

Direct and Indirect Effects By Alternative

Proposed activities may affect aquatic ecosystems, soil productivity, geologic hazards and special areas. Aquatic ecosystems include physical conditions (sediment, bed/bank stability and flow regimes), chemical conditions (temperature/ oxygen and water purity) and biological conditions (aquatic life and TES species). Soil productivity includes soil erosion, compaction, nutrient removal, and soil heating. Geologic hazards include landslides. Special areas include riparian ecosystems, wetlands and floodplains.

Aquatic Ecosystems

Physical

- Sediment

Most sediment delivered to streams comes from a source zone along streams where width depends on topography, soils, and ground cover. Connected disturbed areas (CDA), like roads and other disturbed soil near streams, can deliver sediment during runoff events. Sediment deposits in streambeds can impact insect populations and fish habitat.

Sediment is not a concern within the Fanny Project Area and will not adversely affect stream channels under any alternative. As outlined in the Affected Environment Report, there are no perennial steams within the Fanny Project Area, and only a third of the channels have been labeled as intermittent. These channels have stream flows that only occur intermittently. Many of these channels are not well defined and are well vegetated with upland species. No areas were identified as CDAs. Each action alternative will implement and apply BMPs to minimize and reduce erosion from the proposed actions.

- Bed and Bank Stability

Damage to bed and bank stability can occur from trampling by animals or humans, vehicle impact, degraded bank vegetation, or excessive flow augmentations. Streams can be made wider and shallower, pools and overhanging banks can be destroyed, and sediment can be deposited into streams.

Bed and bank stability will not be adversely affected under any alternative. As outlined in the Affected Environment Report, there are no perennial steams within the Fanny Project Area, and only a third of the channels have been labeled as intermittent. These channels have stream flows that only occur intermittently. Many of these channels are not well defined and are well vegetated with upland species. Adverse impacts to bed and bank stability is not anticipated under any alternative within the Fanny Project Area because the channels flow water infrequently.

- Flow Regimes

Flow regimes can be altered by major changes in cover type or ground cover, a dense road network, or water projects. Water temperature and chemistry, sediment transport, aquatic habitats, and aquatic life cycles can be degraded.

Flow regimes will not be adversely affected under any alternative. As outlined in the Affected Environment report, there are no perennial steams within the Fanny Project Area. Flows that do occur, occur as intermittent runoff events. Direct runoff is negligible for the Minnelusa outcrop that comprises almost two thirds of the Fanny Project Area (Driscoll, Carter, Williamson and Putnam, 2002).

Chemical

- Temperature/Oxygen

Summer water temperature can increase and winter water temperature can decrease by removing shade, reducing low flows, or damaging banks so streams are wider and shallower. Dissolved oxygen is usually reduced when summer water temperature is increased. Such impacts impair or destroy the suitability of water bodies for aquatic biota.

Temperature and oxygen will not be adversely affected under any alternative. As outlined in the Affected Environment Report, there are no perennial steams within the project area, so water temperature and dissolved oxygen are not a concern.

- Water Purity

Water purity can be degraded by placing concentrated pollutant sources near water bodies; such as, applying harmful chemicals in or near water bodies, or intercepting hazardous rock strata by

roads. Degrading water purity can impair or destroy use of the water body by aquatic biota, and humans.

Water purity will not be adversely affected under any alternative. As outlined in the Affected Environment Report, there are no perennial steams within the project area, so water purity would only apply to runoff events that occur intermittently. Harmful chemicals will not be applied near water bodies and there are no known hazardous rock strata within the Fanny Project Area.

Biological

- Aquatic Life

Aquatic life can be degraded by migration barriers, changed flow regimes, riparian damage, or by big sediment or chemical loads.

Aquatic life will not be adversely affected under any alternative. As outlined in the Affected Environment Report, there are no perennial steams within the project area, so the aquatic life is limited and restricted to seeps and springs. Seeps and springs will be protected under all action alternatives and will not be impacted.

Soil Productivity

The long-term maintenance of site productivity is a goal (Goal 1) of the Forest Plan, as amended by the Phase I Amendment, and the mission of the Forest Service. Soil erosion, soil compaction, nutrient removal, soil heating and regeneration hazards can limit the long-term productivity of forested sites. All analysis is based on Natural Resource Conservation Service (NRCS) soil surveys and the Black Hills National Forest Soil Interpretation Notebook.

- Soil Erosion

Severe erosion can impair long term soil productivity if soils are heavily disturbed on shallow or highly erodible soils. Evidence of severe erosion is rills or pedestals.

Alternative 1 will have no effect on soil erosion because no new soil disturbance will occur. **Alternatives 2 and 3** have the potential to affect soils that have severe erosion hazards. These soils include BwE, HtG, RnG and VoG. Activities on these and other soils will control erosion through implementation and application of Best Management Practices (BMPs). BMPs include, but are not limited to; 1) machinery operations must be restricted to dry or frozen soil conditions on slopes greater than 20% on soils with severe erosion or high mass wasting potential; and 2) ground skidding must be avoided on slopes steeper than 40 percent on soils with severe erosion or high mass wasting. There are no anticipated effects on soil erosion.

- Soil Compaction

Soil compaction is caused by excess weight of vehicles and animals. It impairs infiltration, root growth, and soil biota.

Alternative 1 will have no effect on soil compaction because no new soil disturbance or vegetation treatments will occur. **Alternatives 2 and 3** have the potential to affect soils that are subject to compaction when wet, but will not have an affect on soil compaction for the other soils. Soils subject to compaction include CkC, SybC, VcE and VkE. Activities on these soils will be restricted to dry or frozen conditions, so no adverse effects are anticipated.

- Nutrient Removal

Soil fertility depends on organic matter and nutrients. Soil productivity can be degraded if humus and topsoil, or even excess leaves and limbs, are taken off site.

Alternative 1 will have no effect on soil fertility because no new soil disturbance or vegetation treatments will occur. **Alternatives 2 and 3** have the potential to affect soil fertility on soils with low organic matter of less than 2 percent. These soils include BwE, HtG, SpE, VkE and SybC. Implementing BMPs and Forest Plan Standard 1102, on these soils, will prevent an adverse impact on soil fertility under **Alternatives 2 and 3** on these soils.

- Soil Heating

Severe fires that occur when the humus and large fuels are dry, and large fuels are consumed near the ground, cause soil heating. Soil heating sterilizes the soil, alters soil physics, consumes organic matter, and removes much of the sites nutrients.

