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Environmental Assessment

Briggs Spring

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

T01N, R01E Sections 11-14, 21-28, 33-36
T01S, R01E Sections 1-5, 9-16, 21-24, 28-30, 33-36
T01S, R02E Sections 6-8, 18, 19, 30-32
T02S, R02E Sections 5-8, 18, 19
T02S, R01E Sections 1-5, 9-13, 243

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Commonly Used Acronyms and Abbreviations

APE	Area of Potential Effect	NEPA	National Environmental Policy Act
AUM	Animal Unit Months	NFMA	National Forest Management Act
BA	Basal Area	NFSR	National Forest System Road
BABE	Biological Assessment/Biological Evaluation	NHPA	National Historic Preservation Act
BCC	Birds of Conservation Concern	NRHP	National Register of Historic Places
BCR	Bird Conservation Region	NWSI	Natural Watershed Sensitivity Index
BHNF	Black Hills National Forest	OHV	Off Highway Vehicle
BHNF	Black Hills National Forest	POL	Products Other than Logs
LRMP	Revised Land and Resource Management Plan	R2	Forest Service Region 2 (Rocky Mountain Region)
BMP	Best Management Practices	RIS	Resource Information System
CCF	Hundred Cubic Feet	RMBO	Rocky Mountain Bird Observatory
CDA	Connected Disturbed Areas	RMRS	Rocky Mountain Research Station
CEQ	Council on Environmental Quality	ROS	Recreation Opportunity Spectrum
CFR	Code of Federal Regulations	RX	Prescribed Fire
DBH	Diameter at Breast Height	SD	South Dakota
DENR	Department of Environment and Natural Resources	SDGFP	South Dakota Game Fish and Parks
EA	Environmental Assessment	SDNHP	South Dakota Natural Heritage Program
EPA	Environmental Protection Agency	SHPO	State Historic Preservation Office
FEMA	Federal Emergency Management Agency	SHR	Stream Health Rating
FPS&G	Forest Plan Standards and Guidelines	SIO	Site Integrity Objective
FRCC	Fire Regime Condition Class	SOLC	Species of Local Concern
FSM	Forest Service Manual	SOPA	Schedule of Proposed Action
FSPro	Fire Spread Probability	SS	Structural Stage
FSR	Forest Service Road	TES	Threatened, Endangered, & Sensitive Species
GIS	Geographic Information Systems	USC	United States Code
HUC	Hydrologic Unit Code	USDA	United States Department of
IDT, ID	Interdisciplinary Team		

Team			Agriculture
LRMP	Land and Resource Management Plan	USFS	United States Department of Agriculture Forest Service
MA	Management Area	USFWS	United States Fish and Wildlife Service
MBBH	Monitoring Birds of the Black Hills	USGS	United States Geological Survey
MIS	Management Indicator Species	WCP	Watershed Conservation Practice
MPB	Mountain Pine Beetle	WCPH	Watershed Conservation Practice Handbook
		WIZ	Water Influence Zone
		WUI	Wildland Urban Interface

SUMMARY

The Hell Canyon Ranger District of the Black Hills National Forest proposes to implement multiple resource management actions, including commercial and non-commercial vegetation treatments, prescribed burning, and construction of a new campground within the Briggs Spring project area. Proposed resource management actions apply only to National Forest lands. The project area is located approximately twenty-five miles northwest of the town of Custer, South Dakota and is in Pennington County, South Dakota (Map 1, Appendix A). The project area is entirely within Management Area (MA) 5.1, Resource Production Emphasis. There are 24,548 acres of National Forest land and 4,368 acres of private owned land, totaling 28,916 acres included within the project area. This action is needed, because the current condition of forested stands does not meet Forest-wide objectives for this management area; there is existing mountain pine beetle outbreak near the Briggs Spring project area and there is opportunity to reduce potential mountain pine beetle caused mortality by sanitation and thinning; there is an opportunity to reduce fire hazard through fuels treatments; and in support of the recently decided Black Hills Travel Management Plan there is opportunity to develop a new off highway vehicle (OHV) campground.

The proposed action was described in a scoping document and mailed to approximately 108 individuals, tribal representatives, groups, government entities and other interested members of the public. The proposed action includes vegetation treatments, prescribed fire, fuel treatments, and construction of a campground.

The Forest Service also evaluated the following alternatives:

Alternative 1 – No Action: The National Environmental Policy Act (NEPA) requires the study of the ‘No Action’ alternative as a basis for comparing effects of the proposed action and other alternatives. The ‘No Action’ alternative assumes no implementation of any elements of the proposed action or other action alternatives would take place within the Briggs Spring project area. This alternative represents no attempt to actively respond to the purpose and need for action or the issues identified during scoping. For example, there would be no effort to modify existing vegetation or related fuels conditions in the project area; current timber sales, fire suppression efforts, noxious weeds treatments and regular system road maintenance would continue on National Forest lands.

Alternative 2 – Proposed Action: This alternative was developed to meet the purpose and need for action and it represents the agency’s recommendations prior to public scoping. The proposed action would manage vegetation within the project area to provide for a sustainable supply of commercial timber, and manage fuels in order to reduce losses of timber and other desired forest habitat and reduce the risk of large-scale, high intensity wildfire. The proposed action includes a

developed recreation campground facility which is designed for OHV recreational use, including both day use and overnight camping.

Alternative 3: This alternative addresses the key issues identified during the scoping process, which are 1) effects of developing a new OHV campground; and 2) susceptibility to mountain pine beetle. The elements that differ from the proposed action (Alternative 2) are expanding the existing Redbank Spring campground to accommodate OHV use rather than develop a new OHV campground and an increase in thinning and sanitation.

Based upon the effects of the alternatives, the responsible official will decide:

- (1) whether or not the information in this analysis is sufficient to make an informed decision;
- (2) whether or not vegetation and fuels treatments should be implemented and, if so, in what manner and in which locations;
- (3) whether or not an OHV recreation campground should be implemented and, if so, in what manner and in which locations.

CHAPTER 1: INTRODUCTION

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 five chapters:

- **Chapter 1: 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: 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. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- **Chapter 3: Affected Environment and Environmental Consequences:** This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area (i.e. Silviculture, Wildlife, Recreation). 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: Consultation and Coordination:** This section provides a list of preparers, agencies and persons consulted during the development of the environmental assessment.
- **Chapter 5: Literature Cited and Glossary**
- **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 planning record located at the Hell Canyon Ranger District Office in Custer, South Dakota.

Background

The first known photographs ever taken in the Black Hills were taken during General George A. Custer's 1874 expedition. These historic photographs give a glimpse of the appearance of the Black Hills in pre-European settlement times. The Black Hills represented a fire adapted ecosystem and past fires created a landscape quite different than what we see today. There were far fewer trees and open spaces were more

abundant. Alteration of natural fire cycles in the Black Hills, as a means of protecting people, timber resources, and private property, has created dramatic changes in the landscape. The development of continuous, dense forest with few open spaces has led to both recent large forest fires and increased mountain pine beetle activity. These are issues familiar to many people living and working in the Black Hills, and to people that visit this unique region. The number of fires on lands managed by the Black Hills National Forest has remained fairly constant at 65-130 starts per year.

The mountain pine beetle, *Dendroctonus ponderosa*, is showing increased activity in the densely stocked pine stands within the project area. In the late 1990's mountain pine beetle infestation started becoming more widespread, eventually reaching the current level of epidemic across the forest. Over the past 10 years there has been extensive tree mortality across the forest, changing the forest at landscape levels. Within the project area, patches of dead trees ranging from 1-2 trees to small groups (5-10) of infested trees can be found in almost every site of the project area. The most noticeable areas of infestation are in the north-eastern area and south of Bert Howey spring. The most recent beetle activity was noted just south of Six-mile Road (Forest Service Road [FSR] 301) and along Custer-Limestone Road (FSR 284), just east of Heggie Road (FSR 284.5D).

The proposed management actions within the action alternatives are designed to reduce the risk of MPB infestation and to provide a sustainable supply of commercial timber (consistent with Forest Plan direction). The action alternatives are also designed to reduce hazards related to large scale wildfire.

The forest-wide Black Hills National Forest Travel Management Plan was signed on March 22, 2010, with implementation beginning on December 01, 2010. This decision designated approximately 13 miles of system trails within the project area.

Location

The Briggs Spring project area is located approximately twenty-five miles northwest of the town of Custer in Pennington County, South Dakota (see Map 1, Appendix A). The project area is located with T01N, R01E Sections 11-14, 21-28, 33-36; T01S, R01E Sections 1-5, 9-16, 21-24, 28-30, 33-36; T01S, R02E Sections 6-8, 18, 19, 30-32; T02S, R02E Sections 5-8, 18, 19; and T02S, R01E Sections 1-5, 9-13, 24. The gross acreage of the project area is 28,916 acres with approximately 24,548 acres of National Forest System land and 4,368 acres of interspersed private land. Major arterial roads that access the project area include FSR 117.1 (Boles Canyon Road) which provides north-south access throughout, FSR 301 (Six Mile Road) which provides east-west access centrally, and FSR 284 (Custer-Limestone Road) is the southern-most boundary.

Management Direction

The Revised Land and Resource Management Plan (Forest Plan), as amended (2006), provides direction for the management of the forest. The Forest Plan contains management goals and objectives, management area direction, and identifies desired future conditions for the forest. Resource specialists reviewed the current condition of the project area and compared these conditions with the desired conditions identified in the Forest Plan including applicable goals and objectives. Opportunities for improvement were identified.

The Decision for the Phase II Amendment to the Forest Plan was signed on October 31, 2005 and became effective on February 28, 2006. The Forest Plan, as amended, establishes 11 goals and associated objectives for multiple-use management of the Forest. Goals 1, 2, 4, and 10 address natural resource objectives for multiple-use management of the Forest. Goals 3 and 5-9 provide socioeconomic emphasis for management of the Forest. Goal 11 addresses recovery rates and fuel-loading after significant fire or other natural event. Goals and objectives provide basic direction for defining a purpose and need for a project and developing a proposed action. Forest Plan goals are discussed in Chapter 1 of the Phase II Amendment of the Forest Plan.

The Forest Plan assigns a management emphasis to each portion of the Forest to meet multiple-use objectives. For each designated Management Area (MA), Chapter 3 of the Forest Plan includes a description of desired future conditions, goals, objectives, standards, and guidelines. National Forest lands within the Briggs Spring project area are completely within MA 5.1 (USDA Forest Service, 2006).

MA 5.1: Resource Production Emphasis. These areas are managed for wood products, water yield, and forage production, while providing other commercial products, visual quality, diversity of wildlife and a variety of other goods and services. Numerous open roads provide commercial access and roaded recreation opportunities, while closed roads provide non-motorized recreation opportunities.

Goals and objectives within the Forest Plan were used to develop the proposed action for the Briggs Spring project.

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

Objective 201: Manage for a minimum of 92,000 acres of aspen, and 16,000 acres of bur oak during the life of the Plan. The highest priority for hardwood restoration is where conifers (e.g., spruce and pine) have out-competed aspen adjacent to riparian systems that once supported beaver.

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 timber lands.

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 420b: Provide recreation facilities, trailheads, trail crossings and other road corridor components to meet demand.

Goal 10: Establish and maintain a mosaic of vegetation conditions to reduce occurrences of catastrophic fire, insect, and disease events, and facilitate insect and disease management and firefighting capability. Three objectives associated with this goal that pertain to this project include:

Objective 10-01: Manage for 50 to 75 percent moderate-to-low fire hazard in the wildland-urban interface and reduce fire hazard within proximity of structures to current NFPA standards...

Objective 10-04: 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 Forest-wide Guideline 4110.

Objective 10-07: Where outbreaks of mountain pine beetle could present risks to management objectives for ponderosa pine, reduce acreage of ponderosa pine stands that are in medium or high risk for infestation.

Purpose and Need for Action

The purpose of this project is to maintain forest health, to manage ponderosa pine within this portion of MA 5.1 in order to provide for a sustainable supply of commercial timber, to manage fuels in order to reduce losses of timber and other desired forest habitat and the risk of large-scale, high intensity wildfire, and to provide a developed recreation campground facility which is designed for OHV recreational use, including large trailers, in support of the recently designated Travel Management OHV trail system within the Briggs Spring project area. This action is needed because: the current mountain pine beetle outbreak in forest stands within and near the Briggs Spring project area indicates there is opportunity to reduce potential mountain pine beetle caused mortality by thinning dense timber stands (Forest Plan, Goal 10 and Objective 10-07); there is opportunity to contribute to the Forest-wide objective (Forest Plan, Goal 3 and Objective 303) through timber harvest throughout the project area; there is opportunity to reduce fire hazard through fuels treatments (Forest Plan, Goal 10 and Objective 10-01 & 10-04); and in light of the recently closed Moon Campground, which is adjacent to the project area, the opportunity exists to create a recreation campground in support of the newly developed OHV trail system (Forest Plan, Goal 4 and Objective 420b).

This action responds to the goals and objectives outlined in the Forest Plan and helps move the project area toward desired conditions described in that plan.

Proposed Action

The Forest Service proposes to implement vegetation treatments with both commercial and non-commercial activities. Commercial treatments include commercial thinning, group shelterwood, overstory removal, shelterwood seedcut, hardwood release or conversion, pine encroachment, and sanitation treatments. Commercial treatments would occur on approximately 12,224 acres with the potential to treat an additional 6,063 acres through sanitation treatment, if needed. Non-commercial treatments include hardwood release, pine encroachment, products other than logs (POL) thinning, deadfall, mechanical fuels treatments, and prescribed burning. Non-commercial treatments would occur on approximately 22,305 acres, including 6,295 acres of prescribed burning. Some commercial and non-commercial treatments overlap each other within the same sites. A recreation campground facility (New Moon Campground) which is designed for OHV recreational use, including both day use and overnight camping would be developed along the east boundary, within sites 040704-23 and 25, northeast of the junction of roads FSR 296.3A and FSR 296.2.

Decision Framework

Given the purpose and need, the deciding official reviews the proposed action, the issues identified during scoping, the other alternatives, and the environmental consequences of implementing each alternative in order to make the following decisions:

- (1) whether or not the information in this analysis is sufficient to make an informed decision;
- (2) whether or not vegetation and fuels treatments should be implemented and, if so, in what manner and in which locations;
- (3) whether or not an OHV recreation campground should be implemented and, if so, in what manner and in which locations.

Public Involvement

The proposal was listed in the Schedule of Proposed Actions in October, 2010. The proposal was provided to the public and other agencies for comment during scoping on October 14, 2010. In addition, as part of the public involvement process, the agency mailed a detailed scoping document to approximately 108 individuals, tribal representatives, groups, government agencies and other interested members of the public. Scoping documents were also uploaded to the forest website, <http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=28361>, in October 2010. Scoping comments received are located in the project record.

Using the comments from the public, other government agencies, groups, tribal representatives the interdisciplinary team (IDT) developed a list of issues to address.

Issues

Issues are unresolved conflicts concerning alternative uses of available resources. Comments received during the scoping process raised various issues in relation to management activities in the Briggs Spring project area. From these comments and other sources, the project interdisciplinary team identified two key issues that drove the development of the alternatives. A brief description of the issues follows.

The Forest Service identified two topics raised during scoping. These issues include:

Issue #1: Effects of Developing a New OHV Campground – Some commenters noted that the proposed action would result in two campgrounds located within close proximity of each other. It was suggested that expanding the existing Redbank Spring Campground should be considered to meet the anticipated needs of OHV users, rather than creating a new campground. **Measures:** Number of OHV recreational campgrounds and size. Number of acres of ground disturbance.

Issue #2: Susceptibility to Mountain Pine Beetle – Some commenters were concerned that the proposed action would not sufficiently reduce the potential for mountain pine beetle caused mortality throughout the project

area. Further sanitation and thinning was suggested. **Measures:** Acres of sanitation and thinning and level of insect risk rating.

CHAPTER 2: COMPARISON OF ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the Briggs Spring project. It includes a description of each alternative. This section includes a description of each alternative considered in detail, including the No Action Alternative (Alternative 1), the Proposed Action (Alternative 2), and one alternative to the Proposed Action, Alternative 3, as well as alternatives not considered in detail. This section also presents the alternatives in comparative form, defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public.

Alternatives Considered in Detail

The Forest Service developed three alternatives, including a no action and proposed action alternative. The alternatives considered in detail by the interdisciplinary team are discussed below. This section provides the summary of activities proposed to occur during implementation of any action alternative. Exact figures, such as acres, miles, or other numerical units of any particular activity, may vary slightly. These figures, which are based on inventory and survey estimates, may vary during preparation of a timber sale, prescribed burn, or other project based upon various site factors such as topography, non-uniform site structure, fuels, refinement of the standard of road needed, etc.

Alternative 1 – No Action

National Environmental Policy Act (NEPA) requires the study of the ‘No Action’ alternative as a basis for comparing effects of the proposed action and other alternatives. Under the No Action alternative, current management plans would continue to guide management of the project area. This alternative represents no attempt to actively respond to the purpose and need for action or the issues presented during scoping. No effort would be made to modify existing vegetation or related fuel conditions within the project area. No vegetation treatments, fuels treatments, or prescribed burning would be implemented; nor would the construction of an OHV campground be implemented to accomplish project goals.

Alternative 2 – Proposed Action

This alternative was developed to meet the purpose and need for action and it represents the agency’s recommendations prior to public scoping. The proposed action would manage vegetation within the project area to provide for a sustainable supply of commercial timber, and manage fuels in order to reduce losses of timber and other desired forest habitat and reduce the risk of large-scale, high intensity wildfire. The proposed action includes a developed recreation campground facility which is designed for OHV recreational use, including both day use and overnight camping.

The proposed OHV recreation campground facility, New Moon Campground, would be a Roaded Natural Recreation Opportunity Spectrum (ROS) Design, located within sites

040704-23 & 25 (see Map 2-Tile 2, Appendix A). A defined ‘training’ lot would be constructed for hands-on learning of common OHV trail features. The proposed location for the New Moon Campground is on an existing OHV trail, eliminating the need for a connector trail from the campground to an existing trail system.

Features of the New Moon Campground would include the following:

- OHV facility would be approximately 17 acres in size, including approximately 15 units of OHV Specialized Fee Campground and 4 units of OHV Day Use Trailhead.
 - Campground – approximately 15 acres
 - Pull through design for camping units (~15 units) with parking spurs for two vehicles with trailers for each site.
 - Two Unisex Vault Toilets.
 - **Alternative 2 specific** – Defined and fenced training lot (~1 acre) for hands-on learning of common OHV trail features.
 - No potable water or garbage collection services, “visitor pack it in – pack it out”.
 - Day Use Trailhead – approximately 2 acres
 - Four gravel surface parking spaces to accommodate vehicles with trailers.
 - Hardened surface roads and concentrated use areas with crushed gravel.
 - The facility would be fenced for cattle exclusion and resource protection.

Vegetation treatments for Alternative 2 include both commercial (see Table 1) and noncommercial treatments (see Table 2).

Table 1. Alternative 2-Proposed Action commercial treatments

Commercial Treatments	Acres	Description
Commercial Thin (CThin)	2,204	Thinning of immature ponderosa pine stands, generally 9-12” in diameter. Objective is to reduce basal area in stands to improve health, tree vigor, and future growth capacity of the stand and to reduce stand susceptibility to mountain pine beetle attack. This treatment would reduce stand basal area (BA) to 50 ft ² /ac or 60 ft ² /ac depending upon existing and desired condition of the stands. A 60 BA will be used in stands to minimize stand susceptibility to mountain pine beetle (MPB) and wildfire. Reducing the basal area will minimize the expansion of the MPB infestation. A 50 BA will be used in stands that are located within or adjacent to areas of existing MPB infestations. A 60 BA will be used in areas that do not have current MPB infestation.
Group Shelterwood	6,376	This is a shelterwood system treatment that is

(GRSH)		applied within pine sites which are not homogenous, but rather have patches or groups of trees of various age classes throughout the stand. A GRSH prescription may include all phases of a shelterwood system such as a commercial thin, seed cut or overstory removal.
Hardwood Release (HWDR)	250	Removal of encroaching conifers from existing hardwood stands. No change of cover type results. Removal of non-commercial conifers will follow commercial removal.
Hardwood Conversion (HWDC)	123	Removal of conifers from mixed conifer/hardwood sites that contain an abundance of hardwoods for the purpose of converting the site to an aspen stand. Removal of non-commercial conifers will follow commercial harvest.
Overstory Removal (OSR)	138	Removal of mature to over-mature trees in the overstory of stands which have been successfully regenerated.
Shelterwood Seed Cut (SWSC)	479	An even-aged regeneration cutting in mature stands. The most desirable seed trees are retained at basal areas of 30-50 ft ² /ac. Opening the canopy creates a favorable growing environment for pine regeneration.
Pine Encroachment (PE)*	2,674	Removal of pine trees from existing meadows to maintain the meadow into the future. Both commercial and non-commercial sized trees may be removed. No change in cover type results.
Sanitation**	6,063	Sanitation is used to remove only individual green trees, which have live mountain pine beetle brood in them. These trees are already dead, however, the foliage will not change color until the following summer. This is a suppression strategy designed to remove live beetles from the site. The stands prescribed for sanitation are in areas of high beetle concentration. This treatment will also be used within commercially treated stands if there is beetle infestation occurring.
Total Acres	18,307	

*Commercial and non-commercial PE treatments would occur on the same acres.

**These acres are planned for sanitation treatment only. All other commercial treatments would include sanitation.

Table 2. Alternative 2-Proposed Action non-commercial treatments

Non-Commercial Treatments	Acres	Description
Pine Encroachment (PE)*	2,674	<i>See description in Table 1.</i>
POL (Products other than log) Thinning	8,478	Non-commercial thinning of dense stands of pine that are less than 9-inches in diameter. Stands of trees will be thinned to reach a desired tree spacing of 18' x 18'. The objective is to reduce stand density to concentrate future growth on the most desirable trees.
POL Thinning/HWDR**	1,021	<i>See description above.</i> A hardwood release treatment would occur in areas that have hardwood inclusions. See description of HWDR above.
Hardwood Release (HWDR)	564	<i>See description in Table 1.</i>
POL Thinning/Deadfall	300	<i>See POL description above and Deadfall description below.</i> Both types of treatment would occur on these sites.
Fuels Treatments:		
Mechanical	1,252	Mechanical thinning of pine less than 9-inches in diameter and to desired tree spacing of 14' x 14' spacing. Mechanical fuels treatment may include hand cutting and piling. Slash piles resulting from this treatment would be burned, however no broadcast burning would occur.
Prescription (Rx) Burning	6,295	Management-ignited fire used for reducing woody material fuel loading in order to modify potential fire behavior which can reduce risks to life and property associated with wildfire. The objective of using prescribed fire in this project is to consume a portion of the dead/down fuels as well as limb a portion of the green trees in support of decreasing overall fire behavior. This treatment contributes to creating a mosaic of burned and unburned areas which results in an appearance of a naturally-burned landscape. Ignition may include but is not limited to both hand and aerial ignition.
Deadfall	1,693	Mechanical treatment of <u>existing</u> slash to a height within 18-24 inches of the ground. May include various methods but not limited to lopping, chipping, crushing, piling and burning, or mastication. No snags would be removed as

		part of this treatment. Some of these sites include hardwood inclusions that would be released (HWDR).
<i>Total Acres</i>	<i>22,305</i>	

*Commercial and non-commercial PE treatments would occur on the same acres.

**Commercial and non-commercial HWDR treatments would occur on some of the same acres.

Alternative 2 would produce approximately 30,127 hundred cubic feet (CCF) of commercial sawlog volume and approximately 8,075 CCF of POL as a byproduct of the mechanical treatments. In addition, 75.9 miles of roads would be maintained, 31.9 miles would be reconstructed, and 0.8 miles of an existing unauthorized road would be reconstructed and converted to a Forest system road, as part of the mechanical treatments proposed in this alternative. Figure 1 shows the entire project area, however Appendix A has more detailed maps. Please refer to Map 2-Tiles 1-3, Appendix A, for a detailed view of Alternative 2 treatment areas.

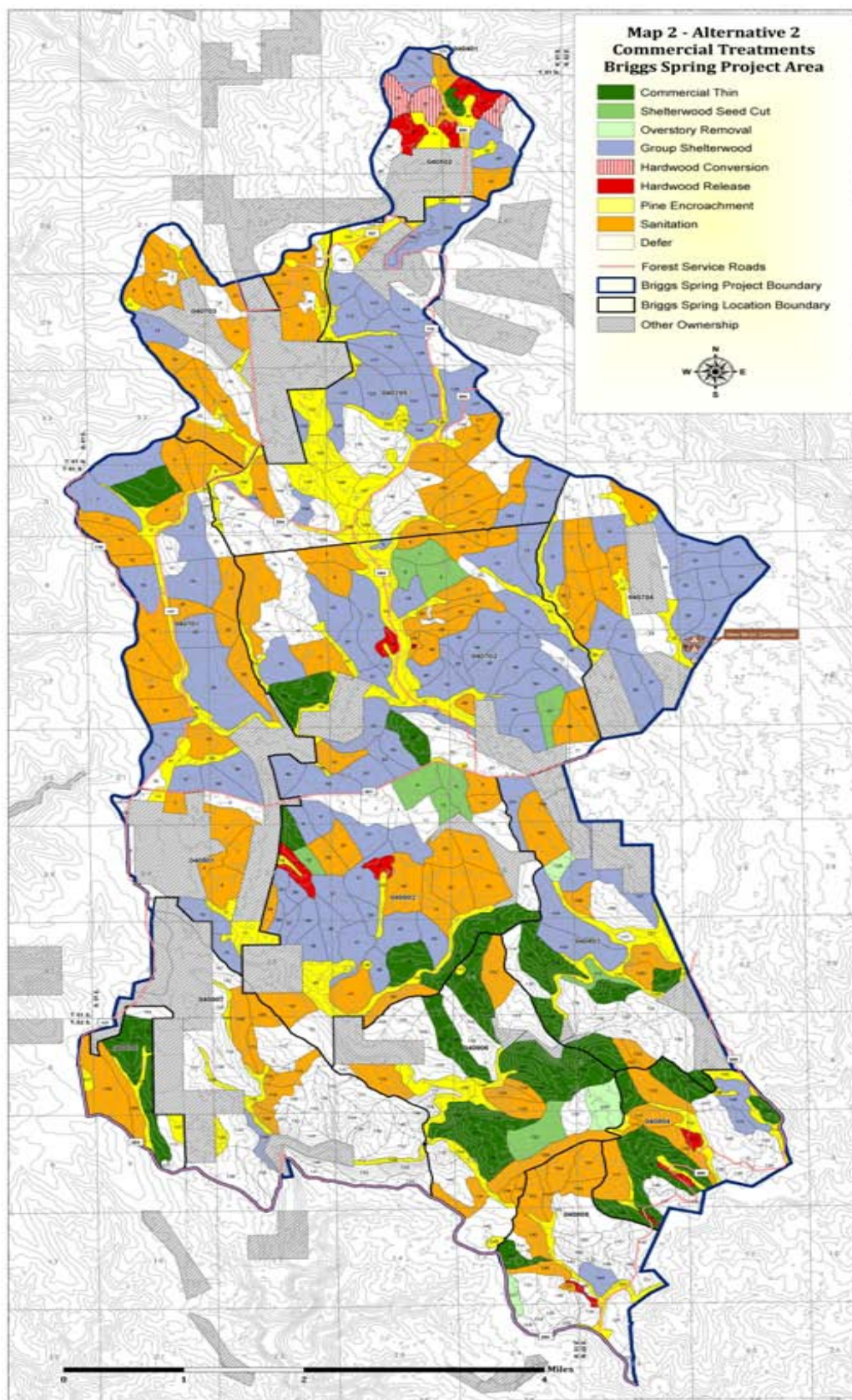


Figure 1. Map 2-Alternative 2 commercial treatments.

Alternative 3

This alternative was developed to address the issues identified during scoping: 1) effects of developing a new OHV campground; 2) susceptibility to mountain pine beetles.

To address issue #1, Alternative 3 eliminates the development of a new OHV campground and proposes to expand the existing Redbank Spring Campground to accommodate OHV recreationists. To address issue #2, Alternative 3 proposes additional group shelterwood and sanitation treatments in more ponderosa pine stands to further reduce MPB susceptibility.

An expansion at the existing Redbank Spring Campground would be a Roaded Natural ROS Design, located within sites 040705-144 & 170 (see Map 4-Tiles 1-2, Appendix A). The expanded OHV campground would include a connector trail to link the campground to the existing OHV trail system. The connector trail would be approximately 0.8 miles in length and be designed for OHVs of 62" in width or less. The facility design features are the same as those proposed for Alternative 2, except Alternative 3 would not include a training lot.

Vegetation treatments for Alternative 3 include both commercial (see Table 3) and non-commercial (see Table 4) treatments.

Table 3. Alternative 3 commercial treatments

Commercial Treatments	Acres	Description
Commercial Thin (CThin)	2,204	Thinning of immature ponderosa pine stands, generally 9-12" in diameter. Objective is to reduce basal area in stands to improve health, tree vigor, and future growth capacity of the stand and to reduce stand susceptibility to mountain pine beetle attack. This treatment would reduce stand basal area (BA) to 50 ft ² /ac or 60 ft ² /ac depending upon existing and desired condition of the stands. A 60 BA will be used in stands to minimize stand susceptibility to mountain pine beetle (MPB) and wildfire. Reducing the basal area will minimize the expansion of the MPB infestation. A 50 BA will be used in stands that are located within or adjacent to areas of existing MPB infestations. A 60 BA will be used in areas that do not have current MPB infestation.
Group Shelterwood (GRSH)	13,845	This is a shelterwood system treatment that is applied within pine sites which are not homogenous, but rather have patches or groups of trees of various age classes throughout the stand. A GRSH prescription may include all phases of a shelterwood system such as a commercial thin, seed cut or overstory removal.
Hardwood Release (HWDR)	259	Removal of encroaching conifers from existing hardwood stands. No change of cover type results.

		Removal of non-commercial conifers will follow commercial removal.
Hardwood Conversion (HWDC)	123	Removal of conifers from mixed conifer/hardwood sites that contain an abundance of hardwoods for the purpose of converting the site to an aspen stand. Removal of non-commercial conifers will follow commercial harvest.
Overstory Removal (OSR)	138	Removal of mature to over-mature trees in the overstory of stands which have been successfully regenerated.
Shelterwood Seed Cut (SWSC)	479	An even-aged regeneration cutting in mature stands. The most desirable seed trees are retained at basal areas of 30-50 ft ² /ac. Opening the canopy creates a favorable growing environment for pine regeneration.
Pine Encroachment (PE)*	2,674	Removal of pine trees from existing meadows to maintain the meadow into the future. Both commercial and non-commercial sized trees may be removed. No change in cover type results.
Sanitation**	3,678	Sanitation is used to remove only individual green trees, which have live mountain pine beetle brood in them. These trees are already dead, however, the foliage will not change color until the following summer. This is a suppression strategy designed to remove live beetles from the site. The stands prescribed for sanitation are in areas of high beetle concentration. This treatment will also be used within commercially treated stands if there is beetle infestation occurring.
Total Acres	23,400	

*Commercial and non-commercial PE treatments would occur on the same acres.

**These acres are planned for sanitation treatment only. All other commercial treatments would include sanitation.

Table 4. Alternative 3 non-commercial treatments

Non-Commercial Treatments	Acres	Description
Pine Encroachment (PE)*	2,674	<i>See description in Table 1.</i>
POL (Products other than log) Thinning	8,889	Non-commercial thinning of dense stands of pine that are less than 9-inches in diameter. Stands of trees will be thinned to reach a desired tree spacing of 18' x 18'. The objective is to reduce stand density to concentrate future growth on the most desirable trees.
POL Thinning/HWDR**	1,021	<i>See POL description above and the HWDR description in Table 1.</i> A hardwood release treatment would occur in areas that have

		hardwood inclusions. See description of HWDR above.
Hardwood Release (HWDR)	564	<i>See description above.</i>
POL Thinning/Deadfall	300	<i>See POL description above and Deadfall description below.</i> Both types of treatment would occur on these sites.
<i>Fuels Treatments:</i>		
Mechanical	1,274	Mechanical thinning of pine less than 9-inches in diameter and to desired tree spacing of 14' x 14' spacing. Site 040705-170 (Redbank Spring Campground) would have tree spacing of 24' x 24'. Mechanical fuels treatment may include hand cutting and piling. Slash piles resulting from this treatment would be burned, however no broadcast burning would occur.
Prescription (Rx) Burning	7,009	Management-ignited fire used for reducing woody material fuel loading in order to modify potential fire behavior which can reduce risks to life and property associated with wildfire. The objective of using prescribed fire in this project is to consume a portion of the dead/down fuels as well as limb a portion of the green trees in support of decreasing overall fire behavior. This treatment contributes to creating a mosaic of burned and unburned areas which results in an appearance of a naturally-burned landscape. Ignition may include but is not limited to both hand and aerial ignition.
Deadfall	1,693	Mechanical treatment of <u>existing</u> slash to a height within 18-24 inches of the ground. May include various methods but not limited to lopping, chipping, crushing, piling and burning, or mastication. No snags would be removed as part of this treatment. Some of these sites include hardwood inclusions that would be released (HWDR).
<i>Total Acres</i>	<i>23,452</i>	

*Commercial and non-commercial PE treatments would occur on the same acres.

**Commercial and non-commercial HWDR treatments would occur on some of the same acres.

Alternative 3 would produce approximately 41,531 hundred cubic feet (CCF) of commercial sawlog volume and approximately 9,931 CCF of POL as a byproduct of the mechanical treatments. In addition, 77.3 miles of roads would be maintained, 33.4 miles would be reconstructed, and 0.8 miles of an existing unauthorized road would be

reconstructed and converted to a Forest system road as part of the mechanical treatments proposed in this alternative. This alternative also proposes to add approximately 0.8 miles of OHV trail to connect the Redbank Spring Campground to the existing OHV trail system. Figure 2 shows the entire project area, however Appendix A has more detailed maps. Please refer to Map 4-Tiles 1-3, Appendix A, for a detailed view of Alternative 3 treatment areas.

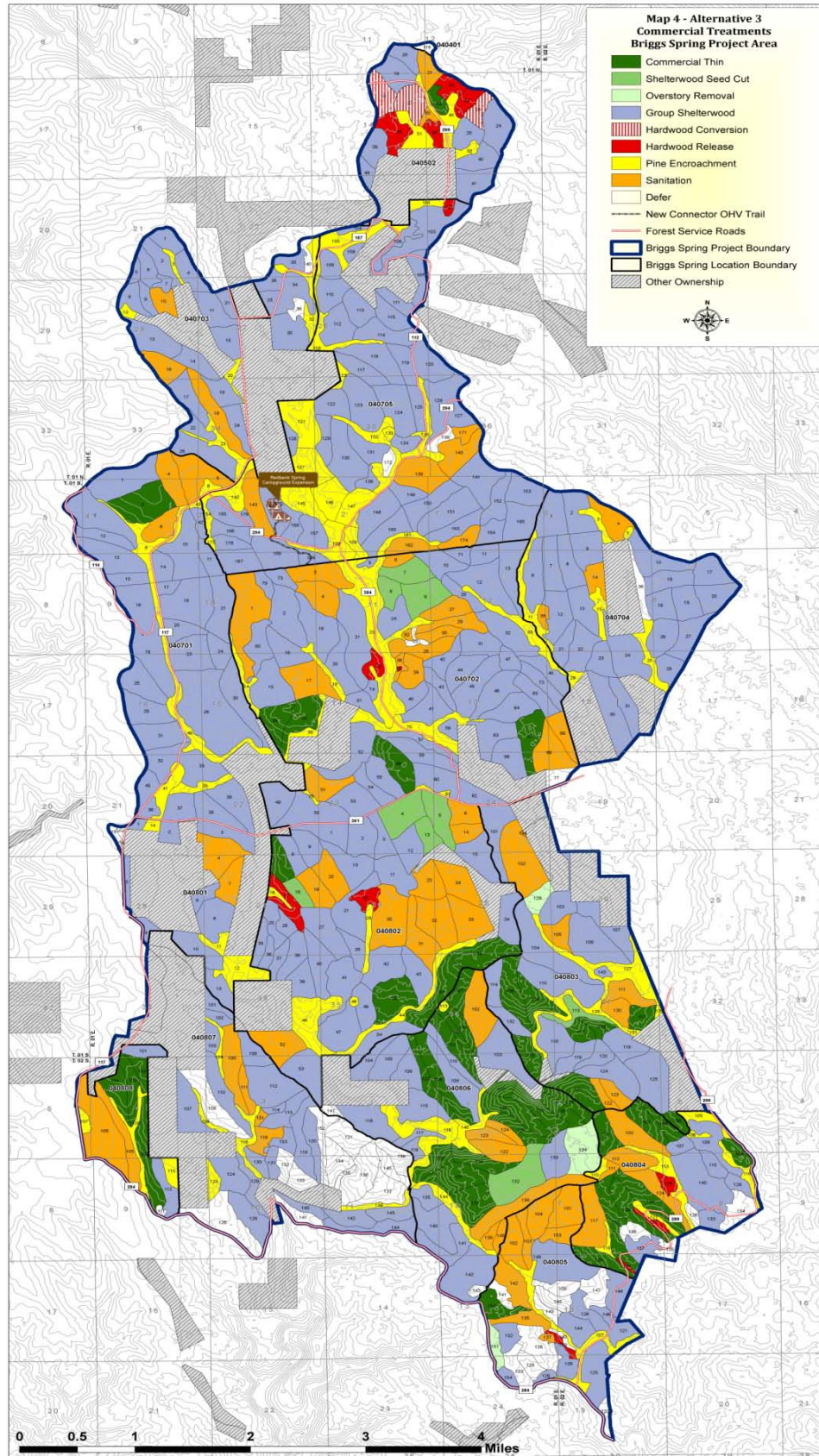


Figure 2. Map 4-Alternative 3 commercial treatments.

Design Criteria

Design criteria include Forest Plan standards and guidelines, USFS Region 2 Watershed Conservation Practices (WCPs), Best Management Practices, and site specific design to avoid resource impacts. They are applicable and to be implemented as a matter of standard operating procedure for the action alternatives. Design criteria are applied to protect resources and forest users. All activities proposed in this project, including any post-sale activities or monitoring, must implement these design criteria. A complete list of project design criteria is available in Appendix B.

Alternatives Not Considered in Detail

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). Public comments received in response to the proposed action provided suggestions for alternative methods for achieving the purpose and need. Some of these alternatives may have been outside the scope of the project, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm. Therefore, the following alternatives were considered, but dismissed from detailed consideration for reasons summarized below.

- An alternative that excludes a developed recreation campground facility which is designed for OHV recreational use, including both day use and overnight camping – This alternative would not meet the purpose and need for action in this project and the no action alternative also serves as an alternative without a developed recreation campground.

Comparison of Alternatives

This section provides a summary of each alternative. Appendix A, Maps 2-5 with corresponding tiles, provide a detailed visual display of vegetation treatments.

Comparison of Vegetation Treatments:

Table 5. Comparison of commercial treatments by alternative

Commercial Treatments by Alternative		
	Acres	
	Alternative 2	Alternative 3
Commercial Thin (CThin)	2,204	2,204
Group Shelterwood (GRSH)	6,376	13,845
Hardwood Release (HWDR)	250	259
Hardwood Conversion (HWDC)	123	123
Overstory Removal (OSR)	138	138
Shelterwood Seed Cut (SWSC)	479	479
Pine Encroachment (PE)*	2,674	2,674
Sanitation**	6,063	3,678

*Commercial and non-commercial PE treatments will occur on the same acres.

**These acres are planned for sanitation treatment only. All other treatments will include sanitation.

Table 6. Comparison of non-commercial treatments by alternative

Non-Commercial Treatments by Alternative		
	Acres	
	Alternative 2	Alternative 3
Pine Encroachment (PE)*	2,674	2,674
POL Thinning	8,478	8,889
POL Thinning (with HWDR)	1,021	1,021
POL Thinning/Deadfall	300	300
Hardwood Release (HWDR)**	564	564
Deadfall	1,693	1,693
Mechanical Fuels Treatment	1,252	1,274
Prescription (Rx) Burning	6,295	7,009

* Commercial and non-commercial PE treatments will occur on the same acres.

**Commercial and non-commercial HWDR treatments will occur on some of the same acres.

Comparison of Structural Stages (SS) by Cover Type:

Structural stage definitions (USDA Forest Service, 2005):

SS1 (grass/forb): This stage is dominated by grasses and forbs lasting until tree seedlings become established.

SS2 (shrub/seedling): This stage consists of shrubs and seedlings. This stage remains until seedlings reach 1" diameter at breast height (DBH).

SS3 (sapling/pole): This stage contains trees with stems 1-9" DBH.

SS3A – sapling/pole stage with less than 40% canopy cover

SS3B – sapling/pole stage with 40-70% canopy cover

SS3C – sapling/pole stage with greater than 70% canopy cover

SS4 (mature): This stage contains trees which are at least 9" DBH.

SS4A – mature stage with less than 40% canopy cover

SS4B – mature stage with 40-70% canopy cover

SS4C – mature stage with greater than 70% canopy cover

SS5 (late succession): This stage is characterized by very large trees (16+ inches DBH). Trees are at least 160 years in age. Late succession ponderosa pine may occur in dense stands but may also grow in the open or in "park-like" stands.

Table 7. Comparison of structural stages (SS) by cover type for all alternatives

Cover Type → Structural Stage ↓	Ponderosa Pine			Aspen			Meadow			Total Acres		
	Alt. 1	Alt. 2	Alt. 3	Alt. 1	Alt. 2	Alt. 3	Alt. 1	Alt. 2	Alt. 3	Alt. 1	Alt. 2	Alt. 3
Meadow/Grassland	0	0	0	0	0	0	2,697	2,697	2,697	2,697	2,697	2,697
SS1	497	497	497	0	0	0	0	0	0	497	497	497
SS2	485	485	485	65	65	65	0	0	0	550	550	550
SS3A	49	133	133	130	242	242	0	0	0	179	375	375

SS3B	132	175	175	47	50	97	0	0	0	179	225	272
SS3C	42	42	42	0	0	0	0	0	0	42	42	42
SS4A	12,725	16,570	16,570	42	97	50	0	0	0	12,767	16,667	16,620
SS4B	7,590	3,495	3,495	47	0	0	0	0	0	7,637	3,495	3,495
SS4C	0	0	0	0	0	0	0	0	0	0	0	0
SS5	0	0	0	0	0	0	0	0	0	0	0	0
Total Acres	21,520	21,397	21,397	331	454	454	2,697	2,697	2,697	24,548	24,548	24,548

Comparison of Roads and Trails:

Table 8. Total miles of all Forest system roads and OHV trail on National Forest land within the project area, by alternative

	Existing/Alt. 1	Alt. 2	Alt. 3
System Roads	108.9	109.8	109.8
System OHV Trails	12.8	12.8	13.6
Total Miles	121.7	122.6	123.4

Table 9. Total miles of Forest system roads within the project area, for all alternatives

	Existing
Roads Closed to All, Yearlong (as storage)	7.9
Roads Open to All, Seasonal	11.3
Roads Open to All, Yearlong	14.3
Roads Open to Highway Legal Vehicles Only, Seasonal	5
Roads Open to Highway Legal Vehicles Only, Yearlong	70.4
System Roads – Total Miles	108.9

Table 10. Total miles of Forest system OHV trails within the project area, by alternative

	Existing/Alt. 1	Alt. 2	Alt. 3
Trails Open, Seasonal	8.2	8.2	9
Trails Open, Yearlong	4.6	4.6	4.6
System Trails – Total Miles	12.8	12.8	13.6

Table 11. Road density for all Forest system roads on National Forest land within the project area, by alternative

	Existing/Alt. 1		Alt. 2		Alt. 3	
	Miles	Miles/Sq. Mile	Miles	Miles/Sq. Mile	Miles	Miles/Sq. Mile
Closed Roads	7.9	0.2	8.8	0.2	8.8	0.2
Open Roads	84.7	2.2	84.7	2.2	84.7	2.2

Seasonal Roads	16.3	0.4	16.3	0.4	16.3	0.4
Total	108.9	2.8	109.8	2.9	109.8	2.9

Comparison of Effects to Issues by Alternative:

Table 12. Effects of issues by alternative

1. Effects of Developing a new OHV Campground	Alternative 1 No Action			Alternative 2 Proposed Action			Alternative 3		
Number of campgrounds	1			2			1		
Number of designated OHV recreational campgrounds and sizes (acres)	0 (0 acres)			1 (18 acres)			1 (17 acres)		
Acres of new or expanded campground	0 acres			18 acres			13 acres		
2. Susceptibility to Mountain Pine Beetles	Alternative 1 No Action			Alternative 2 Proposed Action			Alternative 3		
Acres of sanitation and thinning	0 acres			18,307 acres			23,400 acres		
	Acres of Low Risk			Acres of Medium Risk**			Acres of High Risk***		
	Alt. 1	Alt. 2	Alt. 3	Alt. 1	Alt. 2	Alt. 3	Alt. 1	Alt. 2	Alt. 3
Acres of Low, Medium, and High <i>Insect Risk Rating</i> *	1,031	1,115	1,115	12,857	16,745	16,745	7,633	3,538	3,538

**Insect Risk Ratings* were evaluated by linking them to structural stages in ponderosa pine. The Forest Plan lists Insect Risk Rating by structural stages. (FEIS Phase II Amendment, p. III-385)

**Note that acres of medium risk would not change between Alternatives 2 and 3. The additional treatments in Alternative 3 would occur on sites that are currently structural stage 4A and after treatment the stands would remain at structural stage 4A.

***Acres of high risk stands remain the same between Alternatives 2 and 3. These sites are wildlife sites that require a higher density of trees, placing them into the high risk category.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section summarizes the environment of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in Chapter 2. For the purposes of this analysis and under federal regulations, “impacts” and “effects” are assumed to have the same meaning and are interchangeable.

The information presented here is based on analysis prepared by resource specialists from the interdisciplinary team (IDT). Analysis was accomplished by field observations and surveys, past experience and professional recommendations, aerial photography, resource modeling, literature review, information obtained through monitoring, Forest Plan direction and associated analysis, and public participation. The specialist reports are included in the project file, which is located at the Black Hills National Forest, Hell Canyon Ranger District, 330 Mount Rushmore Road, Custer, South Dakota. All resource specialists used the best available science in completing their analysis, in accordance with Forest Service Manual (FSM) 1920.

Past, Present, and Reasonably Foreseeable Actions

Analysis of cumulative effects include past, present, and reasonably foreseeable future activities that could affect the biological or social environments. See Appendix F for a listing of past, present, and future activities considered in the Briggs Spring project cumulative effects analysis. The project area boundary was used to address cumulative impacts, unless otherwise noted in the resource discussions. Rationale for cumulative effects boundaries is noted in the cumulative effects discussions by resource.

Forest Vegetation

Affected Environment

Cover Type

The vegetation in the Briggs Spring area is dominated by ponderosa pine (*Pinus ponderosa*) (88%). Very little white spruce (*Picea glauca*) is present but can be found growing along the bottom of north facing slopes which have limestone cliffs and as scattered individuals in some pine stands. Quaking aspen (*Populus tremuloides*) stands (1%) are found throughout the analysis area but are mainly found in the northern half. There are many small aspen clones and individuals found within the pine stands throughout the project area. Large meadows/grasslands (11%) tend to dominate the wide drainage bottoms throughout the northern half of the analysis area. While smaller meadows run up the draws in the southern half of the analysis area. See Table 13 for existing cover types within the project area.

Table 13. Existing cover types in the Briggs Spring project area

Cover Type	Acres	Percent (%)
Meadow/Grassland	2,697	11
Aspen	331	1
Ponderosa Pine	21,520	88
Total Acres	24,548	100

Structural Stage

There are several age classes and diameter size classes within the forested sites. Approximately 50% of the stands are multi-storied, 33% of the stands are two-storied and the remaining (approximately 20%) is single-storied. Most multi-storied stands are pine stands that have regenerated that give the stands multiple layers within the canopy. See Table 14 for existing structural stages by cover type within the project area.

Table 14. Existing structural stages (SS) by cover type in the Briggs Spring project area (shown in acres)

Cover Type → Structural Stage ↓	Ponderosa Pine	Aspen	Meadow	Total Acres
Meadow/grassland	0	0	2,697	2,697
SS1	497	0	0	497
SS2	485	65	0	550
SS3A	49	130	0	179
SS3B	132	47	0	179
SS3C	42	0	0	42
SS4A	12,725	42	0	12,767
SS4B	7,590	47	0	7,637
SS4C	0	0	0	0
SS5	0	0	0	0
Total Acres	21,520	331	2,697	24,548

The slope in the project area ranges from level ground to 65%. Approximately 95% of the project area has a slope less than 20% with an average of 10%. The average elevation is 6,465 feet.

Ponderosa Pine

Ponderosa pine (*Pinus ponderosa*) dominates the Briggs Spring analysis area with 21,520 acres, 88% of the area. Pine is often in pure ponderosa pine stands, however pine is associated with quaking aspen in most of the analysis area with the exception of the far northern location (040502), where pine is associated with white spruce and quaking aspen. In the southern locations (040807, 040808) ponderosa pine can be found with Rocky Mountain Juniper (*Juniperus scopulorum*) on occasion.

The overall average stand age for ponderosa pine stands of 8-inch trees and larger is 99 years old. Thirteen percent of the pine stands are over 120 years old, rotation age for pine in the Black Hills, while 8% of pine stands are less than 80 years old (See Figure 3).

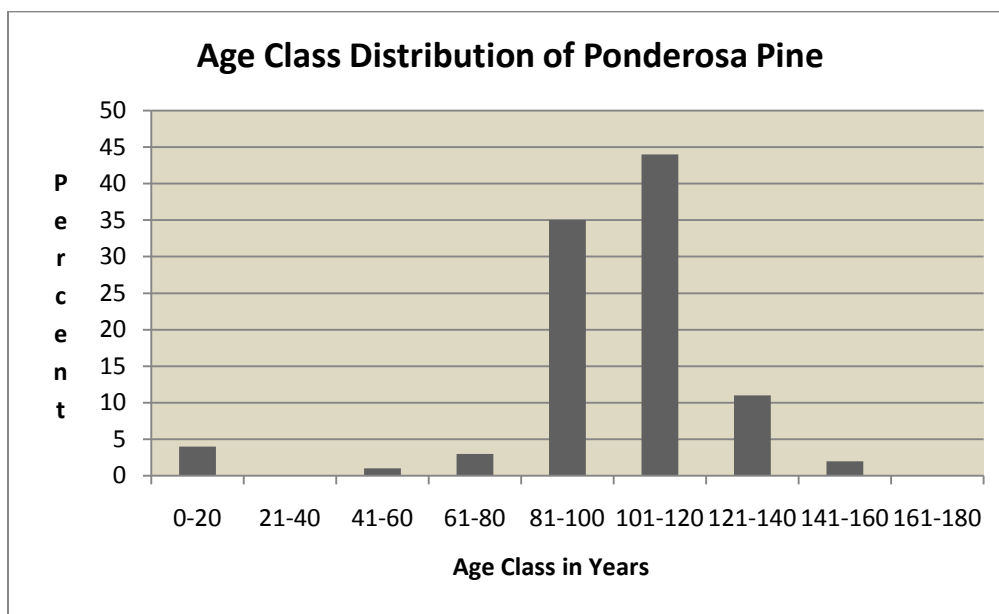


Figure 3. Existing condition of age class distribution of ponderosa pine in the Briggs Spring project area.

Structural Stage – Management Area 5.1 has a structural stage objective (Objective 5.1-204) within the ponderosa pine cover type (Table 15). This objective is to manage for the following percentages of structural stages in the ponderosa pine cover type across the management area in a variety of sizes and shapes.

Table 15. Structural stage objective percentages for ponderosa pine in MA 5.1 across the Black Hills National Forest

Structural Stage	Objective Percentage	Structural Stage	Objective Percentage
SS1	5%	SS4A	25% *
SS2	5%	SS4B	25% *
SS3A	10%	SS4C	5% *
SS3B	15%	SS5	5% **
SS3C	5%		

*10% of the SS4 ponderosa pine acres in the management area will have an average tree size of 'very large' (16-inches or greater DBH). Seek opportunities to increase understory shrubs in open-canopy structural stages.

**Active management is allowed, and may be necessary to provide desired late-successional characteristics.

The current condition of the structural stage percentages for ponderosa pine cover type throughout MA 5.1, including the Briggs Spring project area, is as follows:

Table 16. Forest Plan objectives versus existing ponderosa pine structural stage distribution in MA 5.1 across the Black Hills National Forest (USDA Forest Service, 2010)

Structural Stage	Forest Plan Objective (%)	Existing Condition Pine Acres	Existing* Condition (%)
SS1	5%	26,760	6%
SS2	5%	16,673	4%
SS3A	10%	24,236	5%
SS3B	15%	17,047	4%
SS3C	5%	10,269	2%
SS4A	25%	185,062	39%
SS4B	25%	142,228	30%
SS4C*	5%	50,437	11%
SS5*	5%	1,227	0.3%
Total	100%	473,939	100%

*Note that SS4C and SS5 are not present within the Briggs Spring project area.

In MA 5.1, pine sites in SS4 have 13% of the stands in the ‘very large’ (VL) tree size (16” DBH or greater), which is 3% over the management area objective of 10%.

Table 17. Forest Plan objective versus existing condition for VL tree size distribution in MA 5.1 across the Black Hills National Forest (USDA Forest Service, 2010)

Structural Stage	Forest Plan Objective VL Tree Size	Existing Condition VL Tree Size Percentage
4A, B, C	10%	13%

Structural stages change over time within a management area due to harvest activities, large wildfires, wind events, or mountain pine beetle (MPB) infestations that would affect an entire stand. Natural or artificial regeneration of a SS1 site would also change structural stages.

Mountain Pine Beetle – Mortality in ponderosa pine from MPB continues to be the most evident of any insect or disease problem in the analysis area. The MPB epidemic continues to increase within the Black Hills National Forest. In 2010, the mapped acreage affected by MPB doubled, as compared with acres attributed to MPB during each of the previous three years, representing significant new pine mortality (Schaupp, 2011).

Currently, there are approximately 7,633 acres of ponderosa pine at high risk for MPB infestation. This is about 35% of the pine stands in the analysis area (Table 18). High-risk pine stands are at a greater potential for increased MPB activity. Generally, stands are considered to be most susceptible to infestation if 75% of the stand is in the 7-13 inch diameter range and the stand density is over 120 ft²/ac of basal area (Allen, 2003).

Table 18. Current MPB rating for ponderosa pine in the Briggs Spring project area

Insect Rating	Acres	Percentage
Low	1,031	5%
Medium	12,856	60%
High	7,633	35%
Total	21,520	100%

Mountain pine beetle risk ratings were determined by structural stages in ponderosa pine (Table 19).

Table 19. Structural stage/MPB risk rating relationship

Ponderosa Pine	
Structural Stage	MPB Risk Rating
1	Low
2	Low
3A	Low
3B	Medium
3C	High
4A	Medium
4B	High
4C	High
5	High

Even though a SS4A is in the lowest tree density the tree size of SS4 (>9 inches DBH) is largely in the 7-13 inch diameter range and therefore 4A stands remain at medium risk (Table 19).

The MPB is showing increased activity in the ponderosa pine stands in the project area. Patches of dead trees ranging from one or two infested trees to small patches, consisting of several infested trees, could be found in almost every site of the analysis area. The most noticeable areas of infestation are in the northeastern area (location 40705) just north of the old powerline and the area to the south of Bert Howey spring in location 40806. Most recently, increased activity was noted in the goshawk stands (location 40802) just south of Six-mile Road (FSR 301) and in a stand (location 40805) along the Custer-Limestone Road (FSR 284) just east of the Heggie Road (FSR 284.5D).

Quaking Aspen

There are 331 acres of quaking aspen (*Populus tremuloides*) in the Briggs Spring project area. More than half of these stands are in the northern half of the project area (north of Six-mile Road; FSR 301). Most of the pine stands within the analysis area are commonly intermixed with smaller aspen clones and individuals scattered throughout the site. Aspen stands within the project area have an average stand age of 70 years within trees of 5-inches DBH and larger, while the average age of aspen less than 5-inches DBH is 13 years. Approximately two-thirds of the aspen stands have large conifers that are out-competing the hardwoods.

White Spruce

There are no white spruce (*Picea glauca*) stands within the project area, however white spruce individuals can be found within the project area. In the northern half of the project area spruce can be found intermixed with ponderosa pine stands and aspen clones. In the southern half of the project area spruce are also found along the northern face of rimrock ledges. Because the presence of white spruce is so minimal throughout the project area, discussion of white spruce will not be carried further in the analysis.

Understory Vegetation

Shrubs, forbs, and grasses are plentiful in the forest understory. Common juniper (*Juniperus communis*) is the most widespread shrub found in the project area. Common juniper typically reaches a height of approximately two to three feet. Oregon grape (*Berberis repens*) and kinnikinnik (*Arctostaphylos uva-ursi*) are also common shrubs found in most sites, while snowberry (*Symphoricarpos albus*) is found in greater numbers in the southern half of the analysis area. Other shrubs include russet buffalo berry (*Shepherdia canadensis*) in the southern locations and shrubby cinquefoil (*Potentilla fruticosa*) in the northern locations. There are a large variety of forbs and grasses in the analysis area.

Meadows/Grasslands

Large meadows throughout the northern half of the project area dominate the wide drainage bottoms while smaller meadows run up the draws in the southern half dividing the conifer stands. There are areas where conifers are encroaching upon the meadows. Conifer regeneration can be found coming into the meadows that are adjacent to conifer stands while other areas with meadow soils have larger conifers already well established.

Environmental Consequences

Cover Type

Alternative 1 – No Action

Under this alternative, no new vegetation management activities would occur within the project area.

Direct and Indirect Effects

No changes would occur to existing cover types in the Briggs Spring project area.

Common to Both Action Alternatives

Direct and Indirect Effects

The number of existing pine acres would decrease as 123 acres of ponderosa pine are converted to aspen. Pine acres would decrease from 21,520 to 21,398 in both action alternatives, a 1% reduction.

Structural Stage

Alternative 1 – No Action

Under this alternative, no new vegetation management activities would occur within the project area.

Direct and Indirect Effects

No changes would occur to existing forest vegetation structural stages in the Briggs Spring project area.

Common to Both Action Alternatives

Direct and Indirect Effects

All action alternatives would move structural stages toward correcting deficiencies in early structural stages in MA 5.1. Both action alternatives would have the same minor impact on the range of structural stages in ponderosa pine in MA 5.1.

Ponderosa Pine

Alternative 1 – No Action

Under this alternative, no new vegetation management activities would occur within the project area.

Direct and Indirect Effects

The effects of deferring treatment in the pine stands would be a slower increase a yield as the size of the existing trees would increase at a reduced rate due to competition, a reduction of diameter growth due to age and overstocking, an increased risk to MPB infestations, and an increased risk of large-scale, high intensity wildfire. The number of ponderosa pine acres would remain the same.

Age class distribution may change where mortality occurs due to MPB. The mortality caused by MPB would open up the pine stands creating large openings or whole stands could be reduced to SS1 (grass stage).

Structural Stage – The forest-wide structural stage objective (Objective 5.1-204) percentages for MA 5.1 would not change with this alternative in the short term (approximately <10 years) unless the MPB infestation would change stand structure. Structural stages 1, 4A, 4B, and 4C would continue to be over target percentages for MA 5.1, while SS 2, 3A, 3B, 3C, and 5 would be under the target percentages for MA 5.1.

In the long term, structural stages would change as trees grow and regenerate, wildfires or wind events take place, or insects and disease related mortality occurs. These changes could take decades, or depending on the event, could happen overnight. Eventually, the majority of structural stages would grow into SS4B or SS4C without any disturbances to the stand. This would not move ponderosa pine stands toward the forest objective (Objective 5.1-204) for structural stages for the management area.

There would be no changes to the ‘very large’ tree size percentages for MA 5.1.

Alternative 1 would not move the stand conditions towards the Forest Plan objectives for structural stages.

Mountain Pine Beetle – Mountain pine beetle risk would not be reduced with Alternative 1. The analysis area would continue to have 35% of the stands in high risk and 60% of the stands in medium risk for susceptibility to MPB infestation. Mortality is expected to

increase from present numbers. The current infestations (Table 20) are expected to increase in size and spread to healthy green trees.

Table 20. Alternative 1-MPB risk rating for the Briggs Spring project area

MPB Risk Rating	Existing Acres	Existing Percent (%)
Low	1,031	5 %
Medium	12,856	60 %
High	7,633	35 %
Total	21,520	100 %

Alternative 2 – Proposed Action

In this alternative 12,244 acres would be commercially harvested, including 6,063 acres of sanitation; 6,295 acres prescribe burned; and 22,305 acres of non-commercial treatments. An estimated volume of 30,127 CCF (14,110 MBF) and 8,075 CCF of POL is expected.

Direct and Indirect Effects

Group shelterwood (6,376 acres) is the main treatment proposed. Group shelterwood was recommended because many of the stands in the project area are not homogeneous, but rather have patches or groups of trees of various age classes throughout the stand. This prescription may include all phases of the shelterwood system such as overstory removal, commercial thin and shelterwood seed cut and would all be harvested to the same basal areas as previously mentioned. After harvest, residual trees would increase in yield as the size of existing trees and their diameter would increase due to reduced competition. The resulting less dense stands would provide a decreased risk of catastrophic wildfire.

POL thinning improves the residual stand by increasing the quality of the timber through the removal of damaged, diseased, and poorly formed trees. An increase of individual tree growth also occurs by releasing the remaining trees from competition.

In this alternative, 6,295 acres are planned for prescribed burning, of which 5,669 acres would occur in pine sites. Mortality limits were designed to prevent excessive mortality within pine stands differentiated by tree diameter sizes.

Structural Stage –Alternative 2 would move the project area toward Forest Plan structural stage objectives for MA 5.1. Timber harvesting would open up the stands and change stand densities and/or tree size depending on the treatment prescribed.

A shelterwood seed cut in the short term would cause more acres to move into SS4A by maintaining tree size but reducing stand density. Initially, more SS4A would need to be created in order to move to the other structural stages. A shelterwood seed cut is a regeneration cut; after implementation the area would regenerate naturally. The shelterwood seed cut would enable the stand to move towards early SS2 and SS3.

An overstory removal would change tree size from sawtimber (SS4) to seedlings/saplings (SS2) following the commercial harvest. This would increase the number of acres of SS2.

Commercial thinning would maintain tree size but depending on residual basal area, the stand could be reduced to SS4A or SS4B.

For SS4 pine sites, 13% of all stands within the management area would maintain a tree size of ‘very large’ (16” DBH or greater) with all alternatives. This is 3% over the target of 10%.

In the short term, the percentages for all structural stages after harvest would remain the same except SS4A and SS4B. Structural stage 4A would increase by 1% to 40%, which moves away from the objective of 25%. Structural stage 4B would decrease by 1% to 29%, which moves toward the objective of 25%. See Table 21 for SS comparisons by alternative.

Table 21. Alternative 2-ponderosa pine structural stages throughout MA 5.1, across the Black Hills National Forest

Structural Stage	Forest Plan Objective (%)	Existing Condition Ponderosa Pine Acres	Existing Condition (%)	Alt. 2 Ponderosa Pine Acres	Alt. 2 (%)
SS1	5%	26,760	6%	26,760	6%
SS2	5%	16,673	4%	16,673	4%
SS3A	10%	24,236	5%	24,320	5%
SS3B	15%	17,047	4%	17,090	4%
SS3C	5%	10,269	2%	10,269	2%
SS4A	25%	185,062	39%	188,909	40%
SS4B	25%	142,228	30%	138,133	29%
SS4C*	5%	50,437	11%	50,437	11%
SS5*	5%	1,227	0.3%	1,227	0.3%
Total	100%	473,393	100%	473,818	100%

*Note that SS4C and SS5 are not present within the Briggs Spring project area.

The forest objective for structural stages applies to the entire management area. Depending on the type of harvests that are prescribed and how many acres are treated will depend on how soon the percentages of the forest plan objectives are reached. Forest growth rates and funding of post harvest treatments also must be taken into consideration. As a result, it may take two or more decades to achieve the Forest Plan structural stage objectives (USDA Forest Service, 2005).

Mountain Pine Beetle – See “Common to All Action Alternatives” below.

Alternative 3

In this alternative 23,400 acres would be commercially harvested; 3,678 acres of sanitation treatment; 23,452 acres of non-commercial treatment, including 7,009 acres of prescribed burning; and an estimated volume of 41,531 CCF of sawtimber and 9,931 CCF of POL would be expected. This alternative harvests the most volume from the greatest amount of acres. This alternative was designed to treat the project area more aggressively and to incorporate more acres of preventative treatments for mountain pine beetle infestation.

Direct and Indirect Effects

The majority of proposed treatments would occur in ponderosa pine stands as in Alternative 2. This alternative proposes to treat more than 11,000 additional acres than Alternative 2.

Group shelterwood is the main proposed treatment as in Alternative 2; however Alternative 3 increases group shelterwood treatments to 7,469 more acres than Alternative 2. Alternative 3 has converted many of the sanitation only treatments from Alternative 2 to group shelterwood treatments. Group shelterwood may include all phases of the shelterwood system such as overstory removal, commercial thin and shelterwood seed cut.

After harvest, residual trees would increase in yield as the size of existing trees would increase due to the reduced competition and increased diameter growth as a result of less competition. These results would be the same as in Alternative 2, but spanning across more acres in the project area. There would be a greater decrease in catastrophic wildfire potential because of a more open canopy created by more acres treated than Alternative 2.

Up to 8,889 acres of POL thinning is proposed with this alternative. This is 411 more acres than Alternative 2. Trees less than 9-inches DBH would be thinned to a spacing of 18' x 18'. POL thinning improves the residual stand by increasing the quality of the timber through the removal of damaged, diseased, and poorly formed trees. An increase of individual tree growth also occurs by releasing the remaining trees from competition. Mechanical fuels treatments would increase by 22 acres more than Alternative 2, to 1,274 acres. These areas would be thinned to 14' x 14' spacing.

This alternative would prescribe burn 7,009 acres (5,964 acres of which are pine sites), which is 714 acres (295 acres of which are pine sites) more than Alternative 2. The same mortality limits listed in Alternative 2 would be used for Alternative 3.

Mountain Pine Beetle – Sanitation only treatments would be done in sites where no other commercial treatments are proposed. These sites were deferred from other treatments for wildlife reasons and to maintain the current stand structure. Sanitation would be implemented if the stand becomes infested with MPB. Alternative 3 increases the acres of commercial treatment from Alternative 2, resulting in 2,385 acres less than Alternative 2 of sanitation only treatment.

See “Common to All Action Alternatives” below.

Common to All Action Alternatives

Direct and Indirect Effects

Commercial thinning would occur on 2,204 acres where a basal area of 60ft²/ac would be prescribed for the majority of the stands. In areas with MPB infestation a 50ft²/ac would be prescribed. Overstory removal would occur on 138 acres to release established seedlings and 479 acres of shelterwood seed cut to regenerate mature pine stands.

A combination of POL (Products Other than Logs) thinning and a fuels treatment (deadfall) is proposed on 300 acres in both action alternatives. The fuels treatments are interspersed with the POL thinning. These acres are located within the Jasper Fire area on the south end of the project area. Trees less than 9-inch DBH would be thinned to a

spacing of 18'x18'. POL thinning improves the residual stand by increasing the quality of the timber through the removal of damaged, diseased, and poorly formed trees. An increase of individual tree growth also occurs by releasing the remaining trees from competition. The fuels treatment would be to reduce the existing slash to a height within 18-24 inches of the ground.

A combination of POL thinning and hardwood release is proposed on 564 acres in both action alternatives. Pine trees less than 9-inch DBH would be thinned to a spacing of 18'x18'. POL thinning improves the residual stand by increasing the quality of the timber through the removal of damaged, diseased, and poorly formed trees. An increase of individual tree growth also occurs by releasing the remaining trees from competition. Inclusions of aspen occur within these pine stands. Removing all sizes of competing conifers would allow more sunlight to reach the forest floor, which would promote sprouting.

The number of existing pine acres would decrease as 123 acres are converted from pine to aspen. Pine acres would decrease from 21,521 to 21,398 in both action alternatives, a 1% reduction. An additional 53 pine acres would be converted to aspen, but new sites would need to be created.

Mountain Pine Beetle – Both action alternatives would reduce the same amount of acres of pine in the high-risk and medium risk categories for MPB infestation. Acres in the high-risk rating would decrease by approximately 18% to 3,538 acres of ponderosa pine. Pine stands at the medium risk rating would increase by approximately 18% (16,745 acres). The low risk rating would remain the same at 5% (1,115 acres). See Table 22.

Table 22. Mountain pine beetle risk rating - Comparison for all alternatives

MPB Risk Rating	Existing Condition Acres Alt. 1	Existing Condition % Alt. 1	Acres Post-Sale Alt. 2	Post-Sale % Alt. 2	Acres Post-Sale Alt. 3	Post-Sale % Alt. 3	Change (%) from Existing Conditon
Low	1,031	5%	1,115	5%	1,115	5%	0%
Medium	12,857	60%	16,745	78%	16,745	78%	+ 18%
High	7,633	35%	3,538	17%	3,538	17%	- 18%
Total	21,521	100%	21,398*	100%	21,398*	100%	

*Pine acres minus 123 acres converted from pine to aspen or meadow.

Quaking Aspen

Alternative 1 – No Action

Under this alternative, no new vegetation management activities would occur within the project area.

Direct and Indirect Effects

This Alternative would not move the aspen stand conditions towards the forest objective.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Eighty-six acres would be prescribed burned in this alternative. A light prescribed fire could initiate a new cohort of suckers in an aspen clone by killing all of the exiting stems. Combining a harvest of conifer overstory with subsequent prescribed burning of scattered slash may most closely approximate the natural fire disturbances that historically maintained aspen in the Black Hills (Sheppard & Asherin, 2004).

Alternative 3

Direct and Indirect Effects

A commercial hardwood release would occur on 259 acres of aspen. This is nine acres more than Alternative 2. Removal of conifers 9-inches DBH or greater would be commercially harvested.

Alternative 3 would prescribe burn 255 acres of aspen stands. This is 169 acres more than Alternative 2. Prescribe burning would be used to stimulate suckering in aspen and introduce new age classes within aspen stands in this alternative.

Common to All Action Alternatives

Direct and Indirect Effects

Existing aspen acres (331 acres) would increase as three pine sites (123 acres) and portions of eight additional pine sites (53 acres) would be converted to aspen sites (total of 176 acres).

Aspen stands would receive more light, moisture, and nutrients, as the more shade tolerant conifers would be removed from the existing aspen stands. Removing conifers growing in and around an aspen clone can reduce competition for moisture and light, which will favor the aspen. Aspen roots extend a considerable distance away from existing stems. Clearing the surrounding conifer forest back 1-1.5 tree heights away from a declining aspen clone will allow new aspen suckers to establish and expand the area occupied by the clone (Sheppard & Battaglia, 2002). Eliminating conifers from the understory would keep conifers from taking over aspen stands in the future. Conifers less than 9-inches DBH would be removed as a post sale activity from the understory of 331 acres of existing aspen stands.

Understory Vegetation

Alternative 1 – No Action

Under this alternative, no new vegetation management activities would occur within the project area.

Direct and Indirect Effects

Within conifer stands, forbs, shrubs, and grasses would be shaded out reducing benefits to other resources such as wildlife and range. In areas with MPB infestation there would be an increase in forbs, shrubs, and grasses where MPB has caused mortality in pine allowing sunlight, moisture, and nutrients to become available to the understory vegetation creating more grass and forage for cattle and wildlife.

Alternative 2 – Proposed Action

Direct and Indirect Effects

This alternative would harvest and open up the canopy on 12,244 acres. This would allow an increase in light, nutrients, and moisture to become available to the understory vegetation of forbs, shrubs, and grasses. The result would be an increase in grass and forage for cattle and wildlife.

Alternative 3***Direct and Indirect Effects***

This alternative would harvest and open up the canopy on 23,400, which is 11,156 more acres than Alternative 2. This would allow an increase in light, nutrients, and moisture over more acres to become available to the understory vegetation. Forbs, shrubs, and grasses would increase creating more grass and forage for cattle and wildlife than Alternative 2.

Common to All Action Alternatives***Direct and Indirect Effects***

The understory vegetation within timbered stands could be set back in the short term (3-5 years) by prescribe burning. Shrubs may be temporarily reduced in size by the prescribe burning but most would re-sprout.

Meadows/Grasslands**Alternative 1 – No Action**

Under this alternative, no new vegetation management activities would occur within the project area.

Direct and Indirect Effects

Meadows would continue to be encroached by conifers, decreasing grass and forage production. Conifers currently growing in meadows would continue to increase in numbers, taking over the meadows. Meadows without conifer encroachment at present may eventually become encroached.

Alternative 2 – Proposed Action***Direct and Indirect Effects***

Prescribe burning in meadows could delay or help remove conifer regeneration from occurring if the tree seedlings are very small in size. Alternative 2 would prescribe burn 540 acres within meadow sites.

Alternative 3***Direct and Indirect Effects***

Prescribe burning in meadows could delay or help remove conifer regeneration from occurring if the tree seedlings are very small in size. Alternative 3 would prescribe burn 790 acres within meadow sites, which is 250 acres more than Alternative 2.

Common to All Action Alternatives

Direct and Indirect Effects

Approximately 2,674 acres of existing meadows would be maintained by removing encroaching pine in both action alternatives. All conifers are to be removed commercially for trees 9-inches DBH or greater or as a post harvest activity for trees less than 9-inches DBH.

Cumulative Effects

The Briggs Spring analysis area has been commercially harvested many times in the past with recorded activities going back to the 1960s. Post sale activities followed with natural disturbances occurring throughout the years, such as wildfires and insect and disease. Appendix X lists past, present, and future activities considered in this analysis.

Time Boundary (1980 to 2022) - Commercial and non-commercial treatments in the early 1980's are the earliest known activities that still affect the landscape today.

Implementation of activities could occur starting in 2012. Full implementation of all activities is expected to be completed by 2022.

Space Boundary - The Briggs Spring analysis area boundary will be used for the cumulative effects analysis. Harvest activities along with post sale activities are confined to the stand level while natural disturbances such as wildfire or insects and disease may be confined to the stand level or the project area.

Ponderosa Pine

Much of the Briggs Spring analysis area has been harvested in the past. At least 19 timber sales have taken place since 1980. The effect of past treatments has been an increase of merchantable volume growth and improvement in the quality of timber. There has also been an improvement in the quality of timber through removal of damaged, diseased, and poorly formed trees. Precommercial thinning has occurred and improved stand health by removing damaged, diseased, and poor quality trees.

Future treatments for the area might be further thinning or regeneration cuts. Any treatments for growth and yield purposes would not occur until stands became overstocked again or regeneration cuts were prescribed at culmination of mean annual increment or when more even-aged treatments were desired.

The Black Hills, including the Briggs Spring analysis area, had been in an on-going drought condition the last 10 years. While MPB does not depend on drought conditions for the insect to continuously increase their population, the drought aided the MPB by increasing stress in healthy trees thus making the trees more vulnerable to a successful MPB attack.

Thousands of acres of ponderosa pine in the analysis area had been harvested or precommercially thinned to a density that has left them more vulnerable to MPB attack than the currently proposed thinning densities. As a result, these stands are now encompassing a large area of even-aged trees, all of which are about the same size, with high-risk densities. Ponderosa pine trees with an average DBH of 7 inches or greater and basal areas over 80ft²/ac leave the stands susceptible to MPB infestation. Overall, 35%

of the analysis area is at high risk for MPB and 60% is at medium risk. Most of these stands would have been harvested before the MPB epidemic, leaving stands at a higher density than considered today.

The current epidemic has not shown signs of slowing down but continuously increasing in numbers. In 2010 the mapped acreage affected by MPB doubled, as compared with acres attributed to MPB during each of the previous three years, representing significant new pine mortality (Schaupp, 2011). From the mapping of the 2010 Aerial Overview Detection Survey, areas of MPB mortality have increased in the Briggs Spring analysis area.

There would be potential adverse cumulative effects to ponderosa pine with the no action alternative. Lack of vegetation treatment within ponderosa pine sites would amplify the potential for beetle populations to increase throughout the project area. Not harvesting ponderosa pine stands would encourage beetle populations to rise and would contribute to the MPB epidemic growing within the analysis area. The MPB population is expected to increase in numbers.

There would be positive cumulative effects under both of the action alternatives. Treatment of ponderosa pine stands intended to lower stand density would reduce the susceptibility to MPB infestation. The proposed activities would result in MPB caused mortality to decrease with the action alternatives.

Quaking Aspen

Many of the aspen stands have been invaded by conifers. Under the no action alternative, the aspen stands would not be released from competition by having conifers removed. This would result in a loss of aspen stands throughout the project area. Under the action alternatives the aspen stands would be released and not be further invaded by conifers as conifer seed sources would be removed. Future hardwood releases and prescribed burning would maintain and enhance the existing aspen stands.

Understory Vegetation

Past harvest activities have opened the forest canopy and produced more understory vegetation in forest stands. In the long term (greater than 10 years) trees would re-occupy the understory and future treatments would be needed to maintain and enhance understory vegetation.

Under the no action alternative, canopy closure would continue to increase through time and less and less understory vegetation would be present under the forest canopy. Currently dense stands would not have their canopy opened up. Existing stands with a more open canopy would start to close as tree crowns grow together and additional trees begin to grow from regeneration.

There would be no adverse cumulative effects to understory vegetation as a result of the action alternatives. Both action alternatives would improve understory vegetation by opening up the forest canopy.

Meadows/Grasslands

The historic meadow sites within the project area have been encroached upon by conifers. Pine encroachment would occur in both action alternatives. Removing conifers of all sizes would fully restore existing meadows. As a result increased grass and forage production would occur. Proposed non-commercial treatments would remove any new pine invasion from adjacent forest stands, maintaining the meadows. There would be no adverse cumulative effects to meadows in the project area as a result of either action alternative.

The cumulative effect under the no action alternative would be that ponderosa pine would remain in meadows and continue to seed into more trees, eventually replacing existing meadow sites. Grass and forage production would continue to decrease.

Wildlife

Affected Environment

Vegetative conditions in the project area were described in Tables 12 & 13 in the Silviculture section. The project area contains many different habitat types. Some of these include: ponderosa pine (*Pinus ponderosa*)/common juniper (*Juniperus communis*), ponderosa pine/bearberry (*Arctostaphylos uva-ursi*), ponderosa pine/snowberry (*Symphoricarpos albus*), quaking aspen (*Populus tremuloides*)/bracken fern (*Pteridium aquilinum*), bebb willow (*Salix bebbiana*) shrubland, shrubby cinquefoil (*Potentilla fruticosa*) shrubland, western snowberry (*Symphoricarpos occidentalis*) shrubland, and a small acreage of white spruce (*Picea glauca*)/grouseberry (*Vaccinium scoparium*). The project area is large and therefore consists of many habitat classifications (see Marriott & Faber-Langendoen, 2000 for detailed descriptions of each habitat type).

Topography is generally gentle rolling hills that support contiguous pine stands broken by meadows and/or grasslands with or without aspen. The majority of the meadow/grassland acreage is on private lands, mostly unoccupied, within the project boundary. This project area contains a mixture of tree species such as aspen and ponderosa pine. Spruce is very limited within the project area. There are several intermittent/ephemeral drainages within the project area but no measurable perennial reaches. Developed and undeveloped springs are present on Forest Service lands. The project area has an extensive road system. The road density for all roads within the project area is 2.8 miles/square mile. These roads provide access for various forest management activities and recreational use, including snowmobile routes. In addition there are approximately 13 miles of system OHV trails within the project area.

Refer to the Forest Vegetation section presented earlier in this chapter for more information on these habitat components and the effects of the alternatives on each. The cumulative effects area for this analysis includes the project area boundary and activities that have occurred within the last 10 years and 10 years into the future. Appendix F provides a summary of past, present, and reasonably foreseeable future activities considered in the cumulative effects analysis.

Snags and Down Woody Material

Stand exam data collected in 2004 and 2005 was used to determine amounts of down woody material and snag numbers. Data shows sufficient amounts of down woody debris throughout the Briggs Spring project area. Down woody material either meets or exceeds Forest Plan Standard 2308. Snags ≥ 9 " diameter at breast height (DBH) and ≥ 25 feet in height were tallied from the stand exam data tree sheets. Snags per acre ranged from 0.80 to 9.33 across the project area. The average snag density by location was 2.92 snags/acre. Snag densities in this project area, from data in 2004 and 2005, were below Objective 211. Areas where mountain pine beetles (MPB) were evident generally had higher snag and down woody material counts and snag clumping was common.

Mountain pine beetle infestations are present within the Briggs Spring project area. There are 7,764 acres of pine habitat present in the project area that are considered at high risk for MPB infestation. High risk sites are those pine stands that are designated as structural stages 3B, 3C, 4B, 4C and 5. Pine beetles and recent fires have created more snags and downed wood in the last five years. Wildfires have occurred in the project area, one of the most recent was the Jasper Fire. Jasper burned more than 83,000 acres on the Forest in 2000, creating many snags. More than 4,500 acres were burned within the Briggs Spring project area boundary.

A new policy is in effect allowing cutting of snags, for fuelwood, within 300' of roads where dispersed camping is also permitted. Within the Briggs Spring project area that would include the area north of Six Mile Road (FSR 301) to the northern extent of the project boundary. Refer to the latest Motorized Vehicle Use Map (MVUM) (implemented December 1, 2010) for areas allowing snag cutting. For the rest of the project area, Standard 2304 would apply and snags would not be cut.

Riparian Habitat

Perennial reaches of water in the Briggs Spring project area are lacking. There are intermittent and ephemeral reaches in the project area as well as numerous ponds, reservoirs and springs. Numerous reservoirs have been created for livestock watering within the project area. Ponds have also been specifically created for wildlife use. Northern leopard frogs, a Region 2 (R2) sensitive species, were found at one of these riparian areas created for wildlife in 2010 surveys. Currently, some riparian areas within the Briggs Spring project boundary are meeting Forest Plan Guidelines 3210 and 3211 for riparian health. There are riparian areas that could use enhancements.

Management Indicator Species (MIS)

The Phase II Amendment to the 1997 Forest Plan-FEIS (USDA Forest Service, 2005) lists MIS to be considered during project-level planning. MIS species were selected from that list for analysis if they have habitat or populations present within the Briggs Spring project area. Some MIS species have other status (such as R2 sensitive), and additional analyses are provided for them in the Briggs Spring Biological Assessment/Biological Evaluation (BA/BE). Full analyses and rationale are found in the Briggs Spring project record.

The MIS species carried forward in this document are:

- White-tailed deer

- Grasshopper sparrow
- Black-backed woodpecker
- Brown creeper
- Ruffed grouse

Monitoring of MIS is accomplished through coordinated efforts involving US Forest Service biologists, research, contracted monitoring surveys and State agencies. Forest monitoring of land bird species is accomplished currently by a contract with the Rocky Mountain Bird Observatory (RMBO). Game species (e.g., white-tailed deer) are monitored by a combination of research by South Dakota State University (SDSU), South Dakota Game, Fish, and Parks (SDGFP) biologists and reported observations.

White-tailed Deer (MIS)

The Briggs Spring area is mainly spring, summer and fall range for white-tailed deer (*Odocoileus virginianus*); although they may inhabit the area in winter if the season is mild. Usually if snow depths exceed 6" deep, deer move to lower elevations. The Briggs Spring area is normally snow covered all winter. For white-tailed deer, spring migration back to summer range generally takes place from mid-to-late May. Fall migration to winter range is normally done during the September to October time frame but is primarily dependent on snow accumulation (Griffin et al., 1999). During field surveys in 2007, 2008, and 2010, white-tailed deer were commonly observed. The area is used for white-tailed deer fawning.

Habitat trend at the Forest-level suggests that summer habitat is increasing while winter habitat is stable to slightly decreasing. The Forest is meeting Objective 238a, with regard to summer habitat, but the Forest may not be maintaining winter habitat, although the decline might not be significant (USDA Forest Service, 2009).

Big Game Screening – Screen cover is defined as: being able to hide 90% of an adult deer or elk from human view at a distance of 200 feet or less (of the road). There are six collector and arterial roads in the Briggs Spring project area where the screening cover requirement (*Guideline 3203*) applies. Currently five of the six roads are in compliance (Table 23). Screening cover was determined by driving these six roads and measuring distances providing adequate screening cover either from vegetation (generally pine regeneration) or topography (slope and landform). These measurements were then compared to total distances (through Forest Service lands only) along the roads.

One arterial road, FSR 301, has inadequate hiding cover (less than 20%). Many of the sites along this road have been treated (harvested) and have an open canopy. Regeneration is not yet adequate to provide 20% hiding cover. Four of the six roads have more than adequate screen cover from vegetation and/or topography. Arterial road FSR 117.1 has just over the recommended 20% hiding cover.

Table 23. Existing screening cover in the Briggs Spring project area on Forest lands

Roads	Functional Class	Percent Screening Cover
117.1	Arterial	21%
284	Arterial	28%
284.5D	Collector	27%

294	Collector	31%
296.1	Collector	42%
301	Arterial	10%

Grasshopper Sparrow (MIS and R2 Sensitive Species)

The grasshopper sparrow (*Ammodramus savannarum*) is considered a locally common migrant and summer resident for South Dakota (Tallman et al., 2002). Monitoring in 2002 showed that grasshopper sparrows were found almost exclusively in native mixed grass prairies in the Black Hills (Panjabi, 2003), however, they have been recently recorded in the Jasper Fire burn area (Panjabi, 2005) and the Rogers Shack Fire burn areas (White & Giroir, 2009). Observations by the Rocky Mountain Bird Observatory (RMBO) tripled from 2004 to 2006 (Giroir et al., 2007). Suitable habitat is present in the Briggs Spring project area. The Jasper fire of 2000 has created suitable habitat for the grasshopper sparrow in the project area.

Black-backed Woodpecker (MIS and R2 Sensitive Species)

The black-backed woodpecker (*Picoides arcticus*) is distributed in low densities throughout most of the Black Hills. In the Black Hills, the black-backed woodpecker seems to favor late successional pine forests and areas that have been burned over or impacted by insects. Research conducted by Mohren (2002) indicated that this species prefers dense stands of mature ponderosa pine (SS 4C) and avoids the more open nature of SS4A and 4B stands. In 2005-2007, there was almost 2-3 times as much SS4C available than is desired by the Forest Plan objectives (USDA Forest Service, 2006; 2007; 2008). There are currently 7,590 acres of SS4B ponderosa pine and no SS4C ponderosa pine acres within the project area.

Throughout the Black Hills National Forest, a total of 7,672 acres of burned forest habitat was created and largely retained over the last five years (USDA Forest Service, 2010). Where wildfires have recently occurred, the species has been observed much more frequently and in higher densities. The “aging” of large burned areas, such as the Jasper Fire, into less suitable habitat is likely being offset by the increasing acreage of insect-infested timber stands and the stable acreage of large diameter, older pine trees. Tree mortality from insects from 1996-2007 is estimated at 300,000 acres, and insect-infested timber stands are increasing. Overall the habitat is relatively abundant and Forest Plan Objective 238b is being met on the Forest. This species’ Forest-wide population trend is likely to decline in the future as vegetation management efforts to reduce the fire-hazard and insect-risk continue (USDA Forest Service, 2010).

Potential suitable habitat is present in the project area. Late succession stands containing large diameter dead trees (snags) created by natural events (wind, lightning), areas of mountain pine beetle activity, and burned acres are present within or adjacent to the Briggs Spring project area. From 2001-2007 the RMBO has observed black-backed woodpeckers just south of the project boundary (Panjabi, 2001, 2003-2005; Giroir et al., 2007). In 2005 one was observed within the project area (Beason et al., 2006).

Brown Creeper (MIS)

The brown creeper (*Certhia Americana*) is considered an uncommon permanent resident of the Black Hills (Tallman et al., 2002), largely tied to late-succession pine and white-

spruce habitats (Panjabi, 2003, 2005). In 2007 brown creepers were observed during RMBO surveys in all forested habitat types and burn habitat (Giroir et al., 2007). In 2002, 2003 and 2005 brown creepers were observed in the project area (Panjabi, 2003, 2004; Beason et al., 2006).

Observation data for the brown creeper reveals a short-term downward Forest-wide population trend. It appears that Objective 238a is being met, although short-term activities to meet the SS4C objective may be affecting the Forest's ability to provide very large trees in SS4C. Continued effort and additional time is needed to increase the acres of SS5 (USDA Forest Service, 2008; 2009).

Ruffed Grouse (MIS)

Ruffed grouse (*Bonasa umbellus*) is considered an uncommon permanent resident in the Black Hills (Tallman et al., 2002) with greatest abundance in the northern Hills (Panjabi, 2003). Ruffed grouse prefer young to medium aged aspen stands (Tallman et al., 2002) but have been observed in other habitat types in the Black Hills (Panjabi, 2003). In 2002 and 2005 ruffed grouse were observed just north of the project area (Panjabi, 2003; Beason et al., 2006).

Aspen acreage in the project area totals 331 acres. This does not include scattered hardwood clones within conifer dominated sites. The hardwood sites represent many structural stages from SS2 up to SS4B (Table 13 in the Silviculture section). A good portion of the existing aspen acreage is in the northern tip of the project area.

Species of Local Concern (SOLC)

Black Hills Supplement "r2_bh_2600-2005-1" to Forest Service Manual 2600 became effective November 7, 2005 and provides direction for the management of SOLC (USDA Forest Service, 2005a). As defined by this supplement, a species of local concern is a plant, fish or wildlife species (including subspecies or varieties) that does not meet the criteria for sensitive status. These could include species with declining trends in only a portion of R2, or those that are important components of diversity in a local area. The local area is defined as Forest Service lands within the Black Hills National Forest. This supplement also provides a detailed explanation of the evaluation criteria used to select species of local concern and a current list for the Black Hills National Forest (USDA Forest Service, 2005a).

Only SOLC species that occur in the Briggs Spring project area or whose habitat occurs in the project area is carried forward in this document. Full analyses and rationale are found in the Briggs Spring project record.

The SOLC species carried forward in this document are:

- Butterflies:
 - o Atlantis fritillary
 - o Tawny crescent
- Snails:
 - o Callused vertigo
 - o Mystery vertigo
 - o Frigid ambersnail

- o Striate disc
- Sharp-shinned hawk
- Cooper's hawk
- Broad-winged hawk
- Northern saw-whet owl
- Pygmy nuthatch
- Bats:
 - o Northern long-eared myotis
 - o Small-footed myotis
 - o Long-eared myotis
 - o Long-legged myotis
 - o Northern flying squirrel
 - o Meadow jumping mouse

Atlantis Fritillary (SOLC)

The Atlantis fritillary (*Speyeria atlantis pahasapae*) is an endemic butterfly of the Black Hills. In general, it occurs in riparian areas adjacent to openings, moist meadows and in boreal forests (NatureServe, 2009). In the Black Hills, this subspecies is restricted to Custer, Lawrence, and Pennington counties. It prefers wet meadows and moist canyons (Marrone, 2002).

Due to the restricted nature of the Atlantic fritillary's distribution in the Black Hills, development or management activities within suitable habitats pose a risk to long-term persistence. Much of the fritillary's habitat is privately owned. There are currently no reliable estimates of the Black Hills population (NatureServe, 2009). No records were found of this species in the project area.

Tawny Crescent (SOLC)

In South Dakota, the tawny crescent (*Phycoides batesii*) is restricted in its distribution to the Black Hills. The populations inhabiting the Black Hills of South Dakota and Wyoming are considered genetically isolated and disjunct from crescents elsewhere (Royer & Marrone, 1992). Tawny crescents were observed at two of 20 monitoring sites on the Mystic Ranger District in 2002 (USDA Forest Service, 2004). However, there continue to be no reliable estimates of local abundance or population estimates for the Black Hills (Stefanich, 2001). Stefanich (2001) hypothesized that the only limiting factor in the Black Hills is the destruction of this butterfly's habitat or isolation of colonies to the extent that populations are unable to disperse. No records were found of this species in the project area.

Callused Vertigo (SOLC)

In 2007 and 2008 surveys were conducted by biological technicians. No callused vertigo (*Vertigo arthuri*) snails were found in the project area. In 2002, the Forest received the final report for a contract to inventory and/or monitor 357 sites for land snails (Frest & Johannes, 2002). Callused vertigo was found sparingly in 63 of the 357 sites inventoried/monitored. Specimens were found at Frest site 73, northeast of the decommissioned Moon Campground, within the Briggs Spring project area (refer to Frest & Johannes, 2002 for exact location of this site).

The narrowly restricted geographical range of the callused vertigo includes South Dakota (51 sites), Wyoming (12 sites in the Bear Lodge Mountains), North Dakota, Minnesota, and Alberta (Frest & Johannes, 2002). The callused vertigo is currently ranked imperiled globally and in South Dakota; it has not been ranked in Wyoming (NatureServe, 2009).

The monitoring protocol for snails was not funded in 2005 - 2008 (USDA Forest Service, 2006a; 2007; 2008; 2009); therefore data to assess the status of SOLC snails is not available. Avoidance of known sites is currently the best available option for conserving and/or enhancing habitat at known snail colonies.

Mystery Vertigo (SOLC)

In 2002, the Forest received the final report for a contract to inventory and/or monitor 357 sites for land snails (Frest & Johannes, 2002). Mystery vertigo (*Vertigo paradoxa*) was found in 23 of the 357 sites inventoried/monitored. They were not generally abundant at any site. This snail was not found in the Briggs Spring project area by Frest or by biological technicians (2007 and 2008). All sites with mystery vertigo were in the central or northern Black Hills or the Bear Lodge Mountains in Wyoming.