Alternative 1 will have no affect on soil heating because no new prescribed fire will occur. **Alternatives 2 and 3** have the potential to affect soil heating on soils with high-prescribed fire hazard. These soils include BwE, HtG, PbD, SpE, SrE, VcE and VnC. These hazards are due to slopes, rooting depth and dryness. Burning during higher fuel moisture contents can control fire intensity and along with burning when soils are moist or frozen will minimize adverse impacts on soil heating

Geologic Hazards

- Landslides

Soil creep, debris avalanches and flows, slumps, and earth flows can occur on unstable slopes if roads overload or undercut them, if vegetation is removed from them, or runoff is emptied onto them. Hazard depends on type of disturbance, nature of earth material, and water content.

Alternative 1 will have no effect on landslides because no new soil disturbance or vegetation treatments will occur. **Alternatives 2 and 3** have the potential to affect landslide potential on soils with moderate and high mass movement potential. These soils include HtG, RnG, VcE, VkE and VoG. These hazards are due to old landslides or soil moisture. Restricting activities to when soils are dry or frozen will minimize the landslide risk. **Alternatives 2 and 3** will not have any effect on landslide potential.

Special Areas

- Riparian Ecosystems

Riparian ecosystems provide shade, bank stability, fish cover, and woody debris to aquatic ecosystems. They also provide key wildlife habitat, migration corridors, sediment storage and release, and surface-ground water interactions. Composition and structure of riparian vegetation can be changed by actions that remove certain species age classes.

Riparian ecosystems will not be adversely affected under any alternative. As outlined in the Affected Environment Report, there are no perennial steams within the Fanny Project Area, and only a third of the channels have been labeled as intermittent. These channels have stream flows that only occur intermittently. Many of these channels are not well defined and are well vegetated with upland species. As a result, there are no riparian ecosystems within the project area, except around seeps and springs. Riparian ecosystems are not a concern within the Fanny

Project Area because seeps and springs will be protected under the action alternatives and will not be impacted.

- Wetlands

Wetlands control runoff and water quality, recharge ground water, and provide special habitats. Actions that may alter their ground cover, soil structure, water budgets, drainage patterns, and long term plant composition can impair these values.

Alternative 1 will have no effect on wetlands because no new soil disturbance or vegetation treatments will occur. **Alternatives 2 and 3** will not have an affect on wetlands, which are generally seeps and springs, in the Fanny Project Area. Seeps and springs will be protected under the action alternatives and will not be impacted.

- Floodplains

Floodplains are natural escape areas for floods that temper flood stages and velocities. **Alternative 1** will have no effect on floodplains because no new soil disturbance or vegetation treatments will occur. **Alternatives 2 and 3** will not have an effect on floodplains because no roads or skid trails will be constructed in floodplains.

Cumulative Effects

The Fanny Project Area is located within three HUC 6 watersheds, Lower Stockade Beaver Creek, Redbird Canyon and Gillette Canyon. As outlined in the Watershed Affected Environment Report, only 1% of the Lower Stockade Beaver Creek watershed is located within the project area. Since there is only a small portion of this watershed in the project area, activities are not anticipated to contribute to the cumulative impact of this watershed. Therefore, this watershed will not be considered as part of the cumulative effects analysis.

Redbird Canyon and Gillette Canyon watersheds will be analyzed for cumulative effects. Land uses within these watersheds include timber harvest, grazing, private ownership and residential housing, and dispersed recreation. All of these activities individually have an impact on the watershed. This results in a cumulative impact on the watershed. The tables below identify activities known to have occurred within these watersheds.

Table 3.20. Activities known to have occurred within Redbird Canyon Watershed.

Redbird Canyon – 101201070404 – 52,047 acres			
Past Actions			
Timber Harvest			
Time Period	**Acres Of Commercial Activities**	**Acres Of Pre-Commercial Activities**	**% Of Watershed for Commercial Activities**
1980-1984	3,872	2,234	7%
1985-1989	8,366	6,591	16%
1990-1994	3,966	6,718	8%
1995-1999	5,162	1,367	10%
2000-Present	3,570	0	7%
Fire			
Year	**Fire**	**Acres**	**% Of Watershed**
2000	Yellow Butte	742	1%
2000	Jasper	9,447	18%
2002	Red Bird	129	<1%
2002	Sheldon	71	<1%

Past, Present and Future Actions				
Grazing				
Allotment	**Allotment Acres**	**Acres of Allotment within Watershed**	**Percent of Allotment within Watershed**	**% Of Watershed**
Crows Nest Upper Beaver	41157	12159	30%	
Ditch Creek	16638	2472	15%	
Central	16496	14272	87%	
Lower Beaver	33856	20279	60%	
Tepee	27818	1368	5%	
Total		50,550		97%
Ownership				
Acres Private Land				**% Of Watershed**
6643				13%
Roads				
Miles Of Road	**Acres Of Road**			**% Of Watershed**
282.9	566			1%

Proposed Actions			
	Activity	**Acres**	**% Of Watershed**
Alternative 2			
	Prescribe Burn	225	<1%
	Commercial Harvest	2,917	6%
	Pre-commercial	1,392	3%
	Total	4,534	9%
Alternative 3			
	Prescribe Burn	225	<1%
	Commercial Harvest	2,538	5%
	Pre-commercial	1,392	3%
	Total	4,155	8%

Table 3.21. Activities known to have occurred within Gillette Canyon Watershed.

Gillette Canyon – 101201070405 – 51,070 acres			
Past Actions			
Timber Harvest			
Time Period	**Acres Of Commercial Activities**	**Acres Of Pre-Commercial Activities**	**% Of Watershed for Commercial Activities**
1980-1984	278	593	1%
1985-1989	17,932	4,252	35%
1990-1994	16,247	11,227	32%
1995-1999	751	7,320	1%
2000-Present	3,325	499	7%
Fire			
Year	**Fire**	**Acres**	**% Of Watershed**
2000	Yellow Butte	20	<1%
2000	Jasper	32,696	64%
2001	Elk Mtn II	1,400	3%

Past, Present and Future Actions				
Grazing				
Allotment	**Allotment Acres**	**Acres of Allotment within Watershed**	**Percent of Allotment within Watershed**	**% Of Watershed**
Ditch Creek	16638	4485	27%	
Central	16496	2132	13%	