The mystery vertigo is rare in the United States and occurs only in South Dakota (21 sites); Wyoming (2 sites in the Bear Lodge Mountains); Michigan (1 site); Maine (2 counties); and a few northern Wisconsin, Michigan, and Minnesota sites (Frest & Johannes, 2002). The species appears to be more common in adjoining areas of southern Canada, generally from the Great Lakes eastward. Mystery vertigo is currently ranked vulnerable globally and critically imperiled in South Dakota; it has not been ranked in Wyoming (NatureServe, 2009).

Frigid Ambersnail (SOLC)

In 2002, the Forest received the final report for a contract to inventory and/or monitor 357 sites for land snails (Frest & Johannes, 2002). The frigid ambersnail (*Catinella gelida*) was found in 12 (none of which are in the Briggs Spring project area) of the 357 sites inventoried/monitored. The frigid ambersnail was rare at all locations, and very few live adults were observed during the early 1990's surveys. Locations are widely distributed geographically across the Forest at varying elevations (3,800 to 6,800 feet).

The frigid ambersnail is currently found only in Iowa (14 sites), South Dakota (12 sites), and Wisconsin (Frest & Johannes, 2002). The frigid ambersnail is currently ranked as critically imperiled globally and in South Dakota and Iowa; it is ranked imperiled/critically imperiled in Wisconsin (NatureServe, 2009). The state of Iowa considers the frigid ambersnail an endangered species. At the time of this report, a status review is underway to determine if the frigid ambersnail warrants listing under the Endangered Species Act (ESA). This snail was not found in the Briggs Spring project area by Frest or by biological technicians (2007 and 2008).

Striate Disc (SOLC)

In 2002, the Forest received the final report for a contract to inventory and/or monitor 357 sites for land snails (Frest & Johannes, 2002). The striate disc (*Discus shimekii*) was found live in only 18 of the 357 sites inventoried/monitored. Sites where the striate disc occurs appear restricted to the higher elevations of the limestone plateau of the west-central and north-central portions of the Black Hills.

The range of the striate disc includes Wyoming (2 sites), Montana (1), Colorado (perhaps 26 sites), South Dakota (1), Oregon (1), California (2), Utah (5), Arizona (3), and New Mexico (7) (Frest & Johannes, 2002). Hendricks (2003) also lists 5 records in Montana. Live sites have also been reported from several Canadian provinces. The striate disc is currently ranked globally as G5 (secure), and S2 (imperiled) in South Dakota (NatureServe, 2009). No striate disc snails were found during district survey efforts and none were located in the four Frest sites within the Briggs Spring project area.

Sharp-shinned Hawk (SOLC)

In South Dakota, the sharp-shinned hawk (*Accipiter striatus*) is considered “uncommon,” with the only recorded occurrences in the western part of the state (Peterson, 1995). In the Black Hills, they have been observed at all elevations (Peterson, 1995), but estimates of local abundance are not available due to their low numbers (Panjabi, 2003). The species has been observed an average of three times per year since bird monitoring began in 2001 (Giroir et al., 2007).

On the Black Hills National Forest, sharp-shinned hawk nests occur in white spruce (Stephens & Anderson, 2002) and ponderosa pine (district biologists). Sharp-shinned hawks have also recently been detected in riparian, aspen, and burned habitats on the Forest, but these were not observations of nest sites (Panjabi, 2001; 2003; 2005). Sharp-shinned hawks occur in most forest types across their range (Bildstein & Meyer, 2000). The amount of potential nesting habitat (SS3B, SS3C, SS4B, SS4C and SS5 ponderosa pine) in the project area is 7,764 acres or 32% of the project area. There is no SS4C or SS5 in the project area.

A single sharp-shinned hawk has been observed in the project area north and east of Redbank Spring Campground in recent years. There are no known nests in the project area.

Cooper’s Hawk (SOLC)

In South Dakota, the Cooper’s hawk (*Accipiter cooperi*) is considered “uncommon,” with the only recorded occurrences in the western part of the state (Peterson, 1995). The Cooper’s hawk has been observed in a variety of habitats in the Black Hills, including ponderosa pine, white spruce, riparian, shrublands, and burned areas (Panjabi, 2001; 2003; 2005; Peterson, 1995). The species appears to be widespread but uncommon on the Forest. Bird monitoring over the past three years has yielded an average of five sightings per year (Giroir et al., 2007).

In ponderosa pine, SS4B (mature stands with 40 to 70% canopy closure), SS4C (mature stands with >70% canopy closure), and SS5 (late succession) correspond most closely to the nesting habitat preferences of the Cooper’s hawk. There are currently 7,590 acres of SS4B pine in the project area. There are no acres of SS4C or SS5 in the project area.

There are no known sightings or nests of the Cooper’s hawk in the project area.

Broad-winged Hawk (SOLC)

In the Black Hills, the broad-winged hawk (*Buteo platypterus*) nests primarily in ponderosa pine, in mixed pine and deciduous habitats, occasionally with a white spruce component (Powder River Eagle Studies, 2000). It is expected that late-successional pine

and aspen make-up the majority of desirable habitat for the species in the Black Hills (Panjabi, 2005). Although considered rare in South Dakota (Peterson, 1995), the species was the second most frequently encountered raptor during surveys in 1996 and 1997 (Powder River Eagle Studies, 2000). Of the 27 broad-winged hawk nests found on the Forest, 25 were in ponderosa pine while one was in an aspen and one was in a paper birch. Nest trees had an average DBH of about 16 inches; canopy closure in nest stands averaged 66% with a range of 45 to 96% (Stephens & Anderson, 2003). These nest-stand characteristics equate to SS4B, SS4C and SS5. Nest sites typically were in areas with slopes less than 10%. No association between nest sites and forest openings or wetlands was detected on the Forest (Stephens & Anderson, 2003).

There were 24 broad-winged hawks identified along transects in 2004, mainly in the northern Black Hills and Bear Lodge mountains. Fourteen of these were located in aspen, eight in late-successional pine and two in the Jasper Burn Area (Panjabi, 2005). Nineteen were detected in 2005. Only two were detected in 2009 (USDA Forest Service, 2010). There are no known sightings or nests of the broad-winged hawk in the project area.

Northern Saw-whet Owl (SOLC)

In South Dakota, the northern saw-whet owl (*Aegolius acadicus*) is considered an uncommon resident (Tallman et al., 2002). The saw-whet owl was determined to be widely distributed and common in the Black Hills (Fauna West Wildlife Consultants, 2003; Drilling, 2010). In the Black Hills, seasonal migration is likely among high- and low-elevation habitat (Johnson & Anderson, 2003). The northern saw-whet owl is tracked by the South Dakota Natural Heritage Program (SDNHP) as a rare species and is ranked three on a rarity scale of one to five, with one being critically imperiled and five being secure (SDNHP, 2006).

Structural stages 4C and SS5 most closely resemble the preferred breeding and nesting habitat for the saw-whet owl. The Briggs Spring project area is lacking SS4C and SS5 acreage, however there may be small suitable pockets of habitat. There are no known sightings or nests in the project area.

Pygmy Nuthatch (SOLC)

The pygmy nuthatch (*Sitta pygmaea*) subspecies of the Black Hills (*Sitta pygmaea melanotis*) is found from southern interior British Columbia and south throughout the forests of the Rocky Mountain West into Mexico and western Texas (DeGraaf et al., 1991). It is considered an uncommon resident in South Dakota (Peterson, 1995). There are no reliable estimates of pygmy nuthatch abundance for the Black Hills (Ghalambor, 2003). Estimates of local abundance are unavailable due to the scarcity of this species and its unpredictable distribution (Panjabi, 2003). From 2001 through 2007 RMBO has recorded 19 pygmy nuthatches on the Forest in eight different habitat types (Giroir et al., 2007). Three pygmy nuthatches were recorded by RMBO in 2009 (USDA Forest Service, 2010).

There are no records of sightings in the project area.

Northern Long-eared Myotis (SOLC)

At the western edge of its range, the northern long-eared myotis (*Myotis septentrionalis*) is found in the wooded riparian zone in badlands and prairies to higher elevation coniferous and deciduous woodlands. In the Black Hills region, this species has been captured at elevations ranging from 4,000 to 6,500 feet (Schmidt, 2003a). Turner (1974) reported northern myotis from Pennington and Custer counties in South Dakota. NatureServe (2009) reported records of this species from Meade and Lawrence counties as well.

Luce et al. (1999) listed habitat associations as dense ponderosa pine and mixed coniferous/deciduous forest. Hibernacula for this species include mines and caves. Northern myotis have been documented using ponderosa pine snags as summer/maternity roosts in the Black Hills (Cryan et al., 2001) and in other regions (Rabe et al., 1998).

A northern myotis was observed on private land, southeast of Moon Campground, within the project area in August 1993. No caves or mines were found in the Briggs Spring project area during field surveys.

Small-footed Myotis (SOLC)

In the Black Hills region, the small-footed myotis (*Myotis ciliolabrum*) has been captured at elevations ranging from 3,800 to 6,000 feet (Schmidt, 2003b). Hibernacula for this species include mines and caves. Maternity and summer roosts are usually associated with rock features (e.g., bluffs, ridges, cliffs, boulders, and major outcroppings) within a variety of habitats (Schmidt, 2003b). The small-footed myotis is one of the few bat species that actually roosts in cavities at ground level.

This species has been reported from all five South Dakota counties of the Black Hills (Turner, 1974). Turner (1974) reported this species as widespread but not abundant in the Black Hills. No records were found for this species in the project area. No caves or mines were found in the Briggs Spring project area during field surveys.

Long-eared Myotis (SOLC)

The only records of long-eared myotis (*Myotis evotis*) in the Black Hills come from unpublished reports. It is unknown whether the Black Hills supports a self-sustaining population. This species is associated with coniferous montane habitats and has been reported foraging among trees and over woodland ponds (Schmidt, 2003c). Limited data suggest that the long-eared myotis uses ponderosa pine snags as summer and maternity roosts in other regions (Rabe et al., 1998; Vonhof & Barclay, 1997). Although relatively little is known about this bat's specific hibernation needs, hibernation sites include caves and mines (Higgins et al., 2000), but there are no known reports of them hibernating in the Black Hills (Schmidt, 2003c).

No records were found for this species in the project area. No caves or mines were found in the Briggs Spring project area during field surveys.

Long-legged Myotis (SOLC)

The long-legged myotis (*Myotis volans*) is considered the most common and widely distributed member of the genus *Myotis* in the Black Hills region and has been reported from all counties occupied by the Black Hills in both South Dakota and Wyoming (Schmidt, 2003d; Luce et al., 1999; Clark & Stromberg, 1987; Turner, 1974).

In the Black Hills, this species occurs primarily at elevations between 4,500 and 6,500 feet (Turner, 1974). This species has been documented using ponderosa pine snags as summer/maternity roosts in the Black Hills (Cryan et al., 2001) and in other regions (Rabe et al., 1998). Cryan et al. (2001) found the long-legged myotis roosting in rock crevices in the Black Hills where they may be subject to disturbance by rock climbing activities. Snags used for roosting in the Black Hills were larger in diameter, in a greater state of decay, and were in higher densities when compared to random snags (Cryan et al., 2001). Hibernating individuals are known to use caves in the Black Hills, including Bush's and Jewel Caves (Schmidt, 2003d; Luce et al., 1999; Turner, 1974).

The long-legged myotis forages over meadows, ponds, streams, and open mesic habitats of the Black Hills where it feeds on flying insects, particularly moths (Luce et al., 1999; Turner, 1974). Although this species is the most common and widely distributed bat in the Black Hills (Turner, 1974), general limits to persistence include availability of roost sites, hibernacula, and foraging areas. The reported preference of this bat for roosting in snags suggests that the availability of mature forests with abundant snags may be a limiting factor (Schmidt, 2003d).

No records were found for this species in the project area. No caves or mines were found in the Briggs Spring project area during field surveys.

Northern Flying Squirrel (SOLC)

There is a lack of specific data on habitat use by northern flying squirrels (*Glaucomys sabrinus*) in the Black Hills. Turner (1974) noted that the highest densities are likely found in white spruce forests in moist canyons of the northern Black Hills. Duckwitz (2001) found flying squirrels in Wind Cave National Park in ponderosa pine types that had an open canopy allowing understory grasses to prosper. Open pine types may provide the "openness" necessary for gliding. Locations where flying squirrels were found in Wind Cave National Park did have large pines while stands of dense dog-hair pine were avoided (Duckwitz, 2001).

The northern flying squirrel in the Black Hills is an isolated population with the nearest population located in the forests of western Wyoming (Clark & Stromberg, 1987; Wells-Gosling & Heaney, 1984).

Meadow Jumping Mouse (SOLC)

Meadow jumping mice range across Alaska through Canada, the northern and eastern United States, and across the Great Plains to the eastern foothills of the Rocky Mountains (WYNDD, 2002; Whitaker, 1972). The Bear Lodge meadow jumping mouse (*Zapus hudsonius campestris*) is a separate subspecies that occurs in the Black Hills region (Beauvais, 2001). There are seven recorded occurrences of this species on the Bearlodge Mountains of the Black Hills, including the type specimen collected in 1864 (WYNDD, 2002). Turner (1974) collected a total of 207 specimens from across the Black Hills and Bear Lodge Mountains in South Dakota and Wyoming. He collected the species as far south as Wind Cave National Park and characterized it as common throughout the study area (Black Hills and Bear Lodge Mountains).

There are no known observations of this species in the Briggs Spring project area.

Threatened and Endangered Species

A list of federally threatened, endangered and proposed species has been provided by the U.S. Fish and Wildlife Service (USFWS), South Dakota State Office, and was last updated on December 21, 2010 (USFWS, 2011). The South Dakota State Office is the primary center for all of the Black Hills, including Wyoming. The USFWS lists the following endangered and/or threatened species for Pennington County, South Dakota: whooping crane, least tern and black-footed ferret. No known occurrences or suitable habitat for these species exists in the Briggs Spring project area.

Consultation with U.S. Fish and Wildlife Service

The whooping crane and least tern have been removed from the list of species considered on the Black Hills National Forest under section 7 consultation (letter of concurrence from D. Gober, Field Supervisor, USFWS, Pierre, South Dakota, dated August 8, 2003). Although the black-footed ferret is listed for Pennington County, it is an experimental population located in eastern Pennington County, where they have been re-introduced into Badlands National Park and the Conata Basin of Buffalo Gap National Grassland. Habitat for the black-footed ferret is not present in the project area. There are no prairie dog colonies present.

With the determination that there are no federally listed species in the project area, no further consultation with the USFWS pursuant to the Endangered Species Act is required.

As of August 8th, 2007 the **bald eagle** was removed from the list of threatened and endangered species under the Endangered Species Act. The bald eagle continues to be protected under the Bald and Golden Eagle Protection Act, and the Migratory Bird Treaty Act. And, in accordance with Regional policy, upon de-listing the bald eagle is automatically given sensitive species status for a period of at least 5 years to ensure recovery of the species is maintained over that period (R2 Supplement, FSM 2672.11 (6)).

There are no Threatened or Endangered species which have habitat within the Briggs Spring project area. Refer to the wildlife BA/BE in the project record.

Region 2 (R2) Sensitive Species

The current sensitive species list for the Rocky Mountain Region (R2) was renewed on June 9, 2009. Sensitive species for the Black Hills National Forest are listed on the R2 threatened, endangered, and sensitive species home webpage (USDA Forest Service, 2010a).

The pre-field review of R2 sensitive species and federally endangered, threatened and proposed species was completed using survey results, district records, communication with District personnel, literature reviews, on-line databases and the South Dakota Natural Heritage Database. Of the 26 R2 sensitive species, six species are present and have suitable habitat in the project area, seven species are not present but suitable habitat exists in the project area. These 13 species may be impacted by the Briggs Spring project.

Species & Habitat Present:

- Bald eagle

- Northern goshawk
- Northern harrier
- Black-backed woodpecker
- Northern leopard frog
- Black Hills redbelly snake

Species Not Present/Habitat Present

- Fringed myotis
- Townsend's big-eared bat
- Flammulated owl
- Lewis's woodpecker
- Grasshopper sparrow
- Cooper's mountain snail
- Regal fritillary butterfly

These sensitive species were analyzed in the Briggs Spring Wildlife BA/BE due to the species presence or presence of potential habitat in the project area. Two of the species listed, the black-backed woodpecker and grasshopper sparrow, are also designated as MIS species. Those species with dual MIS and R2 Sensitive Species designations will be discussed under the MIS section.

Bald Eagle (R2 Sensitive Species)

Bald eagles (*Haliaeetus leucocephalus*) have been documented in all counties in the Black Hills. In South Dakota, approximately 300 bald eagles winter in the Black Hills and along the Missouri River (USFWS, 2010). In the Black Hills, this species utilizes winter habitat where carrion is available (along highways and in big game winter range) and where there are open lakes and streams. In addition, this species population is in an upward trend in South Dakota with successful nesting in twenty-two counties (South Dakota Game, Fish and Parks [SDGFP], 2010a). South Dakota trends based on mid-winter surveys are reported by the SDGFP (2010b). The first nesting attempt in the Black Hills was in 2007 at Deerfield Reservoir (USDA Forest Service, 2009).

There have been no reported bald eagle sightings during the breeding season in the project area. The project area lacks any suitable nesting habitat for the bald eagle. Bald eagles have been sighted in the Briggs Spring project area during winter.

Northern Goshawk (R2 Sensitive Species)

In the Black Hills, the northern goshawk (*Accipiter gentilis*) is considered a rare permanent resident and has been found nesting in all the counties in the Black Hills (Tallman et al., 2002).

In the Black Hills, this species is usually found in ponderosa pine, especially in more closed canopy with multiple vegetation structure. Nest stands are typically mature, closed canopy (greater than 60%) ponderosa stands with high basal area. Little is known about migration of this species (NatureServe, 2009).

There is foraging and nesting habitat in the Briggs Spring project area. The nesting habitat is limited. There are two known goshawk territories. One of these territories was found due to new survey efforts within the project area in 2007. The other territory is

historical with success prior to 2007. Both nest territories were active in 2007. Neither was successful in 2008. In 2009 both were successful. Neither was successful in 2010. These two territories are monitored yearly.

Northern Harrier (R2 Sensitive Species)

The northern harrier (*Circus cyaneus*) is considered an uncommon migrant and summer resident in South Dakota (Tallman et al., 2002). Although the Black Hills is not considered within their range, recent large fires in the central and southern Hills may have produced desirable habitat. Northern harriers have been seen on a few occasions in the Jasper Burn Area, near Elk Mountain and in large grasslands/meadows (personal observation).

The open grasslands/meadows within the Briggs Spring project area provide suitable foraging and nesting habitat for the northern harrier. The Jasper fire created suitable habitat for this species in the Briggs Spring project area. In spring of 2004 a harrier was observed approximately two miles north of Moon Campground flying over a meadow.

Black-backed Woodpecker (R2 Sensitive Species and MIS)

The black-backed woodpecker (*Picoides articus*) is discussed under the MIS section.

Northern Leopard Frog (R2 Sensitive Species)

In the Black Hills, the northern leopard frogs' (*Rana pipiens*) current distribution is considered high where suitable habitat is available (USDA Forest Service, 2004). This species is vulnerable to habitat alteration/loss, introduced predaceous fish, susceptible to overgrazing, low water quality and wetland loss (Smith, 2003). At the time of this report the northern leopard frog has been petitioned for listing under the Endangered Species Act (ESA).

This species requires three types of habitat. Winter habitat, usually lakes, streams or ponds, is needed for winter torpor. High oxygen saturation is best in the winter waters. Summer habitat for this insectivorous frog is considered upland forage ground often near the breeding ponds. The third habitat is breeding/tadpole habitat. This is usually shallow bodies of water with little to no current, aquatic vegetation, good water quality, and little overhead canopy. Warmth from the sun is needed for proper development of the tadpoles. Larval development becomes an issue if water is too cold. This could explain why frogs are not breeding at springs in the Black Hills (Smith, 2003).

Suitable habitat exists in the Briggs Spring project area. During surveys 2007-2010, leopard frogs were only observed in 2010 at one site.

Black Hills Redbelly Snake (R2 Sensitive Species)

The Black Hills subspecies (*Storeria occipitomaculata*) is an isolated population; the next nearest population is located in the eastern part of South Dakota, some 300 miles away. Suitable habitat may be broadly distributed or abundant in the Black Hills. The snake is not rare in good habitat and is considered quite common in the Black Hills (USDA Forest Service, 2000; SDGFP, 2010c).

Suitable habitat for this species exists in the Briggs Spring project area. A Black Hills redbelly snake was observed by a district biologist at Redbank Spring in July 2003.

Fringed Myotis (R2 Sensitive Species)

This subspecies (*Myotis thysanodes pahasapensis*) only occurs in the Black Hills and possibly northwest Nebraska. This species is considered a rare to uncommon year-round resident. Known locations are found in Lawrence, Meade, Pennington and Custer Counties of South Dakota and possibly Crook and Weston Counties in Wyoming (Luce et al., 1997; Tigner & Stukel, 2003).

There are no known caves, mines or documented roost sites within the Briggs Spring project area. However, there are some exposed rock outcrops and snags within the area that have the potential for use as roost sites for bats. There is no evidence to suspect that a major hibernaculum (cave) site exists within this project area. There was a fringed myotis captured southwest of Moon Campground in August of 1993, outside of the Briggs Spring project area.

Townsend's Big-eared Bat (R2 Sensitive Species)

Within the Black Hills, the Townsend's big-eared bat (*Corynorhinus townsendii*) has been recorded in Fall River, Meade, Pennington, Custer and Lawrence counties (Higgins et al., 2000). Population trends appear to be declining in the Black Hills as well as throughout their range. Loss of habitat is the main contributor to lower numbers, which is attributed to the loss of large caves and dilapidation of mines. This species is highly sensitive to human disturbance, especially at maternity roost sites (USDA Forest Service, 2000).

Suitable foraging habitat and potential roosting/hibernating habitat is present in the Briggs Spring project area. There are no known caves or abandoned mine adits in the project area. However, there are man-made structures, rock outcrops, and cliff-face crevices and fissures. There are no records of Townsend's big-eared bats in the Briggs Spring project area. There is a known Townsend's big-eared bat hibernation site about one mile from the southwest corner of the project area.

Flammulated Owl (R2 Sensitive Species)

The flammulated owl (*Otus flammeolus*) has recently been confirmed in the Black Hills. An incidental observation (unconfirmed) was reported in the summer of 1994 by a bat biologist doing mist netting in the southern Black Hills. He reported a "small, dark-eyed owl" becoming entangled in the net and was released. However, in 2002 at least two, maybe three, flammulated owls were observed in the northern Black Hills (Panjabi, 2003). These observations do not prove a flammulated owl population has established itself in the Black Hills.

Migration in this species is still poorly understood but recent review of the data suggests that this species may be a long distance, north-south, migrant. Experiments have found that this owl does not become torpid in cold temperatures. It is likely that prey availability also plays a large role in the migratory behavior of this species (McCallum, 1994).

Based on published information, and the recent Black Hills sightings it is reasonable to expect that suitable habitat for flammulated owls is present in the Briggs Spring project area.

Lewis's Woodpecker (R2 Sensitive Species)

In the Black Hills, the Lewis's woodpecker (*melanerpes lewis*) is considered an uncommon, permanent resident (Tallman et al. 2002). The Rocky Mountain Bird Observatory (RMBO) has recorded three to nine occurrences of this species on the Black Hills National Forest each year from 2001-2007 (Giroir et al., 2007). Three times as many Lewis's woodpeckers were observed in 2009 compared to 2007 (USDA Forest Service, 2010). This species has been documented in all counties in the Black Hills of South Dakota (Peterson, 1995). This species' breeding range is closely related to the range of ponderosa pine (Saab & Vierling, 2001). This species is vulnerable to loss of large snags, salvage timber harvest and fire suppression.

Potential suitable habitat is presumed present in the project area in respect to large dead trees, snags created by MPB activity and late succession pine stands. RMBO has recorded Lewis's woodpeckers just south of the project area (Beason et al., 2006). A district biologist has observed this species just outside of the southeast corner of the project area.

Grasshopper Sparrow (R2 Sensitive Species and MIS)

The grasshopper sparrow (*Ammodramus savannarum*) is discussed under the MIS section.

Cooper's Mountain Snail (R2 Sensitive Species)

Distribution data for the United States and Canadian provinces is known to be incomplete for Cooper's mountain snail (*Oreohelix strigosa cooperi*). Current identified distribution is in the Black Hills of South Dakota and Wyoming. Populations are limited in the Black Hills to suitable habitat mostly in Spearfish Creek, upper reaches of Rapid Creek, Higgins Gulch, Prospect Gulch and Grand Canyon near Deadwood, SD. This species could also be found in other drainages in the northwest region of the Black Hills. According to Frest and Johannes, 2002, Pilsbry (1939) cited a wider range.

Frest (1991-2001) surveyed four sites within the Briggs Spring project area: 40701-32 (Frest site #73), 40702-23 (Frest site #356), 40705-148 (Frest site #270) and 40803-101 (Frest site #74) (Frest & Johannes, 2002). No R2 sensitive *Oreohelix* were found at these sites. However, there is limited suitable habitat in the project area. No surveys conducted by district biologists and/or technicians in 2007 and 2008 produced any *Oreohelix* snails.

Regal Fritillary Butterfly (R2 Sensitive Species)

The Black Hills is at the western edge of the regal fritillary butterfly's (*Speyeria idalia*) range. Distribution within the Black Hills may be related to moisture gradient (USDA Forest Service, 2000). In South Dakota, it is most commonly associated with tall-grass prairie near wet areas and mixed-grass sites along the Missouri River breaks and Fort Pierre National Grassland (Marrone, 2002). The main component of all habitat types is the presence of extensive grassland with a readily available supply of *Viola* spp. and nectar (Royer & Marrone, 1992).

There is potential habitat in the Briggs Spring project area within the Jasper Burn acreage and large grasslands/meadows. There are no records of the species in the project area.

Migratory Birds

Many species of migratory birds are of international concern due to naturally small ranges, loss of habitat, observed population declines and other factors. Species of concern applicable to project-level conservation are identified by many sources, including the Endangered Species Act, the R2 sensitive species list, the Black Hills National Forest MIS and Species of Local Concern list, internal and public scoping efforts, and the USFWS Birds of Conservation Concern (BCC) (USFWS, 2008). BCC 2008 publication partitions North America into 37 Bird Conservation Regions (USFWS, 2008). The Black Hills is included in BCR 17 – Badlands and Prairies. Of the 28 bird species found in BCR 17 (USFWS, 2008), fifteen are duplicated on the R2 sensitive species list, and are evaluated in the BA/BE if they have potential to occur in the Black Hills. Six species are not expected to occur in the Black Hills due to lack of habitat. There are seven remaining species that could potentially occur in the Black Hills: golden eagle, prairie falcon, upland sandpiper, black-billed cuckoo, red-headed woodpecker, pinyon jay and dickcissel. Of these seven species, the golden eagle, prairie falcon, upland sandpiper and red-headed woodpecker have the potential to occur within the project area. The black-billed cuckoo, pinyon jay and dickcissel will not be analyzed because suitable habitat is not present in the Briggs Spring project area.

Golden Eagle (Migratory Bird)

Golden eagles (*Aquila chrysaetos*) are considered uncommon permanent residents in western South Dakota (Tallman et al., 2002) and only ten have been detected during recent bird monitoring efforts (Giroir et al., 2007). Golden eagles were observed in the project area in the summers of 2007 and 2008. Golden eagles are commonly seen feeding on carrion along roads in the Black Hills during winter (personal observation).

Contiguously forested habitats, such as those found within most of the Briggs Spring project area are not preferred by golden eagles, but they may be included in a home range if suitable nesting or foraging habitat is nearby. The Briggs Spring project area contains limited small areas of rim-rock outcrops, but there are no substantial cliffs or rock faces that provide typical nesting substrates. Eagles could forage within the meadows (primarily on private land) of the project area, or in nearby grasslands and burned forest (e.g., Jasper Burn area).

Prairie Falcon (Migratory Bird)

The prairie falcon (*Falco mexicanus*) is considered an uncommon permanent resident in far western South Dakota (Tallman et al., 2002). Two nest sites were discovered in the Black Hills in 2002, one in Spearfish Canyon and one in Redbird Canyon. Redbird Canyon is about 6 miles south of the project area. Additionally, a nest site was found in Hell Canyon in 2001, but was not active in 2002. Prairie falcons within the Black Hills were located primarily at the periphery of the Hills where high cliffs and open grassland exist (Panjabi, 2003). Prairie falcons have been observed every year since the RMBO study began in 2001 except for the 2007 field season (Giroir et al., 2007).

No prairie falcons were observed in the project area during field visits. A prairie falcon was observed, by a wildlife biologist, foraging in an open meadow in August 2003 just east of the Briggs Spring project area. This is the closest observation on record. There is no nesting habitat in the Briggs Spring project area. Limited foraging habitat is available

in the north half of the project area and consists of open meadows interspersed with forested sites. The Jasper Fire of 2000 created foraging habitat in the south portion of the project area.

Upland Sandpiper (Migratory Bird)

The upland sandpiper (*Bartramia longicauda*) is considered uncommon and local in the Black Hills (Tallman et al., 2002). The 1966 to 2004 BBS population trend data for BCR 17 indicates that the species has been increasing slightly at a rate of 0.3% per year (Sauer et al., 2005). Monitoring data from 2004 found the species restricted entirely to the mixed-grass prairie habitat type in the southern Hills (Panjabi, 2005). There is suitable habitat in the south portion of the project area that has been burned by the Jasper Fire of 2000. There are no recorded observations in the project area. However, there was an observation of an upland sandpiper just south of the project boundary in the Jasper burn in 2007 (Giroir et al., 2007).

Red-headed Woodpecker (Migratory Bird)

The red-headed woodpecker (*Melanerpes erythrocephalus*) occurs locally in the Black Hills, where they are generally uncommon to rare. At present, they occur in very low densities, primarily in burn areas. Red-headed woodpeckers breed in the eastern portion of Colorado in riparian habitat and urban parks. They are found throughout Wyoming but primarily breed in the eastern and north-central parts of the state.

Monitoring data from 2001 through 2007 showed that this species was detected exclusively in burned habitat. The highest density was in 2007 with 1.48 birds/km². RMBO has recorded red-headed woodpeckers in the south end of the project area in 2001, 2003, 2004, 2005 and 2007 (Panjabi, 2001; 2004; 2005; Beason et al., 2006; Giroir et al., 2007). The Jasper Fire of 2000 created habitat for this woodpecker within the project area.

Demand Species

Demand species are important local game animals which are not included in other emphasis groups above. The Rocky Mountain elk (*Cervus elaphus nelsoni*) and Merriam's wild turkey (*Meleagris gallapavo merriami*) are two of these demand species and each will be analyzed.

Rocky Mountain Elk (Demand Species)

The elk population of the Black Hills is difficult to estimate in part because of interstate movements of the species. However, the 2007 estimate placed the population level at 3,800 elk in the South Dakota Black Hills (Huxoll, 2008). The 2008 estimate decreased to 3,600 elk (Huxoll, 2009). The 2009 estimate decreased to 3,300 elk (Huxoll, 2010). No population estimates are available for the Wyoming portion of the Black Hills. The elk herd in Wyoming appears to be growing, but at a slower rate than in the past (Sandrini, 2007). The Forest has committed (through Objective 217) to managing habitat for a total of 4,350 elk, which was the combined population objective establish by the two state game agencies in 1996 (USDA Forest Service, 2005).

Elk are commonly seen in the Briggs Spring project area. The project area is entirely within MA 5.1 (resource production emphasis) which includes management for a

diversity of wildlife species. The Rocky Mountain Elk Foundation (2002) considers the majority of the project area as crucial annual range for elk. The southern tip is considered crucial annual, summer and winter range. Rumble et al. (2005) found that elk generally avoid areas within 1 km of primary and secondary roads during this time period. Currently, open system road density within the project area is 2.8 mi/mi². There are also approximately 13 miles of OHV system trail within the project area.

Merriam's Wild Turkey (Demand Species)

The wild turkey is a non-migratory species. There are six recognized subspecies of wild turkey and of these the Merriam's (wild) turkey is the race introduced in the Black Hills in the late 1940s and early 1950s (Flake et al., 2006). The Merriam's turkey is common and widespread on the Forest, with an estimated population of 35,000 birds in the South Dakota portion of the Black Hills (Huxoll, 2009). The 2009 population estimate for turkeys in the Black Hills was 40,000 (Huxoll, 2010). Turkey populations on the Forest have been on a steady increase since 1998 (USDA Forest Service, 2004; 2004a).

Turkeys are common in the Briggs Spring project area throughout the summer. Turkeys would remain in the area during mild winters. Adequate roosting habitat is available in the project area.

Environmental Consequences

Snags and Down Woody Material

Under all alternatives, no snags would be cut unless deemed a safety hazard during operations. As per Standard 2301, if the project area does not meet Objective 211 than all snags will be left during treatments unless deemed a safety hazard.

Alternative 1 – No Action

Direct and Indirect Effects

Snags would be expected to increase because of natural mortality. Trees would become more dense and over time, competition for water and nutrients would stress the trees, which would make them more susceptible to insects and disease agents. Dense trees would increase wildfire risk as well. Natural mortality levels would be higher with this alternative than any of the action alternatives. As these trees die and fall to the ground there would be an increase in down woody debris. Since there would be no project activities all snags and down woody debris would be left in place.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Alternative 2 proposes sanitation treatment on 6,063 acres if needed. This treatment would only harvest those trees that have been hit by pine beetles but are still green. Proposed fuel treatments on 9,303 acres, including mechanical thinning, broadcast burning, and deadfall treatment have the potential to destroy snags and downed wood. Vegetation treatments, both commercial and non-commercial have the potential to destroy snags and downed wood as well. This alternative would have more potential than Alternative 3 to retain future snags. Any protection of standing snags would move snag densities toward Forest Plan standards and guidelines.

Alternative 3

Direct and Indirect Effects

Alternative 3 proposes sanitation treatment on 3,678 acres. Fuel treatments are similar to those under Alternative 2; however, there are 714 more acres of prescribed burning planned under this alternative. Under this alternative, snags and downed wood may be destroyed during commercial and non-commercial vegetation treatments as well as fuel treatments. Alternative 3 proposes harvesting pine trees from more acres (7,469 more acres of group shelterwood) and accomplishing more prescribed burning than Alternative 2. This may mean that there would be fewer replacement snags in the future and there is a higher potential to destroy more snags, if considered safety hazards, under Alternative 3.

Cumulative Effects

Past firewood cutting, timber harvest and fuels management activities have contributed to the loss of snags and downed woody habitat. Fire, MPB and other causes of tree mortality continue to create snag/downed wood habitat. With restrictions on cutting standing dead for firewood (except where designated), an increase in MPB outbreaks, past and potential future wildfires the outlook for improving snag densities for this area is good. The effects of the new Forest Policy (implemented December 01, 2010) of allowing cutting of snags within 300' of roads, where dispersed camping is allowed, are not known yet. MPB infestations within the project area are enlarging and infestations are showing up in new areas throughout the project area. It is expected that by the time project activities would be initiated, snag densities would potentially be higher than current numbers due to the numerous "bug" pockets that have started killing trees in the area. Proposed activities would add to past management activity impacts.

Riparian Habitat

Alternative 1 – No Action

Those riparian areas that are fenced to exclude livestock would continue to be maintained or re-built where failing. Riparian areas that are not receiving protection from excessive use by livestock and/or wildlife may continue to suffer.

Common to Both Action Alternatives

Direct and Indirect Effects

Both action alternatives propose the same riparian protection/enhancement projects (post harvest). These include: planting willows, building more exclosure fencing, constructing road closures and installing new stock tanks farther from riparian corridors. Design criteria are included in Appendix B for specific riparian sites and protection guidance.

Cumulative Effects

Past fire suppression, timber harvest, road use, recreation (motorized), livestock grazing, and natural events such as drought and flooding have caused impacts to riparian areas within the project area. Fire suppression has resulted in an increase of pine trees which may lead to a change in water tables. Drought conditions and livestock/wildlife use can also negatively impact the water level in the riparian areas. Timber harvest, road use,

motorized recreation, flooding and livestock grazing can contribute sediment buildup. The harvest of trees may also be beneficial for riparian areas by decreasing acreage of pine trees and thereby decreasing water use.

Neither the no action alternative nor the action alternatives would cause detrimental impacts to riparian areas within the Briggs Spring project area. There are design criteria in place to protect/enhance some riparian areas where mechanical and burning treatments are proposed. Some fence projects and willow plantings are proposed in post-harvest activities in the action alternatives, near riparian areas in order to protect/enhance the resource. Therefore the action alternatives would move the riparian areas to better conditions overall in the project area. The action alternatives may help to meet Forest Objectives, Standards and Guidelines.

Management Indicator Species (MIS)

Summary of Effects on MIS

The following is a summary of effects to the previously mentioned wildlife MIS. A detailed analysis can be found in the Wildlife Report in the project record.

	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
White-tailed Deer (<i>Odocoileus virginianus</i>)	<i>Direct and Indirect Effects</i>		
	No immediate effects. Potential for additional hiding cover along roads. Potential for pine to further encroach in meadows and hardwoods, reducing quality forage. Increased potential in competition for forage between livestock and big game.	Low impact on screening cover along roads where vegetation treatments are proposed. Increased forage production and quality than Alt 1. Potential to decrease fawning cover due to vegetation treatments. Increased potential of OHV and recreation disturbance to deer by creating a second campground within the project area.	Low impact to screening cover along roads where vegetation treatments are proposed. Increased potential of amount & quality of forage over Alt 2. Potential to decrease fawning cover more than Alt 2 due to increased vegetation treatments. Redbank Spring Campground expansion may cause less detrimental effects due to existing OHV and recreation activity.
	<i>Cumulative Effects</i>		
	Would not have adverse cumulative effects. May decrease forage, but increase hiding cover and screening cover.	Would add to positive effects of past prescribed burns and timber harvests by increasing diversity of forage, and increasing early successional vegetative stages. May slightly reduce screening cover. Potential to decrease winter habitat for big game species. Expected to add to disturbance by OHV and recreation use.	Would add to positive effects of past prescribed burns and timber harvests by increasing diversity of forage, and increasing early successional vegetative stages more than Alt 2. May slightly reduce screening cover. Increased potential from Alt 2 to decrease winter habitat for big game species. Expected to minimally add to disturbance by OHV use.

	<i>Summary</i>		
	None of the alternatives would contribute to a Forest-wide loss of summer habitat or decrease in population for white-tailed deer, allowing for attainment of Objective 238a. Both action alternatives would slightly decrease screening cover and Guideline 3203 would be met along five of the six arterial and collector roads. One of these road's existing condition currently does not meet Guideline 3203, this is not a result of any action alternatives. Both action alternatives may decrease big game winter habitat, however adequate habitat across the forest would allow attainment for Objective 217. The proposed action alternatives would meet Forest Plan standards and guidelines. Therefore, this species is likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Grasshopper Sparrow <i>(Ammodramus</i> <i>savannarum)</i> Note: Also R2 Sensitive Species	<i>Direct and Indirect Effects</i>		
	No immediate effects. Ponderosa pine would continue to encroach into meadows/grasslands. This would exacerbate the utilization of forage on remaining meadows/grasslands and could affect species that use meadows/grasslands as food, nesting and/or cover.	Rx burning in spring and summer may negatively impact this species' nesting attempts. Design criteria for fall burning would improve habitat and eliminate nesting conflicts with burning. Harvest activities are not expected to affect this species.	Rx burning in spring and summer may negatively impact this species' nesting attempts more than Alt 2. Design criteria for fall burning would improve habitat and eliminate nesting conflicts with burning. Increased burning acres may enhance or create more habitat for this species than Alt 2. Harvest activities are not expected to affect this species.
	<i>Cumulative Effects</i>		
	Would not have adverse cumulative effects. The Jasper Fire increased grasshopper sparrow habitat within the project area. Continued grazing and chemical herbicide treatments may negatively impact the grasshopper sparrow.	Vegetation treatments, such as Rx burning and pine encroachment, would improve and expand habitat, adding to previous vegetation treatments. Continued grazing and chemical herbicide treatments may negatively impact the grasshopper sparrow.	Vegetation treatments, such as Rx burning and pine encroachment, would improve and expand habitat, even more so than Alt 2. Continued grazing and chemical herbicide treatments may negatively impact the grasshopper sparrow.
	<i>Summary</i>		
	Following design criteria all alternatives would allow the Forest-wide grasshopper sparrow population to remain stable and allow for the attainment of Objectives 221 & 238a . The action alternatives in this project would move toward attainment of Objective 205 . The proposed action alternatives would meet Forest Plan standards and guidelines; therefore this species is likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Black-backed Woodpecker <i>(Picoides arcticus)</i> Note: Also R2 Sensitive Species	<i>Direct and Indirect Effects</i>		
	Would allow natural successional changes to occur in vegetation. Existing stands would become dense and stressed and eventually	Proposed fuel and harvest treatments would potentially decrease snag habitat. May disturb nesting woodpeckers if harvest occurs during	Increased acres of proposed fuel treatments and harvest treatments would potentially decrease snag habitat, more than Alt 2. Potential is greater to

	become susceptible to MPB infestations and/or wildfire. This alternative would provide greatest potential for increase in woodpecker habitat. Snags would increase due to natural mortality.	nesting season, expected to be a short-term impact.	disturb nesting woodpeckers, but still expected to be a short-term impact.
	<i>Cumulative Effects</i>		
	Past wildfires and past and existing MPB infestations have created habitat throughout the Forest and project area.	No additive effects on existing snag densities. Proposed pine treatments would add to the loss of larger diameter trees from past harvest activities. May result in decreased preferred or potential habitat.	No additive effects on existing snag densities. Proposed pine treatments would add to the loss of larger diameter trees from past harvest activities. Increased potential to result in decreased preferred or potential habitat.
	<i>Summary</i>		
	Alternative 1 has the greatest potential for increasing woodpecker habitat. Both action alternatives may decrease preferred and/or potential habitat, but they would not affect the habitat or population trend Forest wide because of providing for Objective 211 (snags). Snags are not allowed to be cut unless deemed a safety hazard or within designated firewood cutting areas. The project area is only a small portion of the currently available habitat, new habitat acres are currently being created across the Forest. Objectives 221 (sensitive species) and 238b are currently being met and would be met under either action alternative. The proposed action alternatives would meet Forest Plan standards and guidelines; therefore this species is likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Brown Creeper (<i>Certhia Americana</i>)	<i>Direct and Indirect Effects</i>		
	Existing mature stands would eventually become SS5, a more desirable habitat. The MPB and wildfire risk would not be decreased, leaving mature stands susceptible to MPB infestation and/or catastrophic wildfire.	Would reduce acres of SS4B (more preferred habitat) to SS4A, impacting brown creeper habitat. May cause displacement of individuals; however creepers may return to the affected area. Harvest activities may disturb nesting, but is expected to be a short term impact. Risk of MPB infestation and wildfire would be reduced.	Would reduce acres of SS4B to SS4A, even more so than Alt 2, increasing potential impact on brown creeper habitat. May cause displacement of individuals; however creepers may return to the affected area. Harvest activities may disturb nesting, but is expected to be a short term impact. Risk of MPB infestation and wildfire would be reduced.
	<i>Cumulative Effects</i>		
	Would not have adverse cumulative effects.	Would add to preferred habitat reduction within the project area, however with lack of treatment habitat may be lost to fire or MPB. Would add to positive impacts of	Would add to preferred habitat reduction within the project area. Would add to positive impacts of previous vegetation treatments by reducing MPB and fire risk.

		previous vegetation treatments by reducing MPB and fire risk.	
	<i>Summary</i>		
	Alternative 1 results in the most potential for preferred habitat for the brown creeper. Both action alternatives would reduce SS4B from the existing condition, however with treatment risk of MPB infestation and wildfire would be reduced. Habitat would be maintained and the project meets Objective 238a . The proposed action alternatives would meet Forest Plan standards and guidelines; therefore this species is likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Ruffed Grouse (<i>Bonasa umbellus</i>)	<i>Direct and Indirect Effects</i>		
	Habitat quality & quantity may decrease due to pine continuing to encroach into hardwood stands. Could result in a decrease of aspen clones or groups of clones. Would not benefit habitat.	Treatments would increase and/or enhance habitat.	Treatments would increase and/or enhance habitat. Rx burning of aspen sites could enhance stands by stimulating growth or cause mortality within aspen sits.
	<i>Cumulative Effects</i>		
	Would not have adverse cumulative effects.	Would help offset negative impacts from past activities. Would enhance species habitat over the next 10 years. Future hardwood treatments would continue to improve habitat.	Would help offset negative impacts from past activities. Would have slightly more potential to enhance species habitat over the next 10 years. Future hardwood treatments would continue to improve habitat.
	<i>Summary</i>		
	Alternative 1 would allow pine encroachment to continue within the hardwood stands, eventually reducing ruffed grouse habitat. Both action alternatives would increase and/or re-establish hardwoods (aspen), enhancing the health of hardwoods within the project area. Alternative 3 would potentially release more aspen compared to Alternative 2, due to harvesting more pine acres. The action alternatives would not contribute to a loss of habitat or decrease in population Forest-wide for the ruffed grouse. The action alternatives would enhance habitat by increasing acres of hardwoods. Therefore Forest Plan Objective 238a would be met. The proposed action alternatives would meet Forest Plan standards and guidelines; therefore this species is likely to persist on the Forest.		

Species of Local Concern (SOLC)

Summary of Effects on SOLC

The following is a summary of effects to the previously mentioned wildlife SOLC. A detailed analysis can be found in the Wildlife Report in the project record.

	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
	<i>Direct and Indirect Effects</i>		

Atlantis Fritillary <i>(Speyeria atlantis pahasapae)</i> Tawny Crescent <i>(Phycoides batesii)</i>	Conifers would continue to encroach into meadows/grasslands and riparian hardwood communities, resulting in a decrease in foraging plants for butterflies. MPB risk & wildfire risk would not be decreased, however this would increase potential habitat that benefits these species.	Riparian fencing projects would enhance habitat. Noxious weed treatments would positively impact these species by aiding in native plant restoration, however there is potential to harm the species by treating nectar or larval host plants. Rx burning & vegetative treatments have potential for direct mortality to individuals; however positive impacts would be created through pine encroachment by opening up meadows/grasslands. MPB & wildfire risk would be reduced.	Same as Alt 2, but slightly increased in potential negative impacts due to more acres treated with Rx burning & vegetative treatments.
	<i>Cumulative Effects</i>		
	Would not have adverse cumulative effects. Would not enhance butterfly habitat.	Would improve current habitat conditions, would offset negative effects from livestock grazing. Would benefit species due to habitat enhancement.	Same as Alt 2, but slightly increase potential for positive habitat enhancement due to more acres of vegetation treatments.
	<i>Summary</i>		
	Alternative 1 would not enhance or increase butterfly habitat and conifer encroachment would continue. Both action alternatives would benefit these species by creating more hardwood communities, meadows/grasslands, and by enhancing riparian areas. The proposed action alternatives would meet Forest Plan standards and guidelines. Therefore the alternatives would contribute toward meeting Objective 221 . These species are likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Callused Vertigo <i>(Vertigo arthuri)</i> Mystery Veritgo <i>(Vertigo paradoxa)</i> Frigid Ambersnail <i>(Catinella gelida)</i> Striate Disc <i>(Discus shimekii)</i>	<i>Direct and Indirect Effects</i>		
	Existing forested stands would be expected to become denser. MPB risk and wildfire risk would not be decreased. Conifer would continue to encroach into hardwood stands.	Rx burning and vegetation treatments would have potential to cause direct mortality to individual snails & potential to impact habitat, negatively. However, opening up forested sites would create more potential habitat. Hardwood treatments would enhance sites, enhancing snail habitat. MPB & wildfire risk would be reduced.	Same as Alt 2, but would increase Rx burning in hardwood sites more than Alt 2 allowing the increased potential of negative impacts to snails and habitat, in the short-term. Long-term effects would include increased potential habitat. Would reduce MPB & wildfire risk more than Alt 2.
	<i>Cumulative Effects</i>		
	Would not have adverse cumulative effects. Would not enhance snail habitat.	Would add to past positive & negative impacts to snail habitat from management activities. Would increase more open pine forest conditions.	Same as Alt 2, but increased potential to negatively impact snails & habitat, as well as more positive effects to habitat.

	<i>Summary</i>		
	Alternative 1 would allow dense forest conditions to be maintained or become denser. Both action alternatives would create a more open pine forest condition. These actions would have potential for both positive and negative impacts on individual snails and habitat. Alt 3 would have the most potential for negatively impacting individual snails, but positively impacting more habitat. Rx burning would follow Forest Plan Standard 3103 , and would not result in cumulative impacts to known snail colonies. The proposed action alternatives would meet Forest Plan standards and guidelines. Therefore the alternatives would contribute toward meeting Objective 221 . These species are likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Sharp-shinned Hawk <i>(Accipiter striatus)</i>	<i>Direct and Indirect Effects</i>		
	Would not reduce existing MPB risk and wildfire risk. Dense forested stands would remain and become denser, enhancing nesting habitat. Conifer encroachment would continue.	Would reduce nesting habitat which may cause displacement and unknown nests would be disturbed; these would be short-term effects. Would decrease existing MPB and wildfire risk.	Same as Alt 2, effects would be slightly increased due to the increased treatment acres.
	<i>Cumulative Effects</i>		
	Would not have short-term adverse cumulative effects. Potential for long-term adverse cumulative effects due to stand replacing events.	Would add to effects of past timber harvest by creating more open density forest, increasing hardwoods and shrubs, and reducing MPB and wildfire risk. Would reduce nesting habitat in short-term, but create a more diverse habitat long-term.	Same as Alt 2.
	<i>Summary</i>		
	Alternative 1 would provide the most diverse habitat and the most potential nesting habitat. Both action alternatives would result in the same potential nesting habitat acres, as well as increasing shrubs and tree species diversity by increasing hardwood and meadow acres. Known nests would be protected through Standard 3204 . The proposed action alternatives would meet Forest Plan standards and guidelines. The alternatives would contribute toward meeting Objective 221 . Therefore this species is likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Cooper’s Hawk <i>(Accipiter cooperi)</i>	<i>Direct and Indirect Effects</i>		
	MPB risk and wildfire risk would not decrease. Conifers would continue to encroach. Forested stands would continue to become denser, providing for the most nesting habitat from other alternatives.	Preferred nesting habitat (SS4B) would decrease. Potential to cause present Cooper’s hawks to move or avoid the area. Unknown nests would be disturbed. These impacts would be short-term. Would reduce the MPB risk and wildfire risk. Would enhance hardwood sites, adding diversity.	Same as Alt 2, but effects slightly increased due to increase in treatment acres.
	<i>Cumulative Effects</i>		

	Would not have short-term adverse cumulative effects. Potential for long-term adverse cumulative effects due to stand replacing events.	Would offset past negative effects to hardwood stands by enhancing and increasing these sites, including future activities.	Same as Alt 2.
	<i>Summary</i>		
	Alternative 1 would provide the most acres of preferred nesting habitat; however the risk of a stand replacing wildfire or MPB infestation would remain high. Both action alternatives would reduce preferred nesting habitat, but lower the MPB and wildfire risk. Known nests would be protected through Standard 3204 . The proposed alternatives would meet Forest Plan standards and guidelines and would contribute toward meeting Objective 221 . Therefore this species is likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Broad-winged Hawk (<i>Buteo platypterus</i>)	<i>Direct and Indirect Effects</i>		
	MPB risk and wildfire risk would not decrease. Conifers would continue to encroach. Forested stands would continue to become denser, providing for the most nesting habitat from other alternatives.	Preferred nesting habitat (SS4B) would decrease. Potential to cause present Broad-winged hawks to move or avoid the area. Unknown nests would be disturbed. These impacts would be short-term. Would reduce the MPB risk and wildfire risk. Would enhance hardwood sites, adding diversity. Fuel treatments may help maintain mature and late successional stage stands.	Same as Alt 2, but effects slightly increased due to increase in treatment acres.
	<i>Cumulative Effects</i>		
	Would not have short-term adverse cumulative effects. Potential for long-term adverse cumulative effects due to stand replacing events.	Would offset past negative effects to hardwood stands by enhancing and increasing these sites, including future activities. This would result in enhanced nesting habitat within hardwood communities.	Same as Alt 2.
	<i>Summary</i>		
	Alternative 1 would provide the most acres of preferred nesting habitat; however the risk of a stand replacing wildfire or MPB infestation would remain high. Both action alternatives would reduce preferred nesting habitat, but lower the MPB and wildfire risk. Known nests would be protected through Standard 3204 . The proposed alternatives would meet Forest Plan standards and guidelines. The alternatives would contribute toward meeting Objective 221 . Therefore this species is likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
	<i>Direct and Indirect Effects</i>		

Northern Saw-whet Owl <i>(Aegolius acadicus)</i>	MPB risk and wildfire risk would not decrease. Conifers would continue to encroach. Forested stands would continue to become denser having potential for more future snags.	Preferred nesting habitat (SS3B) would increase slightly. Potential to cause present northern saw-whet owls to move or avoid the area. Unknown nests would be disturbed. These impacts would be short-term. Would reduce the MPB risk and wildfire risk. Potential loss of snags, however snags may be created through Rx burning. Would enhance hardwood sites, adding diversity.	Same as Alt 2. Effects slightly increased due to increase in treatment acres, except preferred nesting habitat acres would remain the same between Alt 2 and 3.
	Cumulative Effects		
	Would not have short-term adverse cumulative effects. Potential for long-term adverse cumulative effects due to stand replacing events.	Would add to past harvest and firewood cutting activities by the potential to reduce more snags.	Same as Alt 2.
	Summary		
	Alternative 1 would provide the most acres of dense habitat; however the risk of a stand replacing wildfire or MPB infestation would remain high. Both action alternatives would slightly increase preferred nesting habitat (SS3B) and lower the MPB and wildfire risk. Potential for the loss of snags is greatest in action alternatives due to harvest activities. However snags would not be cut during harvest activities unless deemed safety hazards. Known nests would be protected through Standard 3204 . The proposed alternatives would meet Forest Plan standards and guidelines. The alternatives would contribute toward meeting Objective 221 . Therefore this species is likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Pygmy Nuthatch <i>(Sitta pygmaea melanotis)</i>	Direct and Indirect Effects		
	MPB risk and wildfire risk would not decrease. Conifers would continue to encroach. Forested stands would continue to become denser having potential for more future snags.	Preferred nesting habitat would decrease. Potential to cause present pygmy nuthatches to move or avoid the area, nesting may be disturbed; these impacts would be short-term. Would reduce the MPB risk and wildfire risk. Potential loss of large trees snags, however snags may be created through Rx burning.	Same as Alt 2. Effects slightly increased due to increase in treatment acres. Increased potential for loss of large diameter trees and snags, more than Alt 2.
	Cumulative Effects		
	Would not have short-term adverse cumulative effects. Potential for long-term adverse cumulative effects due to stand replacing events.	Would add to past harvest and firewood cutting activities by the potential to reduce and create more snags. The MPB has and continues to create snags. Proposed fuels treatments would add to past treatments to have potential to maintain mature and late successional stage stands.	Same as Alt 2. Effects slightly increased due to increase in treatment acres.
	Summary		
Alternative 1 would provide the most acres of nesting habitat; however the risk of a stand replacing wildfire or MPB infestation would remain high. Both action			

	alternatives would decrease preferred nesting habitat and lower the MPB and wildfire risk. Potential for the loss of snags is greatest in action alternatives due to harvest activities. However MPB mortality and Rx burning would have the potential to create snags. Snags would not be cut during harvest activities unless deemed safety hazards. The proposed alternatives would meet Forest Plan standards and guidelines and would contribute toward meeting Objective 221 . Therefore this species is likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Northern Long-eared Myotis (<i>Myotis septentrionalis</i>) Small-footed Myotis (<i>Myotis ciliolabrum</i>) Long-eared Myotis (<i>Myotis evotis</i>) Long-legged Myotis (<i>Myotis volans</i>)	<i>Direct and Indirect Effects</i>		
	Forested stands would become denser. MPB risk and wildfire risk would not decrease. Conifers would continue to encroach.	Potential to reduce future replacement and existing snags. Would decrease potential snag roosting habitat (SS4B). Rx burning may create snags. MPB infestation would create snags. Would reduce large diameter trees. May disturb roosting/nesting sites, present bats may be displaced or avoid area; these would be short term effects. Would benefit grasses, shrubs, and forbs, increasing prey species and foraging habitat for these species of bats. Would reduce MPB and wildfire risk.	Same as Alt 2, with increased potential for snag loss and large diameter tree loss.
	<i>Cumulative Effects</i>		
	Would not have short-term adverse cumulative effects. Potential for long-term adverse cumulative effects due to stand replacing events.	Would add to past wildfires & burning, harvest and firewood cutting activities creating and losing snags. The MPB has and continues to create snags. Future riparian area projects would benefit bat foraging habitat. Proposed fuels treatments would add to past treatments to have potential to maintain mature and late successional stage stands.	Same as Alt 2.
	<i>Summary</i>		
	Alternative 1 would allow for the most suitable roosting snags for these species. Both action alternatives would enhance forage habitat and suitable roosting snags would be available. Alternative 2 would provide more future snags than Alternative 3. The proposed alternatives would meet Forest Plan standards and guidelines. The alternatives would contribute toward meeting Objective 221 . Therefore these species are likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Northern Flying Squirrel (<i>Glaucomys sabrinus</i>)	<i>Direct and Indirect Effects</i>		
	Forested stands would become denser. MPB risk and wildfire risk would not decrease. Conifers would continue to encroach, possibly increasing spruce habitat.	Potential to reduce future replacement and existing snags. Would decrease potential snag roosting habitat (SS4B). Rx burning may create snags. MPB infestation would create snags. Would reduce large diameter trees. May disturb nesting sites and potential to directly harm individuals; these would be short term effects. Would increase	Same as Alt 2, with increased potential for snag loss and large diameter tree loss.

		and enhance hardwood stands. Would reduce MPB and wildfire risk.	
	<i>Cumulative Effects</i>		
	Would not have short-term adverse cumulative effects. Potential for long-term adverse cumulative effects due to stand replacing events.	Would add to past wildfires & burning, harvest and firewood cutting activities creating and losing snags. The MPB has and continues to create snags. Proposed fuels treatments would add to past treatments to have potential to maintain mature and late successional stage stands.	Same as Alt 2.
	<i>Summary</i>		
	Alternative 1 would allow for the most potential of large snags for this species. However hardwoods would suffer due to encroachment by conifers. Alternative 2 would retain more large trees, have less potential for snag loss, and more potential for snag replacement than Alternative 3. The proposed alternatives would meet Forest Plan standards and guidelines and would contribute toward meeting Objective 221 . Therefore these species are likely to persist on the Forest.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Meadow Jumping Mouse (<i>Zapus hudsonius campestris</i>)	<i>Direct and Indirect Effects</i>		
	Riparian areas would continue to receive high seasonal use. Many exclosure fences would remain to protect riparian areas. MPB risk and wildfire risk would not decrease. Conifers would continue to encroach into meadows/grasslands.	Would enhance meadows/grasslands through pine encroachment treatments. Riparian areas would be enhanced through post sale activities (fencing, willow planting, etc.). Rx burning in meadows would have potential to negatively impact this species in the short-term. Long term Rx burning impacts would enhance meadow vegetation. Would reduce MPB and wildfire risk.	Same as Alt 2.
	<i>Cumulative Effects</i>		
	Would not have adverse cumulative effects.	Past activity impacts would be offset by proposed actions. No adverse cumulative effects are expected from action alternatives. Enhancing riparian areas (meadow jumping mouse habitat) would move them, overall, into a better condition. Post-sale activities would have potential to enhance habitat.	Same as Alt 2.
	<i>Summary</i>		
	All alternatives, including the no action, would not cause detrimental impacts to riparian areas within the project area. Both action alternatives would increase protection of this habitat through post-sale projects, such as exclosure fencing. Both action alternatives would move riparian areas toward a better overall condition. The proposed alternatives would meet Forest Plan standards and guidelines and would contribute toward meeting Objective 221 . Therefore these species are likely to persist on the Forest.		

Threatened and Endangered Species

It was determined that management activities on the Forest would have ‘no effect’ on any Threatened and Endangered species since the Black Hills National Forest lacks suitable habitat.

There are no Threatened or Endangered species which have habitat within the Briggs Spring project area. Therefore, **no effects** to Threatened or Endangered species would occur. Refer to the Wildlife BA/BE in the project record.

Region 2 (R2) Sensitive Species

Summary of Effects on R2 Sensitive Species

The following is a summary of effects to the previously mentioned wildlife R2 sensitive species. A detailed analysis can be found in the Wildlife Report and BA/BE in the project record.

	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Bald Eagle <i>(Haliaeetus leucocephalus)</i>	<i>Direct and Indirect Effects</i>		
	None expected.	Would remove large trees that provide winter roost and perch sites.	Same as Alt 2, but with an increased potential for large tree loss due to increase in treatments.
	<i>Cumulative Effects</i>		
	Would not have any cumulative effects expected.	Would not have any cumulative effects expected.	Same as Alt 2.
	<i>Determination</i>		
	All alternatives would have ‘ no impact ’ on the bald eagle. Therefore the alternatives would contribute toward meeting Objective 221 .		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Fringed Myotis <i>(Myotis thysanodes pahasapensis)</i>	<i>Direct and Indirect Effects</i>		
	Potential for increased MPB infestation and wildfire would create more roosting habitat/snags and increased grass/forbs structural stages would increase prey base.	Would affect roosting individuals during harvest activities and Rx burning. Would have potential for snag loss and replacement snag loss, resulting in less potential roosting habitat. May decrease prey species habitat. Noxious weed treatments would have potential to decrease prey base. Would have potential for loss of small water catchments due to sedimentation.	Same as Alt 2, but with an increased potential for loss and habitat disturbance due to increase in treatments.
	<i>Cumulative Effects</i>		

	Would not have any short-term cumulative effects expected. Potential for long-term cumulative effects due to stand replacing events, resulting in enhanced habitat.	Would add to past wildfires & burning, harvest and firewood cutting activities creating and losing snags (roosting habitat). The MPB has and continues to create snags. Prey species may increase due to increased grass/forbs SS.	Same as Alt 2.
	<i>Determination</i>		
	Both action alternatives <u>'may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing'</u> . The determination would be the same under the No Action Alternative due to the new Forest Policy of cutting standing dead trees within 300 feet of some roads. Therefore the alternatives would contribute toward meeting Objective 221 .		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Townsend's Big-eared Bat (<i>Corynorhinus townsendii</i>)	<i>Direct and Indirect Effects</i>		
	None expected.	Harvest activity may disturb roosting bats or may cause individual mortality. Vegetation treatments may change microhabitats of roosting habitat. Would result in loss of large diameter trees and a more open forest condition, which may affect prey species short-term. Would increase hardwoods, benefiting prey species. Noxious weed treatments may prey species. May result in loss of small water catchments, which would negatively impact this species.	Same as Alt 2, but with increased potential due to increased treatments.
	<i>Cumulative Effects</i>		
	Would not have any adverse cumulative effects expected.	Would add to past harvest impacts to roosting habitats, but would not contribute to adverse cumulative effects.	Same as Alt 2.
	<i>Determination</i>		
	Alternative 1 would have <u>'no impact'</u> on the Townsend's big-eared bat. Both action alternatives <u>'may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing'</u> . Therefore the alternatives would contribute toward meeting Objective 221 .		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Northern Goshawk (<i>Accipiter gentilis</i>)	<i>Direct and Indirect Effects</i>		
	Forested stands would continue to become denser. MPB risk and wildfire risk would not decrease. In the long-term, would provide the most nesting	Preferred nesting habitat would decrease. Would treat deferred goshawk sites with sanitation, which may prevent habitat loss in the event of MPB infestation. Harvest activities have timing restrictions minimizing	Same as Alt 2, but with increased potential due to increased treatments.

	habitat of all alternatives.	disturbance to goshawk territories. May cause direct mortality to individuals in unknown nests. This impact would be short-term. Potential loss of cover habitat would increase susceptibility of young to predators. Would affect prey species through opening of forest canopy, loss of snags, loss of down woody material, and ground cover.	
	<i>Cumulative Effects</i>		
	Would not have any short-term cumulative effects expected. Potential for long-term cumulative effects due to stand replacing events, resulting in enhanced habitat.	Would add to past harvest, MPB mortality, and wildfire impacts to nesting habitats, however the action alternatives would provide two nest protection areas as well as other areas of suitable nesting habitat. Activities proposed in the action alternatives may cause adverse effects to northern goshawks in the project area within the next 10 years.	Same as Alt 2.
	<i>Determination</i>		
	Forest Plan Objective 221 is currently being met in the project area. Either action alternative would meet Objective 221 . Alternative 1 would have <u>'no impact'</u> on the northern goshawk. Both action alternatives <u>'may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing'</u> .		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Northern Harrier (<i>Circus cyaneus</i>)	<i>Direct and Indirect Effects</i>		
	None expected.	Rx burning may displace present harriers, but nearby habitat exists. Rx burning would enhance grassland habitat. Noxious weed treatment may affect grass/forbs growth and prey base.	Same as Alt 2, but with increased potential due to increase treatments. Would benefit habitat more than Alt 2 due to increased Rx burning.
	<i>Cumulative Effects</i>		
	Would not have any adverse cumulative effects expected.	May add to past burning, grazing, and noxious weed treatment impacts. Rx burning and potential wildfires may displace individuals and may interfere with nesting attempts. Would overall enhance habitat.	Same as Alt 2.
	<i>Determination</i>		
	Alternative 1 would have <u>'no impact'</u> on the northern harrier. Both action alternatives <u>'may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward</u>		

	<u>federal listing'</u> . Therefore the alternatives would contribute toward meeting Objective 221 .		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Flammulated Owl (<i>Otus flammeolus</i>)	<i>Direct and Indirect Effects</i>		
	None expected.	May directly impact individuals in unknown occupied cavities. Potential to reduce preferred habitat. Would remove large diameter trees. Potential loss of snags. Would enhance and increase hardwoods. Would enhance prey species habitat.	Same as Alt 2, but with increased potential due to increase treatments.
	<i>Cumulative Effects</i>		
	Would not have any adverse cumulative effects expected.	Would add to past fire, insect mortality, and harvest impacts to snags and replacement snags. Prey species habitat may improve on a general scale.	Same as Alt 2.
	<i>Determination</i>		
	Both action alternatives <u>'may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing'</u> . Therefore the alternatives would contribute toward meeting Objective 221 . The determination would be the same under the No Action Alternative due to the new Forest Policy of cutting standing dead trees within 300 feet of some roads.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Lewis's Woodpecker (<i>Melanerpes lewis</i>)	<i>Direct and Indirect Effects</i>		
	Existing snags would fall, adding to down, woody material and new snags would be created (MPB, disease, wildfire).	Potential to loss of snags/cavities. Would, overall, decrease habitat. Future nesting habitat would be decreased. Potential to decrease prey species habitat through burning. Rx burning may create snags and replacement snags. Noxious weed treatments may impact prey species.	Same as Alt 2, but with increased potential due to increase treatments.
	<i>Cumulative Effects</i>		
	Would not have any adverse cumulative effects expected.	Past wildfires created a large area of suitable habitat, the increase in potential loss of suitable habitat and potential creation of snags would add to these impacts.	Same as Alt 2.
	<i>Determination</i>		
	Both action alternatives <u>'may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing'</u> . Therefore the alternatives would contribute toward meeting Objective 221 . The determination would be the same under the No Action		

	Alternative due to the new Forest Policy of cutting standing dead trees within 300 feet of some roads.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Black-backed Woodpecker <i>(Picoides articus)</i> Note: Also MIS	<i>Direct and Indirect Effects</i>		
	See effects under the MIS section.	See effects under the MIS section.	See effects under the MIS section.
	<i>Cumulative Effects</i>		
	See effects under the MIS section.	See effects under the MIS section.	See effects under the MIS section.
	<i>Determination</i>		
	Both action alternatives <u>'may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing'</u> . Therefore the alternatives would contribute toward meeting Objective 221 . The determination would be the same under the No Action Alternative due to the new Forest Policy of cutting standing dead trees within 300 feet of some roads.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Grasshopper Sparrow <i>(Ammodramus savannarum)</i> Note: Also MIS	<i>Direct and Indirect Effects</i>		
	See effects under the MIS section.	See effects under the MIS section.	See effects under the MIS section.
	<i>Cumulative Effects</i>		
	See effects under the MIS section.	See effects under the MIS section.	See effects under the MIS section.
	<i>Determination</i>		
	Alternative 1 would have <u>'no impact'</u> on the grasshopper sparrow. Both action alternatives <u>'may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing'</u> . Therefore the alternatives would contribute toward meeting Objective 221 .		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Northern Leopard Frog <i>(Rana pipiens)</i>	<i>Direct and Indirect Effects</i>		
	None expected.	Harvest and post-harvest activities near riparian sites may have direct adverse effects. Potential for habitat disturbance or loss. Noxious weed treatments may affect water quality and plant species diversity. Would enhance habitat for this species by protecting riparian areas.	Same as Alt 2.
	<i>Cumulative Effects</i>		
	Would not have any adverse cumulative effects expected.	Would add to past activities impacts on habitat. Would supplement habitat, overall. Past fires have removed canopy, increasing ground temperatures, which may limit distribution. Past and potential future OHV use can	Same as Alt 2.

		impact this species.	
	<i>Determination</i>		
	Alternative 1 would have <u>'no impact'</u> on the northern leopard frog. Both action alternatives <u>'may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing'</u> . Therefore the alternatives would contribute toward meeting Objective 221.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Black Hills Redbelly Snake <i>(Storeria occipitomaculata)</i>	<i>Direct and Indirect Effects</i>		
	None expected.	Potential for direct individual impact by harvest and Rx burning activities. Potential for habitat disturbance and/or loss due to harvest, burning, and OHV use. Potential for loss of down woody material. Noxious weed treatments have potential to affect habitat. Potential for enhanced habitat due to post-sale riparian enhancement projects.	Same as Alt 2 with increased potential for impacts due to increased treatment acres.
	<i>Cumulative Effects</i>		
	Would not have any short-term cumulative effects expected. Potential for long-term cumulative effects due to stand replacing events, resulting in loss of habitat.	Would add to past harvest, wildfire, and livestock grazing impacts. Burning and wildfire would impact the redbelly snake and its habitat. Continued OHV use and potential increase in use would impact this species if present.	Same as Alt 2.
	<i>Determination</i>		
	Alternative 1 would have <u>'no impact'</u> on the Black Hills redbelly snake. Both action alternatives <u>'may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing'</u> . Therefore the alternatives would contribute toward meeting Objective 221.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Cooper's Mountain Snail <i>(Oreohelix strigosa cooperi)</i>	<i>Direct and Indirect Effects</i>		
	None expected.	Potential for direct individual impact by harvest and Rx burning activities. Potential for habitat disturbance and/or loss due to harvest, burning, and OHV use. Potential for loss of down woody material. Noxious weed treatments have potential to affect habitat.	Same as Alt 2 with increased potential for impacts due to increased treatment acres.
	<i>Cumulative Effects</i>		
	Would not have any short-term cumulative effects expected.	Would add to past harvest, wildfire, and livestock grazing impacts where this species is	Same as Alt 2.

	Potential for long-term cumulative effects due to stand replacing events, resulting in loss of habitat.	present. Continued OHV use and potential increase in use would impact this species if present.	
	<i>Determination</i>		
	Alternative 1 would have <u>'no impact'</u> on the Cooper's mountain snail. Both action alternatives <u>'may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing'</u> . Therefore the alternatives would contribute toward meeting Objective 221.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Regal Fritillary Butterfly (<i>Speyeria idalia</i>)	<i>Direct and Indirect Effects</i>		
	None expected.	Potential for direct individual mortality from Rx burning. Would have temporary habitat loss, short term. Would enhance habitat, including riparian habitat, long term. Noxious weed treatments may affect habitat.	Same as Alt 2 with increased potential for impacts due to increased treatment acres.
	<i>Cumulative Effects</i>		
	Would not have any short-term cumulative effects expected. Potential for long-term cumulative effects due to stand replacing events, resulting in loss of habitat.	Would add to past harvest, wildfire, and livestock grazing impacts where this species is present. Past and continued livestock grazing would impact this species. Would impact species in the short term, but would enhance habitat in the long term.	Same as Alt 2.
	<i>Determination</i>		
	Alternative 1 would have <u>'no impact'</u> on the regal fritillary butterfly. Both action alternatives <u>'may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing'</u> . Therefore the alternatives would contribute toward meeting Objective 221.		

Migratory Birds

Summary of Effects on Migratory Birds

The following is a summary of effects to the previously mentioned migratory birds species. A detailed analysis can be found in the Wildlife Report and BA/BE in the project record.

	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Golden Eagle (<i>Aquila chrysaetos</i>) Prairie Falcon (<i>Falco mexicanus</i>)	<i>Direct and Indirect Effects</i>		
	Conifers would continue to encroach into meadows/grasslands. MPB risk and wildfire	Would maintain and enhance existing habitat through harvest and burning. Harvest activities may benefit foraging habitat by opening up the	Same as Alt 2 with increased potential for impacts due to increased treatment acres.

	risk would not decrease.	canopy.	
	<i>Cumulative Effects</i>		
	Would not have any short-term cumulative effects expected. Potential for long-term cumulative effects due to stand replacing events, resulting in potential for more foraging habitat.	Would add to past harvest and burning impacts to habitat. Existing and potential increase of OHV use may disturb nesting birds.	Same as Alt 2.
	<i>Summary</i>		
	Golden eagle and prairie falcon habitat would be expected to be maintained. All alternatives would meet Forest Plan standards, therefore populations of both species would remain stable.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Upland Sandpiper (<i>Bartramia longicauda</i>)	<i>Direct and Indirect Effects</i>		
	Conifers would continue to encroach into meadows/grasslands. MPB risk and wildfire risk would not decrease.	Rx burning would have potential to impact nesting attempts, but expected to improve habitat overall. Harvest activities are not expected to impact this species. Would improve habitat overall. Noxious weed treatments have potential to impact habitat.	Same as Alt 2 with increased potential for impacts due to increased treatment acres.
	<i>Cumulative Effects</i>		
	Would not have any short-term cumulative effects expected. Potential for long-term cumulative effects due to stand replacing events, resulting in potential for more habitat.	Would add to past harvest and burning impacts to habitat. Past and continued grazing and weed treatments may impact the habitat. Overall improvement to habitat for this species. Habitat would be maintained or enhanced.	Same as Alt 2.
	<i>Summary</i>		
	Upland sandpiper habitat would be expected to be maintained or enhanced. All alternatives would meet Forest Plan standards; therefore the Forest-wide population of upland sandpipers would remain stable.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	<i>Direct and Indirect Effects</i>		
	None expected.	Would have impacts benefiting habitat for this species. Rx burning may create snags and replacement snags. Would improve riparian habitats.	Same as Alt 2 with increased potential for impacts due to increased treatment acres.
	<i>Cumulative Effects</i>		

	Would not have any short-term cumulative effects expected. Potential for long-term cumulative effects due to stand replacing events.	Would add to past harvest, burning, and MPB impacts. Overall habitat would benefit from project activities.	Same as Alt 2.
	<i>Summary</i>		
	Red-headed woodpecker habitat would be expected to be maintained or enhanced. All alternatives would meet Forest Plan standards; therefore the Forest-wide population of red-headed woodpeckers would remain stable.		

Demand Species

Summary of Effects on Demand Species

The following is a summary of effects to the previously mentioned Demand Species. A detailed analysis can be found in the Wildlife Report in the project record.

	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Rocky Mountain Elk (<i>Cervus elaphus nelsoni</i>)	<i>Direct and Indirect Effects</i>		
	Forested stand would become denser, providing more cover. MPB risk and wildfire risk would not decrease. Conifers would continue to encroach into meadows and hardwoods, reducing forage. Potential to increase forage competition between livestock and big game.	Potential to displace individuals in the short term. Would enhance forage habitat. Potential to loss of cover in areas. Rx burning would have potential to cause decrease in calving cover. Potential of increased OHV use may increase disturbance to this species.	Same as Alt 2 with increased potential for impacts due to increased treatment acres.
	<i>Cumulative Effects</i>		
	Would not have any short-term cumulative effects expected. Potential for long-term cumulative effects due to stand replacing events.	Would add to past harvest and burning impacts. Overall habitat would benefit from project activities.	Same as Alt 2.
	<i>Summary</i>		
	Rocky Mountain elk habitat would be expected to be maintained or enhanced. All alternatives would meet Forest Plan standards and would allow attainment for Objective 217 ; therefore the Forest-wide population of Rocky Mountain elk would remain stable.		
	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
Merriam's Wild Turkey	<i>Direct and Indirect Effects</i>		
	Forested stand would become denser,	Potential to displace individuals in the short term.	Same as Alt 2 with increased potential for

(Meleagris gallapavo merriami)	providing more roosting habitat. MPB risk and wildfire risk would not decrease. Conifers would continue to encroach into meadows and hardwoods. Existing down woody material and regenerating pine would provide cover and foraging habitat.	Potential to disturb nesting turkeys. Potential for direct individual mortality or nest mortality due to harvest and burning activities. Would enhance forage habitat. Would increase summer habitat and decrease winter & roosting habitat. Rx burning would have potential in loss of down woody material and microhabitats. Potential increase in OHV use may impact turkeys.	impacts due to increased treatment acres.
	<i>Cumulative Effects</i>		
	Would not have any short-term cumulative effects expected. Potential for long-term cumulative effects due to stand replacing events. Would provide the most roosting habitat throughout the project area.	Would add to past harvest, wildfire, livestock grazing, recreation and drought impacts. Overall habitat would benefit while including the potential decrease of roosting and winter habitat.	Same as Alt 2.
	<i>Summary</i>		
	Merriam's wild turkey habitat would be expected to be maintained or enhanced. All alternatives would meet Forest Plan standards and would allow attainment for Objective 217 ; therefore the Forest-wide population of Rocky Mountain elk would remain stable.		

Fire and Fuels

Affected Environment

From historic conditions, much more of the landscape is now forested and we are losing our open meadows and hardwood stringers which serve as natural fuel breaks (USDA Forest Service, 2005). Estimates show that 40% of the forest was non-stocked or meadow in 1875 compared to less than 6% in 2000. As a result of this increased fuel loading, more of the Black Hills is available for, and affected by, large, intense forest fires. The ponderosa pine cover type dominates the landscape and as a result of fire exclusion, ponderosa pine has encroached on the non-forested communities, contributing to the reduction in size of the hardwood cover type, creating dense, closed canopy ponderosa pine stands. Surface fuels include duff, small woody debris, dead down logs and long needle litter. Isolated areas of storm damage and slash from past management activities exist within the project area.

Fire Regime and Condition Class

Historically, fires were more frequent and less severe. Fire suppression activities have trended the forest outside historic ranges. Currently, there are three general types of fire regimes in the Black Hills (USDA Forest Service, 2005). Fire regimes characterize the

role fire plays in an ecosystem. Table 24 describes each of the three fire regimes. The Condition Class rating can be used to describe the degree of departure from the historic fire regime (Hann et al., 2003). Table 25 describes each followed by a typical stand structure for each Conditions Class.

Table 24. Fire regimes in the Black Hills (USDA Forest Service, 2005)

	General Characteristics	Major Controlling Variables	Distribution
Frequent, Low-Severity Fire Regimes	Fires recur within any stand at relatively short intervals (10-50 years), burning at low severity in the canopy and soil, and variable severity in the understory.	Weather (fires occur during dry periods), Climate (extensive fires tend to occur in dry years that follow 1-3 wet years), and Fuels (fuels gradually accumulate during the intervals between successive fires).	Evidence of surface fire in ponderosa pine forests throughout the Black Hills, most frequent at the Prairie-Forest ecotone and less frequent in interior forests at mid to high elevations (Fisher et al. 1987, Brown and Sieg 1999, Brown et al. 2000, Wienk 2001, Brown 2003, Wienk et al. 2004).
Infrequent, High-Severity Fire Regimes	Fires recur within any stand at long intervals (100-500+ years), burning at high severity in the canopy and understory, and at variable severity to the soil.	Weather and Climate are the primary controllers (most ignitions extinguish by themselves because of wet conditions; extensive fires occur only in very dry summers; variability in fuels usually has little influence on fire frequency, extent, or severity).	Large areas of even-aged and dense forest and of closed canopy, mature or old-growth forest at the time of settlement are evidence of stand-replacing disturbance (Graves 1899, Shinneman and Baker 1997).
Mixed Severity Fire Regimes	These fire regimes are intermediate between the Frequent, Low-Severity and the Infrequent, High-Severity Fire Regimes. Fires occur at variable intervals (10- >100 years), and burn at variable severity (patches of high severity intermingled with patches of low or intermediate severity).	Weather, Climate, and Fuels all influence fire frequency, extent, and severity, in complex ways that are not well understood, with enormous variability over time and space.	Proposed as the dominant model for fire regimes in ponderosa pine forests of the Black Hills. Under this model, surface fire forms the background process creating forest structure and landscape pattern. However, fires sometimes burn with mixed severity, with both a surface fire and a stand-replacing fire component, and may sometimes create large areas of high severity burns. Forest patches are variable in size and within patch structure (Lentile et al. in press)

Table 25. Fire Regime Condition Class (FRCC) rating descriptions (Hann et al., 2003)

Fire Regime Condition Class	Description
FRCC1 Low Departure from the central tendency* of the historic fire regime.	Fire regimes are within the historical range. Risk of losing key ecosystem components is low. Vegetative attributes are intact and functioning within the historical range.
FRCC2 Moderate Departure from the central tendency* of the historic fire regime.	Fire regimes are moderately altered from their historical range. Risk of losing key ecosystem components is moderate. Vegetation attributes have been moderately altered from their historical range. Fire frequencies have departed from natural frequencies by one or more return intervals, resulting in changes to fire size, intensity, severity, and landscape patterns.
FRCC3 High Departure from the central tendency* of the historic fire regime.	Fire regimes are significantly altered from their historical range. The risk of losing key ecosystem components is high. Vegetation attributes have been significantly altered from their historical range. Fire frequencies have departed from historical frequencies by multiple return intervals, resulting in dramatic changes to fire size, intensity, severity, and landscape patterns.

*Central tendency refers to a composite estimate of vegetation characteristics including: species composition, structural stages, stand age, canopy closure, and mosaic pattern; fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances.

The coarse scale national data characterizes the Black Hills as primarily Condition Class III, high relative risk of significantly altering or losing key components of the ponderosa pine forest system (USDA Forest Service, 2005). These conditions significantly increase the probability of a surface fire transitioning to a crown fire with increased burn severity and tree mortality. See Figure 4 for differences of FRCC stand structure. Evidence of past fires shows the potential for large, high intensity surface fires, and, given the right conditions, stand-replacing fires. Recent examples include the Jasper, Elk Mountain II, Battle Creek, Rico and Alabaugh fires.

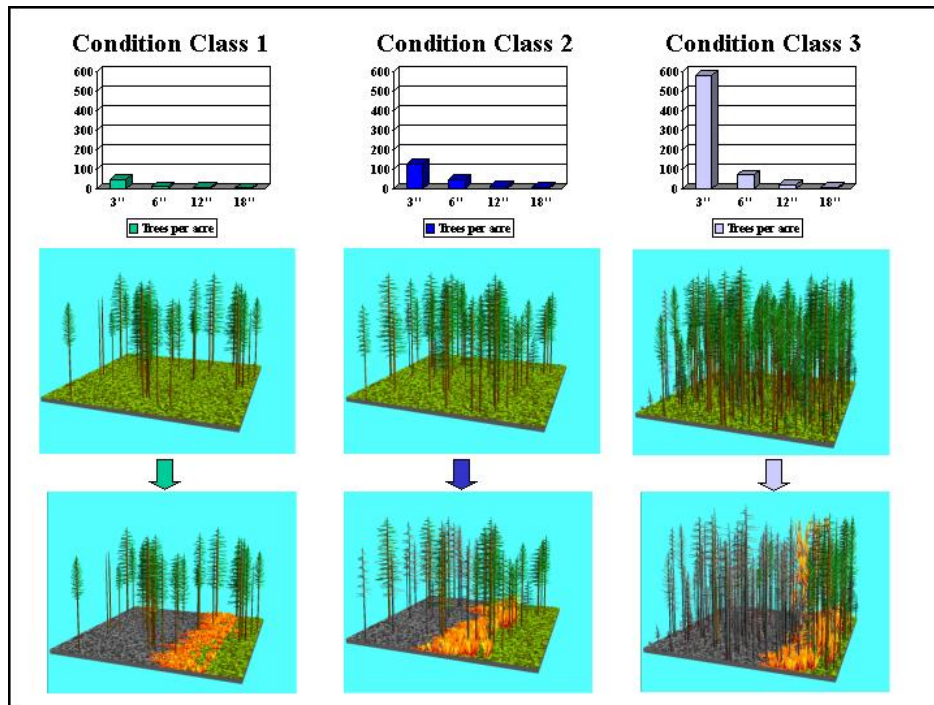


Figure 4. Typical stand structure for each Fire Regime Condition Class (FRCC).

Fire Risk

Risks are defined as those uses or human activities which have the potential to result in a wildfire ignition. Fire history occurrence of both large and point fires were analyzed using the project perimeter. The fire history data includes fires occurring from 1950 to present. Table 26 displays known fire history within the Briggs Spring project area. Of the fires identified, 46 are known lightning-caused, 11 human caused, two miscellaneous, and two unknown. Both fire history occurrence data as well as large fire history, those fires exceeding 20 acres, in and around the project area are depicted in Figure 5. In addition, the percent of the project area impacted was analyzed. Table 27 displays large fire history within the project boundary.

Table 26. Known fire history in the Briggs Spring project area from 1950 to present

Fire Size Class	Fire Size (acres)	Number of Fires
A	0 – ¼	61
B	¼ to 9	17
C	10-99	1
D	100 – 299	0
E	300-999	0
F	1000-4999	0
G	5000 +	0
U	Unknown	0

Table 27. Area of each large fire falling within the project perimeter

Fire Name	Fire Year	Total Acres	Acres Within Project Area	Percent of Project Area
Jasper	2000	83,511	4,739	6%

The number of fires on the entire Black Hills National Forest system lands has remained fairly constant at 65-130 starts per year. The number of fires that have escaped initial attack has also remained constant. However, these escaped fires have become larger and are more difficult to control with an average large fire size increasing from under 1,000 acres per fire in the early 1900's to over 8,000 acres in recent years, having burned approximately 239,000 acres since 1980.

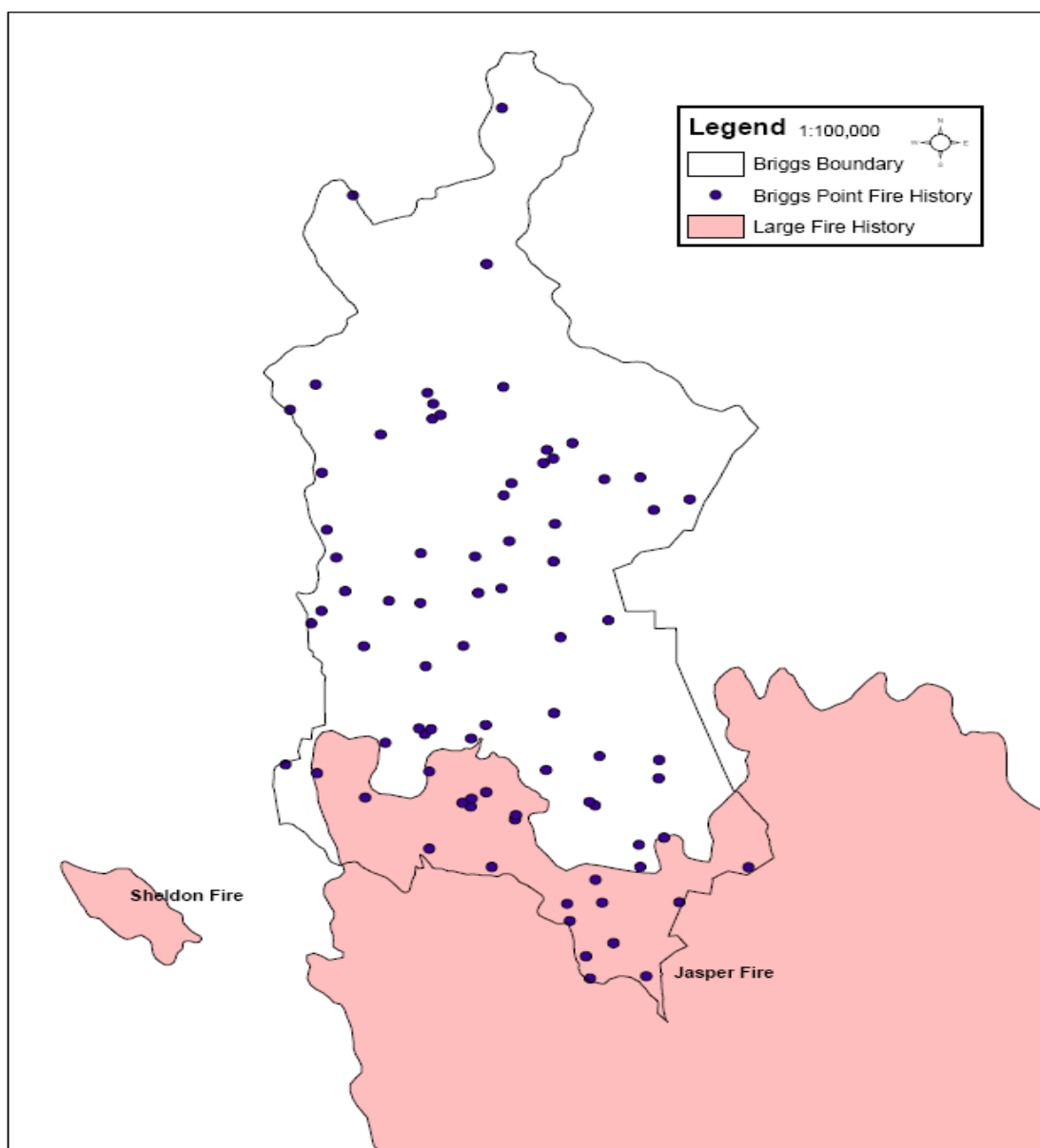


Figure 5. Large fire history in and around the project area and the point fire history within the project boundary.

Values at Risk

Values are defined in the forest plan environmental impact statement (EIS) (USDA Forest Service, 2005, Appendix E-80) as any or all natural resource improvements, or other values that may be jeopardized if a fire occurs. There are no At-Risk Communities (ARC) located within the Briggs Spring project area however, five ARC are located less than six miles from the project boundary with one being within one mile of the project boundary (Figure 6). To further assess the level of wildfire risk for each community buffer zones were created at distances of one half, one, two, and three miles around each community (Figure 6). Based on the Pennington County RapidMap, it was determined there are approximately 11 residences contained within the project area, and an additional 15 more within a three mile radius of the project boundary.

Additional values at risk include commercial timber stands, power lines, range improvements, such as fences and spring developments, investments in timber stand improvement and reforestation, wildlife habitat, including snags, forage, riparian areas, security cover, and mid to late seral ponderosa pine stands, sensitive species, recreation sites, as well as water, air and visual quality.

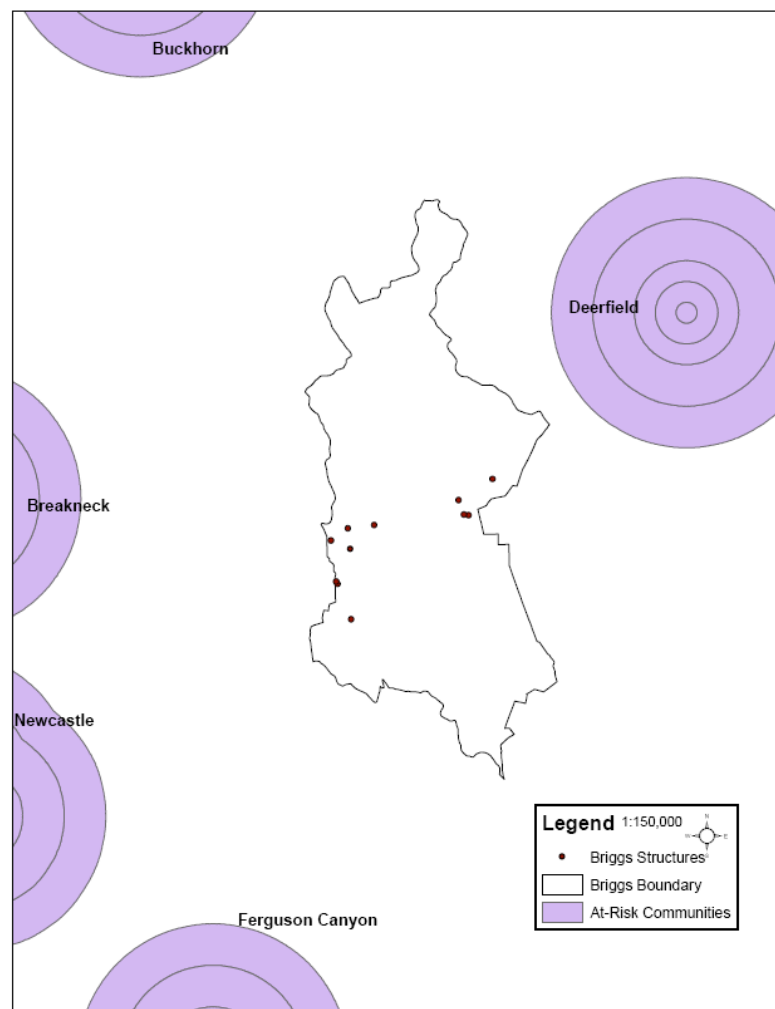


Figure 6. At-Risk Communities (ARC) adjacent to the project boundary and structures located within the project area.

Fire Hazard

Fire hazard is defined as a fuel complex that determines the ease of ignition and the resistance to control. Hazard is an expression of what kind of fire may potentially occur and how it affects human values. The fire hazard rating increases as the amount and continuity of surface and canopy fuels increases. As the amount of fuel on a given landscape increases and fuel profiles become more horizontally and vertically continuous, the intensity of a wildfire in that landscape is expected to increase. Areas with high fire hazard rating have the potential to exhibit more extreme fire behavior with more severe effects than those with a low hazard rating.