Murphy	6451	1733	27%	
Darrow	15296	5920	39%	
Porcupine	10040	6382	64%	
Lower Beaver	33856	6737	20%	
Tepee	27818	17489	63%	
Lithograph	17064	21	0%	
Elk Mountain	24708	1085	4%	
Total		**45,984**		**90%**
Ownership				
Acres Private Land				**% Of Watershed**
5837				11%
Roads				
Miles Of Road	**Acres Of Road**			**% Of Watershed**
300.6	601			1%
Proposed Actions				
	Activity	**Acres**	**% Of Watershed**	
Alternative 2				
	Prescribe Burn	143	<1%	
	Commercial Harvest	1,464	3%	
	Pre-commercial	464	1%	
	Total	2,071	4%	
Alternative 3				
	Prescribe Burn	143	<1%	
	Commercial Harvest	1,368	3%	
	Pre-commercial	454	1%	
	Total	1,965	4%	

Timber Harvests – Commercial timber harvest has occurred in the past and will continue into the future. The proposed activities within the Fanny Project Area will be the actions within the foreseeable future. Actions beyond this project are difficult to predict. In general, timber harvest does not contribute negatively to the cumulative impact on a watershed. Best Management Practices (BMP) monitoring has shown that if BMPs are implemented there is very little or no impacts to the watershed. Timber harvest also reduces the number of trees within the watershed making more water available for stream flow or ground water recharge. Pre-commercial thinning activities generally have no impact, since it is generally a hand operation and no ground disturbance is involved.

Redbird Canyon watershed has had an average of about 10% of the watershed commercially harvested every 5-year period since 1980. The high was 16% in the late 1980's. This is about average and has not had a negative impact on the watershed. The Fanny Project Area is proposing to affect 6% and 5%, respectively for alternatives 2 and 3, with commercial harvest activities.

Gillette Canyon watershed has had an average of about 15% of the watershed harvested every 5-year period since 1980 with commercial activities. The high was 35% in the late 1980's. During the early 1990's, 32% of the watershed was harvested. This watershed was intensively managed from 1985 to 1994, commercially harvesting 67% of the watershed. This amount of timber harvest within a watershed could have negative effects on a watershed. However, because of the geology of the area and the silvicultural harvest systems used, there has not been any negative

impact to the watershed. The Fanny Project Area is proposing to affect 3% of the watershed under both action alternatives with commercial harvest activities. This is not anticipated to have any negative effects to the watershed.

Fire – Fire has contributed to the cumulative impact of the watersheds and has caused the biggest impact. There have been five fires in the two watersheds in the last three years. The most negative impact from fire is removal of the organic layer on top of the soil. With this layer removed there is nothing to absorb the rainfall. Water runoffs from the site erode the soil. Effects from fire can last a long time. The organic layer will develop over time as the vegetation re-establishes. Runoff from burned areas is usually greatly reduced within five years.

Redbird Canyon watershed has had 19% of the watershed affected by fire in the last three years. Rainfall events have produced floods in this watershed. This has impacted the watershed, but it will recover over time.

Gillette Canyon watershed has had 67% of the watershed affected by fire in the last three years. Rainfall events have produced floods from this watershed. This has impacted the watershed, but it will recover with time. Signs of recovery are already evident by the amount of vegetation that has returned to the area.

Grazing – Grazing by livestock and wildlife has occurred, and will continue to occur in this project area. Watershed impacts come from grazing the riparian zone and trampling of the stream and banks. Upland grazing generally does not contribute to the impacts on the watershed. In both watersheds, riparian zones are rare and are limited to seeps and springs. Streams within the watersheds are mostly ephemeral, with a few identified as intermittent. Cattle have not damaged the streams and banks along these stream courses. To minimize any cumulative impacts of grazing on the watershed, the cattle should be continually on the move and not allowed to stay in any one area for an extended period of time.

Redbird Canyon and Gillette Canyon watersheds have 97% and 90%, respectively, of the watersheds that are fall into grazing allotments. In Redbird Canyon there are 5 different allotments and Gillette Canyon has 8 allotments. The number of cattle and pastures vary by allotment. Grazing has not contributed significantly to cumulative watershed impacts.

Ownership – Private land can contribute to the cumulative impact of a watershed. In most cases, private land ownerships are along streams. Impacts can be from residential, grazing or roads. It is difficult to assess the total impacts from private land without doing a detailed inventory.

Within ***Redbird Canyon watershed***, approximately 13% of the area is in private ownership. Approximately 11% of the ***Gillette Canyon Watershed*** is in private ownership. Although there are some residences on these private land parcels, private land ownership has not contributed significantly to the cumulative watershed impacts.

Roads – Roads are generally considered to be the most probable cause of impacts within a watershed. Water tends to concentrate, or flow on roads where it is not designed to go. When this occurs near streams, degradation of the stream and water quality can occur, as well as potential impacts to the beneficial uses that the waters are designated to provide. When this occurs on hillsides, soil productivity can be affected which can have a cumulative impact on the watershed. Within both watersheds, approximately one percent (1%) of the watershed is made-up of roads. This equates to 3.5 miles of road per square mile in Redbird Canyon watershed and

3.75 miles of road per square mile in Gillette Canyon watershed. Roads have impacted the watershed, but since there are no perennial streams, the impact is considered minimal and not as severe.

Conclusion

All of the above uses contribute to the cumulative impacts to the watersheds, some more than others. There have been impacts to the watersheds, especially Gillette Canyon because of the recent fires. While Redbird Canyon watershed has had impacts, it is not to the degree as Gillette Canyon watershed. However, these combined uses in the watersheds have not impacted the watershed to the point that the beneficial uses have been affected. (There were not any specific beneficial uses assigned to these watersheds in South Dakota since they do not have perennial flow. However, there are some designated uses downstream in Wyoming.)

The proposed action plans to treat up to 9% of the Redbird Canyon watershed and up to 4% of the Gillette Canyon watershed. These activities are consistent with what the watershed has been subject to in the past (i.e. Gillette Canyon has been the most impacted and will receive the least amount of treatments). Proposed actions in both watersheds will not affect the beneficial uses downstream.

Lands and Minerals

Introduction

Lands

There are a total of six private parcels of land within the Fanny Project Area. Three of the six private parcels are in-holdings surrounded by Forest Service land. Forest Service Road 376 and U.S. Highway 16 do cross two separate private inholdings within the project area.

Minerals

The regional geology and mineral resource potential of the Fanny Project Area is described in U.S. Geological Survey Bulletin 1580 (Dewitt et. al., 1986). Detailed geologic mapping is available for the western portion of the Fanny Project Area in the Fanny Peak (Brobst, D. and Epstein, J., 1963) and Clifton Quadrangles (Cuppels, N., 1963). Detailed geologic maps are not available for portions of the Fanny Project Area in the Deadhorse Flats and Jewel Cave NW Quadrangles.

The geologic formations that are present in the Fanny Project Area are Permian to Pennsylvanian in age (approximately 240 - 290 million years in age) and include the sedimentary rocks of the Minnekahta Limestone, Opeche Formation, and Minnelusa Formation (youngest to oldest). The Minnekahta Limestone is a thin-bedded gray to pink limestone averaging 25 to 40 feet in thickness that outcrops in the southern portion of the project area. The Opeche Formation is a red to purple, fine-grained sandstone, siltstone, and shale and averages 70 to 120 feet in thickness. The Opeche occurs as isolated outcrops in the Minnekahta Limestone and as a continuous unit below the Minnelusa Formation in the central portion of the project area. The Minnelusa Formation outcrops in the northern portion of the project area and consists of sandstone, sandy limestone, limestone, and breccia that averages 700 feet in thickness.

Undifferentiated Quaternary Alluvium in Boles and Red Bird Canyons are the most recent geologic formation in the project area.

Existing Condition

Lands

There is currently only one (1) easement within the project area, and there are three (3) special use permit holders within the project area.

- Ron Dube's Wilderness Adventures has a special use permit to lead turkey hunts in April and May. Ron Dube's Wilderness Adventures uses the collector and local roads west of Bowles Canyon Road (FSR 117.1) to access sections 8, 16 - 20, 29 –32; T 2 S; R 1 E and sections 5 - 8, 18, 19; T 3 S; R 1 E.
- Black Hills Expeditions has a special use permit for up to 200 days to use the existing roads and trails to lead hiking and mountain bike trips. Black Hills Expeditions uses FSR 376 to access local roads and trails in sections 3, 4, 9 – 11; T 2 S; R 1 E. Only section 9 is within the Fanny Project Area, and use is only along the Boles Canyon Road (FSR 117.1). Access into the Fanny area is along FSR 284, 284B and 284.5D.
- The Summit Ridge Lookout Recreation Area has a cabin that can be rented using a special use permit. The cabin at the Summit Ridge Lookout Recreation Area is accessed from Bowles Canyon Road (FSR 117.1) to FSR 265.

Minerals

Mineral Activity

The mineral activity in the project area has historically been very low to non-existent. There are currently no operating mines in the project area (private or federal).

Abandoned Mines

There were no abandoned mines identified in the Abandoned Mine Land Database for the project area (Webb, C., et al, 1998). There is one abandoned rock quarry in the Opeche Formation One located in the NE ¼, SW ¼, Section 18, T. 3 S., R. 1 E just off the Boles Canyon Road (Brobst, D. and Epstein, J., 1963). It is anticipated that there is a very low probability of future mineral activity in the project area. At this point in time there are no anticipated effects to the environment from past mining activity.

Mineral Recreational Opportunities

The only potential recreational activity for the project area may be the few individuals who attempt to collect invertebrate fossils. No free use permits have been issued for the collection of rocks in the project area.

Oil and Gas Resources

The sedimentary rocks in the study area have been identified as having a moderate potential for large deposits of oil and natural gas that have previously not been investigated or explored (Dewitt et. al., 1986). Currently no wells have been drilled in the projected area.

Geotechnical Issues

The breccia of the Minnelusa Formation is particularly unique and is a mixture of sandstone, limestone, shale, and chert fragments in a matrix of calcite cemented, sandstone. Within the breccia are several hundred, vertical, circular, and breccia pipes tens to several hundred feet in diameter (Brobst, D. and Epstein, J., 1963). They form chimney like monoliths in the canyon walls and a large number of breccia pipes have been identified in section 16, T. 3 S., R. 1 E. as well as sections 8 and 9 of T. 3 S., R. 1 E. Roads that are constructed through these breccia pipes have the potential to fail when on steep slopes. These breccia pipes occur in soil unit HtG – Hopdraw-Sawdust-Rock Outcrop.

Direct and Indirect Effects By Alternative

There is currently no mineral activity in the project area nor is any mineral activity projected in the future. There are no direct or indirect effects to the mineral resource from either alternative two or three. There are no cumulative effects to the mineral resource from either alternative two or three.

The Minnelusa Limestone has been identified in the Forest Plan as having the potential to contain caves but currently no caves have been identified in the project area. There are no direct or indirect effects to the cave resource from either alternative two or three. There are no cumulative effects to the cave resource from either alternative two or three.

If caves are encountered during road construction and logging activities in either alternative mitigation will consist of implementing all parts of Black Hills Forest Standard 1401 for the protection of cave resources.

Recreation Resources

Introduction

Recreation use includes hunting, hiking, camping, horse riding, off road vehicles, and driving on the existing road network. From a recreation standpoint the Fanny Project Area is one of the least used areas of the Hell Canyon Ranger District.

Existing Condition

Developed Recreation

The Summit Ridge Recreation Area is located at the western edge of the project area and is accessed from Boles Canyon Road (FSR 117.1) to FSR 265. The Summit Ridge Recreation area consists of a cabin that sleeps up to seven people, one outhouse, and the Summit Ridge fire lookout (decommissioned). The site has historically been used from late spring to late fall on an almost continual basis every weekend. Starting this year the Hell Canyon Ranger District has made plans to make the site available on a year round basis. Currently, there are hunters who have rented the facility during different periods of the hunting season.

The facility is surrounded by a heavy growth of small “doghair” and mature ponderosa pines. There are no established trails leading from this facility, however, people use the two-track roads for mountain biking, walking, OHV, and driving. People who stay at the Summit Ridge

Recreation Area come for the solitude and use it as a base to explore the surrounding countryside.

Dispersed Recreation

Sightseers, dispersed campers, hikers, horse riding, mountain bikers, and OHV drivers are present in the spring and summer months. They use the current road system to access the area, and they use informal/unregulated camping sites, as well as off road recreation opportunities.

Recreation Special Uses

Ron Dube's Wilderness Adventures has a special use permit to lead turkey hunts in April and May. Ron Dube's Wilderness Adventures uses the collector and local roads west of Bowles Canyon Road (FSR 117.1) to access sections 8, 16 - 20, 29 –32; T 2 S; R 1 E and sections 5 - 8, 18, 19; T 3 S; R 1E. Black Hills Expeditions has a special use permit for up to 200 days to use the existing roads and trails to lead hiking and mountain bike trips. Black Hills Expeditions uses FSR 376 to access local roads and trails in sections 3, 4, 9 – 11; T 2 S; R 1 E. Only section 9 is within the Fanny Project Area, and use is only along the Boles Canyon Road (FSR 117.1). Access into the Fanny area is along FSR 284, 284B and 284.5D.

Spring and Fall Hunting

The highest use of the Fanny Project Area occurs during the hunting seasons; turkey in April and May, elk rifle season in October; and deer rifle season in November. The current road system provides hunters access to the hunting areas and to informal/unregulated camping sites. Ron Dube's Wilderness Adventures has a special use permit to lead turkey hunts in April and May.