A detailed examination of the Hazard Rating is best accomplished by reviewing known data regarding the arrangement of the vegetation, or structural stage. The structural stage gives an indication of the current fire hazard and is a stand level rating of crown fire susceptibility. Table 28 gives an approximate area of each structural stage and indicates the existing fire hazard.

Table 28. Current acres of each structural stage and existing Fire Hazard Rating

Structural Stage	Approximate Acres	Fire Hazard
Non-structured	2,697	Low
1 – Grass/Forb	497	Low
2 – Shrubs/Seedlings	550	Moderate
3A – Sapling/Pole (<40%)	179	Moderate
3B – Sapling/Pole (40-70%)	179	High
3C – Sapling/Pole (>70%)	42	Very High
4A – Mature >9” (<40%)	7,366	Moderate
4A – Mature <9” (<40%)	5,401	Very High
4B – Mature >9” (10-70%)	5,031	High
4B – Mature <9” (10-70%)	2,606	Very High
4C – Mature <9” (>70%)	0	Very High
5 – Old Growth	0	Very High

In assessing hazard, an overall Hazard Rating of high to very high exists in approximately 54% of the project area (Table 29). It is suspected that much of the non-forest land also follows this trend resulting in a higher percentage of high to very high Hazard Rating, however to what extent is unknown. The high to very high fire hazard rating is determined on the availability of fuels to sustain a fire. The high fire hazard that exists in the Briggs Spring project area is a result of the disruption of the historic fire regime, creating a landscape dominated by large contiguous stands of dense ponderosa pine with a high loading of surface and ladder fuels. In addition, recent pockets of tree mortality caused by insect and disease will increase fuel concentrations on the ground resulting in an overall increase of fire hazard. In an area such as Briggs Spring, where high risk coincides with high hazard, the probability of fire with undesirable conditions is more likely and could be very detrimental to many of the values existing in and around this project area.

Table 29. Total acres and percentage of project area for the existing Fire Hazard Rating

Approximate Total Acres	Fire Hazard	Approximate Percentage of Project Area
3,194	Low	13%
9,260	Moderate	33%
4,227	High	21%
7,725	Very High	33%

Air Quality

Air quality in the Black Hills is considered to be excellent, having pollution concentration lower than both State and Federal standards (USDA Forest Service, 2005). Maintaining and improving air quality in the Black Hills and western South Dakota is desired. Although usually short in duration, smoke from wildfires and prescribed fires has the potential to affect air quality. The Environmental Protection Agency (EPA) addresses smoke from wildland fire under their natural events policy at <http://www.epa.gov/ttn/caaa/t1/memoranda/nepol.pdf> (USDA Forest Service, 2005).

The Briggs Spring project area is in the vicinity of two Class 1 Airsheds; Badlands National Park and Wind Cave National Park and five communities; Deerfield, Buckhorn, Breakneck, Newcastle and Ferguson Canyon. The project area is designated as a Class II area allowing higher concentrations of pollutants than the Class I Airsheds. Smoke generated by wildfire is usually greater and cannot be mitigated; however, smoke generated under controlled conditions can be mitigated using the following means:

- Limit treatment area size
- Specify wind directions and speed
- Specify minimum mixing heights
- Stagger ignitions

These mitigation techniques in addition to other control methods for smoke management minimize the impacts of smoke to visibility and human health.

Environmental Consequences

Alternative 1 – No Action

The no action alternative assumes that no change in management would occur within the project area. Management actions currently being practiced, including suppression would continue to be practiced. The only other changes that would occur on the landscape would be those that occur as a result of natural occurrences, wildfire suppression or those resulting from other project decisions.

Direct and Indirect Effects

A no action alternative would continue the trend of the current FRCC 3 resulting in increasing fire hazards. In the absence of vegetation treatments, tree densities would continue to increase, as would crown cover and ladder fuels. As a result, there would be higher resistance to control and increased likelihood of wildfire escape with increased risk of losses. This trend would continue until interrupted by a natural disturbance such

as a catastrophic fire. Recent fires in the Black Hills area provide examples of what type of fire behavior can be expected and its effects on the landscape.

This alternative would not alter human activities or usage in the area therefore fire risk is not expected to change because the probability of an ignition occurring is not expected to change.

The value rating would also remain unchanged unless a wildfire occurred and destroyed values in the project area.

In the next 10-20 years, as regeneration develops and fills in openings across the landscape, fire behavior would favor large scale stand replacing events. High flame-lengths, fireline intensities, spread rates, and probabilities of ignition can be expected. The closely spaced regeneration would have a ladder effect in the remaining stands of trees, enabling fire to transition to the crowns. This fire behavior would make heavy equipment necessary for fire suppression. Firefighters could not use direct attack tactics.

Fire behavior in both the moderate and high severity areas of the project area would result in an increase in resistance to control and a greater likelihood of wildfire escape leading to an increased risk of loss of natural forest resources as well as private property, and decreased firefighter and public safety. The high intensity would also cause consumption of the remaining duff layer and soil heating as well as other resource damage. Without treatment, the fire hazard would continue to move toward very high. The greatest potential for wildland fire growth exists with this alternative.

Qualitatively, in the absence of treatments or the use of prescribed fire, the fire hazard is expected to worsen across the project area. The only action that could improve the fire hazard under the no action alternative is a wildfire and the longevity and improvement of fire hazard would be directly associated to the intensity of that fire.

Although air quality would not be directly impacted under the no action alternative, there would not be any control over the timing or amount of emissions released into adjacent airsheds in the event of a wildfire. A large wildfire has the potential to make a much greater impact on adjacent communities and Class 1 Airsheds, possibly exceeding National Air Quality Standards. The EPA addresses smoke from wildland fire under their natural events policy at <http://www.epa.gov/ttn/caaa/t1/memoranda/nepol.pdf> . (USDA Forest Service, 2005)

Alternative 2 – Proposed Action

Alternative 2 focuses on the management of vegetation to maintain forest health, provide for a sustainable supply of commercial timber, and reduce the risk of large-scale, high intensity wildfire.

This alternative would treat 18,307 acres commercially, 16,010 acres non-commercially and 6,295 acres with prescribed fire. Of the non-commercial treatments 1,693 acres would be treated by deadfall treatments and 1,252 acres designed specifically for mechanical fuels treatments. Many follow-up treatments or consecutive treatments including both mechanical and prescribed fire are planned, resulting in more than one treatment in some sites.

The commercial treatments would reduce basal area (BA) to 50 ft²/ac. or 60 ft²/ac., which would reduce the susceptibility to mountain pine beetles as well as the possibility of

crown fire spread. Pre-commercial thinning would also decrease crown fire potential. Prescription burning would reduce the current fuel loadings changing fire behavior of future wildfires, reducing risk to life and property. Mechanical fuels treatments would treat slash to within 18 inches of the ground to break up fuel continuity, reducing fire hazard and providing greater tactical opportunities during fire suppression.

Direct and Indirect Effects

Treatments outlined in Alternative 2 would decrease the risk for large-scale, high intensity fires, allowing for characteristic low to mixed severity fires to occur. The treatments proposed in Alternative 2 would also have a substantial effect on fire behavior. The chances for successful initial attack under this alternative are much greater than Alternative 1, and the risk to residential areas, the general public, and firefighters is also greatly reduced. This is a result of treated stands generally burning in a surface fire configuration with isolated and small group torching. In addition, an improvement of FRCC can be expected as conditions move towards a more natural condition.

The actions associated with this alternative are not substantial enough to significantly alter human activities or usage in the area therefore fire risk is not expected to change because the probability of an ignition occurring is not expected to change.

The value rating would also remain unchanged unless a wildfire occurred and destroyed values in the project area.

This alternative would move 9,916 acres from the high to very high fire hazard rating to the low and moderate fire hazard rating. The timber treatments, fuels treatments, and prescribed burning would decrease ladder fuels, reduce the surface fuel loading, and break up the continuity of the fuels. Prescribed burning would also enhance the mosaic of burned and unburned fuels that resulted from past wildfires. The result of these treatments would be a decrease in flame length, intensity, duration, spotting, probability of ignition, and crown fire potential. This would create more strategic and tactical firefighting opportunities resulting in greater success during initial attack due to the fact that fireline construction rates would be enhanced, line placement opportunities would increase, and resistance to control would decrease. Suppression costs would also decrease due to the improved initial attack success rate. The reduction in fire behavior would create a safer environment for firefighters as well as the public. The break up in fuel continuity would also lead to more opportunities for locating safety zones. The risk of MPB outbreaks and the resulting accumulation of surface fuels would also be reduced by thinning.

Accomplishing prescribed broadcast burning objectives is estimated to require approximately 10-15 ignition days per year for 3 to 10 years. Although usually short in duration, smoke from prescribed fires has the potential to affect air quality. Smoke generated by wildfire is usually greater and cannot be mitigated; however, smoke generated under controlled conditions can be mitigated using the following means:

- Limit treatment area size
- Specify wind directions and speed
- Specify minimum mixing heights
- Stagger ignitions

These mitigation techniques in addition to other control methods for smoke management minimize the impacts of smoke to visibility and human health.

This alternative would meet Forest Plan Goal 10 of establishing and maintaining a mosaic of vegetative conditions to reduce occurrences of large-scale, high intensity fire, insect, and disease events, and facilitate insect and disease management and firefighting capabilities, and Standard 4103, utilizing prescribed fire to achieve management objectives. This alternative would also meet Guideline 4110.

Alternative 3

Alternative 3 was designed to further reduce the susceptibility to MPB by including more thinning and sanitation as well as additional acres of prescribed fire.

This alternative would treat 23,400 acres commercially, 16,443 acres non-commercially and 7,009 acres with prescribed fire. Of the non-commercial treatments 1,693 acres would be treated by deadfall treatments and 1,274 acres designed specifically for mechanical fuels treatments. Many follow-up treatments or consecutive treatments including both mechanical and prescribed fire are planned, resulting in more than one treatment in some sites.

Direct and Indirect Effects

Reduction in crown fire hazard should result from the creation of a mosaic pattern, breaking vegetative continuity both vertically and horizontally across the landscape. An improvement of FRCC can be expected as in Alternative 2, however more acres would be moving towards a more natural condition as a result of additional acres being treated with this alternative.

As with alternative 2, the actions associated with this alternative are not substantial enough to significantly alter human activities or usage in the area therefore fire risk is not expected to change because the probability of an ignition occurring is not expected to change.

As with Alternative 2, the value rating would also remain unchanged unless a wildfire occurred and destroyed values in the project area.

Treatments outlined in Alternative 3 would have a greater effect to reducing fire hazard than Alternative 2. This alternative would move 15,935 acres (6,019 acres more than Alternative 2) from the high to very high fire hazard rating to the low to moderate fire hazard rating.

Accomplishing prescribed broadcast burning objectives is estimated to require approximately 10-15 ignition days per year for 3 to 10 years. Although usually short in duration, smoke from prescribed fires has the potential to affect air quality. Smoke generated by wildfire is usually greater and cannot be mitigated; however, smoke generated under controlled conditions can be mitigated using the same means as in Alternative 2.

This alternative would meet Forest Plan Goal 10 of establishing and maintaining a mosaic of vegetative conditions to reduce occurrences of large-scale, high intensity fire, insect, and disease events, and facilitate insect and disease management and firefighting

capabilities, and Standard 4103, utilizing prescribed fire to achieve management objectives. This alternative would also meet Guideline 4110.

Cumulative Effects

The cumulative effects in the Briggs Spring project were analyzed using those activities occurring within the project boundary. Those effects were analyzed from 2000, the year that Jasper Fire occurred, through 2026, which allows for MPB activity, mechanical and prescribed fire activities to be complete. The cumulative effects would occur on all types of ownerships that fall within the designated area.

In the Briggs Spring project area, past, present, and reasonably foreseeable future actions contribute to changes in fuel conditions. Past management activities may have created situations that could have increased as well as decreased the risk of large scale, high intensity wildfires. For example, wildfire suppression leads to a buildup in down woody material, increased stocking, and increased ladder fuels, which all increase fire hazard. The previous lack of thinning in dense stands has also contributed to an increase in wildland fire behavior, tree densities, the presence of ladder fuels, and dense crown closures, again all contributing to higher fire hazard. In addition, these dense stands have also contributed to the growth of MPB. If fires had been allowed to burn instead of pursuing an aggressive fire suppression program over the last 75-100 years, a considerable increase in the amount of acreage in stands would have burned at a more frequent interval and a lower intensity. However, today's conditions favor wildfires of increased fire intensity at longer fire return intervals.

Management activities which have reduced fire hazard in the project area include the past timber sales, Redbank, Dumbuk and Thumb, as well as some private timber sales which occurred on private land. Reductions in fire hazard occurred on most, but not all of the sites treated in these activities, depending upon the amount of biomass removed. In addition, prescribed fire projects, including the Stateline and Thumb prescribed burns, have occurred in the project area and have reduced fire hazard in those areas. Vegetation treatments identified on adjacent lands within the cumulative effects area would enhance the cumulative value of both FRCC and fire hazard. In areas not being treated, the potential for sustained crown-fires, as well as fireline intensity would increase. With this type of fire behavior, forest suppression objectives would not be met.

Fire occurring several miles outside of the project boundary may affect the project area under the right conditions. On the Black Hills National Forest, fires in adjacent areas have previously had the ability to make large runs of up to 12 miles. Although this event is rare and requires extreme conditions, a large scale high intensity fire is more probable if no treatment is implemented. A fire start in the Briggs Spring project area (under the right conditions) would not only threaten or damage/destroy improvements in the immediate area, but also has the potential to burn into or affect surrounding communities such as Newcastle, Deerfield, Ferguson Canyon, Buckhorn, or Breakneck within one burning period (12 hours). A large scale, high intensity wildfire brings with it numerous risks and effects. Homes in the path of a wildfire are perhaps the most immediately recognized value at risk, however severe wildfires put numerous other important values at risk including: critical infrastructure, critical fish and wildlife habitat, firefighter and public health and safety, soil productivity, clean air, and functional fire-adapted ecosystems (Graham et al., 2004). Some of these values are also threatened by the

secondary effects of wildfire, such as landslides, soil erosion, and the spread of exotic species (Graham et al., 2004).

The action alternatives are expected to have positive long term cumulative effects. The proposed treatment combined with monitoring and foreseeable future projects would decrease the risk of large scale, high intensity damage of wildfire as well as decrease fuel loading, moving the project area to a more desirable condition. The proposed treatments would reduce stand density and canopy closure bringing the forest back to a more historical type condition. Projects in adjacent areas would also have an impact. These projects combined with the treatments proposed in the Briggs Spring project would decrease the hazardous fuels much more efficiently for longer periods of time.

Summary of Effects

Analysis has demonstrated that all action alternatives would have a change on fire behavior within treated areas. This change is expected to be mixed severity in nature, opposed to those areas not treated which will experience more high severity to stand replacement fire behavior. The chances for successful initial attack would also increase in all action alternatives and the risk to the identified values at risk would decrease. In addition, an improvement of FRCC can be expected as conditions move towards a more natural condition. Under the no action alternative, there would be no change in fire behavior therefore no improvement in existing FRCC.

The fire risk is not expected to change in any of the alternatives because the actions associated with this alternative are not substantial enough to considerably alter human activities or usage in the area therefore fire risk is not expected to change because the probability of an ignition occurring is not expected to change.

Fire hazard is expected to improve in all action alternatives. Alternatives 2 and 3 are very comparable with only 667 acres separating these alternatives. Treatments identified in Alternative 2 will shift 9,916 acres, or 40% of the project area, from a high to very high rating to a low to moderate rating. Treatments identified in Alternative 3 will shift 10,583 acres, or 43% of the area, from a high to very high rating to a low to moderate rating (Table 30 and Figure 7). Under the no action alternative, there would be an increase in fuel loading resulting in increased fire behavior, which also has the potential to further impact wildlife, soils, visual qualities, and timber. The no action alternative would not improve fire hazard.

Table 30. Fire Hazard Rating by alternative

Fire Hazard Rating	Alternative 1		Alternative 2		Alternative 3	
	Acres	%	Acres	%	Acres	%
Low	3,194	13	17,236	70	17,384	71
Moderate	8,095	33	3,969	16	4,488	18
High	5,211	21	2,054	8	1,834	7
Very High	8,048	33	1,289	5	842	3
Total	24,548	100	24,548	100	24,548	100

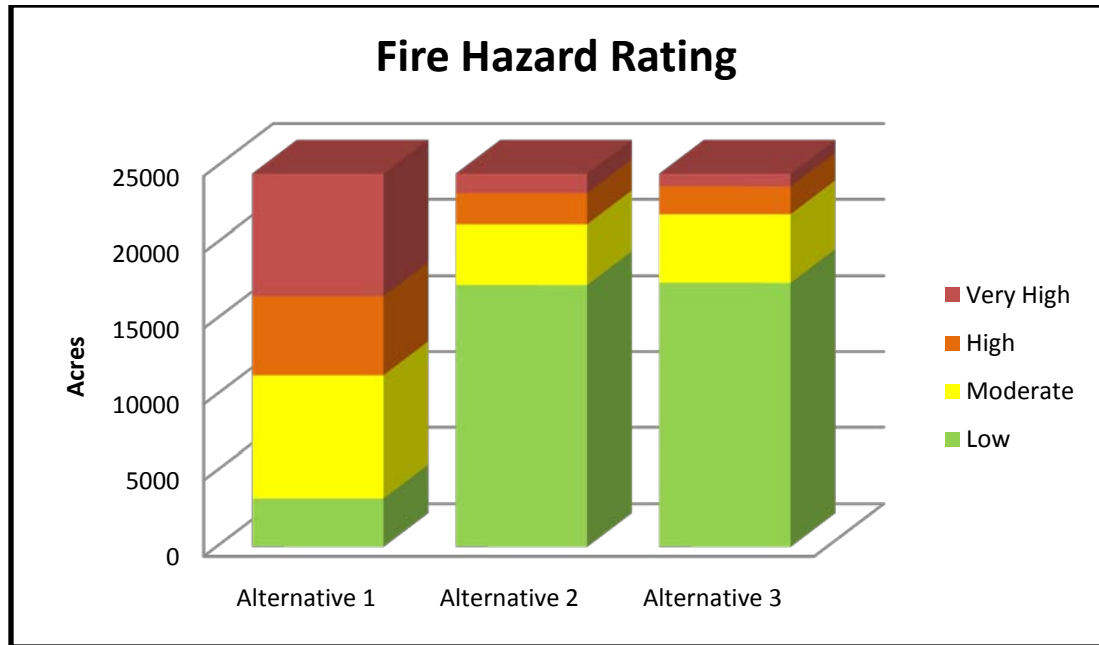


Figure 7. Fire Hazard Rating by alternative.

Air quality would be affected by all action alternatives. More smoke would be generated by Alternative 3 than Alternative 2. Smoke generated by prescribed burning can be mitigated while smoke generated by wildfire is usually greater and cannot be mitigated; however, smoke generated under controlled conditions can be mitigated using the same means as stated in Alternative 2.

All action alternatives would meet the Forest Plan Goal 10 of establishing and maintaining a mosaic of vegetative conditions to reduce occurrences of catastrophic fire, insect, and disease events, and facilitate insect and disease management and firefighting capabilities, and Standard 4103, utilizing prescribed fire to achieve management objectives.

It is important to understand that fuel treatments would not prevent wildland fires from occurring. However, with fuel treatments, the risk of an extreme wildfire event would be greatly decreased. Fuel treatments would also need to occur in adjacent planning areas in order for treatments to be most effective at a landscape scale.

Botany, Rangeland, and Noxious Weeds

Affected Environment

A large portion of the project area contains the community type Black Hills Montane Grasslands (Marriot & Faber-Langendoen, 2000). While most grasslands/meadows within the project area would fit into this community type, the majority of areas have a considerable proportion of exotic grasses such as Kentucky bluegrass (*Poa pratensis*), common timothy (*Phleum pratense*), and smooth brome (*Bromus inermis*). Many of these areas also have a major proportion of non-native clovers (*Trifolium spp.*). These exotic invaders greatly reduce the botanical potential in these grasslands. However, a few large grasslands, and several isolated meadows, do exist within the project area that are not completely dominated by exotics and contain a rich diversity of native plants.

The areas that are not dominated by exotic grasses or clovers are especially important to the area because of their limited acreage. Many of these areas are being affected by pine encroachment. Total acres dominated by grasslands and/or meadows total approximately 2,697 acres.

Several small springs/seeps occur throughout the project area. Many of these have been developed in the past to be used as livestock water facilities and have small reservoirs built around them.

Botany

A comprehensive botanical survey was completed in 2007 exclusively for the Briggs Spring project area to collect information related to plant communities, assess sensitive species habitat, and identify locations of target plant species (sensitive species, state-listed species, and species of local concern). Subsequent surveys were completed in 2010 as a result of long-term rangeland monitoring for the livestock grazing program and general plant surveys of the area. Surveys will be ongoing in the project area.

South Dakota state listed species are plant species that have been identified as rare in the state of South Dakota. The state has identified these plants for tracking by the South Dakota Natural Heritage Program. There are occurrences of four of these species located within the Briggs Spring analysis area. These four species will be carried forward in this analysis:

- Moonwort grapefern (*Botrychium lunaria*)
- Least grapefern (*Botrychium simplex*)
- Fendler's whitethorn (*Ceanothus fendleri*)
- Giant lousewort (*Pedicularis procera*)

A pre-field review was conducted of available information to assemble occurrence records, describe habitat needs and ecological requirements, and determine whether field reconnaissance is needed to complete the analysis. Sources of information included botanical surveys, Forest Service records and files, local professional judgment, and published research.

Species of Local Concern (SOLC) – Based on known conditions of this project area, pleated gentian (*Gentiana affinis*) is the only SOLC which is present and there may be suitable habitat and will be carried forward in this analysis. There were numerous occurrences of this species found during the survey of this project area.

Region 2 (R2) Sensitive Species – No R2 sensitive plant species have been located within the project area, but suitable habitat is present for two species: Iowa moonwort (*Botrychium campestre*) and narrowleaf grapefern (*Botrychium lineare*). Since no R2 sensitive species have been identified in the project area, only suitable habitat will be analyzed. A pre-field review was conducted of available information to assemble occurrence records, describe habitat needs and ecological requirements, and determine whether field reconnaissance is needed to complete the analysis. Sources of information included botanical surveys, Forest Service records and files, local professional judgment, and published research.

No further analysis is needed for species that are not known or suspected to occur in the project area, and for which no suitable habitat is present. Table 31 documents the two species that will be carried forward in this analysis.

Table 31. Forest Service R2 Sensitive Species in Briggs Spring project area

Scientific Name/ Common Name/ Plant Code	Distribution and Habitat	Known To Occur in Project Area?	Suitable Habitat Present?
<i>Botrychium campestre</i> /Iowa moonwort/BOCA5	Rangewide the species occurs primarily on well-drained soils in non-forested habitats, occasionally under shrubs in or at the margins of these habitats. Black Hills occurrences are known from BKF lands, private land and Wind Cave National Park. <i>Botrychium campestre</i> is extremely inconspicuous. Rangewide, it is considered a grassland species associated with sandy grassland habitats in prairies, dunes, railroad sidings, and fields over limestone. Black Hills sites occur on limestone substrates and are primarily in open grassland dominated habitats usually with high to moderate forb diversity. Little bluestem (<i>Schizachyrium scoparium</i>) occurs at several of the sites. Black Hills occurrences range in elevation from approximately 3,850 to 6,700 ft.	No	Yes
<i>Botrychium lineare</i> /narrowleaf grapefern/BOLI7	Western populations of the species occur primarily on limestone substrates in a variety of habitats including heavily forested sites and grassy meadows, fen-like seeps and gravelly roadsides. Black Hills sites occur on limestone substrates in open grassland habitats (both high elevation montane grasslands and lower elevation little bluestem dominated habitats), on old (estimated 15-25 years) native surface roadbeds and in openings along perennial streams. Elsewhere in its range, this species has often been documented in areas of road disturbances and other human and natural disturbances. Black Hills occurrences range in elevation from approximately 4,200 (in Wind Cave national Park) to 6,700 ft.	No	Yes

Rangeland

Range condition, trend and inventory for the analysis area were measured on the various allotments many times during the 1960's, 1970's and 1980's in addition to more recent studies conducted in 2002 and 2010.

The Briggs Spring project area includes portions of three grazing allotments as follows: Central Allotment, the entire allotment except a small portion of the Estes Springs pasture; Crow's Nest Upper Beaver Allotment, Unit D, Antelope Unit, and portions of

Units 5, 4, B, C, 4, 3, and 1; and, Lower Beaver Allotment, Units Moon, Summit Ridge, and Wilson. Table 32 shows historical grazing use by allotment.

There are currently a total of 24 grazing permits, (4 private land permits and 20 term permits) within the analysis area. Cattle are present in the allotments from June 1st – October 15th annually.

Table 32. Historical use by allotment in the Briggs Spring project area

Central Grazing Allotment	The first recorded actual use on this allotment dates back to 1930, use was primarily by cattle with five to 43 horses permitted in the 1940's. The grazing system was season-long continuous grazing. The allotment was first cross fenced in 1964. Today seven permittees graze the allotment under a deferred rotation grazing system.
Crow's Nest Upper Beaver Grazing Allotment	Past grazing management of the allotment was season-long use, with water being the only distributing factor. In the late 1940's the first division fence was constructed, dividing the allotment into two units. In the early 1950's voluntary reductions and partial stocking occurred, and in 1956 permittees were offered a choice of taking massive reductions or implementing a range improvement program and intensive management system. This program led first to development of rest rotation and increased numbers, and later to the deferred rotation systems that are currently in use. Because of overstocking disclosed in the production-utilization study done in the late 1980's, livestock numbers were reduced by 120 head in the analysis area in 1991.
Lower Beaver Grazing Allotment	Grazed by cattle season-long until it was first cross-fenced in 1966. Prior to 1966 distribution was a concern on the allotment, with the north end receiving heavy use while the southern end received very light use. The cross fence allowed for a season-long unit in the southern end of the allotment and a two-unit deferred grazing system on the northern portion. In 1973 the season-long use of the southern portion was changed to a two-unit deferred rotation system.

Noxious Weeds

The Briggs Spring project area contains the past analysis areas of Dumbuk, Redbank and Thumb. Those areas were surveyed during noxious weed treatment in 2005-2010.

Canada thistle (*Cirsium arvense*) and hound's tongue (*Cynoglossum officinale*) are the main invaders in this analysis area. Smaller infestations of common tansy (*Tanacetum vulgare*), yellow toadflax (*Linaria vulgaris*), and oxeye daisy (*Leucanthemum vulgare*) also exist. In 2010 leafy spurge was found and treated. The Redbank Campground is surveyed and treated for weeds annually.

In the project area it is known that there is at least 440 acres of noxious weed infestations. Previous disturbances within the project area and current infestations put this area at high risk for continued invasion.

Documented noxious weed species found in the area include:

- leafy spurge (*Euphorbia esula*)
- Canada thistle (*Cirsium arvense*)
- hound's tongue (*Cynoglossum officinale*)
- yellow toadflax (*Linaria vulgaris*)
- common tansy (*Tanacetum vulgare*)

- oxeye daisy (*Leucanthemum vulgare*)
- sulfur cinquefoil (*Potentilla recta*)
- common mullein (*Verbascum thapsus*)
- bull thistle (*Cirsium vulgare*)
- musk thistle (*Carduus nutans*)

Environmental Consequences

Botany

State Listed Species and SOLC

Effects to the following species are similar and are analyzed together. State listed species include: moonwort grapefern, least grapefern, Fendler's whitethorn, and giant lousewort. SOLC include: pleated gentian.

Alternative 1 – No Action

No new proposed activities would occur in the project area.

Direct and Indirect Effects

There would be no direct effects, since no activities would occur. There would be no damage to any unknown individuals from forestry treatments, prescribed fire, or campground developments. Conifers would continue to encroach into meadows/grasslands and forest stands would continue to become denser, which may result in loss of habitat for these species. Risk of MPB infestations and wildfire would not be decreased; there would likely be an increase in risk for both, resulting in potential negative affects to state listed and SOLC plant species.

Noxious weed infestations are a risk for these plant species, as exotics are often able to out-compete native vegetation for available nutrients. In addition, the treatment of such infestations with herbicides might present a risk to these plants if unknown occurrences are inadvertently sprayed. The lack of additional disturbance associated with the no action alternative would reduce the possibility of noxious weed infestations in state listed and SOLC species habitat.

Common to Both Action Alternatives

Direct and Indirect Effects

Direct effects of the disturbances associated with the vegetation treatments would be the loss of individual plants from heavy equipment operations, locations of burn piles, skid trails, or any activity in suitable habitat. However the overall effect of treatments would be neutral to beneficial. The proposed pine encroachment treatment in both alternatives would likely enhance habitat for these species. Both action alternatives would reduce the overall risk of MPB infestation and large-scale, high intensity wildfire.

Indirect effects would be the increased potential for noxious weed infestations in disturbed areas. This can be detrimental to state listed and SOLC plant species, as

noxious weeds and invasive species have the ability to out-compete desired native plant species. The herbicides used in noxious weed control can also be detrimental to these species if the individuals are inadvertently exposed to the herbicides.

Prescribed burning and tree thinning appear to have the potential to increase the growth and reproduction of Fendler's whitethorn according to Huffman and Moore (2004). Thus the management activities proposed in the action alternatives would be expected to have a beneficial effect on these species.

Giant lousewort would potentially be affected. The stand it occurs in is proposed for a group shelterwood treatment under both action alternatives. No available sources indicate known effects to giant lousewort from disturbances such as forestry treatments. While adverse effects may occur to this species in the project area it would not affect the overall population in the Black Hills.

The proposed campground sites occur in areas that do not contain any known populations of any state listed or SOLC plants, or suitable habitat.

The alternatives would meet Forest Plan standards and guidelines, therefore it is determined **pleated gentian is likely to persist on the forest.**

R2 Sensitive Species

Effects to the following species are similar and are analyzed together. R2 sensitive species include: Iowa moonwort and narrowleaf grapefern.

Alternative 1 – No Action

No new proposed activities would occur in the project area.

Direct and Indirect Effects

Under the no action alternative, there would be no direct effects, since no activities would occur. There would be no damage to any unknown individuals from forestry treatments, prescribed fire, or campground developments.

By not treating stands infested with mountain pine beetle and reducing hazardous fuels, there would likely be an increased risk for a large-scale, high intensity wildfire. This type of fire often times has effects such as deep soil heating and intensities that could negatively affect both the belowground and aboveground portions of Iowa moonwort and narrowleaf grapefern individuals (USDA Forest Service, 2005, Appendix C).

A decrease of suitable habitat (grass dominated communities) would likely result with implementation of the no action alternative. With the current absence of a natural fire regime and without treatment, it is expected that forested stands will become denser and ponderosa pine will continue to encroach upon suitable habitat. Allowing pine encroachment to continue may result in a loss of suitable habitat for these species.

The lack of additional disturbance associated with the no action alternative would reduce the possibility of noxious weed infestations in the sensitive plant habitat. Noxious weed infestations are a risk for R2 sensitive plants, as exotics are often able to out-compete native vegetation for available nutrients and moisture. In addition, the treatment of such

infestations with herbicides might present a risk to sensitive plants if unknown occurrences are inadvertently sprayed.

This alternative would result in both positive and negative impacts to these two species. There would not be any disturbance to unknown individuals nor would the potential to increase noxious weed infestations exist through the no action alternative. The negative impacts could result in an increased risk of a large-scale, high intensity wildfire damaging species habitat and a loss of habitat from conifer encroachment. Since both species occupy similar habitat the following determination is valid for both: **“May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend for federal listing.”**

Common to Both Action Alternatives

Direct and Indirect Effects

Both action alternatives would potentially benefit suitable habitat for these species. The earlier successional conditions that occur with opening the overstory canopy could produce conditions that would be beneficial to site colonization by wind-dispersed, spore-producing *Botrychium* species (Iowa moonwort and narrowleaf grapefern), if the associated mycorrhizal species and other microsite conditions are present (Farrar, 2004). Reducing canopy cover, amount of biomass, and hazardous fuels would reduce the likelihood of a severe, high intensity wildfire that could degrade habitat for sensitive species. Hardwood stands are typically not considered suitable habitat for Iowa moonwort and narrowleaf grapefern. Removing conifers would likely have a neutral to beneficial effect on any unknown Iowa moonwort and narrowleaf grapefern populations. Treatment of the sites that are proposed for pine encroachment would likely enhance habitat for Iowa moonwort and narrowleaf grapefern. There is potential for treatments to have short-term impacts to any unknown individual plants during the treatments; but long-term, the proposed pine encroachment treatments would likely have a beneficial impact for these species by enhancing or conserving the habitat conditions.

Prescribed fire would unlock nutrients bound in un-decomposed organic matter above the soil and release them to be available for plants. Decreasing the ponderosa pine density and the proposed prescribed burning would be expected to reduce the risk of wildfire, which would help protect sensitive plant species habitat. Prescribed burning would not be expected to have negative impacts to these species.

The proposed campground sites occur in areas that do not contain any known populations of Iowa moonwort or of narrowleaf grapefern, nor does it contain suitable habitat. The sites are dominated by ponderosa pine and the soils that occur on the sites are typically not conducive for these two species in the Black Hills.

Negative direct effects of any of the proposed treatments would be the loss of any unknown individuals from heavy equipment operations, locations of burn piles, skid trails, or any activity in suitable habitat.

Indirect effects from any of the proposed treatments would be the increased potential for noxious weed infestations in disturbed areas. The herbicides used in noxious weed control can also be detrimental to sensitive species if the individuals are inadvertently

exposed to the herbicides. While unknown individuals may exist on these sites and may be damaged during operations, the overall effect would be neutral to beneficial.

Both Alternative 2 and 3 would likely result in positive and negative impacts. Any negative impacts to unknown individuals are expected to be short-term, while long-term impacts should be beneficial. Since both species occupy similar habitat the following determination is valid for both: **“May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend for federal listing.”**

Rangeland

Alternative 1 – No Action

No new proposed activities would occur in the project area.

Direct and Indirect Effects

The no action alternative would eventually result in a decrease of grassland communities in the project area as forested stands become denser and ponderosa pine continues to encroach upon grassland and meadow areas. As a result, the amount of available forage would decrease as grassland communities decline and ponderosa pine becomes denser. Also, access to available forage would eventually decrease as forested stands become denser and livestock travel within forested areas becomes difficult. Having less forage available in forested areas, grazing animals would increase the grazing pressure on non-forested areas. This may result in a possible decrease in the condition of those rangelands. A decrease in condition of the rangelands would eventually lead to an additional decrease in the amount and quality of forage available. With all of the above, this would make it more difficult to meet the Forest Plan Guideline 2505, *Proper Use or Residual Levels-Riparian/Uplands*, with the current grazing permits.

This alternative would not increase the potential for livestock-recreational user conflicts with the addition or expansion of an OHV campground as proposed in either of the action alternatives. An increase in OHV traffic leads to the potential of conflicts with livestock as OHV oftentimes lead to the disruption of livestock behavior.

Common to Both Action Alternatives

Direct and Indirect Effects

Both action alternatives would increase the overall amount of forage available by decreasing ponderosa pine density in the grasslands/meadows, uplands, and aspen stands. Decreasing pine density may also open areas up that were previously inaccessible to livestock. The treatments may allow for more even-distribution of livestock throughout the pastures and reduce utilization in more critical areas such as meadows and grasslands.

Cattle are permitted and present in allotments within the project area as follows: Crow's Nest/Upper Beaver and Lower Beaver Allotments from June 11th – September 30th; and, Central Allotment from June 11th - October 10th. Conflict with permitted uses may occur if fences are left down or gates are left open.

The proposed campground in either action alternative would have the potential to increase livestock-recreational user conflicts. The number of recreation user days would be expected to increase with the implementation of either campground site. This would lead to an increased potential for gates to be left open and livestock to be harassed by OHV's. Within the developed recreational area conflict would be minimal as these areas would be fenced out from livestock grazing.

Noxious Weeds

Alternative 1 – No Action

No new proposed activities would occur in the project area.

Direct and Indirect Effects

Noxious weed populations would be limited to current infestations unless disturbance occurs from natural events, or large-scale fire. The lack of additional disturbance associated with the no action alternative would reduce the possibility of noxious weed infestations.

Noxious weed infestations are known to increase with large fire events. The lack of treatment of hazardous fuels would lead to the potential increase of a large-scale high intensity wildfire, thus increasing the potential for a large-scale outbreak of noxious weeds.

Common to Both Action Alternatives

Direct and Indirect Effects

There is a potential for 21,866 acres (under Alternative 2) or 23,917 acres (under Alternative 3) being disturbed from timber harvest, fuels treatments, and prescribed fire. Skid trails, landings, burn piles and areas where machinery is working would create conditions in favor of seedbeds for noxious weeds. The actual amount of disturbance is dependent on the scope and amount of acres infested with MPB, type of equipment used, and the time of year the disturbance occurs.

Because parts of this project area are within areas that burned under intense wildfire conditions (Jasper Fire) and were heavily infested with Canada thistle, there is a very high risk that the existing seedbank would result in a marked increase in Canada thistle infestation. Past experience indicates that populations of plants with pappiferous fruit, such as Canada thistle, have the potential to spread 30% a year with disturbance. The potential in this project area could be much greater due to the existing seedbank that might have resulted from recent infestations. However there are design criteria set in place to help minimize this effect.

Prescribed burning temporarily reduces the grassland vegetation for one or two growing seasons thus reducing the competition of noxious weeds. Existing fuel loads (wood currently on the ground) would naturally burn with higher temperatures in relation to fuel loads associated with grassland vegetation increasing the heat of the soil beneath these heavy fuels allowing noxious weeds to germinate with no competition of native grasses. Anytime activities remove the protective herbaceous cover and soil is exposed, (such as

severe fire, skid trails resulting from timber harvest, road creation, etc.) there is an increase in the likelihood of exotic plants being introduced into an area. Proposed thinning treatments would also include ground disturbance with similar results of existing and new infestations of noxious weeds. Previous disturbances within the project area and current infestations put this area at high risk for continued invasion. The infestations can be expected to spread at least 30% per year when there is disturbance. At highest risk will be areas containing larger fuel loads and downed timber which create a place for past seed accumulation and will burn with much higher intensities.

It is critical that the proposed post harvest activity of using herbicides for noxious weed control be implemented to mitigate the spread of invasive plant species. Monitoring of the effectiveness of treatment, and retreatment as needed, is essential.

Cumulative Effects

The cumulative impact area for this analysis is the identified project area within the Briggs Spring project area. Activities beyond the project area have a diminished effect on the botany, rangeland, and noxious weeds within the project area. The timing limit for the cumulative effects analysis is estimated at 20 years, ten years prior to present and ten years in to the future, which allows for an adequate length of time to record vegetative changes.

Past, present and reasonably foreseeable activities within the Briggs Spring project area include timber harvest, timber thinning, limited mining, wildfire, prescribed burning, grazing, road construction and maintenance, noxious weed control, wildlife habitat improvement projects, and dispersed recreational use on both the public land and private land in the area. A list documenting known past and planned future activities for this area is included in Appendix F.

Noxious weed infestations are expected to increase under both action alternatives. Any past, present or foreseeable future activity that causes soil disturbance has the potential to introduce and increase the rate of spread of noxious weeds and other exotic plants. This can be detrimental to rangeland resources and SOLC and state listed plant species, as invasive species have the ability to out-compete desired native plants. The potential for noxious weed establishment is even greater in disturbed areas adjacent to existing weed populations. The movement of equipment in and out of these areas also facilitates weed establishment. Roads create a network of corridors through which seed dispersal can occur.

The herbicides used in noxious weed control can also be detrimental to SOLC and state listed species if the individuals are inadvertently exposed to the herbicides.

The grazing in the Briggs Spring project area will continue as identified in the Allotment Management Plans for the grazing allotments within the project area. Under both action alternatives, creation of transitory range would have a positive cumulative effect on those allotments by reducing the time livestock spend in riparian areas. Broadcast burning proposed under the action alternative would work against the cumulative effect of fire suppression by killing small trees and setting back succession, though it is expected to have limited effects on overstory canopy. All of the effects to rangeland resources presented here would be limited in intensity and duration. Any negative impacts would

be minimal and are directly related to livestock management in the short term as they are impacted by treatment activities.

All of the above uses are limited in intensity and duration and therefore when combined with the alternatives analyzed, including the no action alternative, do not result in adverse cumulative impacts to the state listed species, SOLC, R2 sensitive species or their habitat.

Minerals

Affected Environment

The regional geology and mineral resource potential of the Briggs Spring project area is described in U.S. Geological Survey Bulletin 1580 (Dewitt et al., 1986). Geologic mapping is available for the Briggs Spring project area in the Geologic Map of the Black Hills Area, South Dakota and Wyoming: Geological Survey Miscellaneous Investigations Series Map I-1910, scale 1:250,000 (DeWitt et al., 1989).

Mineral resources on National Forest System lands can be divided into three categories. These categories are Locatable Mineral Resources, Salable Mineral Resources, and Leasable Mineral Resources.

Locatable minerals are minerals or mineral materials subject to claim and development under the General Mining Law of 1872, as amended. As set forth in this law, all locatable minerals on public domain lands such as the Briggs Spring project are open to location, discovery and mining. The Forest Service has only limited authority to restrict and regulate locatable mineral activities on public domain lands (USDA Forest Service, 2006c). High-calcium limestone is a potential locatable mineral resource that could be present within the Briggs Spring project area.

Salable minerals are a group of mineral commodities such as common variety sand, gravel, and stone that are salable under the Materials Act of 1947. The Forest Service has discretionary authority over production of these commodities from National Forest system lands (USDA Forest Service, 2006c).

Oil and gas are leasable minerals under the Mineral Leasing Act of 1920. This act provides authority to the Bureau of Land Management to lease oil and gas deposits on public domain National Forest system lands. Significant oil and gas production is occurring along the western and southwestern margins of the Black Hills, although no oil and gas production or exploration activities are known in the direct vicinity of the Briggs Spring project area. Dewitt et al. (1986) does classify a majority of the Briggs Spring project area with a low potential for discovery of small oil and gas deposits. The very western edge of the project area may be in the moderate potential area for discovery of large oil and gas deposits (stratigraphic traps) as described by Dewitt et al. (1986).

No current mineral exploration or production activities are known within the Briggs Spring project area. No notice of intents for mineral activities have been filed with Black Hills National Forest and a search of the Bureau of Land Management Geographic Claim Index shows that there are no active mining claims in the area.

There are no known abandoned mines in the Briggs Spring project area (Webb et al., 1998; DeWitt et al., 1986). This concurs with the identification of a limited potential for

mineral resource development as discussed above. The closest abandoned mine is approximately three-miles east of the project area (Davis et al., 1998).

The Pahasapa Limestone hosts the vast majority of caves within the Black Hills including Jewel and Wind Caves, the second and fourth longest caves in the world respectively. Currently, there are no known caves in the project area. The Pahasapa Limestone does have the potential to host cave systems. This potential is indicated by the occurrence of caves along the outcrop of the Pahasapa Limestone south of the Briggs Spring project area which contains at least ten (10) caves three-miles or less from the project area. The closest known caves are less than one-mile from the project area.

The rocks within the Briggs Spring project area host Paleozoic invertebrate fossils. In addition, in very rare occasions, deposits of Pleistocene vertebrate fossils such as camels and mammoths are found within sediment-filled sinkholes in the Pahasapa Limestone. Examples of Pleistocene vertebrate fossil deposits include the Hot Springs mammoth site in the southern Black Hills and the Richmond Hill site in the northern Black Hills. The Pleistocene deposits are very difficult to identify and are often only discovered by chance in some type of excavation.

Potential mineral recreational opportunities include fossil collecting and exploration for undiscovered caves. No permits have been issued for the collection of rocks or fossils in the project area.

Environmental Consequences

Direct, Indirect Effects and Cumulative Effects for All Alternatives

Current transportation conditions within the project area are adequate to facilitate activities related to exploration and development for either locatable minerals or oil and gas. However, it is not considered likely that these activities will occur in the near future.

The Briggs Spring project would not cause direct or indirect effects to mineral resources under any alternative, therefore there would not be any cumulative effects to mineral resources under either Alternatives 1, 2, or 3. Cumulative effects to cave resources are also unlikely under the three alternatives.

Lands and Special Uses

Affected Environment

There are 4,368 acres of private land within the Briggs Spring project area. The private in-holdings are mostly large Homestead Entry Surveys that are surrounded by federal land administered by the Forest Service. Most of the private parcels are raw land primarily used for grazing or recreation with only a few year round residents. Access to private land is provided through system and/or non-system, NU-new unauthorized forest roads and private roads. Lands special uses are very minimal within the project area and therefore do not pose any concerns or issues. Black Hills Power has submitted an application and project proposal for a very extensive new 230kV Transmission overhead power line that would cross both private and National Forest System (NFS) land within the Briggs Spring project area.

There are no special use permits and only one issued easement within the Briggs Spring project area. Easements have not been issued to landowners in this part of the district due to the fact that the private in-holdings are predominantly raw land and landowners have not historically performed any road maintenance, reconstruction or snow removal to access the parcels. As private land increasingly becomes subdivided for either year around residential, single family homes or seasonal cabins, we may see an influx of applications for easements to obtain perpetual legal access.

Environmental Consequences

Alternative 1 – No Action

There would be no project activities implemented under this alternative.

Direct and Indirect Effects

This alternative would not have any short-term effect on the lands resource. There is a potential for untreated NFS lands to have an increased threat of wildfires due to higher stocking densities. This could pose a risk of fire spread to private property. This would also eliminate the ability to reduce potential mountain pine beetle spread onto private land and subsequent tree mortality by not thinning dense timber stands on NFS lands. Any land use proposals, including the 230 kV overhead transmission line corridor application, would continue to be considered through the Lands and Special Uses programs. Other uses such as Small Tracts Act applications, special use permit applications, other utility requests, easement applications and opportunities to acquire right-of-ways would continue within the project area.

Common to All Action Alternatives

Direct and Indirect Effects

These alternatives would not have any long term effects on the lands resource. The minimal special uses and right-of-ways within the project area would not conflict with any action alternative provided roads are kept open for access to the public. Short term effects of proposed activities would include dust and noise from increased traffic during harvest operations. Increased log hauling traffic could impact roads that the public utilizes to access their private property. Smoke from prescribed burning and slash pile disposal operations may impact some adjacent landowners. Reduction in stand density could reduce fire intensities, should a fire start on forest and endanger private property. Social impacts include private landowners' receptivity to more aggressive silvicultural prescriptions and its relationship to land values. No needs have been identified for acquiring right-of-ways for implementation of either action alternative.

Cumulative Effects

The Briggs Spring project area boundary, land exchanges within the last 30 years and special uses within the last 10 years were used to evaluate cumulative effects. Activities proposed under the action alternatives would not have any effect on the current lands and special uses, nor would they affect any foreseeable future lands and/or special uses proposals.

Heritage Resources

Affected Environment

Prehistoric Context

The Black Hills are part of the greater culture area of the Northwestern Plains with human occupation of dating to 11,000 B.P. (Frison, 1991:7,13). Over this vast period of human occupation, the ecology, subsistence patterns, technology, and the cultures of Black Hills inhabitants have witnessed notable changes (Frison, 1991:24). These changes are grouped into phases of occupation, which are held in the archaeological record. The Black Hills National Forest Cultural Resources Overview identifies cultural sites that represent all of these prehistoric phases of occupation in the Black Hills (Rom, et al. eds., 1996). Identifiable tribal groups living within the Black Hills area during the Protohistoric period include the Kiowa, Crow, Arapaho, Cheyenne, and Sioux.

Many Native Americans consider the entire Black Hills sacred land. Their belief system links specific locations in and around the Black Hills to star constellations (Rom, et.al. eds., 1996). These spiritually significant locations include but are not limited to: Devil's Tower, Old Baldy Mountain, Hot Springs, Buffalo Gap, Reynolds Prairie, the spearfish formation "race track" that surrounds the Black Hills, and Harney Peak (Goodman, 1992). Ceremonies are performed at these sacred locations during specific periods on the celestial calendar or weather events (Goodman, 1992: 12).

Historic Context

Although influenced by Euro-American culture through the introduction of horses, guns, and disease as early as the 17th century, sporadic use of the Black Hills by Euro-Americans largely began in the early 1800's and consisted mainly of fur trappers and traders (Sundstrom, 1989). The western half of South Dakota, including the Black Hills, portions of southern North Dakota, and nearly the entire area of the Powder River Basin in Wyoming and Montana was recognized as unceded Indian Territory by the 1868 treaty between the United States and the Sioux and Arapaho. More intense Euro-American occupation in the Black Hills began shortly after gold was discovered in the Black Hills in 1874. It was this discovery that brought a full scale influx of Euro-American prospectors and miners to the Black Hills.

Historic settlement in the Black Hills by Euro-Americans is generally auxiliary to this history of the mining industry. Homestead patents are common from the late 1800's through the 1920's. Industries such as the ranching and logging industry became common in the early 1900's. However, much of the land was not patented and remains public land. During the Great Depression/New Deal Period (1920-1941), public works projects became common across the Black Hills landscape. The Civilian Conservation Corp (CCC) and the Works Progress Administration (WPA) organized groups of men in camps to construct lookouts, roads, trails, dams, and wells throughout the area.

Within the Briggs Spring project area there are 25 known cultural resources determined eligible for listing on the National Register of Historic Places (NRHP). The majority of sites are considered prehistoric and range in age from 7,000 to 250 years before present. They include rock shelters, lithic procurement sites, quarries, and village sites. The historic sites include remnants of various CCC developments linked to the Great

Depression and New Deal time period in addition to past remnants of logging and homesteading.

Field Surveys

Sections of the Level III cultural resource inventory were first contracted to Niwot Archaeological Consultants in 2006 and 2008. *A Level III Heritage Resource Inventory, Monitoring, and Evaluation: Redbank Unit of the Briggs Analysis Area* by Brad Noisat (BKF # R2006020300133) resulted in the survey of 5,141 acres. *Level III Heritage Resource Inventory: Moon Unit of the Briggs Analysis Area* by Brad Noisat (BKF # R2008020300104) resulted in the survey of 1,197 acres in 2008. The two contract inventories consisted of new survey and the evaluation of newly discovered sites.

The Forest Service conducted an in-house cultural resource survey of the remaining 2,626 acres distributed across the 24,548 acre Heritage area to protect (APE). Newly recorded and previously recorded unevaluated sites were evaluated for eligibility to the NRHP. All eligible sites were monitored and evaluated for effects from all project alternatives.

Environmental Consequences

Alternative 1 – No Action

There would be no project activities implemented under this alternative.

Direct and Indirect Effects

If there is no federal action, then there is no undertaking, as defined in 36 CFR Part 800.16(y), for Section 106 of the National Historic Preservation Act (16 U.S.C. 470f). However, **no action** may result in the destruction of cultural resources due to the increased fuel loading and tree mortality from overgrowth--both of which increase the risk of fire and subsequent ground disturbance and erosion. Many of the eligible sites in the Briggs Spring analysis area are eligible for listing on the NRHP due to the presence of intact subsurface cultural deposits or standing architectural features. As such, any processes that disturb the soil/sediment matrices of an archaeological site (including erosion) or increase the intensity and probability of catastrophic wildfire, adversely impact the site's eligibility.

Common to All Action Alternatives

Direct and Indirect Effects

Within the Briggs Spring project area there are 25 known cultural resources determined eligible for listing on the National Register of Historic Places. The Forest Service developed site specific recommendations for these eligible cultural resources to avoid adverse effects from all action alternatives. These recommendations were submitted within the Section 106 report for the Briggs Spring project. The South Dakota SHPO concurs with these determinations. Furthermore, SHPO concurs with a finding of **No Adverse Effect**, provided that these cultural resources are avoided by all ground disturbing activities during project implementation. If during the course of any ground disturbance related to this project, any bones, artifacts, foundations, or other indications of past human occupation of the area are uncovered, all operations will cease within a 100-meter radius of the site location and a district archaeologist notified immediately.

The SHPO and regional Tribal Historic Preservation Offices (THPOs) will be notified of the discovery and provided an opportunity to comment. Any cultural resources located during project implementation will be protected based on the recommendations of the district archaeologist and the SHPO.

Adherence to the design criteria would result in no direct or indirect effects to cultural resources from Alternative 2.

Cumulative Effects

The nature of the cultural resources and the foreseeable actions in the project area dictate that the cumulative effects area should match the physical site boundaries. Therefore, the cumulative effects area is defined as the known archaeological sites in the identified burn, thinning units, and access roads to and from the project area. The timing limit for the cumulative effects analysis is 20 years; ten years prior to present and ten years in the future.

No adverse effects are expected to occur as a result of any alternative provided that the design criteria are followed and the site specific recommendations are implemented. Because there will be no direct or indirect effect to cultural resources, there will be no cumulative effects associated with the Briggs Spring project.

Scenery

Affected Environment

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

The Briggs Spring project area is noted for conifer stands in gently rolling terrain, meadows that follow streams and intermittent streams, and pockets of aspen and other hardwood trees. Forested areas are predominantly populated by ponderosa pine communities, but spruce communities can be found in most streams and wet areas. Water features are limited to low-flow streams. Apparent human alterations in the form of roads, have generally been accepted over time as part of the positive cultural landscape character attributes – when they do not dominate the landscape in appearance or quantity, and are limited around non-motorized areas or recreation facilities. Vegetation alterations in the form of fuel treatments (small trees removed), noncommercial thinning, commercial thinning, seed tree cuts, and overstory removals are scattered, and only readily apparent when adjacent to a main road. Pine and spruce stands are expanding into meadows and hardwood stands.

There are isolated foreground views along Sensitivity Level 2 Roads (County and Major Forest Development Roads & Trails) where past vegetative treatments are evident; however in the middleground views (away from the main roads) vegetative treatments are not readily apparent due to the relatively flat terrain. Mountain pine beetle activity is evident in this area in the form of red-needle trees that were recently killed; however it is generally isolated in small pockets. Trees that are under attack have clumps of pitch that are evident on the trunk, when viewed up close, and the color of the needles is a lighter hue which is generally not apparent from a distance. Unless an individual walks through the forest looking at each tree, the scope of the mountain pine beetle spread is not apparent.

In the surrounding landscape, outside this planning area, past vegetation treatments are evident in the foreground and middleground views. Areas to the west are generally natural appearing. Vegetation management has been very active in the north & east, and these areas tend to have a more managed appearance. The Jasper Fire occurred in the summer of 2000 (approximately 83,510 acres), burning through the landscape south of the planning area and killing the majority of trees. Today the Jasper Fire area is a large open grass area. As a result of wildfire and vegetation management, the areas surrounding the planning area have a variety of appearances – resulting in a Moderate Existing Scenic Integrity condition.

Scenic Integrity Objectives (SIOs) are management objectives for forest scenic resources. Within the Briggs Spring project area there is 0% High SIO, 31% Moderate SIO, and 69% Low SIO.

Environmental Consequences

Alternative 1 – No Action

There would be no project activities implemented under this alternative.

Direct and Indirect Effects

Existing conditions and natural processes of trees growing and regenerating would continue. The existing MPB activity would be expected to continue for several years, pockets of MPB killed trees could expand in size and spread.

Common to All Action Alternatives

Direct and Indirect Effects

Vegetative treatments would result in the removal of trees within a stand. How well these treatments blend into the characteristic landscape, and meet the SIO, is based upon the slope, aspect, and vegetation remaining on the site. Thinning trees to an even spacing can result in a managed, un-natural appearance.

This project maintains a large tree component across the majority of the planning area, with only a few units removing the entire overstory. The result would be a multi-storied, or multi-aged, forest – although with a reduced density of trees. This lower population of trees would reduce the susceptibility to mortality from wildfire and MPB, and a forested appearance in the long term. By treating these areas through the action alternatives the visually desirable large tree characteristics (SS 4A) - though widely spaced, would have a

greater potential to remain as a feature in the planning area, more so than the no action alternative. In addition, the vegetation treatments would enhance the large tree component, when present, by reducing competition for nutrients around them. A variety of vegetation structure would be maintained – both large & small trees (Form, Line & Texture), and an increase in hardwoods, grasses and shrubs (Color, Texture, Seasonal Variety) within the planning area would result. Overall, the variety of vegetation that would be enhanced at the stand level would be a very positive feature from a scenery standpoint.

Impacts to the scenery resource would also occur from or be influenced by related actions such as roads, prescribed burning, slash treatments, logging systems, and landing locations. These elements can impact the overall scenery quality by changing the form, color, and texture of landscapes as viewed from foreground, middleground, and background views.

Alternative 2 – Proposed Alternative

Direct and Indirect Effects

Alternative 2 would modify the vegetation across the landscape - this management activity would occur quickly over the span of a few years. The variety of treatments would also create a variety of textural patterns and improve opportunities to view hardwoods and wildlife. Overstory removal treatments generally do not meet the High or Moderate SIO. However, due to the limited size and scattered location of these units in this landscape, the rolling hills and ridges would reduce the visibility of these types of treatments, so they would be less evident in this landscape. Restoration treatments to increase hardwood sprouting, and thinning treatments to decrease potential for MPB to attack forest stands, would meet the assigned SIO. These various treatments would move the vegetation in this landscape to being less dense and more open, closer to conditions that emulate the effect of natural fire interval in this ecosystem. Hardwoods and meadows would be more evident and provide seasonal color and textural variety in the landscape, than currently exists. The reduction in trees, slash, and small trees, would open views into the forest, and returning to an appearance that could be similar to a 15 to 30 year fire interval that created the ‘natural appearance’ for this ecosystem. This alternative would meet the assigned SIOs for this planning area.

“New Moon” OHV Recreation Campground Facility – The proposed campground location is in an area with a Low SIO assigned under the Forest Plan. Views toward the campground from private land (0.1 miles southwest) would be partially-screened by vegetation immediately surrounding the campground. Campground facilities would be visible, though color and size of the buildings should help them blend into the landscape and vegetation. Other facility features such as tables, bulletin board, and fire rings would be visible from the surrounding area, though less evident due to size, distance, color, and the position of the campground on higher flat terrain. Recreation vehicles in the campground would be the most visible elements in the landscape. The trailhead would be closest to the private land. A bulletin board in this location would be evident, though vehicles parked here would be the most visible. Construction of a limited capacity, and lower Development Level, campground, and a trailhead, in this location would meet the assigned LOW SIO.

Alternative 3

Direct and Indirect Effects

The effects of this alternative are similar to Alternative 2 except in two ways.

First, the group shelterwood treatment would occur on essentially double the acres as in Alternative 2. This increase in areas treated with this prescription would reduce the acres of dense vegetation, moving the vegetation toward more open forest stands. Hardwoods would be more evident across the landscape, providing a contrast in color throughout the year, particularly adjacent to meadows and in drainages. Rock formations will be readily apparent as well. The diversity of vegetation structure, created for wildlife, will be visible in all distance zones. This change in treatment prescriptions would result in less areas of dense vegetation.

Expansion of the existing Redbank Campground Facility –This proposed campground expansion is in an area with a Moderate SIO assigned under the Forest Plan. Views toward the campground from private land (0.2 miles north) are screened by topography, and vegetation on the north side of the campground. Forms (restrooms, bulletin boards, tables, fire rings, etc.) would be similar to those currently at the site. Although the quantity would increase, the visibility would be at the same level. The dark brown color of most features would blend into the landscape in this location. Facilities and recreation vehicles in the campground would not be readily visible in the landscape. Expanding capacity, at a similar low Development Level, of the campground in this location would meet the assigned Moderate SIO.

Alternative 3 would modify the vegetation across the landscape - this management activity would occur at a similar pace as Alternative 2, though over a wider area. Aside from the decrease in sanitation and increase in group shelterwood treatments, the effects would be the same as Alternative 2. The reduction in trees, slash, and small trees, would open views into the forest, and returning to an appearance that could be similar to a 15 to 30 year fire interval that created the ‘natural appearance’ for this ecosystem, but on a larger area than Alternative 2. This alternative would meet the assigned SIOs for this planning area.

Cumulative Effects

The boundary on the ground for analyzing cumulative effects is primarily that of the planning area. This identified area is the landscape that is evident in the foreground and middle ground from the main travel routes, with particular attention to recreation facilities.

The time boundary for this analysis extends from 1980 (when the start of recent vegetation management activities took place) to 2050 [completion of management activities (2020), followed by 5 years for pine seedlings to become established, and approximately 25 years for trees to grow up and visually ‘fill’ open areas]. This time period includes known management activities, and activities that are planned but have yet to be accomplished.

Fire suppression over the past century has played a role in the increased density of the vegetation on the forest. Likewise, much of the Forest was pre-commercially thinned by the Civilian Conservation Corp in the 1930’s and 1940s, however we do not know if that

effort included any or all of this planning area. The areas where these treatments occurred do not stand out, but blend in with the surrounding vegetation.

Although the planning area is relatively free of fire scars, a large wildfire occurred along the southern boundary of the planning area. The Jasper Fire (2000) burned intensely, killing the majority of all trees within the fire perimeter. As a result, ten years later, the area is a large grass covered area, approximately 85,000 acres in size. The large size has limited seed dispersion from ponderosa pine trees around the perimeter of the fire.

Past vegetation treatments are not readily apparent on the ground, as trees have grown up, the topography is gently rolling, and treatment areas did not form 'hard edges' between treated and non-treated locations. The action alternatives would treat the vegetation in a manner that would be apparent to most observers; however those treatments should not dominate the landscape. In areas that are treated, it will take approximately 5-15 years to get new trees and shrubs established in the understory and move these treated areas to the point where they start to appear different – moving toward a more natural appearance.

Alternative 2 – Proposed Action

Under this alternative, trees of all sizes would be selected for harvest. The resulting appearance of vegetation treatments would change little for the first 10 years after the treatments are completed. Any treatments would result in fewer trees across the landscape, reducing the risk of MPB infestation and reducing fire hazard.

Effects of MPB activity are most evident when trees have been killed and the green needles have turned red in color. As the trees decay and fall, openings would be created. These openings would change the character from a uniform appearing landscape 'carpeted' with pine trees to a complex matrix of openings, decaying dead trees, residual pine trees, and expanding areas of hardwood trees.

Hardwoods would be more evident as well. Panoramic views are limited within this planning area due to the gently rolling nature of the topography. Roads accessing landings would be evident until the road template no longer exists. The greatest visual effects in the immediate foreground would be from roads and landings, as they will take the longest time to heal.

The variety of treatments would produce a natural appearing forest, but one that has fewer trees, as if fire had continued to play its natural role all along. Due to the insect activity and fuel treatments adjacent to private land, the current view of the forest from these locations would likely change from their current condition. Views of these treatments would be limited from Sensitivity Level 1 or 2 roads outside the planning area, due to the topography surrounding the planning area.

Alternative 2 would modify the vegetation across the landscape. Management activities would be more evident. The variety of treatments would create a variety of vegetation patterns, colors, and improve opportunities to view hardwoods and wildlife. Restoration treatments to increase hardwoods and meadows may take time to appear natural, but long term they would improve the visual diversity in the landscape. Prescribed burning, piling and burning, would reduce fuel levels to natural levels, which is a positive ecological & scenic characteristic of frequent fires in a pine ecosystem. Prescribed burning treatments would meet a Moderate to High Scenic Integrity one year after being completed.

Alternative 3

Under this alternative, cumulative effects are similar to Alternative 2, with the differences noted below.

Alternative 3 management activities would modify the vegetation across the landscape on a larger area as noted in the effects section. Treatments should meet a Moderate to High Scenic Integrity one year after being completed.

Transportation

Affected Environment

The existing transportation system was inventoried in the summer of 2007 and 2008, and reviewed in 2010. During the 2010 review additional road condition surveys were conducted to capture any change in road conditions. The existing transportation system was assessed for maintenance needs and for roads that could be needed in order to support commercial timber harvest and other resource needs in the project area. Approximately 12.8 miles of National Forest System Road within the Briggs Spring project area were designated for Off Highway Vehicle (OHV) trail system as indicated in the March 22, 2010 Record of Decision and later depicted on the December 1, 2010 Motor Vehicle Use Map.

To summarize, the transportation system within the Briggs Spring project area is comprised of approximately 121.7 miles of existing roads and OHV trails. The breakdown of the existing transportation system is listed below in Table 33.

Table 33. Existing roads and OHV trails within the Briggs Spring project area

Roads and Trails by System		
System Classification	Length in Miles	Road Density (Miles/Square Mile)
National Forest System Roads	108.9	2.8
OHV Trail System	12.8	0.1
Total	121.7	2.9

*Unauthorized roads are not part of the Forest transportation system and are not open to motorized recreation.

The Briggs Spring planning area is located in a snowmobile use area which affects the seasonal availability of some roads. Additionally, past management decisions have closed roads on a yearlong basis for resource protection. The travel management designation of the National Forest System Roads (FSRs) within the project area and road density (miles of road per square mile) is depicted in Table 34. Likewise, Table 35 indicates OHV trail miles and trail density. Maps 9-11 in Appendix A show transportation for Alternatives 1-3.

Table 34. Travel Management – NFSRs in miles and road density

Travel Management Designation	Length in Miles	Road Density (Miles/Square Mile)
Roads Closed to All, Yearlong	7.9	0.2
Roads Open to All, Seasonal (May 15 to Dec. 15)	11.2	0.3

Roads Open to All, Yearlong	14.3	0.4
Roads Open to Highway Legal Vehicles Only, Seasonal (May 15 to Dec 15)	5	0.1
Roads Open to Highway Legal Vehicles Only, Yearlong	70.4	1.9
Total	108.9	2.9

There may be further change in the travel management of roads in the next few years as the Forest implements the Travel Management Plan for the Black Hills National Forest.

Table 35. Travel Management – National Forest System (NFS) OHV trails in miles and trail density

Travel Management Designation	Length in Miles	OHV Trail Density (Miles/Square Mile)
Trails Open to All Vehicles, Yearlong	4.6	0.1
Trails Open to All Vehicles, Seasonal (May 15 to Dec. 15)	8.2	0.2
Total	12.8	0.3

Environmental Consequences

Alternative 1 – No Action

There would be no project activities implemented under this alternative.

Direct and Indirect Effects

Under Alternative 1 there would be no effects from a proposed action. There would be no change in the transportation system due to a proposed action. Scheduled annual and grid maintenance would continue as it has in the past. Road densities would remain the same under this alternative.

Common to All Action Alternatives

Direct and Indirect Effects

The action alternatives propose additional maintenance, reconstruction, route conversion (reconstruction of 0.9 miles of unauthorized roads). Potential direct adverse effects from these proposed activities would be short term vegetation loss, vegetation removal, soil disturbance and compaction, an increase of mixed traffic and traffic delays during project implementation. Short term increases of noise and dust would occur.

Within the Briggs Spring project area the majority of the NFSRs would require minimum maintenance or reconstruction to facilitate the extraction of timber and other resource access.

Project implementation would be accomplished by utilizing a majority of the existing NFSRs, reconstructing selected existing NFSRs to the standard in which they were designed, and reclassifying selected unauthorized roads for conversion to system roads. Road reconstruction may include but is not limited to structural improvements, such as rolling dips or culverts, surface reconditioning or realignment. Select system roads would be closed to protect and prevent damage to resources. Conversion of unauthorized

roads to NFSRs may require the reconstruction the existing road template include but not limited to structural improvements, such as, rolling dips and culverts, aggregate placement or centerline adjustments. Temporary roads would be closed after use as part of the timber operations unless identified as motorized routes in the Black Hills National Forest (BHNF) Travel Management Plan.

Use of the transportation system would vary somewhat between the action alternatives. Reconstruction activity would bring road standards up to the minimum necessary to accommodate commercial timber hauling, while protecting soil and water resources. In a similar manner, reconstruction of existing unauthorized roads (NFSR conversion) would also bring roads up to minimum road standards necessary for commercial haul while protecting soil and water resources. All temporary roads may also be used to access portions of proposed treatments units. All temporary roads would be closed or decommissioned during post resource management activities.

Roads utilized under the action alternatives would be reconstructed, constructed and maintained in accordance to the Engineering Design Guidelines and Best Management Practices Compliance.

Alternative 2 – Proposed Action

Direct and Indirect Effects

The transportation system under Alternative 2 proposes to maintain 75.9 miles, reconstruct 31.9 miles and add 0.9 miles of existing unauthorized road to National Forest System Roads (NFSR). The 0.9 miles of converted road would be closed to public use after treatment activities, no change to open road density would occur. All unneeded unauthorized roads, approximately 35.3 miles, have been administratively closed to public traffic under the Black Hills National Forest Travel Management decision, as shown on the Motor Vehicle Use Map (MVUM). It should be noted that many of these unauthorized roads may be used for temporary access during timber harvest operations. No new road construction would occur under this alternative.

Alternative 3

Direct and Indirect Effects

The transportation system under Alternative 3 proposes to maintain 77.3 miles and to reconstruct 35.3 miles of National Forest System Road. This alternative would also include new construction (approximately 0.8 miles) of an OHV trail to connect the proposed expanded Redbank Spring Campground to the existing OHV trail system. Like Alternative 2, Alternative 3 would convert 0.9 miles of unauthorized road to National Forest System Road which would be closed following treatment activities, no change to open road density would occur. All unneeded unauthorized roads, approximately 35.3 miles, have been administratively closed to public traffic under the Black Hills National Forest Travel Management decision, as shown on the Motor Vehicle Use Map (MVUM). It should be noted that many of these unauthorized roads may be used for temporary access during timber harvest operations. No new road construction would occur under this alternative.

Cumulative Effects

Alternative 1 – No Action

Alternative 1 would have no direct or indirect effects, therefore no cumulative effects would occur.

Common to All Action Alternatives

The action alternatives would not increase open road density for the project area. Therefore, no negative cumulative effects to open road density would occur.

These activities along with the Briggs Spring project have the potential for the following cumulative effects on the transportation system:

- Annual maintenance on Maintenance Level 3 and 4 roads would have a positive effect on the transportation system. These routes would only require minimal maintenance to support timber harvest activities barring no significant or catastrophic weather events occur. Grid maintenance activities in 2008-2009 would have most roads in a state that would require minimal maintenance to support timber harvest activities.

Road maintenance, reconstruction, and construction within the Briggs Spring project, combined with annual and grid maintenance activities, would have cumulative effects on ground disturbance, vegetation loss, dust/noise increases and sediment movement for short durations and in scattered areas within the analysis area.

Recreation

Affected Environment

Recreation is an approved use in this management area and this area is designated as a Roaded Natural area in the Recreation Opportunity Spectrum (ROS). Numerous open roads provide commercial access and roaded recreation opportunities, while closed roads provide non-motorized recreation opportunities. Activities such as hunting, hiking, and biking occur on roads closed to motorized vehicle traffic. Some roads are open year-round while others are open seasonally; some motorized vehicle use restrictions may be for management area purposes.

The Briggs Spring project area is ideal for recreational activities on the Black Hills National Forest. It provides mostly un-fragmented and undeveloped public lands for recreating in a forested setting. There are no paved roads, no commanding new custom homes or sub-divisions, and very limited commercial services. Terrain in the interior of the project area is a limestone plateau, which is flat or rolling and park-like with broad open meadows interspersed with aspen and pine stands. There are few inspiring rock formations but the outer edges of the area are steep and mountainous mainly to the north and east with steep limestone canyons that drop off to the drier south. The northern two-thirds of the project area experiences heavy winter snowfall. This makes it excellent for winter recreation but limits passenger vehicle access and may limit timber harvest activities during the winter season. This area offers the best consistent conditions for a groomed snowmobile trail system on the district. It is relatively easy to experience a sense of solitude in this primarily motorized area. There is evidence of historic and continuing management actions, mainly timber harvesting and cattle grazing, which blend with the natural setting.

Primary recreational use of this area is dispersed in nature and includes hunting, horseback riding, OHV (off highway vehicle) use (mainly ATV riding and snowmobiling) and camping, primarily associated with a vehicle.

Developed Recreation

There is one developed recreation campground in the project area, Redbank Spring Campground. Redbank Spring Campground is a fee-required Forest Service operated campground. It consists of four campsites and offers two vault toilets, campfire rings and picnic tables. There is no potable water at the Redbank Spring Campground. The campground is considered to be in a quality location being at the end of the campground service road, FSR 294.2A, and surrounded by open native grass fields with scattered timber stands.

The Forest Service operated Moon Campground, which was located on the western boundary of the project area, was decommissioned in October 2008 and the area rehabilitated back to a forested setting. This campground had three campsites with picnic tables, campfire rings, and a vault toilet. It was decommissioned as part of a Forest Service Recreation Facility Analysis (RFA) planning effort. The RFA determined which recreation facilities on a forest wide basis were most important to maintain or improve to meet the needs of current and future users of the National Forest as well as which ones to decommission or modify. Moon Campground was in need of replacement of all improvements due to their poor condition. Considering its size at three sites, low volume and occupancy, its proximity adjacent to a private residence, and a busy timber haul road (FSR 117), it was decided to decommission the campground.

The RFA also recommended that Redbank Spring Campground be modified to provide increased camping capacity to accommodate campers from the closed Moon Campground. Recommended improvements are to be designed for OHV users who would be overnight camping. Design of an OHV specialized campground includes group camping sites, roads, pull-throughs, and camping spurs designed for large radius turn vehicles with trailers, information kiosk(s) for posting maps and tread lightly OHV education information, and a day use equipment trailer parking area.

From fee receipts it has been determined that Redbank Spring Campground has a 40% occupancy rate, considered moderate, during the main Memorial Day-Labor Day season of operation. Fall season of use from Labor Day to the end of October primarily serves hunters and is more minimal. The majority of use is from Wyoming residents. This campground is “off the beaten path” compared to most Black Hills National Forest campgrounds and is accessed only by many miles of gravel roads. It provides more of a roaded-natural setting for camping due to its remoteness. From Forest Service personnel observations, many campers are also hauling OHV’s on trailers to ride on the Forest. A two or three person size group of OHV campers is common and they rent most of the campsites typically on weekends. The Forest Service added a two trailer overflow parking area in the campground in 2007 to help accommodate this use. Deep winter snows typically preclude any early spring or late fall campground use and the access roads are closed to wheeled vehicle travel (insert dates closed) for use as groomed snowmobile trails.

Dispersed Recreation Use and Trails

The project area is popular with fall big game hunters and fall/spring turkey hunters. On the weekends, hunters typically camp overnight at Redbank Spring Campground or along roadsides. Approximately 50% of the time spring turkey hunting is not possible in the project area due to late season deep snows. From personal observations of the project area there are usually 2-3 weekend horse camp outings each summer. These are small 2 to 4 person horse riding groups, camping beside the road, who ride the roads during the daytime. Mountain bike riders have been observed riding during the day on the multitude of roads within the Jasper Fire burn area, in the project area, 2-3 times per year. It appears they are using one car to begin their day ride to travel in one direction and then use another car at the end of the ride to travel back to the first car. Open fires are banned year-round throughout the Black Hills National Forest, unless in an approved and permitted campfire ring. Dispersed camping sites should not include campfires and associated fire scars, trash and impacted soils and vegetation.

The project area includes OHV trails and snowmobile trails. Table 36 shows approximate mileages and type of system trails in the project area. The snowmobile trail system is operational and closed by regulation to wheeled traffic from December 15th to March 30th annually. The OHV trails in the project area are either open to vehicles less than 62 inches in width or open to full size vehicle widths. There are no non-motorized system trails in the project area.

Table 36. Approximate mileages of system trails in the project area

OHV >62" Width	OHV Full Size	Snowmobile Trail
6.2 mi.	5.0 mi.	13.7 mi.

Overall, the Briggs Spring project area is part of an important dispersed recreation area in all seasons, whether it is summer OHV use, fall big game hunting, winter snowmobiling, or spring turkey hunting. Some developed recreation camping occurs at the Redbank Spring Campground to a moderate level of use. The well-roaded nature of the area lends itself to recreation in a motorized setting. The limestone canyons, located in the southern section of the project area, offer a higher degree of solitude and quality for non-motorized recreational pursuits not found in the rest of the Briggs Spring project area.

Recreation Special Uses

According to the Forest Service Special Use Data System (SUDS) there are no outfitter guiding permits issued for the project area. There was a group recreation event permit issued in 2006 within the project area for a weekend-long dispersed group camping and horse riding event.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

The No Action alternative would have no effect on recreation resources in the project area. No changes to existing developed sites or dispersed recreation activities would occur.

Common to All Action Alternatives

Direct and Indirect Effects

Short term direct effects (3-5 year time period) would be attributable to increased noise, smoke, dust and logging traffic from nearby harvest and post-harvest activities. These effects would occur to motorized and snowmobile trail users, dispersed recreation users, and developed campground users. Prescribed burning and winter slash pile burning would create smoke in the project area which may cause temporary adverse effects to system trail and campground users. Increased noise, smoke and dust from project activities may temporarily decrease the quality of a recreational users' experience.

Redbank Spring Campground would not be open to the public when vegetation activities would be occurring within the site itself. Design criteria would be in place to restrict harvest activities during the full operation period of the facility, which is May 15th through October 15th annually. Short duration smoke and noise from post-sale activities such as pile burning and prescribed fire burning may decrease the quality of a camping experience. However burning activities normally would occur outside of the full operation period of the campground.

The dispersed activity of driving for pleasure on forest roads would be affected particularly by increased dust and traffic from logging traffic.

Sections of motorized trails and snowmobile trails may be temporarily closed to the public during timber harvesting and hauling for safety reasons. It would be possible that some trails may be closed temporarily with no alternative trail routes except by utilizing system roads which would require OHV drivers to have a state driver license and registration. Snowmobile trail users may have some disruption to system trails. This could include increased safety signing due to harvest and post-harvest vegetation activities that would occur in the winter. Affected trails would need to be closed and brought back to trail standards during proposed post-harvest operations.

These short term effects could occur during all seasons of the year with the likelihood of effecting the highest dispersed recreation use period and activity of fall big game hunting.

Long term (beyond a five year time period) direct effects concern visual changes of recreation sites and adjoining areas to campground users (see Scenery section). The appearance of the area would be from a denser forested setting to a more open one until the vegetation regenerates. This more open forested appearance would create more opportunities for recreational wildlife viewing.

The Redbank Spring Campground would be expected to have less hazardous tree maintenance work in the long term as thinning would remove high risk trees and reduce the chance of beetle infestation of the stand.

Both action alternatives propose an OHV campground facility. Either alternative would be designed for day use OHV riding on designated OHV system trails and overnight camping.

Snowmobile system trails may experience more drifting of snow from a more open forest in windy areas; however the trails may also experience increased snow depth from a more open forest canopy. Trails, overall, would benefit from harvest activities because typically harvested stands would result in healthier trees and less high-risk trees, resulting

in fewer dead trees falling across trails, ultimately requiring less maintenance and increased user safety in the long term.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Short term direct effects to action Alternative 2 would include short duration dust, noise and other disturbances to the public and adjacent private land owners of the area identified for new construction of the “New Moon” OHV campground.

Long term indirect effects to this alternative would be increased recreation traffic and noise to adjacent private landowners and forest visitors caused by the presence of a developed recreation campground at the identified location. Other effects would include an enhanced campground experience by visitors due to the modernized and disabled person accessible facilities. This would include a training lot and new furnishings such as picnic tables, fire rings, and new vault toilets designed for wheelchair access. Traffic flow and parking would be designed for safety and ease of visitors with features such as pull-through design camp spurs and larger turning radius corner turns.

Alternative 3

Direct and Indirect Effects

Short term direct effects to action Alternative 3 would include increased traffic, noise and other disturbance caused by the constructed expansion of the Redbank Spring Campground and the construction of approximately 0.8 miles of new OHV trail connecting Redbank Spring Campground to the existing OHV trail system. The design of the expansion of Redbank Spring Campground would include fencing along the edge of the open fields adjacent to the campground, preventing OHV users from riding off-road into the open fields. Illegal off road OHV use would be minimized or eliminated through public education, traffic control barriers, sign posting and the presence of Forest Service personnel on a regular basis at the recreation sites. The level of disturbance from construction activities would be mostly apparent to users of Redbank Spring Campground which may be temporarily closed to the public during expansion construction.

Long term indirect effects to this alternative are from increased recreation use of Redbank Spring Campground due to an increased size from 4 to approximately 19 camping units. The size of the campground would increase by approximately 17 acres. In addition there would be an associated trailhead parking lot and approximately 0.8 mile connector trail to the OHV trail system. Effects would include increased recreation vehicle traffic and noise from campers and OHV day riders.

Positive effects would include an enhanced campground experience by visitors due to the modernized and disabled person accessible facilities. This would include new furnishings such as picnic tables, fire rings, and new vault toilets designed for wheelchair access. Traffic flow and parking would be designed for safety and ease of visitors with features such as pull-through design camp spurs and larger turning radius corner turns. There are no adjacent landowners to the Redbank Spring Campground, therefore the expansion of the existing campground would not impact adjacent private landowners as in Alternative 2.

Cumulative Effects

The cumulative impact area for this analysis is the Briggs Spring project area. The time boundary for the cumulative effects analysis is 10 years in the past, present, and 10 years to the future. Past, present and future activities within the Briggs Spring project area boundary include timber harvests, grazing, road maintenance, OHV trail maintenance, noxious weed control, wildlife habitat improvement projects, and recreation use.

The No Action alternative would have no cumulative effect on recreation because it does not have direct or indirect effects.

Either action alternative would represent a small developed recreation program for the project area with negligible negative effects of increased noise from recreation connected traffic. Alternative 3 would contribute less cumulative effects of noise and increased recreation connected to traffic disturbances to private landowners. Both action alternatives would have minimal direct and indirect effects on recreation, some positive, some negative, depending upon the specific use being considered. There would be no adverse long-term cumulative effects to the recreation resource as a result of implementing any of the alternatives, including the no action.

Soils and Hydrology

Affected Environment

Soils

The objective of soil resource management is to improve or maintain long-term soil productivity. Soil productivity is the inherent capacity of a soil to support the growth of specified plants, plant communities, or a sequence of plant communities. In order to improve or maintain long-term soil productivity, soil disturbance should be minimal and adequate measures taken to protect the surface soil, keep the soil in place, reduce compaction, and maintain nutrient and organic matter levels (USDA Forest Service, 1996).

There are 12 soil map units within the Briggs Spring project area. Five soil map units (with symbols, JhD, ReC, SybC, SycE, and VcE) comprise 95% of the project area and the other seven soil map units occupy 5% or less (see Table 37 below and Map 8 in Appendix A).

Table 37. Soil Map Units in the Briggs Spring project area and respective percentage of the project area

Map Unit Symbol(s)	Map Unit Name	Acres in Project	Percent of Project
BsB	Bullflat-Cordeston silt loams, 2 to 9 percent slopes	491	2%
CkC	Citadel-Vanocker complex, 2 to 12 percent slopes	179	0.6%
JhD	Judy-Heath-Paunsaugunt variant complex, 2 to 25 percent	2,531	9%
PbD	Paunsaugunt-Gurney complex, 2 to 15 percent slopes	89	0.3%

ReC	Redbird-Heath silt loams, 2 to 9 percent slopes	1,666	6%
SyaC	Stovho silt loam, 2 to 15 percent slopes	306	1%
SybC	Stovho-Lail-Trebor complex, 2 to 12 percent slopes	11,725	41%
SycE	Stovho-Trebor complex, 10 to 40 percent slopes	9,587	33%
TuG	Trebor-Rock outcrop complex, 40 to 80 percent slopes	112	0.4%
VcE	Vanocker-Citadel complex, 10 to 40 percent slopes	1,840	6%
VkE	Vanocker-Lakoa complex, 10 to 40 percent slopes	174	0.6%
VoG	Vanocker-Sawdust-Rock outcrop complex, 40 to 80 percent	225	1%

Soil Health Assessment

Results of field inspections conducted within the Briggs Spring project area during 2007-2008 indicate that in some cases there were residual impacts from past logging activities in the form of landings, compression tracks, and some minor compaction in highly-traveled areas (skid trails and landing areas). These were generally associated with more recent management activities, while sites with management that occurred some time ago exhibited few if any residual impacts. However, no previously disturbed sites within the Briggs Spring project area were found to be degraded and existing soil conditions indicate overall soil health, productivity, and function.

Soil Erosion

Soil erosion is defined as the movement of individual soil particles by a force, and is initiated by the planar removal of material from the soil surface (sheet erosion) or by concentrated removal of material in a downslope direction (rill erosion). Surface erosion is a function of four factors: (1) susceptibility of the soil to detachment; (2) magnitude of external forces (raindrop impact or overland flow); (3) the amount of protection available by material that reduces the magnitude of the external force (soil cover); and (4) the management of the soil that makes it less susceptible to erosion (Foster, 1982; Megahan, 1986).

Although erosion is a natural process occurring on the landscape, management activities can increase the amount of material transported offsite, as well as accelerate the rate at which it is removed. Severe erosion can impair long-term soil productivity if soils are heavily disturbed on shallow or highly erodible soils. Erosion potential is the relative susceptibility to sheet and rill erosion when surface cover is completely removed from the site. Ground vegetation, downed debris, root masses, and duff help stabilize soil. When soil is disturbed by management practices, it can be exposed to runoff. When this happens, sheet and rill erosion occur. Erosion hazard is therefore an indication of the risk of soil loss associated with disturbance. Soil erosion is discussed in terms of rutting and displacement, erosion hazard for activities occurring off roads and trails, soil suitability for natural surface roads and trails, erosion hazard associated with natural surface roads and trails, and windthrow potential.

Soil Rutting Hazard and Displacement

Concentration of runoff, accelerated erosion, sediment delivery to surface waters, and damage to roads and trails can result from soil rutting. Soil rutting hazard ratings are an indication of how easily surface ruts can form through the operation of forestland equipment (USDA NRCS, 2009). Nearly all of the soils within the Briggs Spring project area are rated as “severe” for rutting potential and thus are very easily rutted.

Soil displacement and puddling (soil deformation and compaction) may occur simultaneously with rutting. Displacement can occur when the productive, upper layer of soil is removed or mixed with underlying, less productive layers during harvest or site preparation. The most common causes of displacement are side-casting of soils during road or fire-line construction, skidding logs, and landing construction and rehabilitation.

Soil Erosion Hazard (Off-Road, Off-Trail)

Erosion hazard is an indication of the risk of soil loss in a managed forest stand. The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail disturbance activities that remove most or all of the protective ground cover and expose the soil surface (USDA NRCS, 2009). Approximately 9,900 acres (34%) have soils rated as “severe” for erosion potential from off-road and off-trail disturbances and indicates that intensive management or special equipment and methods are needed to prevent excessive soil loss (Table 38). These areas correspond to hill side slopes throughout the project area. Approximately 2,000 acres (7%) are rated as “moderate” for erosion potential from off-road and off-trail disturbances. This indicates that the expected soil loss is small and generally, no special measures are needed. These areas correspond to the Virkula soils found in the southern portion of the project. The remaining area (16,990 acres or 59%) is rated as “slight” and corresponds to stringer drainage bottoms and broad, flat ridgetops.

Table 38. Soil Map Units in the Briggs Spring project with elevated risk of erosion

Erosion Rating	Soil Map Units included in rating	Acres in Project	Percent of Project
Very Severe	None	None	None
Severe*	SycE – Stovo-Trebor complex TuG – Trebor-Rock outcrop complex VoG – Vanocker-Sawdust-Rock outcrop	9,920	34%
Moderate	VcE – Vanocker-Citadel complex VkE – Vanocker-Lakoa complex	2,015	7%
Slight	BsB – Bullflat-Cordeston CkC – Citadel-Vanocker JhD – Judy-Heath-Paunsaugunt variant complex PbD – Paunsaugunt-Gurney complex ReC – Redbird-Heath SyaC – Stovho SybC – Stovho-Lail-Trebor	16,990	59%

*The severe erosion rating in three soil map units, as noted above, is due to the steep slopes within these sites.

Three soil map units within the Briggs Spring project area are prone to wind throw. These include the Stovho-Lail-Trebor (SybC), Stovho-Trebor (SycE), and Trebor-Rock outcrop (TuG) map units, which total 21,424 acres or 74% of the project area. These units are located throughout the project area, especially on exposed ridgelines.

Soil Heating

Most soils within the Briggs Spring Project Area are rated low for potential for damage by fire with the exception of some isolated segments in the vicinity of White Spring and the upper end of Redbird Canyon, and the Virkula soils found in the southern portion of the project.

Only 408 acres of the 4,740 acres of previously burned soils from the Jasper Fire within the Briggs Spring project were mapped as high soil burn severity; 2,529 as moderate; and 1,802 as low within the previously burned portions of the project.

Current fire research points to the fact that soils tend to recover within 3-5 years following wildfires as vegetation is established (Neary et al., 2005). These particular areas have had approximately 10 years to recover, thus any fire-induced water repellency has long-since dissipated with the annual freeze-thaw cycles and effective ground cover has increased significantly.

Soil Compaction

“Soil compaction is caused by excess weight of vehicles and animals. It impairs infiltration, root growth, and soil biota,” (USDA Forest Service, 1996). There are six soil map units in the project area which are more susceptible to compaction than the other soil map units. These six soil map units (with symbols CkC, SyaC, SybC, SycE, VcE, and Vke) comprise approximately 82% of the project area. Forest Plan monitoring of soil compaction has occurred across the Black Hills since 1999 (USDA Forest Service, 2007a). There is evidence that Black Hills soils can compact when timber harvest occurs on moist or wet soils, and that harvesting when soils are dry can prevent or limit compaction.

Organic Matter and Nutrients

In the Briggs Spring project area there are three soil map units (with symbols JhD, SybC, and Vke) which may contain soil organic matter of less than 2% (Forest Plan Standard 1102). The three map units comprise approximately 50% of the project area. These soil groups contain two to three different soils that are lumped into one overall unit and it is usually only one soil that exhibits low organic matter. Within the area occupied by these soil map units, it is estimated that approximately 3,800-5,400 acres or 13-19% of the Briggs Spring project area truly contains areas limited by low amounts of topsoil organic matter.

Forest Plan Objective 212 prescribes an average of 5-10 tons per acre of coarse, woody debris (CWD) for conifer stands, to be provided at least once during stand rotation (approximately 100 years), and provided that a conflict with fire or pest management objectives does not exist (USDA Forest Service, 2006). Distribution of CWD throughout

a treated area is also more desirable than isolated concentrations. Current CWD levels of sites surveyed during field investigations appear to meet or exceed 5-10 tons per acre.

Geologic Hazards

The Limestone Plateau is generally considered to be stable, five soil map units in the Briggs Spring project area are rated as having mass movement potential. These soil map units occupy a total of approximately 11,940 acres (41%) and include the Stovho-Trebor (SycE), Trebor-Rock outcrop (TuG), Vanocker-Citadel (VcE), Vanocker-Lakoa (VKE), and Vanocker-Sawdust-Rock outcrop (VoG) soil map units (USDA SCS, 1990).

However since most of the Briggs Spring project area has slopes that are less than 40%, the actual risk of mass movement is relatively low. Only 83 acres (0.3%) within the project boundary have slopes that exceed 40%. These steep areas coincide with canyon walls associated with the southern portion of Redbird Canyon. In fact, most of the area (92%) has slopes of 20% or less, thus making the area very well-suited to ground-based, mechanical operations. There are no roads or trails currently located on hill slopes with slope or soil stability concerns within the Briggs Spring project area, regardless of ownership. No slope failures were identified during field reviews, with the exception of small, isolated talus and rock slide areas on canyon side walls.

Environmental Consequences

Effects to geologic resources were analyzed for the time period beginning in the year 2000 and extending through the year 2026. The year 2000 was chosen as a starting point for effects analysis because the Jasper Fire occurred in this year within part of the Briggs Spring Project Area and post-fire runoff events caused some geologic adjustments. The year 2026 was chosen as an ending point in time because project activities would not begin to be implemented until 2011, with proposed prescribed burning and harvest activities taking place over the course of the next 10 years through the year 2021.

Scientific research has found that most burned areas tend to recover within 3-5 years following a fire (Neary et al., 2005), so a buffer of 5 additional years was added to allow for recovery of the landscape following any prescribed burning activities that would be implemented as late as the year 2026.

Alternative 1 – No Action

Direct and Indirect Effects

Soil Erosion

This alternative would not have any new activities within the project area so soil erosion would not be affected and would remain unchanged. Areas where erosion is occurring would not change. There would be no direct effects to soil productivity from soil erosion with this alternative because no new activities are planned. Extensive areas of soil erosion can occur following large-scale, high intensity wildfire events. Fire hazard and the potential for wildfire would continue to increase in this alternative.

Soil Heating

There would be no direct effect to soil productivity from soil heating with this alternative because no burning would occur. If a wildfire were to occur, the soils could be adversely affected.

Soil Compaction

This alternative would not have any new activities occurring within the project area so soil compaction would not be affected. There would be direct or indirect effects to soil productivity from soil compaction with this alternative because no new activities are planned.

Organic Matter and Nutrients

This alternative would not have any new activities within the project area therefore; soil organic matter and nutrients would not be affected. There would be no direct or indirect effects to soil productivity from nutrient removal with this alternative because no new activities are planned.

Geologic Hazards

This alternative would not have any new activities within the project area; therefore the potential for mass movement of soil would not be affected. There would be no direct or indirect effects to soils from geologic hazards, mass movement.

Common to All Action Alternatives

Direct and Indirect Effects

Soil Erosion

The alternatives vary in potential for soil erosion by the extent of vegetation treatments on soils with severe erosion hazard rating where slopes are greater than 20%.

Alternatives 2 and 3 would implement mechanical treatments on soils with a severe erosion hazard rating on 7,866 acres (27% of project area) for Alternative 2 and 9,000 acres (31% of project area) for Alternative 3. Prescribed fire is not expected to impact soil productivity from soil erosion because the organic layer of soils would not be burned off and would remain to protect soils from erosion. Implementation of Forest Plan standards and guidelines, which include WCPs and BMPs would minimize the potential for erosion in any alternative.