Direct and Indirect Effects By Alternative

Alternative 1– No Action

Under this alternative no vegetative treatments would occur. There would be no effect from timber activities to the Summit Ridge Recreation Area, recreation users, or special use recreation permit holders. Use of the Summit Ridge Recreation Area will continue as well as all other associated recreation activities.

Alternatives 2 and 3

The general effects to recreationists would include increased traffic and noise during harvest operations. Both alternatives would temporarily displace recreation activities in the harvest areas. Both alternatives would create a short-term decrease in visual quality in the harvest areas due to the occurrence of landings, skid trails, brush piles, and fresh stumps. Road-based recreationists may experience short-tern temporary disturbance or inconvenience due to encounters with road construction or maintenance activities in both alternatives. Users of the Summit Ridge Lookout Recreation Area will experience short-term noise, traffic, and aesthetic impacts because of the close proximity to harvest activities in both alternatives.

Approximately 40 miles of unclassified roads is proposed for closure under Alternative 2. While there will be fewer roads to drive on, this effect will not substantially affect the quantity, quality, or type of motorized recreation opportunities available to this user group since the Black Hills National Forest has over 5,204 miles of system roads and an estimated 3,430 miles of wheel-track roads open to all types of recreation opportunities. Even though roads will be closed in

Alternative 2, the opportunity for un-limited off-road motorized recreation opportunities will still be available. In summary, there will be no effect to the motorized recreation opportunities in the project area under Alternative 2.

Approximately 40 miles of unclassified roads and 23 miles of classified roads are proposed for closure in Alternative 3, and an area closure would be implemented which will prohibit off-road motorized use. The road closures and area closure in Alternative 3 would increase the non-motorized recreation opportunities in the project area as well as forest wide. The area closure and the additional road closures in Alternative 3 will decrease the opportunities for motorized recreation in the project area. As in Alternative 2, this effect will not substantially affect the quantity, quality, or type of motorized recreation opportunities available to this user group because of the on-road and off-road motorized recreation opportunities available elsewhere in the Black Hills National Forest. In summary, there will be no effect to the motorized recreation opportunities in the project area under Alternative 3.

Ron Dube's Wilderness Adventures will see no effects with the implementation of Alternative 2 and a positive effect under Alternative 3. The closure of roads, the area closure, and the emphasis on habitat enhancement will increase the hunting opportunities for Ron Dube's Wilderness Adventures, as well as for all other hunters.

Cumulative Effects

The cumulative effects to visual quality for all recreation activities will improve in future years under both action alternatives as the project area becomes more diverse in age classes and density, as hardwood species increase, and as meadow openings are maintained or increased. There are no other cumulative effects to the motorized or non-motorized recreationist in either Alternative 2 or 3 with the exception of big game hunters. The cumulative effects to big game hunters and Ron Dube's Wilderness Adventures should be an increase in hunting opportunities in future years due to emphasis on wildlife habitat enhancement, especially in Alternative 3.

Scenery Management

Introduction

Within the Fanny Project Area there is a range of Scenic Integrity Objectives (SIO) from Low to High (see BHNF LRMP III-69 & III-100, and Scenic Integrity Objectives Map for locations). The majority of the area lies within a Low SIO. Areas with a Moderate SIO (Scenic Class 2) are located along the Boles Canyon Road FSR 117.1 – a Secondary Road with a Moderate Concern Level and a Typical (Class B) Inherent Scenic Attractiveness. Areas with a High SIO (Scenic Class 1) are located along US Highway 16, a primary highway with a High Concern Level and a Distinctive (Class A) Inherent Scenic Attractiveness.

The topography of the area is gently rolling. Views to adjacent landforms are generally limited to the Foreground and Middle ground due to the rolling terrain.

Existing Condition

Landscape Character

The Fanny Project Area is located within the Moderately Dissected Terrain / Mixed Forest Landscape Character Unit (LCU). This LCU covers a broad range of characteristics, but is primarily rolling high plateau with moderately dissected canyons in the central and southern portions. The stands are typically dominated by ponderosa pine, with aspen and grassland dominating the lower elevations.

Landscape use patterns throughout this area include developed/transitional uses, natural appearing, historic mining, and rural uses. Management of this area includes evidence of timber harvests, recreational uses, and grazing.

Visually Sensitive Areas

Sensitivity Level 1 travelways include U.S. Highway 16 that traverses the project area along the southern boundary. Sensitivity Level 2 travelways in and around the project area include FSR 277, 282, 283, 284, 291, 296, 668, as well as Lyman Draw and Hell Canyon south of Jewell Cave National Monument (NM). (See Agriculture Handbook #701, chapter 4, page 8)

Scenic Integrity

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 and features, water, rock and landforms.

The existing scenic integrity of the Fanny Project Area prior to the fires of 2000 & 2001 was Moderate to High. As a result of the fires the area, many past management activities are now more evident, with a less natural appearing landscape, and thus a Moderate to Low scenic integrity.

Inventoried Scenic Classes

The inventoried scenic class values are 1, 2, 3, and 4. Scenic Class 1 areas are within the foreground and middleground of the Sensitivity Level 1 travelways – along Highway 16. Scenic Class 2 areas are within the foreground of the Sensitivity Level 2 travelways along FSR 277, 282, 283, 284, 291, 296, 668, as well as Lyman Draw and Hell Canyon south of Jewell Cave National Monument (NM). Scenic Class 3 - 4 areas make up the majority of the project area and are associated with areas seen from Sensitivity Level 3 travelways or small, unseen areas. The scenic class values demonstrate the importance of the views in different areas.

Recreation Opportunity Spectrum (ROS)

The ROS classification for the Fanny Project Area is Roaded Natural. ROS is a function of management areas, which are displayed in the maps section (Appendix G). The physical, social and managerial settings support the Forest Plan ROS classifications of this area. The existing road system and current development of this area do not provide an opportunity for designation of roadless areas. The ROS is compatible with the Scenic Integrity Objectives.

Desired Future Condition

The Fanny Project Area is visible from one main travelway through the Black Hills National Forest, US Highway 16. This travelway provides the forest visitor distant, as well as foreground and middle ground, views into the forest. In addition, the Fanny area is visible from other secondary roads within/adjacent to the area: FSR 277, 282, 283, 284, 291, 296, and 668. These routes provide close up views (Foreground) of the Forest, its natural beauty and the management activities taking place.

Any management of the landscape viewed from these corridors should borrow valued attributes such as form, line, size, shape, texture, or pattern, from the elements naturally found in the landscape.