Past monitoring and field investigations within the project area found that most existing erosion problems are related to roads and their effects on streams (USDA Forest Service, 2010).

Although some wind-throw of trees would continue to occur, large areas of wind-thrown trees are not expected to result following project implementation due to the consideration of wind-throw potential when proposed silvicultural prescriptions were developed for the project area.

Alternative 2 does not propose any new road or trail construction and therefore no new construction would take place on soils with elevated erosion risk. Approximately 76 miles of road maintenance and 33 miles of road reconstruction are proposed this would correct existing road runoff and erosion issues.

Alternative 3 includes approximately 0.8 miles of new trail construction that would link the expansion of the Redbank Spring campground associated with this alternative to the nearby existing trail system. Most of this proposed trail segment would be built across soils with severe erosion hazard rating (0.6 miles out of 0.8) and would likely require more maintenance and drainage structures to prevent rutting and erosion and overall trail damage. However all new construction is required to implement standard WCP/BMP

measures to control runoff and erosion as part of project design criteria (Appendix B). Therefore the potential for soil erosion would be minimal.

The “New Moon” OHV campground proposed by Alternative 2 is an ideal location based on the inherent soil properties found at this site. The NRCS provides soil interpretations specifically tailored to recreation developments, including suitability for camp and picnic areas, off-road motorcycle/ATV trails, and human foot paths and trails (USDA NRCS, 2009). Soils at the proposed location are rated “somewhat limited” for overall campground development. This indicates that soils are generally suited for campground development but may require some additional measures or considerations to address limitations posed by specific soil properties. Fair performance and low-to-moderate levels of maintenance will be required to maintain vegetative cover and prevent rutting and soil loss due to erosion. Furthermore, soils in the proposed campground area are rated “slight” for erosion from off-road and off-trail disturbance in general. Soils in this location are not limited for human foot paths and trails or off-road motorcycle/ATV trails.

Alternative 3 proposes an expansion of the existing Redbank Spring campground to accommodate OHV use. Soils in this area are not well suited for development and disturbances associated with a campground and off-road motorcycle/ATV trails based on the inherent soil properties. The inherent soil properties create conditions that will yield poor performance and high levels of maintenance will be required to maintain vegetative cover and mitigate rutting and soil loss due to erosion. Soils in this campground area are rated “severe” for erosion from off-road and off-trail, disturbance in general as discussed previously. Design criteria specific to the Alternative 3 OHV campground has been included to minimize these potential effects (Appendix B) and prevent soil erosion that would be considered detrimental.

Based on the acres of mechanical treatments proposed on soils with severe erosion hazard rating and proposed campgrounds in each alternative, Alternative 3 has the greatest potential for soil erosion than Alternative 2. Although the alternatives would vary in the potential for effects, no detrimental erosion would be expected due to design criteria, including Forest Plan direction.

Soil Heating

Effects to soils from heating from management actions can come from two sources; burning slash piles and prescribed fire.

Burning slash piles may result in detrimental soil disturbance due to the high intensity fire, high temperatures, and long duration of burning needed to completely burn these larger piles. However, design criteria have been included to minimize the amount of detrimental soil disturbance associated with burned slash piles (Appendix B). Burning of hand piles can also result in severely burned soils but these piles are much smaller in size and therefore do not produce the same degree or extent of soil damage. Design criteria pertaining to slash treatment and hand piles has also been included to minimize potential effects to soils (Appendix B). These measures include specifications for pile locations and size, soil and duff moisture requirements, and rehabilitation where necessary.

Prescribed fire is proposed on approximately 6,295 acres (Alternative 2) and 7,009 acres (Alternative 3). Prescribed burning associated with Alternatives 2 and 3 are not expected to result in severely burned soils within proposed activity areas. Prescribed broadcast-

burn prescriptions would be designed to provide only the fire intensity needed to achieve vegetation and fuel management objectives. Design criteria have also been included to protect soils during prescribed burning operations (Appendix B). These measures include specifications for soil and duff moisture requirements, fire intensity, appropriate ignition techniques, ground cover requirements following burning, and rehabilitation measures. Soil heating and associated effects to physical, chemical, biological, and hydrologic soil functions are expected to be minimal because fire intensities are expected to be primarily low to moderate.

Soil Compaction

Thinning, mechanical fuels treatment, and prescribed burning activities associated with either of the action alternatives are not expected to directly or indirectly result in detrimental levels of soil compaction. Much of the project area contains rock outcroppings and extensive surface rock within the soil which helps to protect soils in these areas from compaction. Activities would be limited to dry or frozen conditions. By controlling the season, location, and intensity of equipment operations, harvest activities can take place on soils with a higher susceptibility to compaction, without causing significant detrimental disturbance.

Treatment methods that avoid ground-based equipment operations within aspen stands such as hand felling, yarding from outside the aspen clone, or leaving felled pine in place, would protect these moist soils and conserve soil characteristics. Equipment operations over snow and/or frozen soil conditions in these areas surrounding the aspen should provide adequate soil protection as well as meet operational needs. Design criteria for management of aspen stands have been included in the Briggs Spring project to protect these sensitive soils.

The construction of an OHV campground under either action alternative would directly cause soil compaction in the development area. However this activity is exempt from inclusion in detrimental soil disturbance calculations because it is associated with proposed administrative sites, facilities, and infrastructure.

Management activities associated with both action alternatives have been designed to minimize soil compaction through the use of design criteria (Appendix B) which includes USFS Watershed Conservation Practices (WCPs) and South Dakota Best Management Practices (BMPs). These practices include but are not limited to the use of designated and existing skid trails in sensitive areas, soil moisture limitations, and seasonal restrictions.

Acres of proposed treatments on soils subject to compaction are:

- Alternative 2 = 18,920 acres (65% of project area)
- Alternative 3 = 21,454 (74% of project area)

Based on these acres, Alternative 3 has the greatest potential for soil compaction, followed by Alternative 2. Very little soil compaction would be expected to occur and it could be a short term impact. Forest Plan monitoring has shown “there is evidence that conditions were such that within one geographic area, on at least one soil type, and to the depth sampled, that the mean soil bulk density decreased from levels above the threshold classified as ‘detrimental compaction’ to levels below the threshold within the time period of one year” (USDA Forest Service, 2009).

Organic Matter and Nutrients

Long term soil productivity associated with organic matter and nutrient cycling is not expected to be negatively affected directly or indirectly by management activities proposed under either action alternative, but rather to trend towards a net improvement following project implementation.

The difference between Alternatives 2 and 3 regarding impacts to the soil resource from nutrient removal are based on acres of mechanical treatment proposed on soils that could have low organic matter. Prescribed fire would affect surface litter layer by partially or entirely consuming organic matter. Prescribed burning also affects the duff layer where topsoil organic matter resides. The degree of impact depends on fire intensity and burning duration and moisture content of the duff layer. Design criteria have been included to limit fire intensity through soil and duff moisture requirements, seasonal timing of burning, slash pre-treatment where necessary, and ignition techniques. Therefore the effects of prescribed burning on topsoil organic matter are expected to be minimal due to the inclusion of design criteria and the inherent nature of lower-intensity prescribed burning.

It is estimated that 4,165 acres (Alternative 2) and 7,744 acres (Alternative 3) of shelterwood treatment are located on soils that could potentially have low topsoil organic matter. Other treatments are proposed on soils with low topsoil organic matter, including various thinning. These other treatments would retain sufficient residual material in the stand to meet Forest Plan Guidelines and Standard 1102.

The Forest Plan requires the maintenance or improvement of long-term levels of organic matter and nutrients on all lands (Standard 1102). Guideline 1102a provides the following direction to achieve this standard for areas where topsoil is thinner than 1 inch, topsoil organic matter is less than 2%, or the effective rooting depth is less than 15 inches:

- Consider the existing and projected levels of fine slash; and
- Retain 90% or more of the fine logging slash (less than 3 inches in diameter) in the stand after each clearcut and seed-tree harvest; and
- Retain 50% or more of the fine slash in these stands after each shelterwood and group selection harvest.

Implementing Forest Plan requirements and design criteria pertaining to these soils is expected to maintain long term nutrient levels and contribute to the topsoil organic matter, and thus ensures compliance with Forest Plan Standards 1102 and 1112 pertaining to the retention of organic matter for soil productivity as well as runoff control.

Geologic Hazards

Approximately 40 acres out of the total vegetation management activities proposed under Alternative 2 include areas where slopes are greater than 40% and soil have the potential for mass movement. Alternative 3 has approximately 68 acres out of the total vegetation management activities. However, these are isolated areas within larger treatment units and are often associated with steep, rocky outcrops and canyon walls.

The project has been designed so that all proposed ground-based mechanical treatments under both action alternatives would generally avoid slopes exceeding 40%. Therefore, any soils prone to movement on these slopes would also be avoided. Ground-based

equipment operations are excluded from these areas, except to cross, short, isolated segments as part of project design criteria that includes WCPs and BMPs in order to minimize the risk of initiating a slope failure during or following harvest activities in these areas. Implementing design criteria would minimize or eliminate the risk of mass movement.

Cumulative Effects to Soils

The cumulative effects area for the soils resource is the proposed activity units in the project area. The effects of the alternatives on the soils resource would be contained within the units. The timeframes used to consider effects of past, present, and future activities are from 2000 to 2026. This time frame would include impacts from the Jasper Fire (2000) and impacts from past timber sales, and through completion of proposed activities in this project. The past, present, and future activities considered in this analysis are presented in Appendix F.

Forest Plan standards and guidelines, as well as site specific design criteria would be implemented in all alternatives. When implemented as described, no adverse cumulative effects to soils are expected to occur. Past monitoring shows that when Forest Plan standards and guidelines are implemented on similar projects, this standard is met (USDA Forest Service, 2008). It is further expected that the compacted, eroded, or displaced condition would be less than 15%, as described in Standard 1103. The following discussion considers the cumulative effects of potential disturbances to long-term soil productivity in accordance with Forest Plan Standard 1101.

Soil Erosion

Past, currently ongoing, and reasonably foreseeable actions listed in Appendix F were considered along with proposed activities for cumulative effects to soil erosion and displacement. Any soil erosion that may occur related to implementation of the Briggs Spring project is expected to be localized, minor in both severity and extent, and thus well below levels that would be considered detrimental. This expectation also applies to other forest management activities and uses. Design criteria and appropriate WCP/BMP measures apply to all forest management activities and uses. These measures are designed to control runoff and erosion for a 10 year storm event (USDA Forest Service, 2006b). Therefore the risk of cumulative detrimental soil erosion is mitigated for typical storm events observed in the Black Hills for all forest management activities.

Past monitoring and field investigations within the project area found that most existing erosion problems are related to roads and their effects on streams (USDA Forest Service, 2010).

Grazing management throughout the project area is not expected to cause extensive soil erosion. Dispersed recreation activities generally do not cause excessive soil erosion issues due to the lack of concentrated use. Concentrated recreation sites are purposely located in flatter terrain which minimizes the potential for soil erosion and employs management strategies to guide concentrated uses where measures are in place (i.e. WCPs/BMPs) to minimize soil erosion.

Any soil erosion would be expected to be minimal and would be within the limits of Forest Plan Standard 1103 for the action alternatives. There would be no cumulative effects to soil erosion resulting from the no action alternative.

Soil Heating

Events that could cause negative effects of soil heating are wildfires and, to a lesser degree, prescribed burning. Prescribed burning within the project area would be implemented in a manner designed to reduce the potential for adverse soil heating impacts. Prescribed burning would have beneficial effects by reducing long-term fire hazard and the potential for large-scale, high intensity wildfire that could have soil heating effects. Therefore, no adverse cumulative effects would be expected under any alternative.

Soil Compaction

Past, currently ongoing, and reasonably foreseeable actions in the Briggs Spring project area were considered along with proposed activities for cumulative effects to soil compaction. Any soil compaction that may occur related to implementation of the Briggs Spring project is expected to be localized and well below levels that would be considered detrimental. This expectation also applies to other forest management activities and uses. Design criteria and appropriate WCP/BMP measures apply to all forest management activities and uses. Therefore the risk of cumulative detrimental soil compaction is minimized.

Grazing management throughout the project area is not expected to cause detrimental levels of soil compaction due to where livestock naturally tend to roam and the presence of rock fragments in most of the soils within the project area. Dispersed recreation activities also do not tend to cause detrimental soil compaction due to the lack of concentrated use for this type of recreation.

Minimal cumulative impacts to the soil from compaction are expected and would be within the limits set by Forest Plan Standard 1103. No cumulative effects from the no action alternative would occur.

Organic Matter and Nutrients

There would be no adverse cumulative impacts to soil organic matter and nutrients from any alternative within the project area because sufficient residual material and trees would be left on site for nutrient recycling after project implementation.

Geologic Hazards

There is little potential for mass movement of soils in this project area. Actions that influence mass movement of soils include timber harvesting and road building. There would be no cumulative impact to mass movement of soils from any alternative. The action alternatives include design criteria to minimize and reduce the risk of landslides within the treatment area.

Hydrology

Affected Environment

The Briggs Spring project boundary overlaps portions of three 6th level watersheds. These watersheds include Redbird Canyon, Gillette Canyon, and a very small portion of the Stockade Beaver Creek watershed (Table 39). Since the project area does not coincide exactly with watershed boundaries, the water resources analysis area differs from the project area boundary. Although a small portion of the Stockade Beaver Creek watershed is included in the Briggs Spring project boundary, it is privately owned land and thus no federal land management activities would take place. For this reason, the Stockade Beaver Creek watershed was excluded from the watershed analysis area.

Watershed Condition

Watershed boundaries and HUC codes were obtained from the National Hydrography Dataset developed and maintained by the USDA Service Center and USGS (USGS, 2008).

Table 39. 6th Level Watersheds (HUC 12) associated with the Briggs Spring project

6 th Level (HUC 12) Watershed	6 th Level (HUC 12) Watershed Name	Total Watershed Acres	Acres of Watershed in Project	Percent of Watershed in Project
101201070404	Stockade-Beaver Creek	37,643	129	0.3%
101201070405	Gillette Canyon	51,464	2,679	5%
101201070406	Redbird Canyon	52,135	26,021	50%

Watershed Condition Classes were assessed during the 1997 Forest Plan Revision, but watershed boundaries have changed since that time due to the development of the nationwide National Hydrography Dataset (USGS, 2008). Watershed boundaries used in the 1997 Forest Plan correspond well to the analysis watersheds for this area and all three watersheds are rated as Condition Class 2 – Moderate Concern. According to the Forest Plan (1997), “Class 2 watersheds are those which may have streams and soils in disequilibrium; a change in the rate or nature of management activity, stricter implementation of Watershed Conservation Practices and BMPs, or minor structural projects should be able to return these watersheds to a Class 1 condition; some upland restoration may be necessary.”

Redbird Canyon (HUC 101201070406)

The overall Redbird Canyon watershed encompasses 52,049 acres (about 81 square miles). Only the upper portion of the watershed is included in the Briggs watershed analysis area (Map 6, Appendix A), totaling 32,054 acres or 62% of the overall watershed. Seeps and springs are abundant throughout the watershed. Stream channels are ephemeral to intermittent in nature, as most precipitation is lost to aquifer recharge. Most of the watershed is National Forest lands managed for timber production and grazing. Privately owned lands comprise 4,638 acres and are a combination of scattered homestead and mining claims, generally occupying wider valley bottoms and grassy meadows.

Gillette Canyon (HUC 101201070405)

The Gillette Canyon watershed encompasses 51,072 acres (about 80 square miles). Only the upper portion of the watershed is included in the Briggs water resources analysis area (Map 6, Appendix A), totaling 18,768 acres or 37% of the overall HUC 6 watershed.

Elevations range from approximately 5,800 feet at the outlet of Wolf Draw in the south over 6,900 feet on the northeastern watershed divide with Spring Creek. Seeps and springs are abundant throughout this watershed as well. Stream channels are ephemeral to intermittent in nature, as most precipitation is lost to aquifer recharge. Most of this watershed is also National Forest lands managed for timber production and livestock grazing. Portions of the watershed that experienced high tree mortality resulting from the Jasper Fire are now primarily managed for grazing and wildlife. Privately owned lands comprise 406 acres of this portion of the Gillette Canyon watershed. Private lands are a combination of scattered homestead and mining claims, generally occupying wider valley bottoms and grassy meadows.

Floodplains

A floodplain is the flat area on either side of a stream or river that is susceptible to inundation by floodwaters. Floodplains slow flood velocities and decrease erosion because they are by nature wide and flat, thus allowing for shallower and slower water. Thus, floodplains provide for flood moderation, water quality protection, ground water recharge, and wildlife habitat, among other benefits. The Federal Emergency Management Agency (FEMA) has mapped 100-year floodplains across the nation (FEMA, 1998).

There are approximately 345 acres of mapped 100-year floodplains within the project area. Mapped 100-year floodplains are located along the following streams and drainage ways: Redbird Draw, isolated segments of Redbird Canyon, and Gillette Canyon.

Wetlands and Riparian Areas

There are approximately 27 acres of wetlands mapped by the NWI within the Briggs Spring project area (Table 40). These are associated with 69 different wetland areas, many of which are associated with impoundments used primarily for stock watering. All of the NWI wetlands within the project boundary are classified as Palustrine and generally less than one acre in size. Additionally, there are 31 miles of mapped linear wetlands within the project boundary (Table 40), located in Redbird Draw and Redbird Canyon. Additionally, there are approximately 30 acres, associated with another 96 wetlands, which were identified during field reviews and GIS analysis that were not identified by NWI mapping. Thirty-five acres are located on Forest Service managed lands and the remaining 22 acres are located on privately owned lands.

Table 40. Wetlands within Briggs Spring project area

Wetland Classification	Wetland Type(s)	Wetland Areas (Acres)	Linear Wetlands (miles)
Lacustrine	Lakes	None	None
Palustrine	Marshes, swamps, floodplains, fens, bogs, wet meadows, etc.	27	31
Riverine	Adjacent to rivers, streams and includes ox bows, freshwater marshes, etc.	None	None
To Be Determined	Field identified and GIS digitized wetlands	30	None
Total		57 acres	31 miles

There are 24 known springs located within the Briggs Spring project area, all of which are in the Redbird Canyon watershed. Nineteen springs are located on USFS lands and include Baseline Spring, Beef Pasture Spring, Bert Howey Spring, Briggs Spring, Cabin Spring, Cigarette Spring, Herrin Spring/WPA Well, Howell Spring, Johnson Spring, Lower Antelope Spring, Multiplex Springs, North Cigarette Spring, Old Camp Spring, Redbank Spring, Redbird Spring, Rogers Spring, Upper Antelope Spring, White Spring, and Willow Spring. The remaining five springs are located on privately-owned lands.

Stream Flow Regime

The Briggs Spring project area does not contain any perennial streams with sustained lengths, but does have a few, very short segments in which surface water can be found, but each segment is generally a few hundred feet in length or less, and supported by springs. These segments add up to less than one mile in length. The area is dominated by intermittent and ephemeral streams. There are approximately 58 miles of intermittent streams and 27 miles of ephemeral streams within the project boundary (Table 41). Due to the highly dissected nature of the Black Hills, numerous ephemeral drainages are also present. These channels generally do not have a defined channel and are often swales, and carry water only in response to larger storm events or snowmelt. Ephemeral drainages/swales are not specifically mapped.

Table 41. Miles of perennial, intermittent, and ephemeral streams in the Briggs Spring project area

Stream Flow Regime	Stream Miles	Acres Associated w/Protected Streams (WIZ)
Perennial – defined channel and generally flows year-round.	0.7	17
Intermittent – defined channel but flows for only part of the year; includes loss zones where streamflow goes underground into ground water aquifers. For the Briggs Spring Project Area, these also include Karst Streams.	58	1,415
Ephemeral – defined channel or flow path, but carries water only in response to larger storm events or snowmelt. For the Briggs Spring Project Area, these include Karst Streams and Water Courses, which are protected water courses.	27	655

The drainages in the Briggs Spring watershed analysis area are in a stream flow regime dominated by runoff resulting from both snowmelt and intense summer thunderstorms (Sando, 1998).

Due to the unique underlying geology of the Briggs Spring project area, it is generally considered a ground water recharge zone (Carter et al., 2002; 2003). Prior to the Jasper Fire of 2000, surface runoff and flow in stream channels was a rare occurrence in this region, often occurring only in response to very high intensity thunderstorms of a “cloud burst” nature. Although short, isolated sections of spring-fed streams exist, stream channels are generally ephemeral and intermittent, carrying water only in response to such intense rainfall events or rapid, seasonal snowmelt. Waterways are often well

vegetated with no defined flow channel and many times have ponderosa pine trees growing within the channels.

No active stream discharge gauges are present in the area (USGS, 2008a). One USGS crest-stage gauge is located near the outlet of Redbird Canyon and used to indirectly measure occasional high flows.

Stream flows have been altered from historic conditions by various human-related disturbances. Historic accounts by the Custer and Dodge Expeditions in 1874 and 1875 noted more perennially-flowing streams, more abundant and lush riparian zones, and more wetlands in low-gradient valley bottoms than conditions today (Grafe & Horsted, 2002; Horsted, 2006; Shepperd & Battaglia, 2002). Subsequent post-settlement timber harvesting, mining, livestock grazing, and beaver trapping changed the water yield as described previously and thus also affected streamflow (Shepperd & Battaglia, 2002). These changes damaged the riparian zones and led to an increase in peak flows and the intensity of flash floods, and a decrease in the perennial flow of some streams (Parrish et al., 1996).

Stream Health

Streams within the Briggs Spring project area have not yet been rigorously surveyed and evaluated for stream stability. However, general stream health assessments have been completed in accordance with Region 2 and Forest Plan guidance. Most stream channels within the Briggs Spring project area are currently stable and rated as “robust”. Some segments of channel instability exist in the southern portion of the project area as a result of post-fire flooding after the Jasper Fire. Post-fire floods scoured material out of channels and stream banks, depositing this material in flatter stream segments where flood waters slowed, particularly at culverts (Gould, 2003). Scour and transport of debris has slowed significantly as the burned area recovered and very little occurs now, and only in response to the occasional runoff created by very high-intensity summer thunderstorms. Overall, stream channels appear to be recovering well based on field investigations.

Connected Disturbed Areas (CDAs) are disturbed sites that have a continuous surface flow path into streams and other water bodies (USDA Forest Service, 1999). Sediment delivery to and transport in streams is a natural process, but roads and other disturbed sites can act as channels that multiply sediment loads to the stream network during runoff events. CDAs include roads, ditches, compacted soils, bare soils, mine spoils, and areas of severely burned soils that are directly connected to the stream network. Ground disturbing activities located within the water influence zone are also considered connected unless site-specific actions are taken to disconnect them from streams (USDA Forest Service, 2006b).

CDAs in the Briggs Spring project area are primarily associated with livestock concentration in wet areas such as springs and wetlands that are not fenced or where fences are in disrepair. Some of the larger spring and wetland areas that are impacted include Briggs Spring, Willow Spring and wetland complex, Upper Antelope Spring, and White Spring

Water Quality

The SD DENR assigns water quality standards based on the beneficial uses of each water body. All streams in South Dakota are assigned the beneficial uses of irrigation, fish and wildlife propagation, recreation, and stock watering (SD DENR, 1999). None of the streams within the Briggs Spring Project Area or water resources analysis area are listed specifically for other beneficial uses due to the lack of continuous surface water.

No water bodies within the Briggs Spring project area are currently listed as impaired (SD DENR, 2010), nor have they been listed on previous years reports (SD DENR, 1998; 2002; 2004; 2006; 2008).

Environmental Consequences

Effects to water resources were analyzed for the same time period as soil resources, beginning in the year 2000 and extending through the year 2026, for the same reasons stated previously. Effects to water resources are also summarized in the context of short term effects (5 years or less) as well as long term effects (longer than 5 years).

Past, currently ongoing, and reasonably foreseeable actions listed in Appendix F were considered along with proposed activities for cumulative effects to water resources. Effects from known past actions were included in the analysis of existing resource conditions. Generally this includes activities that have occurred since the 1874 Custer Expedition to the Black Hills region. Proposed activities associated with each alternative were considered in the analysis of direct and indirect effects. Past and present land use and activities within the analysis watersheds, which encompasses the Briggs Spring project boundary, include timber harvest, wild and prescribed fire, livestock grazing, private land ownership, roads and off road vehicles, mines and quarries, various types of recreation, and forest product gathering. All of these activities or events individually have some level of impact on the watershed, which results in cumulative effects to watershed and water resources conditions and processes.

Alternative 1 – No Action

Direct and Indirect Effects

Floodplains, Wetlands and Riparian Areas

This alternative would not have any new activities within the project area so there would be no direct or indirect effects on floodplains, wetlands and riparian ecosystems.

Stream Flow Regime

Alternative 1 would not have any new activities within the project area. Therefore, no direct effects to flow regime would occur. Indirect effects include a potential for increase in biomass over time, which would generally reduce the amount of water available for streamflow. This alternative would also have potential for a large stand replacing event which would impact stream flow regime.

Stream Health and Water Quality

This alternative would have no new activities within the project area. Current conditions of temperature/oxygen, sediment, water purity, aquatic life, and bed and bank stability would be expected to remain unchanged. No change to existing stream health ratings would occur. However, this alternative has potential for a large scale disturbance, such as a large-scale, high intensity fire, to occur and this would impact water quality and stream health.

Common to All Action Alternatives

Direct and Indirect Effects

Floodplains, Wetlands and Riparian Areas

No measureable, negative direct or indirect effects to stream channels and floodplains in the project area are expected as a result of changes in annual water yield or runoff magnitudes resulting from either action alternative.

Both potential locations for an OHV campground proposed by the action alternatives are located well away from stream channels and floodplains and therefore would not affect these resources. Short-term impacts may occur to stream channels and floodplains under both action alternatives in areas where vegetative and fuels treatments and road work is proposed within riparian corridors and adjacent to streams. However, design criteria and WCPs/BMPs (Appendix B) are included to protect stream courses and minimize floodplain and riparian impacts during management activities. Forest Plan Standards 1301, 1302, 1306 and Guideline 1115 also stipulate the use of buffers for streams and riparian areas (USDA Forest Service, 2006).

Roads that cross wetland and riparian areas would have design criteria and WCPs/BMPs associated with them. Management activities would be expected to be an overall improvement in wetland and riparian conditions once protective measures around these areas are installed (i.e. fencing or natural barriers) and road improvements are made.

Design criteria have been included in the project to protect these areas during management activities. Buffers provide protection for these areas, no effects to wetland and riparian areas are anticipated for proposed activities. Therefore this project would comply with all water-quality related Forest Plan Standards and Guidelines and all State and National water quality regulations.

The proposed OHV campground associated with Alternative 2 is not located near wetlands, riparian areas, or GDEs and would therefore have no direct or indirect impact to these resources.

There is a potential for adverse impacts to wetland and ground water dependent ecosystems associated with the Redbank Spring and pond to result from the proposed OHV campground at Redbank Spring for the reasons described previously in the soils section. No substantial or long-lasting effects to wetlands, riparian areas, or ground water dependent ecosystems at Redbank Spring are expected to result from the modification of the existing campground based on the requirement for proper implementation and project design criteria and WCP/BMP measures and regular campground maintenance and monitoring.

Runoff and erosion control measures are included as part of the project design criteria and required WCP/BMP measures. Additional design measures specific to the OHV campground in Alternative 3 are also included to mitigate potential impacts to wetland and ground water dependent resources and to be in alignment with national Forest Service direction, water resources and wetland regulations, and Forest Plan standards and guidelines. These measures are in addition to other standard WCP/BMP measures and are included in project design criteria listed in Appendix B.

Stream Flow Regime

Stream flow is not anticipated to be negatively affected by implementation of project activities associated with either action alternative.

Intermittent and ephemeral streams and drainages occasionally flow in response to very intense summer thunderstorms currently and would continue to do so. In these events, the amount and rate of rainfall is the driving force behind streamflow being produced and carried throughout the drainage network. Therefore proposed vegetation treatments, prescribed fire, fuels treatments, and OHV campground areas are not expected to measurably alter this current response. WCP/BMP measures are included in the project design. These measures are designed to control runoff damage from at least a 10-year storm of any duration (USDA Forest Service, 2006b). Therefore, for typical precipitation events observed in the Black Hills area, storm runoff is not expected to cause damages to soil or water resources.

Stream Health and Water Quality

Proposed timber and fuels management, and prescribed burning activities associated with both action alternatives are not expected to degrade water quality or exceed state specified thresholds for the various water quality parameters associated with each beneficial use. Commercial and non-commercial thinning and prescribed burning activities associated with Alternative 2 and 3 are not expected to result in detrimental levels of soil erosion as explained previously in the soil erosion discussion, and therefore no substantial increase in sediment transport to streams and water bodies is anticipated. Measures have been included in the project to protect the quality of ground water as required by Forest Service Manual 2880 – Geologic Resources, Hazards, and Services (USDA Forest Service, 2008). Applicable WCPs found in FSH 2509.25 (USDA Forest Service, 2006), along with SD BMPs (SDSU et al., 2003), are used to prevent degradation of both surface and ground water quality. These measures include stream and riparian buffers, avoidance of sensitive areas, seasonal operations, drainage features, and restrictions on harvest, road activities, and fire ignition in and immediately adjacent to water resources.

Vegetative buffers would remain in place to filter any incoming sediment or chemical pollutants, provide stream bank stability, minimize bank erosion, and provide necessary shading to maintain cooler water temperatures necessary for coldwater fisheries. All water bodies including but not limited to lakes, ponds, wetlands, springs, perennial and intermittent streams, and water courses have 100-foot WIZ vegetative buffers as required by agreement with the SD DENR (USDA Forest Service, 2006b; 2009a) and Forest Plan Standards 1301, 1302, 1306 and Guideline 1115 (USDA Forest Service, 2006).

WIZ buffers would be avoided by ground-based equipment except at designated crossing points, to perform road work, to end-yard any cut trees out of the WIZ, or where site-specifically approved. Forest management activities such as tree harvest and prescribed fire can take place within the 100-ft WIZ buffer along streams if desired for silvicultural reasons and done so cautiously, with a “tread lightly” approach. Design criteria has been included to protect vegetation within 50 feet of each stream bank for stream-side areas where vegetation management may be desired. Within this 50 foot stream-side buffer, willows, aspen, spruce, or other trees and shrubs providing physical bank stabilization or shade to the stream would not be removed unless site specifically approved otherwise.

Approximately 76 miles of road maintenance activities are proposed under Alternative 2 and approximately 33 miles of road reconstruction is proposed. Approximately 77 miles of road maintenance activities are proposed under Alternative 3 and approximately 34 miles of road reconstruction is proposed. Alternative 3 also proposes approximately one mile of OHV trail construction that would connect Redbank Spring Campground to the existing OHV trail system. Road maintenance and reconstruction activities would reduce potential impacts to water quality. Road problems and CDAs would be corrected as part of the commercial timber harvest and road package, thus reducing sediment to the streams. Harvest activities would have a positive effect on stream temperature for those short segments that carry surface water flow.

Alternatives 2 and 3 could result in localized, short term sediment delivery to water resources from road-related activities adjacent to streams or at stream crossings. In the long term, roads would produce less sediment as a result of the implementation of the road work in these alternatives (road work associated with timber sale areas).

The proposed OHV campground associated with Alternative 2 is not located near streams or other water bodies and will therefore have no direct or indirect impact to these resources.

There is a potential for adverse impacts to the water quality of Redbank Spring and pond due to the proposed expansion of Redbank Campground for an OHV recreation area. The proposed OHV campground location associated with Alternative 3 has a much higher risk of resulting in excess runoff and sediment delivery to the adjacent surface water bodies compared to Alternative 2. This is largely due to the current location of Redbank Campground in the immediate proximity of Redbank Spring, pond, and wetland. Design criteria specific to the Alternative 3 OHV Campground has been included, in addition to standard runoff and erosion control measures. These additional design and operational requirements are necessary to minimize the potential for adverse impacts to water quality at Redbank Spring and pond. Design Criteria and WCP/BMP measures for campground layout and design, as well as regular maintenance and monitoring of visitor use and compliance, are expected to prevent water quality impairment of Redbank Spring and pond. No substantial or long-lasting effects to wetlands, riparian areas, or ground water dependent ecosystems at Redbank Spring are expected to result.

Cumulative Effects

Floodplains, Wetlands and Riparian Areas

Cumulatively, stable stream channels throughout the area are expected to remain in their current conditions until a natural disturbance such as wildfire occurs, which would likely cause instability. Conversely, already unstable stream channels would continue to degrade, causing impacts to ripple throughout their tributary networks as well. Design criteria and WCPs/BMPs have been included in both action alternatives to protect streams and floodplains during harvest activities. Road work associated with both action alternatives would lead to improved flood passage and channel stability at improved stream crossings.

Cumulatively, all activities are expected to maintain current conditions of wetlands, riparian areas, and/or ground water dependent ecosystems through implementation of

design criteria and WCPs/BMPs (Appendix B). Some improvements in condition may occur where road-related problems are addressed through commercial timber harvest road work. In general, wetland, riparian, and GDE sites are expected to remain in their current condition, regardless of which alternative is chosen.

Stream Flow Regime

Under Alternative 1, current stream flow conditions would likely persist. Cumulative impacts could occur from MPB killing enough trees across watersheds, or a large-scale, high intensity wildfire occurs, both of which could cumulatively result in increased stream flows in the short term. Timber management associated with the action alternatives may cumulatively make more soil moisture available throughout the watersheds to sustain slightly higher water levels in springs, wetlands, and stream channels downstream of these areas. Prescribed fire, fuels treatment, and an OHV campground would not have any measureable effect on stream flows, regardless of the alternative chosen.

Stream Health and Water Quality

Cumulatively, all activities are expected to maintain current water quality levels through the proper implementation and adherence to required design criteria and WCPs/BMPs (Appendix B). The OHV campground associated with Alternative 3 would require more extensive engineering design and WCP/BMP measures than Alternative 2 to prevent impacts to water quality. However, specified design criteria, including proper implementation and maintenance of WCP/BMP measures, would ensure protection of water quality at Redbank Spring. Vegetation management, prescribed fire, and road activities, including design criteria and WCP/BMP measures, would not be expected to have a negative, measurable change in overall water quality in any of the streams or water bodies due to activities associated with either action alternative. Implementation of either action alternative may cumulatively result in decreased sediment delivery and improved water quality through road improvement work.

Routine maintenance of trails, developed recreation facilities, and dispersed campsites or the operations of outfitters and guides would not involve activities which would increase sedimentation or affect water quality. Public recreational uses would have no measurable effect on sediment yields in the project area, due to the fact that disturbance created by these activities would be small, if any and dispersed across the landscape. Routine road maintenance is likely to occur as needed on existing roads in the project area.

For Alternative 1, existing CDAs would be corrected as funding and project authorizations allow (i.e. grazing allotment improvements, annual road maintenance, stream or wetland improvement projects, etc). For both action alternatives, existing road-related CDAs could be corrected as part of contracted road work associated with timber sales. Both action alternatives would have the potential to create new disturbed sites related to the creation or expansion of existing campground facilities for concentrated OHV recreational use. However, the OHV campground proposed under Alternative 2 is located well away from any surface waters and thus is not likely to result in a connection to surface water bodies. The expansion of the Redbank Spring Campground proposed under Alternative 3 has the potential to result in a new CDA due to the proximity of the facility immediately adjacent to Redbank Spring, pond, and wetland and the level of development of hardened, impervious surfaces. However, design measures specific to

the Alternative 3 OHV campground have been included in addition to standard design criteria and WCP/BMP measures to prevent a connection to surface water bodies. Therefore, the risk of creating a new CDA site would be minimized through project design criteria and required WCP/BMP measures.

CHAPTER 4: CONSULTATION AND COORDINATION

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

Interdisciplinary Team Members:

Lynn Kolund	District Ranger – Bachelor of Science, Forest Biology, Colorado State University, 1978. Thirty-one years of Forest Service experience in timber, silviculture, recreation, wilderness, fire and lands. Worked on seven districts and two Supervisor’s offices on six National Forests in Wyoming, Colorado, Alaska and South Dakota.
Kelly Honors	District NEPA Coordinator – Bachelor of Science, Forestry, State University of New York, College of Environmental Science and Forestry, 1985. Twenty six years of Forest Service experience at the district level in timber and planning; twenty-three of those years on the Black Hills National Forest. Twenty-two years experience in writing NEPA documents.
Wendy Steuerwald	IDT Leader – Assistant NEPA Coordinator – Bachelor of Science, Wildlife Management, University of Wisconsin-Stevens Point, 2003. Thirteen years of Forest Service experience at the district level on the Black Hills National Forest, twelve years experience in timber and one year in planning.
Nancy Bayne	Silviculturalist – Bachelor of Science, Forest Resources with an emphasis in Silviculture, University of Minnesota, 1986. Twenty-one years of Forest Service experience in timber at the district level on the Black Hills National Forest. Six years in current silviculturalist position.
Gwen Lipp	Fire/Fuels Planner – Bachelor of Science, Environmental Engineering, South Dakota School of Mines and Technology, 2004. Ten years of Forest Service experience at the district and national level in fire operations, fuels, timber, prescribed fire and planning. Current qualifications include: Incident Commander Type 4, Dozer Boss, Engine Boss, Prescribed Fire Effects Monitor, Prescribed Fire Ignition Specialist, Resource Unit Leader, Situation Unit Leader, Task Force Leader trainee,

Burn Boss Type 2 trainee and Planning Section Chief trainee.

Tracy Clark

Wildlife Biologist – Bachelor of Science, Wildlife Management with Minor in Environmental Law Enforcement, University of Wisconsin-Stevens Point, 1990. Eight seasons (1989-1994, 2000-2001) of wildlife experience as a Biological Technician with the Forest Service, Park Service and BLM in South Dakota, Idaho and Oregon. From 1994-1996 worked as a private consultant with the Minnesota DNR writing land stewardship plans and performing forest inventory. From 1996-2001 worked as a contractor performing stand exam on the Black Hills National Forest. Have been a Wildlife Biologist on the Black Hills National Forest since January of 2002.

Jessica Gould

Hydrologist – Bachelor of Science (2000) and Master of Science (2004) in Civil Engineering, focusing on water resources, from the South Dakota School of Mines and Technology (SDSM&T). Master's thesis conducted on the Black Hills NF, studying post-fire watershed responses after the Jasper Fire of 2000. PhD candidate in Geology & Geological Engineering, focusing on hydrogeology (groundwater), also from SDSM&T. Doctoral research focuses on identification and characterization of peat-forming, groundwater-dependent wetlands called fens in the Black Hills. Fourteen years of experience with the Forest Service at the district and SO levels, eleven in soil and water resources management, and 10 years working on the Black Hills NF. Nationally Registered and State licensed EMT-Intermediate and volunteer fire fighter with Hill City Fire and Ambulance Services. Hydrologist on the DOI National Interagency Burned Area Emergency Response (BAER) Team since 2003, lead Hydrologist since 2007. Assessed post-fire watershed conditions on over 5 million acres associated with fires in SD, WY, MT, ID, NV, and CA.

Lucas Bindel

Rangeland Management Specialist –

Matthew Scott

Botanist – Bachelor of Science – Rangeland Ecology and Watershed Management; Minor, Reclamation and Restoration Ecology; Extensive coursework in soils and botanical sciences, 2006. Three years experience fuels, wildland and prescribed fire management. Four years experience as a Natural Resource Specialist for Laramie Rivers Conservation District focused in rangeland management, vegetation monitoring, and wildlife habitat management. Qualified for OPM 430 Series (Botanist) in 2010. Six months experience as Botanist on the Black Hills

National Forest.

Matthew Padilla	Archaeologist – Master of Arts in Anthropology and Minor in GIS from New Mexico State University, 2006. Bachelor of Arts in Anthropology from Kansas State University, 2003. Three field seasons as an Archaeological Technician for the Black Hills National Forest (2002, 2004, 2005). One year as a SCEP archaeologist on the Plumas National Forest (2006). Four years of Forest Service experience as an Archaeologist at the district level, six years as a fire archaeologist, and five years as a BAER archaeologist. USFS experience in California and South Dakota.
Donald Weiland	Civil Engineering Technician – Bachelor of Science in Industrial Technology from Black Hills State University, 1996. Associate of Science in Drafting from Black Hills State University, 1994. Fourteen years of Forest Service experience at the district and Forest level in transportation planning, road design, contract preparation & administration, and environmental analysis. Certified in roads, administration of timber sales, and public works under the Forest Service National Construction Certification Program. Eighteen years as an Army Engineer with experience in route reconnaissance and roads planning and road construction operations.
Dave Pickford	Recreation – Bachelor of Arts in Outdoor Recreation from Eastern Washington University, 1984. Eighteen years of Forest Service experience as the District level in timber, firefighting, trails, recreation and wilderness on the Ottawa and Black Hills National Forests. USFS, NPS and USFWS field experience in Washington, Idaho, Wyoming, Colorado, UP Michigan as well as NH State Parks. Former USAF Survival Specialist and USAF (civilian) Outdoor Adventure Program Staff.
Meagan Buehler	Lands Specialists – Bachelor of Science, Forestry, minor in Wildlife & Fisheries Biology, University of Massachusetts-Amherst, 1997. Eleven years experience with the Forest Service at the district level for the Black Hills National Forest currently as District Lands Specialist. One season experience with the BLM in Oregon as a forester-stand exams and timber sale preparation.
Gary Haag	Geologist/Minerals Specialist: Bachelor of Arts, Geology, Rutgers University, 1979 & Master of Science, Geology, Rutgers University, 1982. New Jersey Department of Environmental Protection 1984-1989, ground water discharge permit program. South Dakota Department of Environment

and Natural Resources 1989-2010, ground water discharge permit program. February 2010 to present on BHNH-Hell Canyon Ranger District as a geologist working on locatable and mineral material projects and mineral potential reports for mineral withdrawals and timber sales.

Stephen Keegan	Forest Landscape Architect - Bachelor of Science, Landscape Architecture & Environmental Studies, State University of New York (SUNY) - College of Environmental Science and Forestry, 1980; Bachelor of Science, Syracuse University 1980; Associates of Arts, Humanities, SUNY - Onondaga Community College, 1978. Twenty-eight years of Forest Service experience at the Forest and Zone level on the Helena, Clearwater, Malheur & Black Hills National Forests. Of which twenty-one years have been as a Landscape Architect conducting Scenic Resource Assessments for: vegetation and fuels management, watershed analysis, utility & facility construction, wild & scenic rivers, scenic byways, and burned area emergency rehabilitation.
Margaret Farrell	GIS/Database Management Specialist – Bachelor of Science, Geology, University of Wyoming, 1985. Eighteen years of Forest Service experience in database management, including fourteen years experience in ESRI GIS products.

Federal, State, and Local Agencies:

Jewel Cave National Monument
 U.S. Fish and Wildlife Service
 The Honorable John Thune, United States Senate
 The Honorable Tim Johnson, United States Senate
 The Honorable Stephanie Herseth-Sandlin, House of Representatives
 Governor Mike Rounds, South Dakota Governor's Office
 South Dakota Department of Environment and Natural Resources
 South Dakota State Department of Game, Fish, and Parks
 Shelly Deisch
 Shannon Percy
 South Dakota Division of Forestry
 State of South Dakota Department of Transportation
 South Dakota Department of Forestry
 Custer County Commissioners
 Custer County Highway Department
 Pennington County Commissioners

Pennington County Planning Department

Tribes:

Cheyenne River Sioux Tribe	Northern Arapaho Tribe
Cheyenne-Arapaho Tribes of Oklahoma	Oglala Sioux Tribe
Crow Creek Sioux Tribe	Rosebud Sioux Tribe
Eastern Shoshone Tribe	Santee Sioux Tribe
Flandreau Santee Sioux Tribe	Sicangu Lakota Treaty Council Office
Kiowa Ethnographic Endeavor for Preservation	Sisseton-Wahpeton Sioux Tribe
Lower Brule Sioux Tribe	Spirit Lake Sioux Tribe
Mandan, Hidatsa and Arikara Nation	Standing Rock Sioux Tribe
	Yankton Sioux Tribe

Organizations, Groups, and Businesses:

Barton Banks	Mies, Inc.
Betty Baldwin Family Trust	National Wild Turkey Federation
Biodiversity Conservation Alliance	Native Ecosystems Council
Black Hills 4-Wheelers	Papcke Family Trust
Black Hills Electric Cooperative	Prairie Hills Audubon Society
Black Hills Forest Resource Association	R.E. Linde Sawmills, Inc.
Black Hills Group Sierra Club	Rocky Mountain Elk Foundation
Black Hills Power and Light	Rushmore Forest Products
Dakota Territory Cruisers	SD Association of Professional Archeologists
Double Triangle Ranch	SD Chapter of the Sierra Club
Geddes Grazing Association	Sky Vue Motel Corp., Inc.
Howell Ranch, Inc.	Spearfish Forest Products
Kay Linton Trust	The Nature Conservancy
Long Shot Ranch	True Ranches, Inc.
Marquiss Family Trust	

Others:

Alexander, Kelsey	Davis, Russell D. & Lorraine
Anderson, Garner	Driscoll, Jesse
Artley, Dick	Gould, Robert
Baldwin, Roberta & Gene	Kloss, Bob
Baldwin, Gene	Kuck, Thomas & Peggy
Brademeyer, Brian	Marty, Les, Shirley & Zane
Compton, Wayne	Morrison, Michael
Couture, Alvin	Orsborn, Paul & Terry

Patton, Dennis

Perino, Janet

Perino, Matt & Donna

Rawhouser, Frank

Rogers, James & Laura

Sorensen, David

Stewart, Cody & Donna

Stuen, Ron

Terry, Blue

Tysdal, Garrett

Tysdal, Harold & Dana

Whitley, David

CHAPTER 5: LITERATURE CITED and GLOSSARY

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Glossary

Activity Fuels

Fuels resulting from or altered by mechanical treatments, such as timber harvest or thinning, as opposed to naturally created fuels.

Age Class

Groups of trees approximately the same age.

Allotment

A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest lands.

Area of Potential Effects

The geographic area or areas within which an undertaking may cause changes in the character or use of historic properties, if any such properties exist.

Arterial Road

Provides service to large land areas and usually connects with public highways or other Forest arterial roads to form an integrated network of primary travel routes. The location and standard are often determined by a demand for maximum mobility and travel efficiency rather than specific resource management service. It is usually developed and operated for long-term land and resource management purposes and constant service.

At-Risk-Community (ARC)

An area (A) that is comprised of —(i) an interface community as defined in the notice entitled “Wildland Urban Interface Communities Within the Vicinity of Federal Lands That Are At High Risk From Wildfire” issued by the Secretary of Agriculture and the Secretary of the Interior in accordance with Title IV of the Department of the Interior and Related Agencies Appropriations Act, 2001 (114 Stat. 1009) (updated 66 Fed. Reg. 43384, August 17, 2001); or (ii) a group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) within or adjacent to Federal land; (B) in which conditions are conducive to a large-scale wildland fire disturbance event; and (C) for which a significant threat to human life or property exists as a result of a wildland fire disturbance event.”

Available Fuel

The total mass of ground, surface and canopy fuel per unit area consumed by a fire, including fuels consumed in postfrontal combustion of duff, organic soils, and large woody fuels.