Roads should blend into the landscape by crossing contours at oblique angles (as opposed to right angles) and minimizing cuts and fills in order to create the road prism. Where cut and fill slopes are created, they would be covered with vegetation, not bare eroding slopes. As a result, the visibility of roads within the middleground and background view, when viewed from the highway, would be limited and at best not evident. In the foreground of the highway only secondary roads, that provide access into the Forest, would be evident. Two track (that are not on the road system) and local roads would be closed, re-contoured, and re-vegetated so they are not evident in the foreground landscape.

Direct and Indirect Effects By Alternative

Alternative 1 – No Action

Under this alternative no vegetative treatments would occur. Existing conditions and natural processes of trees growing and regenerating would continue. Wildfires will continue to be extinguished as quickly as possible. This management strategy will continue to deny the natural role of fire in the landscape, as a result, the ponderosa pine will continue to grow dense, becoming thicker, reducing visible open space, and moving the forest away from a more open park-like condition.

Alternatives 2 and 3

Effects for both alternatives are similar. However, effects of Alternative 3 are anticipated to be somewhat less than Alternative 2, since there are less acres of Overstory removal treatments proposed under Alternative 3. For both action alternatives, many of the treated areas are adjacent to one another, clumped in groups (although not necessarily having the same treatment), in effect treating the area on a landscape basis. This is generally a desired approach to treating an area, from a scenery standpoint, as it avoids creating a “patch-work” appearance on the landscape.

Generally those treated areas on the west and south sides of the ridges, ridge noses, and ridge tops are most visible. Many units in these areas will be seen in Middleground or Background, when viewed from the highway.

Forested stands that will be the most visible, as of the result of treatments, will be those that remove the greatest number of overstory trees beyond the typical forest character on this landscape.

Commercial thin and Shelterwood prep-cut treatments generally meet a Moderate Scenic Integrity Objective (SIO).

Shelterwood seed-cut treatments generally meet a Moderate to Low SIO.

Overstory Removals generally meet a Low SIO when they are more than 10% of the existing natural openings, or typical openings for this landscape. These treatments can achieve a Moderate SIO if they are designed to mimic natural openings that are typical for this landscape. Conversely, these treatments will meet a Very Low SIO if the treated areas are not designed to mimic natural openings.

The majority of the visible commercial cutting units are proposed for Shelterwood prep-cut (similar to a commercial thinning) or an Overstory Removal prescription. Vegetation will change from dense stands with dark color and fine texture, to more open stands with a coarser texture. This will be most evident when the ground is snow covered; depending upon vegetation in the surrounding forest.

Vegetation management will be most visible when these landscapes are covered with snow. Shelterwood Seed-Cut and Overstory Removal units will likely appear as large white forms, with patches of dark vegetation (and corresponding shadow) in them. These units have the greatest potential to appear out of scale and character with natural vegetative patterns.

During other times of the year, these different treatment units will be most visible from mid-day until evening, given the sun's position and cloud cover, as the play of shadows across the hillsides will affect the appearance of vegetation on the landscape.

Most shelterwood treatments would remove portions (40-60%) of the overstory canopy, leaving a variety of seedlings/saplings and pole-sized trees, depending on the site-specific conditions. Overstory removal treatments, where most or all of the overstory canopy is removed, could result in visual impacts to the characteristic landscape. From a middleground viewing distance, these changes could be noticeable to the average forest visitor because of the lack of vegetation, courser texture, lighter colors and the possible formation of shadow lines between adjacent stands of denser timber. As re-vegetation occurs, these units will have a finer texture, and lighter green color, than surrounding stands. When viewed in background, these treated areas will be most evident when the ground is snow covered. The snow will accentuate the form created by the shape of the unit(s). The shape of the cutting unit has the greatest visual effect on the landscape, when viewed from the Middleground and Background distance zones.

When trees retained for wildlife are kept together in a clump, the scenic resource can also benefit. Leave-tree clumps help to shape the harvest units, or mimic natural vegetative patterns, similar to those found in the surrounding landscape.

The proposed prescribed fire will have an immediate effect in the landscape that will be evident. Where low intensity fire occurs, black scorch marks will be evident on the boles of the trees from

less than one foot to three feet in height; these marks will fade over time. At three years they should blend with the bark on trees and appear as a natural condition. Often shrubs are stimulated and begin to grow in these areas, depending upon the amount of tree cover. Areas that have received a low intensity fire meet a High SIO within 1-2 growing seasons.

Where moderate to high intensity burns occur, seedlings, saplings, branches on trees, as well as some pole and possibly mature trees can be killed. The smaller trees that are fire killed should be down and well into decomposition at the end of three years, and thus should meet the Scenic Integrity Objective of Low to Moderate.

All action alternatives would meet the Scenic Integrity Objectives identified for the Fanny Project Area.

Cumulative Effects

There have been 6826 acres of Commercial timber harvest since 1985, and 2178 acres of Pre-commercial harvest since 1981, within the planning area.

The effects of these activities are not readily apparent from Highway 16 when viewing this landscape. Evidence of harvest activities is evident to the viewer only when driving on Forest roads through the project area. The forest is dynamic and changing, vegetation continues to grow, but the loss of overstory trees and logging slash may still be evident in places.

Heritage Resources

Introduction

This section displays the current status of the analysis and effects to heritage resources within the Fanny Project Area. The field review and analysis for this project is still in progress. Completion of the final report is expected on or before April 1, 2003.

Forest Plan Direction

Guideline 6101 – Consider long-term Forest management needs in determining appropriate use of mitigation of effects to, or avoidance of, heritage resources during project planning.

Guideline 6106 – During all planning and implementation activities, incorporate information, data and ideas in the Black Hills Heritage Resources Overview and the Forest Heritage Resources Database.

Existing Condition

As of February 19, 2003, approximately 65% of the Fanny Project Area has been intensively inventoried. To date, 8 previously recorded sites are known to be located within the project area and 19 new sites have been found. Of the 27 sites currently reported, 7 sites have been identified as eligible, or potentially eligible, in the project area for listing with the National Register of Historic Places (NRHP). All identified historic and prehistoric properties will be protected by following the heritage resource compliance process mandated by Section 106 of the National Historic Preservation Act (NHPA) and the recommendations outlined in the heritage resource report. The regulations governing Section 106 review are contained in 36 CFR Part 800, which describes the compliance process. All timber harvests, fuels treatments, maintenance and re-

construction of roads are designed to protect eligible sites by avoidance or other site-specific mitigations identified by the District Archeologist. During implementation, the District Archeologist will be consulted on site locations, avoidance, and mitigation measures required to protect heritage resources.

Upon completion of the final report, Native American groups will be contacted and responses solicited concerning this project. Concurrence on the eligibility determinations and determinations of no effect on heritage resources will be obtained from the South Dakota State Historic Preservation Officer (SHPO) prior to the Decision Maker's final decision for this project.

Direct and Indirect Effects By Alternative

Alternative 1 – No Action

Under this alternative no vegetative treatments would occur. No changes to the roads or access in to the area would occur. The No Action Alternative would not directly impact any heritage resource, however, it would not provide for any new mitigation needed for sites currently being impacted.

Alternative 2 and 3

All action alternatives propose ground-disturbing activities that could potentially cause damage to known and/or unknown heritage sites. Although measures would be taken to ensure that heritage sites are not disturbed, the possibility does exist that unknown sites could be disturbed. If any new sites are discovered during the implementation phase of this project, the District Archeologist would be notified immediately and activities would cease until the site is reviewed.

Cumulative Effects

Past, future, and foreseeable activities within the Fanny Project Area include timber harvest, recreation, road construction, range, and associated improvement projects. All of these activities may have a cumulative effect to heritage resources in the form of increased soil erosion, increased visitor use and traffic, and vandalism. These impacts are difficult to quantify, but can be avoided or minimized through the implementation of appropriate site-specific mitigation measures through consultation with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation.

It is recognized that heritage resources may be present in the subsurface with no surface manifestation. Therefore, if additional heritage resources are discovered during timber harvest activities, all operations must cease within a 100-meter radius of the site location and a forest archeologist notified immediately. Any heritage resources located during project implementation would be protected based on the recommendations of the District Archeologist and the SHPO. All sites would be evaluated under the terms specified in 36 CFR 60.4 and 36 CFR 800 and applicable Forest guidelines (FP Guidelines 4102, 6101, 6106).

Transportation Management and Roads Analysis Process

Introduction

This section displays an overview of the analysis and effects to the transportation system within the Fanny Project Area. The Transportation Report and Roads Analysis Process assessment for this project contains detailed documentation of the existing transportation system, and is available for review in the Project File.

Forest Plan Direction

Objective 310 – Maintain the Forest Development Road (FDR) system and prioritize capital improvements in accordance with Forest Plan direction and road management objectives.

Standard 9105 – Construct temporary roads where there is a one-time need for a transportation facility. Return the road to vegetative production when the one-time need is fulfilled.

Standard 9106 – Obliterate (decommission) forest development roads when project decisions indicate they are no longer needed to achieve management activities, or when resource damage cannot be mitigated. Inventory and obliterate non-forest development road travelways during project planning and implementation.

Existing Condition

The existing transportation system was inventoried and reviewed in 2002. Analysis of the existing transportation system is documented in the "Fanny Project Area Roads Analysis Process" assessment located in the Project File. This assessment provides documentation of the IDT analysis and recommendations for change to the transportation system. Some of these recommendations are incorporated in the action alternatives.

The transportation system within the Fanny Project Area is comprised of approximately 120.5 miles of existing roads. U.S. Highway 16 accounts for 0.6 miles, with no state highways or county roads within the analysis area. National Forest System roads account for 77.8 miles of roads, and there are 40.8 miles of unclassified roads within the project area. Current road inventory indicates 8.3 miles of road are closed yearlong and 4.0 miles are closed seasonally. Open road density from the existing road network is 2.87 miles per square mile. Access for resource management must take into consideration soil and water resources, public safety, economy of access, wildlife and other resource needs.

Direct and Indirect Effects By Alternative

Alternative 1 – No Action

Under this alternative no change to the existing transportation system would occur. The existing road system would remain unchanged. The existing open road density would remain at 2.87 miles per square mile since no additional closures would occur. No road improvements would occur at this time. Normal maintenance activities would continue as needed. Under this alternative road closures identified through the Roads Analysis Process that would improve wildlife habitat and reduce sedimentation would not occur. Additionally, any area closure that would prohibit off road, motorized travel would not be implemented.

Alternative 2

Alternative 2 proposes changes to the existing transportation system. Approximately 40 miles of unclassified roads would be closed (decommissioned) permanently with a physical barrier to improve wildlife habitat and reduce the potential for sedimentation. Approximately 5 miles of system road would be closed administratively (gated access) to improve wildlife habitat, while also providing access for resource protection and future management needs. Closure (decommissioning) of unclassified roads is consistent with recommendations identified through the Roads Analysis Process, and Forest Plan Standard 9106.

Alternative 3

Alternative 3 proposes to close approximately 40 miles of unclassified roads permanently, and approximately 23 miles of system roads administratively (gated). Alternative 3 also proposes to apply an area closure throughout the project area that would prohibit off road, motorized travel. Benefits of these road closures and area closure include improved wildlife habitat, reduced potential for sedimentation, improved water quality, reduction of maintenance costs, and providing more opportunities for solitude and non-motorized access. Closure (decommissioning) of unclassified roads is consistent with recommendations identified through the Roads Analysis Process, and Forest Plan Standard 9106. Area closures, as well as seasonal and yearlong closures are consistent with Management Area 5.4 direction and Forest Plan Guideline 9102 and 9103.

The following table displays the existing (Alternative 1) miles of open and closed roads, and changes proposed by the action alternatives.

Table 3.22. Proposed Travel Management Changes and Improvements.

	Alt. 1 (Existing)	Alt. 2	Alt. 3
US Highway	0.63	0.63	0.63
National Forest System Roads	77.78	72.48	72.48
Unclassified Roads	40.81	0	0
Total Existing Roads	120.54	73.11	73.11
Proposed Travel Management Changes			
Roads OpenYearlong	104.68	72.48	51.57
Roads Closed Yearlong	8.32	1.83	22.74
Roads Closed Seasonally	4.02	4.02	4.02
Roads Decommissioned	0	40.14	40.14
Designated Area Closure	No	No	Yes
Open Road Density (mile/square mile)	2.87	1.99	1.41
Proposed Road Improvement and New Construction Activities (miles)			
New Construction	0	0	0
Construction/conversion	0	0.6	0.6
Reconstruction	0	5.2	5.2
Pre-use Maintenance	0	66.2	66.2
Temporary Roads	0	13	13

Total Estimated Costs ($$)			
New Construction/Conversion	0	$1,650	$1,650
Reconstruction	0	$28,000	$28,000
Pre-use Maintenance	0	$36,500	$36,500
Temporary Roads	0	$16,500	$16,500

For all of the action alternatives, the timber sale purchaser will maintain roads used during the timber harvest operation. System roads not needed for harvest or post harvest activities would be maintained through either annual maintenance or grid maintenance (every five years). Access to private lands would not change or be impeded. Two sections of existing unclassified road will be converted to Forest System Roads. These roads were identified through the Roads Analysis Process as access routes needed for current and future resource management. All motorized use may be prohibited by a road closure order or area closure under one or both action alternatives in order to protect and ensure wildlife security and solitude, and/or to protect soil and water resources.

Cumulative Effects

The transportation system currently in place within the Fanny Project Area has developed as a result of timber management activities, livestock management activities, and an increased desire to enter the forest utilizing ATVs and 4-wheeled drive vehicles for recreation and hunting purposes. Timber harvest activities and the need for permittee access to manage livestock will continue within and adjacent to the Fanny Project Area. All temporary roads and skid trails created by timber harvest activities are to be closed and rehabilitated following completion of the sale. However, if closures are not effective, indiscriminate use can cause the creation of two-track roads (unclassified roads).

Alternative 1 would not change the existing condition. Use of these two-track roads would continue, especially during hunting season. This alternative would do nothing to improve wildlife habitat or to reduce sedimentation.

Alternatives 2 and 3 would close approximately 40 miles of roads that are currently unclassified, and Alternative 3 would additionally close some classified roads that were identified as unnecessary. Alternative 3 would also impose an area closure that would prohibit off-road motorized travel within the project area. Road densities would be reduced under both action alternatives, improving habitat for many wildlife species and improving opportunities for solitude.

Economic Analysis

Introduction

The economic analysis for this project was conducted using the software package QUICKSILVER (QUICKSILVER v. 5.003 - USDA Forest Service Economic Analysis Tool, 1997). The financial analysis only includes direct costs and revenues to the Forest Service. The analysis only includes those actions connected to the project that will occur over the next 5-10

years. The financial analysis does not include an estimate of non-monetary values for recreation, wildlife, and forage.

The following sections described costs and revenues that are used in the analysis and their source. In addition, any assumptions that may affect the analysis are presented. Most assumptions are designed to simplify the analysis. Though costs could be distributed in different ways over the analysis period, the important aspect is to keep assumptions consistent across alternatives to facilitate meaningful comparisons. In situations where actual economic returns are an issue and decision criteria, it would be necessary to do a more exact analysis. In this analysis, the most important information is relative differences between alternatives. In most cases where assumptions depart from what would normally be expected, the assumptions result in a lower economic value than what would be expected, or are designed to be consistent with other assumptions in the analysis. Scheduling of activities that follow the sale is based upon a 5-year sale length and current district experiences in the timing of activities.

Two separate investment analysis were done. The first analysis includes only what is necessary and required to harvest the timber proposed under each action alternative. Revenues and benefits include values from the sale of sawtimber and POL. Costs include roads necessary to complete the timber sale, sale administration costs, and regeneration costs. Also included in associated costs are appeals and litigation costs anticipated to occur prior to the timber sale. The second analysis includes all costs and benefits associated with the project. Revenues and benefits are the same as the first analysis, and include the sale of sawtimber and POL. Costs, however, include all activities associated with the harvest of timber and post sale activities funded through Knutson-Vandenberg (KV) or other appropriated fund sources. These include non-commercial thinning, fuels treatments, travel management, noxious weed treatments, monitoring, and improvement projects for range and wildlife.

Costs

Sale preparation/administration costs are based upon a three-year average of costs for the Forest. Three year average costs for timber sale preparation are $24.66/MBF for sale administration. Sale prep costs are displayed in year 0. Normally, all of the administration portions of costs are spread out over the contract period. Rather than trying to develop specific assumptions on what costs occur in what year, all the costs are lumped in year 1. This assumption results in a lower economic value than if the costs were spread out.

Road costs are based upon the estimated costs given the amount of work that needs to be done.

Costs for pre-commercial thinning, regeneration surveys, pine encroachment, fuels treatment, travel management, and burning are all based on the recent planning costs used in recent timber sales. The costs include district administration and overhead. Also, some mitigation costs have been added in.

Benefits

The stumpage values are the average experienced on the forest as documented by the Regional Office. The revenues are assumed to occur all at one time. This assumption simplifies the situation that would normally occur with the revenues occurring throughout the life of the sale. This assumption by itself would tend to raise the economic value of the project, but it is

consistent with the assumption on sale administration costs, which tend to lower the economic value of the project.

All cost and benefit values are entered into the "Quick-Silver" program. This program analyzes the costs and benefits for a variety of investments or operations in order to compare the economic performance (costs and revenues) associated with each alternative. The results of the analysis are displayed in the table below. The values shown are intended to show relative efficiency of each alternative and serve as a means of comparing alternatives. The values will fluctuate with changes in costs and stumpage values, and do not reflect actual costs and revenues.

The only benefits included in this analysis were those revenues associated with the sale of sawtimber and products other than logs (POL).

Table 3.23. Financial Analysis Results by Alternative for the Fanny Project.

Financial Measure	*Alternative 1 – No Action*	*Alternative 2*	*Alternative 3*
Investment Analysis – #1 Analysis of costs and benefits associated only with the commercial timber sale.			
Present Value Costs	0	($264,605.93)	($247,749.78)
Present Value Benefits	0	$697,211.54	$621,538.46
Present Net Value	0	$432,605.61	$373,788.69
Benefit/Cost Ratio	0	2.63	2.51
Investment Analysis – #2 Analysis of costs and benefits associated with the timber sale and all associated post sale activities.			
Present Value Costs	0	($892,920.11)	($865,819.04)
Present Value Benefits	0	$697,211.54	$621,538.46
Present Net Value	0	($195,708.57)	($244,280.58)
Benefit/Cost Ratio	0	0.78	0.72

Direct and Indirect Effects By Alternative

Alternative 1 – No Action

There will not be any costs or benefits associated with the No Action Alternative.

Alternative 2

Alternative 2 produces the greatest revenues, but also has the greatest associated costs. The benefit/cost ratio and Present Net Value (PNV) is highest under this alternative.

Alternative 3

The Present Net Value (PNV) is lowest under this alternative. Alternative 3 does not harvest as much timber as Alternative 2, resulting in less revenue. However, costs associated the timber sale and post sale activities are lower than Alternative 2.

The main factors leading to the differences in financial measures between alternatives are:

- Volume of timber harvested.
- Varying costs associated with road construction, re-construction and decommissioning.
- Differences in the number of acres treated with post harvest treatments (pre-commercial thinning).

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The following people were members of the Interdisciplinary Team (IDT) who participated in the preparation and analysis of the Fanny Environmental Assessment.

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