Basal Area

The cross-sectional area of a stand of trees measured at 4 feet 6 inches from the ground. The area is expressed in square feet per acre.

Best Management Practices (BMPs)

Land management methods, measures, or practices intended to minimize or reduce water pollution. Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility.

Big Game

Certain wildlife that may be hunted for sport under state laws and regulations. In the Black Hills, these animals include deer, elk, turkey, mountain goats, and bighorn sheep.

Biological Evaluations

As defined by FSM 2670.5, a biological evaluation is a documented Forest Service review of Forest Service programs or activities in sufficient detail to determine how an action or proposed action may affect any threatened, endangered, proposed, or sensitive species.

BMPs

(See "Best Management Practices.")

Board Foot

timber measurement equaling the amount of wood contained in a board one-inch thick, 12-inches long, and 12-inches wide.

Broadcast Burning

A management ignited fire, allowed to burn under specific conditions (prescriptions) and within established boundaries to achieve some land-management objective.

Browse

Twigs, leaves and young shoots of trees and shrubs on which animals feed.

Canopy

The cover by vegetation and/or branches. Often but not always restricted to the tree layer or greater than six feet tall.

Canopy Closure/Cover

The percentage of the ground and/or sky covered by vegetation and/or branches. These are perceived from a human point of view perpendicular to flat ground.

Canopy Fuels

The live and dead foliage, live and dead branches, and lichen of trees and tall shrubs that lie above the surface fuels. (See also Available Canopy Fuel)

Clearcut

The harvesting (removal) in one cut of all trees in an area. The area harvested may be a patch (zero-to-ten acres), stand (not more than 40 acrea), or strip.

Collector Road

Serves smaller land areas than a Forest arterial road and is usually connected to a Forest arterial or public highway. Collects traffic from Forest local roads and/or terminal facilities. The location and standard are influenced by both long-term multi-resource service needs, as well as travel efficiency. May be operated for either constant or intermittent service depending on land use and resource management objectives for the area served by the facility.

CMAI

(See "Culmination Mean Annual Increment.")

Compaction

The packing together of soil particles by forces exerted at the soil surface, resulting in increased soil density.

Conifer

A group of cone-bearing trees, mostly evergreen, such as the pine and spruce.

Council on Environmental Quality (CEQ)

An advisory council to the President established by the National Environmental Policy Act (NEPA) of 1969.

Cover Type

The vegetative species that dominates a site. Cover types are named for one plant species or non-vegetated condition presently (not potentially) dominant, using canopy or foliage cover as the measure of dominance.

Crown

The upper part of a tree or other woody plant carrying the main branch system and foliage and surmounting at the crown base a more or less clean stem.

Crown Fire

Any fire that burns in canopy fuels.

Crown Fire Hazard

A physical situation (fuels, weather, and topography) with potential for causing harm or damage as a result of crown fire.

Cubic Foot

A unit of measure usually referring to wood volume (1 foot wide by 1 foot long by 1 foot thick).

Culmination Mean Annual Increment (CMAI)

The point at which a tree or stand achieves its greatest average growth, based on expected growth, according to the management systems and utilization standards assumed in the Forest Plan.

Cultural Resources

(See "Heritage Resources.")

Cumulative Effects

Collective results of past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes the actions.

DBH

(See "Diameter at Breast Height.")

Dead Fuels

Fuels with no living tissue within which moisture content is governed almost entirely by solar radiation.

Decision Documents

Documents that provide the criteria and information used in the formulation and evaluation of alternatives and the preferred alternative.

Design Criteria

Management measures included in the design of a project to avoid or minimize potential resource impacts.

Diameter at Breast Height (DBH)

The diameter of a standing tree at a point 4 feet, 6 inches from ground level.

Ecosystem

A community of living plants and animals interacting with each other and with their physical environment. A geographic area where it is meaningful to address the interrelationships with human social systems, sources of energy, and the ecological processes that shape change over time.

Eligible (Heritage Resources)

Indicates a specific heritage resource qualifies for or is already listed in the National Register of Historic Places.

Endangered Species

Any species of animal or plant in danger of extinction throughout all or a significant portion of its range and so designated by the Secretary of Interior in accordance with the 1973 Endangered Species Act.

Ephemeral Streams

A stream or portion of a stream that flows briefly in direct response to precipitation in the immediate vicinity and whose channel is at all times above the water table.

Erosion

The wearing away of the land surface by running water, wind, ice, gravity, or other geological activities.

Erosion Hazard Rating

The probability of soil loss resulting from complete removal of vegetation and litter. It is an interpretation based on potential soil loss.

Fire Hazard

A fuel complex, defined by volume, type, condition, arrangement and location, that determines the ease of ignition and the resistance to control.

Fire Incidence

The average number of fires in a specified area during a specified time period.

Fire Occurrence

Number of fires per unit time in a specified area (synonym for fire frequency).

Fire Regime Condition Class (FRCC)

A tool developed to evaluate current against natural landscape characteristics with respect to vegetation-fuel composition and structure, fire frequency, fire severity, and other disturbances. **Fire Regime Condition Class** characterizes the degree of departure from natural fire, vegetation, and fuel regimes.

- **Fire Regime Condition Class I** - Fire regimes are within natural range, and risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within historical range.
- **Fire Regime Condition Class II** - Fire regimes have been moderately altered from their natural range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from natural frequencies by one or more return intervals. Vegetation attributes have been moderately altered.
- **Fire Regime Condition Class III** - Fire regimes have been significantly altered from their natural range. The risk of losing key ecosystem components is high. Fire frequencies have departed from natural frequencies by several return intervals. Vegetation attributes have been significantly altered.

Fire Risk

The chance of a fire starting, as affected by the nature and incidence of causative agents, including lightning, people, and industry. Three risk scales are used: high, moderate, and low. High-risk areas include locations where lightning, people, or industry have commonly caused fire in the past; moderate-risk areas include locations where lightning, people, or industry have periodically caused fire in the past; and low-risk areas include locations where lightning, people, or industry have infrequently caused fire in the past.

Fire Suppression

All the work and activities connected with fire-extinguishing operations beginning with discovery and continuing until the fire is completely extinguished.

Fire Suppression Objective

To suppress wildfires at minimum costs consistent with land and resource management objectives and fire-management direction as determined by National Fire Management Analysis System (NFMAS). This includes all work and activities associated with fire-extinguishing operations beginning with discovery and continuing until the fire is completely extinguished.

Fireline Intensity

The rate of heat energy released per unit time per unit length of a fire front. Numerically, it is the product of the heat combustion, quality of fuel consumed per unit area in the fire front, and the rate of spread of a fire as measured in BTUs per second per foot of the fire front.

Forage

Vegetation used for food by wildlife, particularly ungulate wildlife and domestic livestock.

Forbs

Any herbaceous plant other than those in the grass, sedge, and rush families. For example, any non-grass-like plant that has little or no woody material.

Forest System Roads

Roads that are part of the Forest Development Transportation System that includes all existing and planned roads as well as other special and terminal facilities designated as part of the Forest Development Transportation System.

Fuel Breaks

Generally wide strips of land 100-300 feet in width on which native vegetation has been modified so that fires burning into them can be more readily controlled. Some fuel breaks contain fire lines such as roads or hand lines that can be widened.

Fuel Complex

The combination of ground, surface, and canopy fuel strata.

Fuel Loading

The volume of the available or burnable fuels in a specified area, usually expressed in tons per acre.

Fuel Model

A set of surface fuel bed characteristics (load and surface-area-to-volume-ratio by size class, heat content, and depth) organized for input to a fire model. Standard fuel models (Anderson 1982) have been stylized to represent specific fuel conditions.

Fuel Treatment

Any manipulation or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control, including lopping, chipping, crushing, piling, and burning (synonym for fuel modification).

Fuels

The organic materials that will support the start and spread of a fire: duff, litter, grass, weeds, forbs, brush, trees, and dead woody materials.

Goal

Broad, general statement that encompasses the desired future conditions that the U.S. Forest Service seeks to attain.

Grass/Forb, Grass/Forb Stage (Structural Stage 1) (See Structural Stages - Structural Stage 1)**Guideline**

Preferred or advisable courses of action; deviations from guidelines are permissible, but the responsible official must document the reasons for the deviation.

Hardwood

Pertains to broadleaf trees.

Herbicide

A chemical substance used for killing or suppressing plants.

Heritage Resources

The physical remains (including but not limited to artifacts, structures, landscape modifications, rock art, trails, or roads) and conceptual content or context (as a setting for legendary, historic, or prehistoric events, such as a sacred area for native peoples) of an area.

Ignition (Fire Management)

The initiation of combustion.

Infrastructure

The facilities, utilities, and transportation systems needed to meet public and administrative needs.

Insect Epidemic

High population levels of insect pests that cause substantial injury to plant or animal hosts. Used synonymously with “Outbreak”.

Intensity (Fire Management)

How hot a fire is. Specifically, a measure (in BTUs per foot per second) of the energy released per unit of time in an area of actively burning fire. The amount of heat released per foot of fire front per second.

Interdisciplinary Team (IDT)

A group of individuals with different specialized training assembled to solve a problem or perform a task. The team is assembled out of recognition that no one discipline is sufficiently broad to adequately solve the problem. Through interaction, participants bring different points of view and a broader range of expertise to bear on the problem.

Intermittent Stream

A stream that flows only at certain times of the year, as when it receives water from springs or from a surface source, such as melting snow.

Landscape Character

Particular attributes, qualities, and traits of a landscape that give it an image and make it identifiable or unique. Valued landscape character creates a "sense of

place" and describes the image of an area. The landscape character provides a reference for defining the inherent scenic attractiveness classes.

Late Succession

Ecosystems distinguished by old trees and related structural features (Mehl, 1992). This term encompasses the later stages of stand development that typically differ from earlier stages in structure, composition, function, and other attributes. There are two types of late-successional ponderosa pine defined for the Black Hills. The first type, open-canopy late-successional ponderosa pine, occurs where periodic, low-intensity fires have been part of the ecosystem. These late-successional stands would consist of clumps or groups of trees with grasses in the openings between the clumps. They would contain large old trees with open branches, irregular, and flattened crowns. The clumps or groups of trees would contain little down dead material and few small trees. The second type, closed-canopy late-successional ponderosa pine occurs where periodic, low intensity high-frequency fires have not been a significant part of the ecosystem. These stands would contain large old trees with open branches and irregular crowns. The stands would have multiple canopy layers made up of various-aged trees. They would be well stocked with trees and contain standing dead and down trees.

Lopping and Scattering

Lopping logging debris and spreading it more or less evenly on the ground.

Management Indicators Species (MIS)

Plant or animal species selected in a planning process that are used to monitor the effects of planned management activities on populations of wildlife and fish, including those that are socially or economically important.

Meadow

An area of perennial, herbaceous vegetation, usually grass or grass-like. A natural opening in a forest, generally at higher elevations, that produces exceptional levels of herbaceous plants.

Mechanical (treatment, activity)

Vegetation management activities which are implemented with the use of mechanized equipment (i.e chainsaws, etc.).

Monitoring

The sample collection and analysis of information regarding Forest Plan and project level management practices to determine how well objectives have been met as well as the effects of those management activities on the land and environment.

Multi-storied Stands (Vegetation)

Plant communities having two or more recognizable canopy layers or height levels.

National Environmental Policy Act of 1969 (NEPA)

An act declaring a national policy to encourage productive harmony between people and their environment; to promote efforts that will prevent or eliminate damage to the environment and the biosphere and simulate the health and welfare

of people; to enrich the understanding of the ecological systems and natural resources important to the nation; and to establish a Council on Environmental Quality.

National Fire Management Analysis System (NFMAS)

A broad umbrella process to help fire managers identify the most efficient fire program meeting the direction in the Forest Plan. This includes information for the planning record on program composition, annual programmed costs, emergency firefighting costs, expected resource impacts, and net value change.

National Forest Management Act (NFMA)

A law passed in 1976 amending the Forest and Rangeland Renewable Resources Planning Act that requires the preparation of Regional and Forest Plans and the preparation of regulations to guide that development.

National Register of Historic Places (NRHP)

A list of heritage resources that have local, state, or national significance. The list is maintained by the Secretary of the Interior.

Natural Regeneration

The renewal of a tree crop by natural means without seeding or planting done by people. The new crop is grown from self-sown seed or by vegetative means, such as root suckers.

Non-motorized Activities

Activities that do not incorporate the use of a motor, engine, or other non-living power source. Non-motorized activities exclude such machines as aircraft, hovercraft, motorboats, automobiles, motor bikes, snowmobiles, bulldozers, chainsaws, rock drills, and generators.

Noxious Weeds

Those plant species designated as weeds by federal or state laws. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage; poisonous; toxic; parasitic; a carrier or host for serious insects or diseases; and generally non-native.

Objective

Concise statement of desired measurable results intended to promote achievement of specific goals. Attainment of objectives is limited by the application of standards and guidelines.

Outbreak

See insect epidemic.

Overstory

The portion of vegetation in a forest forming the uppermost foliage layer.

Piling and Burning

Piling slash resulting from logging and subsequently burning individual piles.

Plant Communities

Assemblage of plant species living in an area. It is an organized unit to the extent that it has characteristics in addition to the individuals and populations and functions as a unit.

Products Other than Logs (POL)

Products such as posts, poles, and fiber from trees or parts of trees less than sawlog size. POL usually includes trees greater than 5 inches diameter breast height (DBH) (4.5 feet from ground level) and less than 7.9 inches diameter breast (DBH), with tops of trees greater than 4 inches to less than 6 inches in diameter.

Prescribed Burning/Fire

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

Prescription (Fire Management)

A written statement defining objectives to be attained, as well as temperature; humidity; wind direction and wind speed; fuel-moisture content; and soil moisture, under which the fire will be allowed to burn, generally expressed as acceptable ranges of the various indices, and the limit of the geographic area to be covered.

Ranger District

Administrative subdivisions of the Forest supervised by a District Ranger who reports to the Forest Supervisor.

Raptor Nests

Any nest of eagles, hawks, falcons, or owls.

Regeneration (Silviculture)

The renewal of vegetation whether by natural or artificial means. Also, the new growth itself.

Responsible Official

The Forest Service employee who has the delegated authority to make a specific decision.

Riparian Area

(See "Riparian Ecosystem.")

Riparian Communities

Repeating, classified, defined, and recognizable assemblages of plantor-animal communities associated with riparian areas.

Riparian Ecosystem

The moist transition zone between the aquatic ecosystem and the relatively drier, more upland, terrestrial ecosystem(s). This transition zone can extend both laterally and longitudinally away from aquatic ecosystems, sometimes into headwater swales that have no defined stream channel. The riparian ecosystem is

the area whose soil is relatively more moist than the adjacent upland and whose vegetation growth reflects the greater accumulation of available water.

Roads

A general term denoting a way with at least two-wheel tracks for purposes of travel by vehicles greater than 50 inches in width.

Sawtimber

Trees suitable in size and quality for producing logs that can be processed into lumber. For planning purposes, trees with an 8-inch diameter or more are classified as sawtimber.

Scarify

To abrade, scratch, or modify the surface of the ground to expose mineral soil.

Scenery

The composition of basic terrain, geologic features, water features, vegetative patterns, and landrise effects that typify a land unit and influence the visual appeal the unit may have for visitors.

Scenic Class

Scenic classes measure the relative importance or value of discrete landscape areas having similar characteristics of scenic attractiveness and landscape visibility. Scenic classes are used during forest planning to compare the value of scenery with the value of other resources, such as timber, wildlife, late succession, or minerals. The higher the scenic class, the more important it is to maintain the highest scenic value. Scenic classes are determined and mapped by combining the three classes of scenic attractiveness with the distance zones and concern levels of landscape visibility. A numerical value of 1 to 7 is assigned to Forest lands. Generally, scenic classes 1-2 have high public value; classes 3-5 have moderate value; and classes 6 and 7 have low value.

Scenic Integrity (Existing or Objective)

State of naturalness or conversely the state of disturbance created by human activities or alteration. Integrity is stated in degrees of deviation from the existing landscape character in a national forest. It is the measure of the degree to which a landscape is visually perceived to be complete. The highest scenic integrity ratings are given to those landscapes that have little or no deviation from the character valued by constituents for its aesthetic appeal. Scenic integrity is used to describe an existing situation, standard for management, or desired future conditions.

Very High: A scenic integrity level that generally provides for ecological change only.

High: A scenic integrity level meaning human activities are not visually evident. In high scenic integrity areas, activities may only repeat attributes of form, line, color, and texture found in the existing landscape character.

Moderate: A scenic integrity level that refers to landscapes where the valued landscape character "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed.

Low: A scenic integrity referring to the landscapes where the valued landscape character "appears moderately altered." Deviations begin to dominate the valued , being viewed, but they borrow valued attributes such as size, shape, effect, and pattern of natural opening, vegetative type changes, or architectural styles within or outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed but compatible or complimentary to the character within.

Very Low: A scenic integrity level that refers to landscapes where the valued landscape character "appears heavily altered." Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect, and pattern of natural openings, vegetative type changes, or architectural styles within or outside the landscape being viewed. However, deviations must be shaped and blended with the natural terrain so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition.

Unacceptable Low: A scenic integrity level that refers to landscapes where the valued landscape character being viewed appears extremely altered. Deviations are extremely dominant and borrow little if any line, form, color, texture, pattern, or scale from the landscape character. Landscapes at this level of integrity need rehabilitation. This level should only be used to inventory existing integrity. It must not be used as a management objective.

Sediment

Displaced soil material suspended in water or that has been deposited in streams and lakes.

Sensitive Species

Those plant and animal species identified by the Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density; or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Severely Burned Soil

A condition in which most woody debris and the entire forest floor is consumed down to bare mineral soil. Soil may have turned red due to extreme heat. Also, fine roots and organic matter are charred in the upper one-half inch of mineral soil.

SHPO

(See "State Historic Preservation Officer.")

Silvicultural System

A management process that tends, harvests, and replaces forests, resulting in a forest of distinctive form with a desired condition.

Silviculture

Generally, the science and art of tree management, based on the study of the life history and general characteristics of forest trees and stands, with particular reference to local factors; more particularly, the theory and practice of controlling

the establishment, composition, constitution, and growth of forests for desired conditions.

Site

An area considered in terms of its physical and/or biological environment; for example, a riparian zone, a homogenous stand of vegetation, or a campground.

Skid Trail

Any way, more or less prepared, over which logs are dragged. Any road or trail leading from stump to landing.

Skidding

Moving logs from the stump to a collecting point.

Slash

The residue left on the ground after harvesting, sanitation operations, windstorm, or fire. It includes such material as unutilized logs, uprooted stumps, broken or uprooted stems, tops, branches, and leaves.

Snag

Standing dead tree or standing portion from which at least the leaves and smaller branches have fallen; often called a stub if it is less than 20 feet tall.

Soil Productivity

The inherent capacity of a soil to support the growth of specified plants, plant communities, or a sequence of plant communities. Soil productivity may be expressed in terms of volume or weight/unit area/year, percent plant cover, or other measures of biomass accumulation.

Standard

Mandatory courses of action; any deviation from standards requires amendment of the LRMP.

Stand

A community, particularly of trees, possessing sufficient uniformity as regards to vegetation type, age class, risk class, vigor, size class, and stocking class that distinguishes it from adjacent communities and thus forms a management or silvicultural unity. Within a stand, a dominant or primary species and age class is identifiable, but there may be inclusions or clusters of different species or ages. R2 RIS stands are typically greater than 10 acres. IRI stands are typically greater than 5 acres.

Stand-replacing Fire

A fire that kills all or most living overstory trees in a forest and initiates secondary succession or regrowth.

State Historic Preservation Officer (SHPO)

A person appointed by a state's governor to administer the State Historic Preservation Program.

Stream Health

The condition of a stream relative to robust health for that stream type and landscape, considering indicators such as channel pattern; slope; particle size;

pool frequency and depth; bank vegetation; and woody debris that reflect the stability and habitat quality of the stream.

Stream Level

A classification of the relative position of streams in a channel network. First-level streams drain into the ocean. Second-level streams are tributaries to the first-level streams. For example, the Mississippi is a first-level stream; the Missouri is a second-level stream.

Structural Stages (Vegetation)

Any of several developmental stages of tree stands described in terms of tree size and the extent of canopy closure they create. They include:

- **Structural Stage 1 (Grass/Forb):** An early forest successional stage during which grasses and forbs are the dominant vegetation. This stage is dominated by grasses and forbs lasting until tree seedlings become established.
- **Structural Stage 2 (Shrubs/Seedlings):** Developmental stage dominated by tree seedlings (less than one inch dbh) and shrub species. This stage consists of shrubs and seedlings. This stage remains until seedlings reach 1 inch diameter at breast height (DBH).
- **Structural Stage 3 (Sapling/Pole):** Developmental stage dominated by young trees 1 to 9 inches dbh, 10 to 50 feet tall, and usually less than 50 years old. This stage is subdivided into three canopy closure classes: SS3A Sapling/Pole stage with less than 40% canopy cover
 - o SS3B Sapling/Pole stage with 40-70% canopy cover
 - o SS3C Sapling/Pole stage greater than 70% canopy cover
- **Structural Stage 4 (Mature):** Consists of trees larger and older than structural stage 3. This stage contains trees which are at least 9" DBH.
 - o SS4A Mature stage with less than 40% canopy cover
 - o SS4B Mature stage with 40-70% canopy cover
 - o SS4C Mature stage greater than 70% canopy cover
- **Structural Stage 5 (Late Succession):** This stage is characterized by very large trees (16+ inches DBH). Trees are at least 160 years in age. Late succession ponderosa pine may occur in dense stands but may also grow in the open or in "park-like" stands.

Successional Stages (Seral Stages)

The relatively transitory communities that replace one another during development toward a potential natural community.

Temporary Roads

A road developed and operated for a limited period of time that will cease to exist as a transportation facility after the purpose for which it was constructed is completed and the occupied land is reclaimed and managed for natural resource purposes.

Thinning

The practice of removing some of the trees in a stand to meet desired conditions. Two types of thinning may be done:

Pre-commercial, Non-commercial: Removing trees that are too small to make a merchantable product.

Commercial: Removing trees that have reached sufficient size to be manufactured into a product and to improve tree spacing and promote more rapid growth.

Threatened Species

Any species likely to become endangered within the foreseeable future throughout all or a significant portion of its range and that has been designated in the Federal Register by the Secretary of Interior as such.

Trail

A general term denoting a way usually less than 50 inches wide for purposes of travel by foot, stock, or trail vehicle.

Transportation System

All roads needed to manage and administer Forest resources. A road network.

Travel Corridor

A strip of land that includes up to a maximum of 1,000 feet for major roads (500 feet either side of the road's centerline) or 500 feet for major trails (250 feet either side of the trail's centerline); travel corridors form a passageway that allows travelers to experience and interact with the quality and character of the landscape.

Travel Management

Travel management is the movement of people and products to and through national forests and grasslands. It connects many different varieties of users and multiple uses on National Forest System (NFS) lands.

Understory

The lowest layer of vegetation in a forest or shrub community composed of grass, forbs, shrubs, and trees less than 10 feet tall. Vegetation growing under the tree canopy.

Values, Values at Risk (Fire Management)

Any or all natural resources, improvements, or other values that may be jeopardized if a fire occurs.

Water Influence Zone (WIZ)

The land next to streams and lakes where vegetation plays a major role in sustaining the long-term integrity of aquatic ecosystems. Includes the geomorphic floodplain, riparian ecosystem, and inner gorge, and has a minimum horizontal width (from top of each bank) of 100 feet or the mean height of mature dominant late-seral vegetation, whichever is greater.

Watershed

The area of land bounded by a divide that drains water, sediment, and dissolved materials to a common outlet at some point along a stream channel or to a lake, reservoir, or other body of water. Also called a drainage basin or catchment.

Watershed Level

The number assigned to an entire drainage basin contributing to the stream segment of a given level and bearing an identical designation; for example, a first-level watershed contains all the drainage area of a first-level stream (See “Stream Level.”)

Waters of the United States

Waters used for navigation and all other waters such as lakes, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes or natural ponds, and their tributaries.

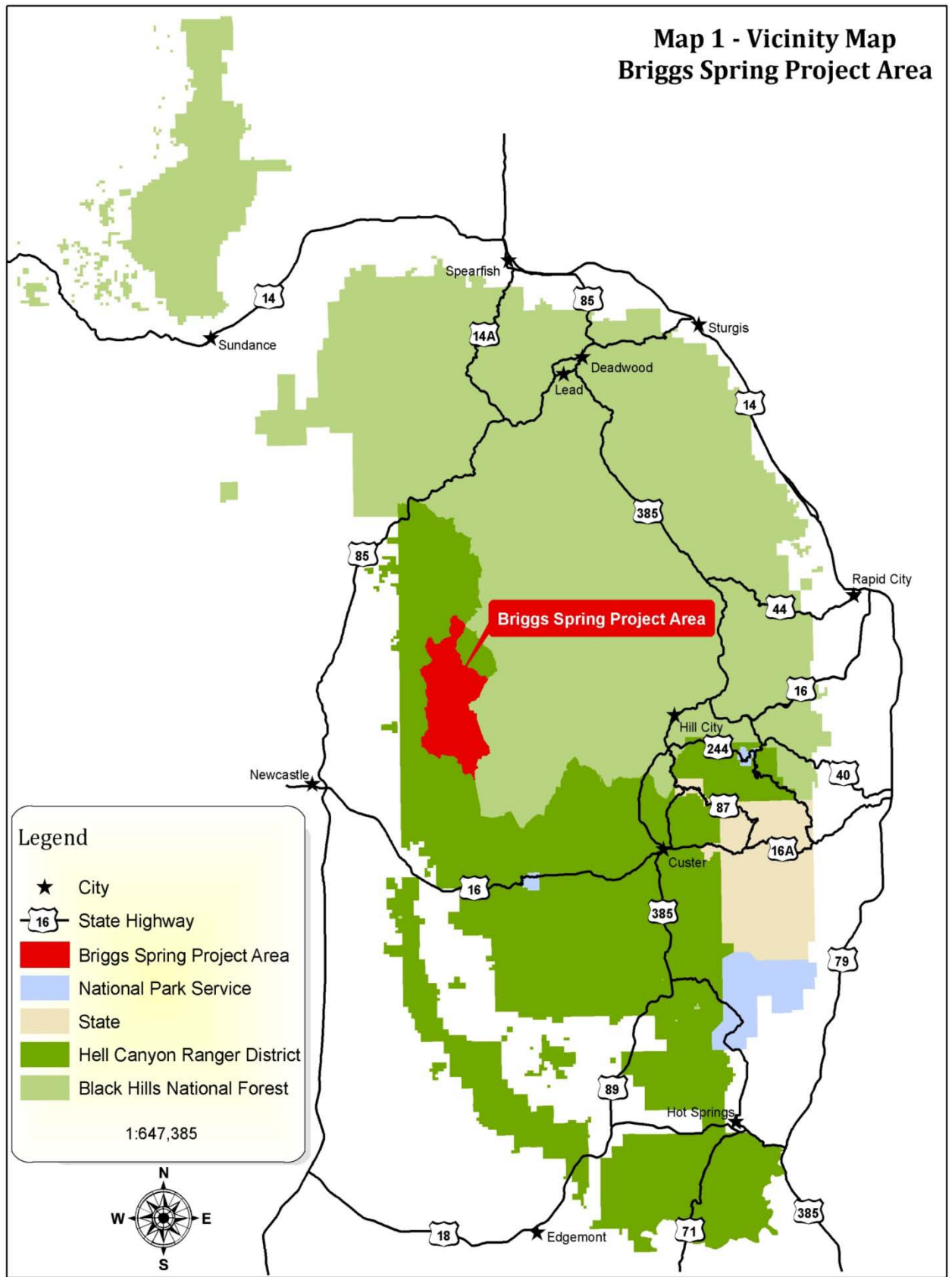
Wetlands

Those areas that are inundated by surface water or groundwater with a frequency sufficient to support and under normal circumstances do or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

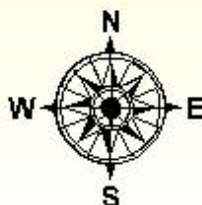
Wildfire

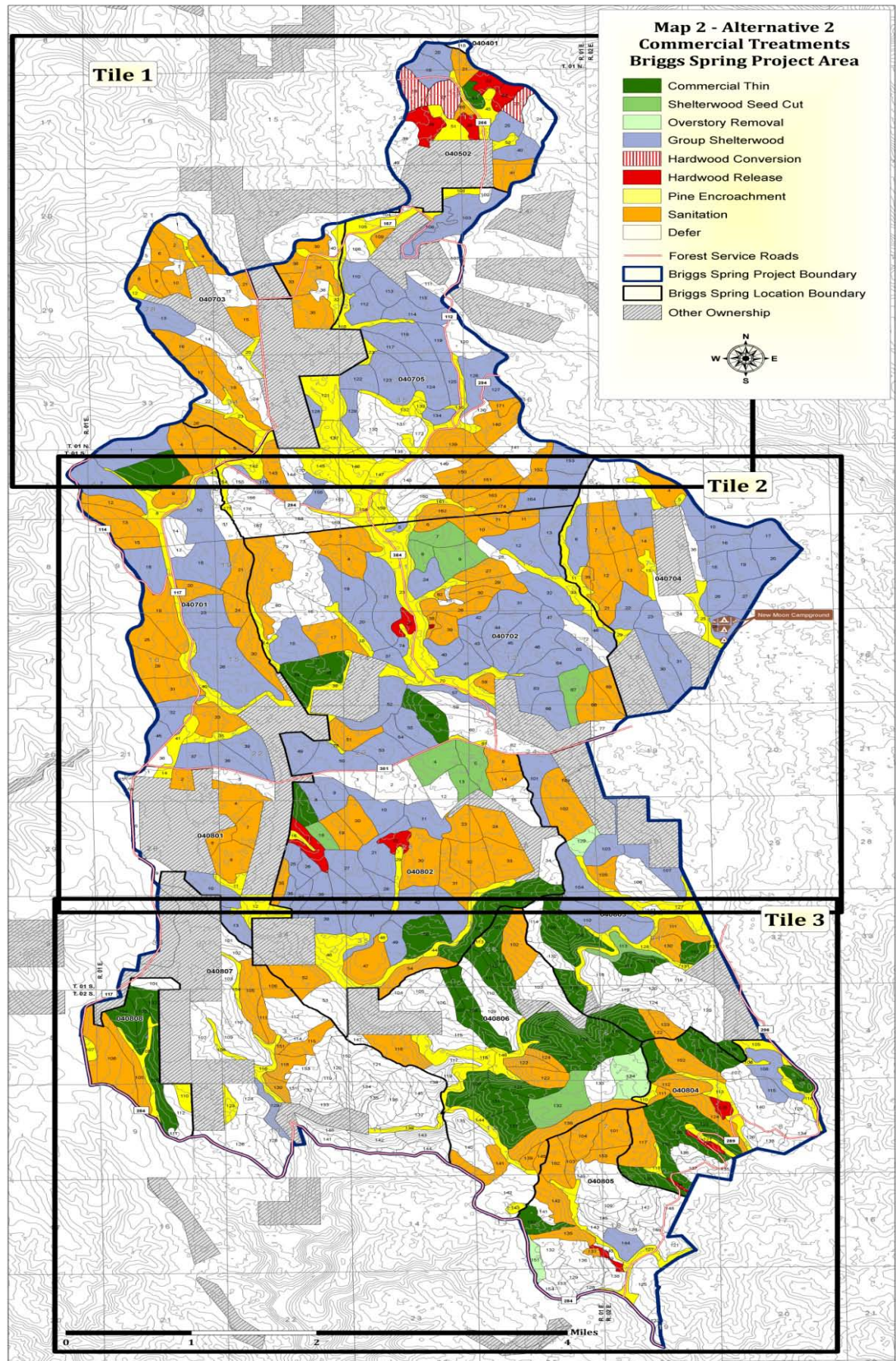
Any wildland fire not designated and managed as a prescribed fire within an approved prescription. All wildfires will be given an appropriate suppression action.

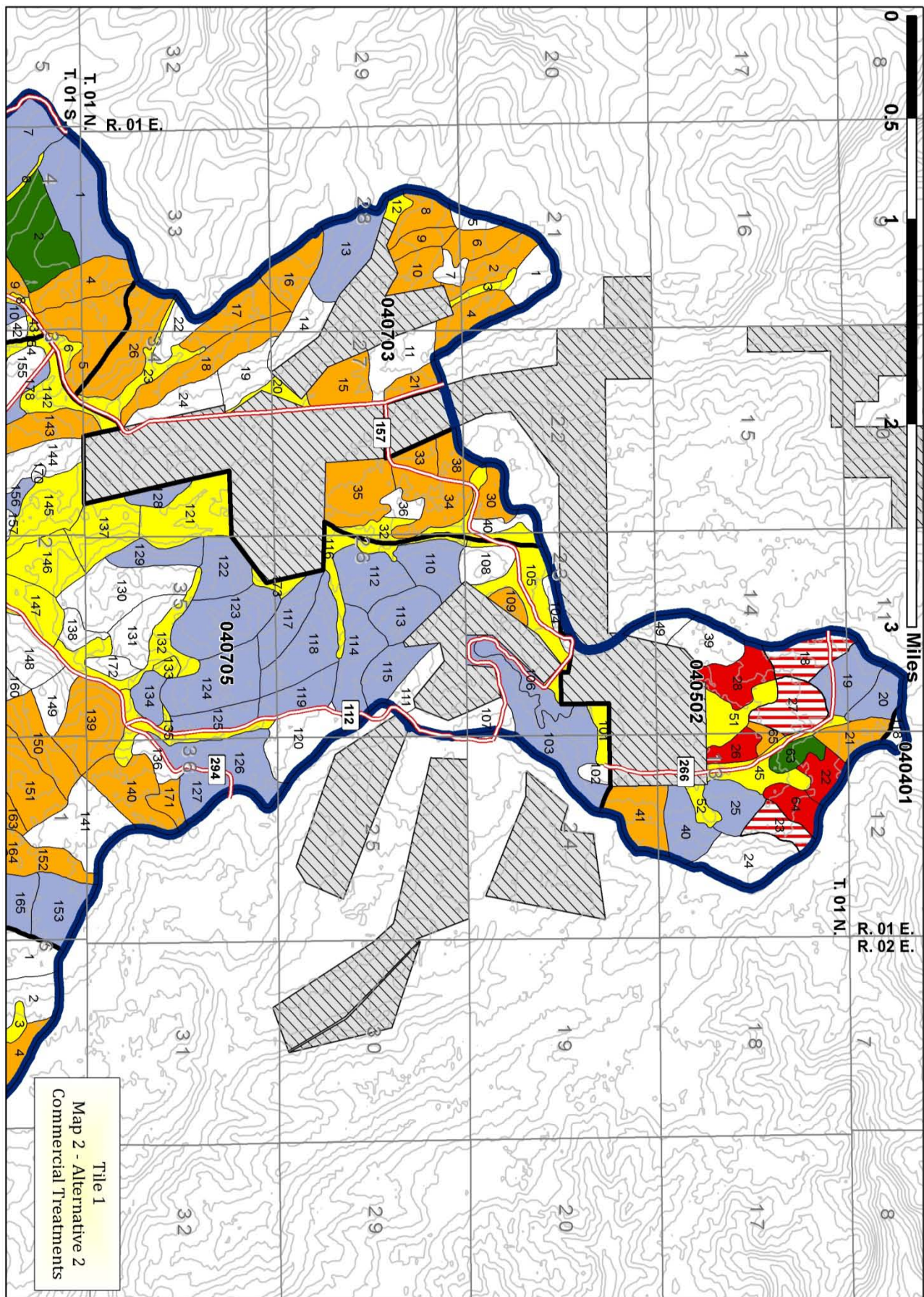
Appendix A: MAPS

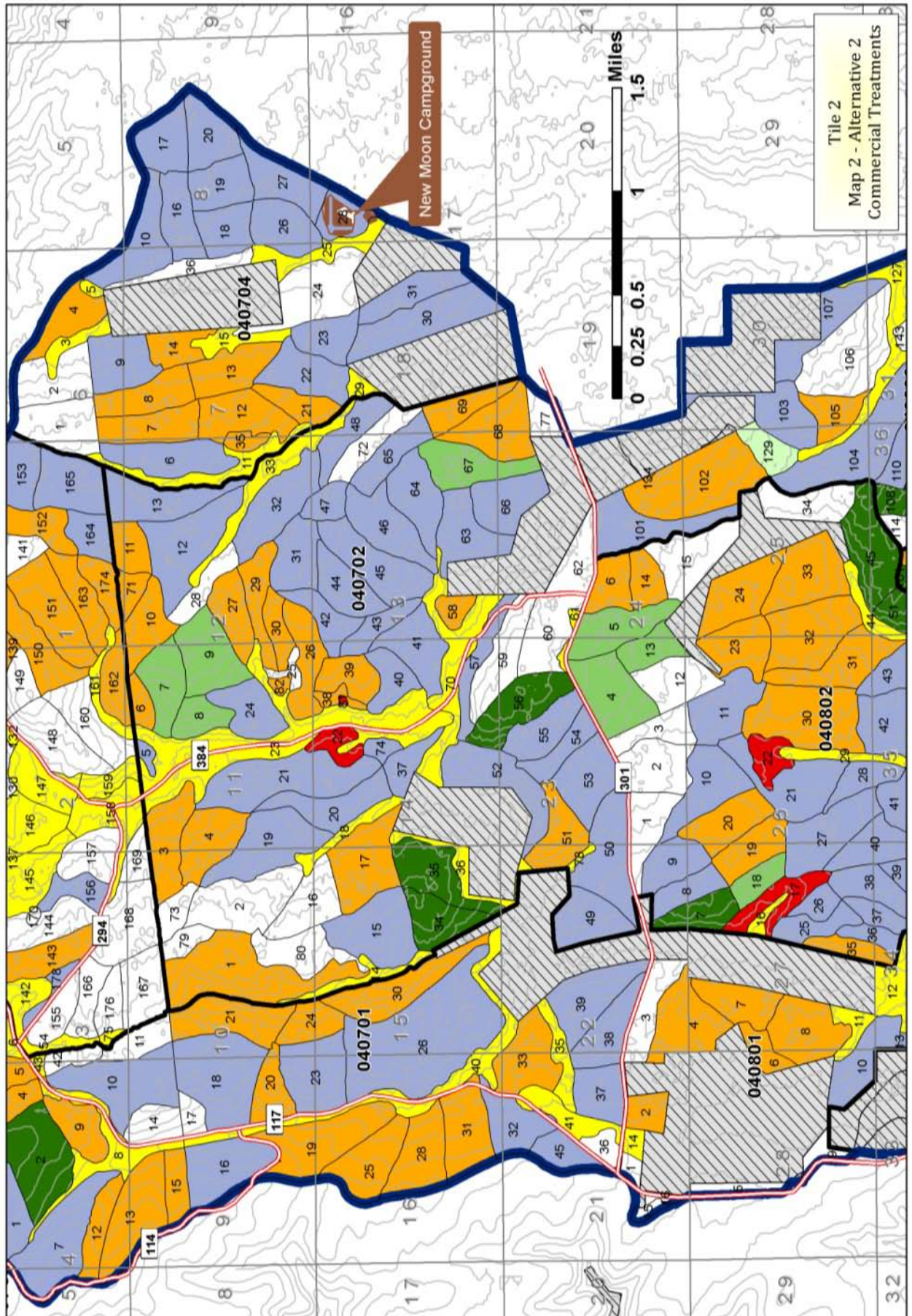


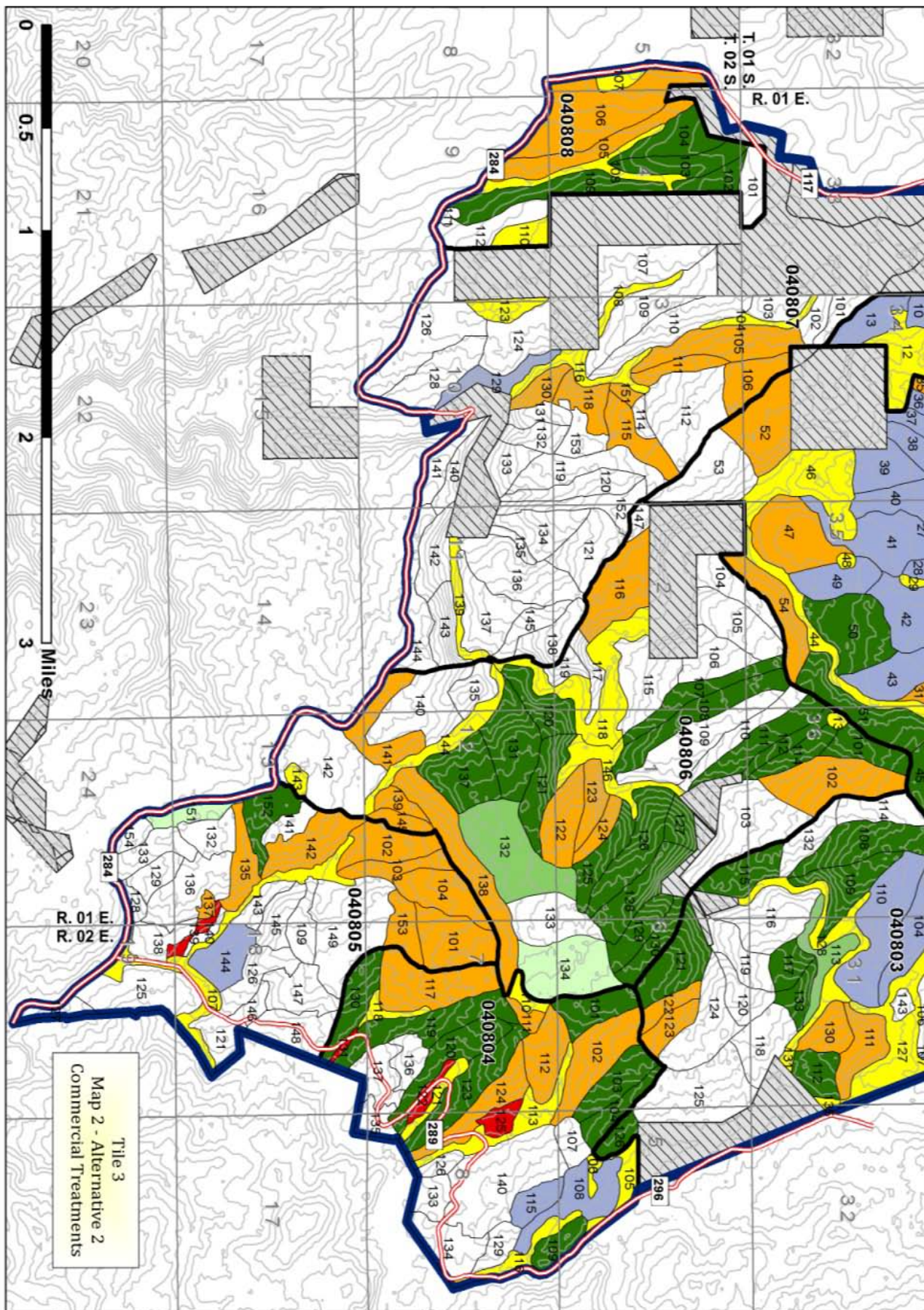
Map 2 - Alternative 2 Commercial Treatments Briggs Spring Project Area





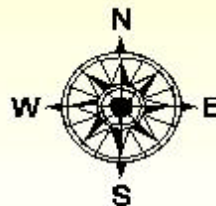


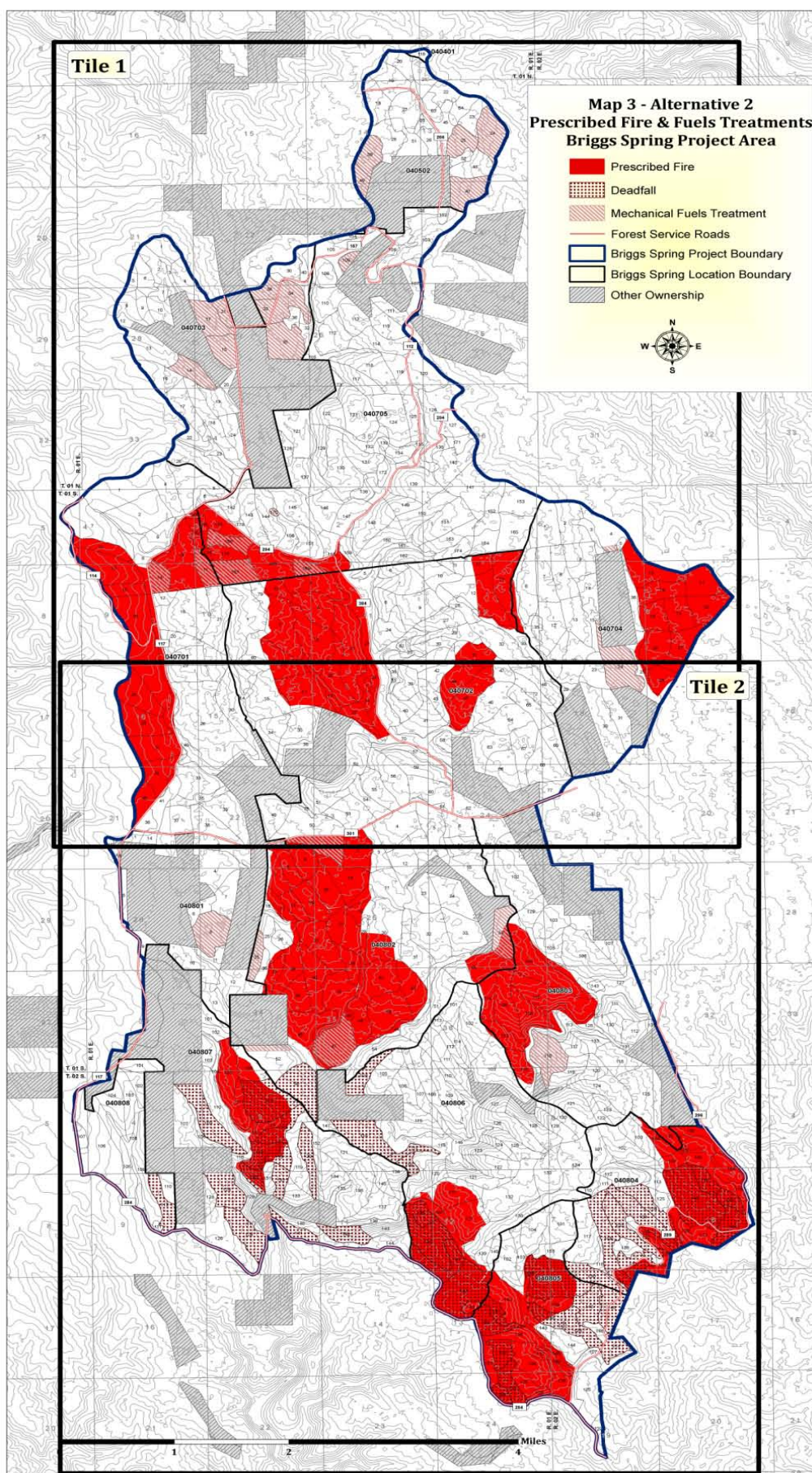


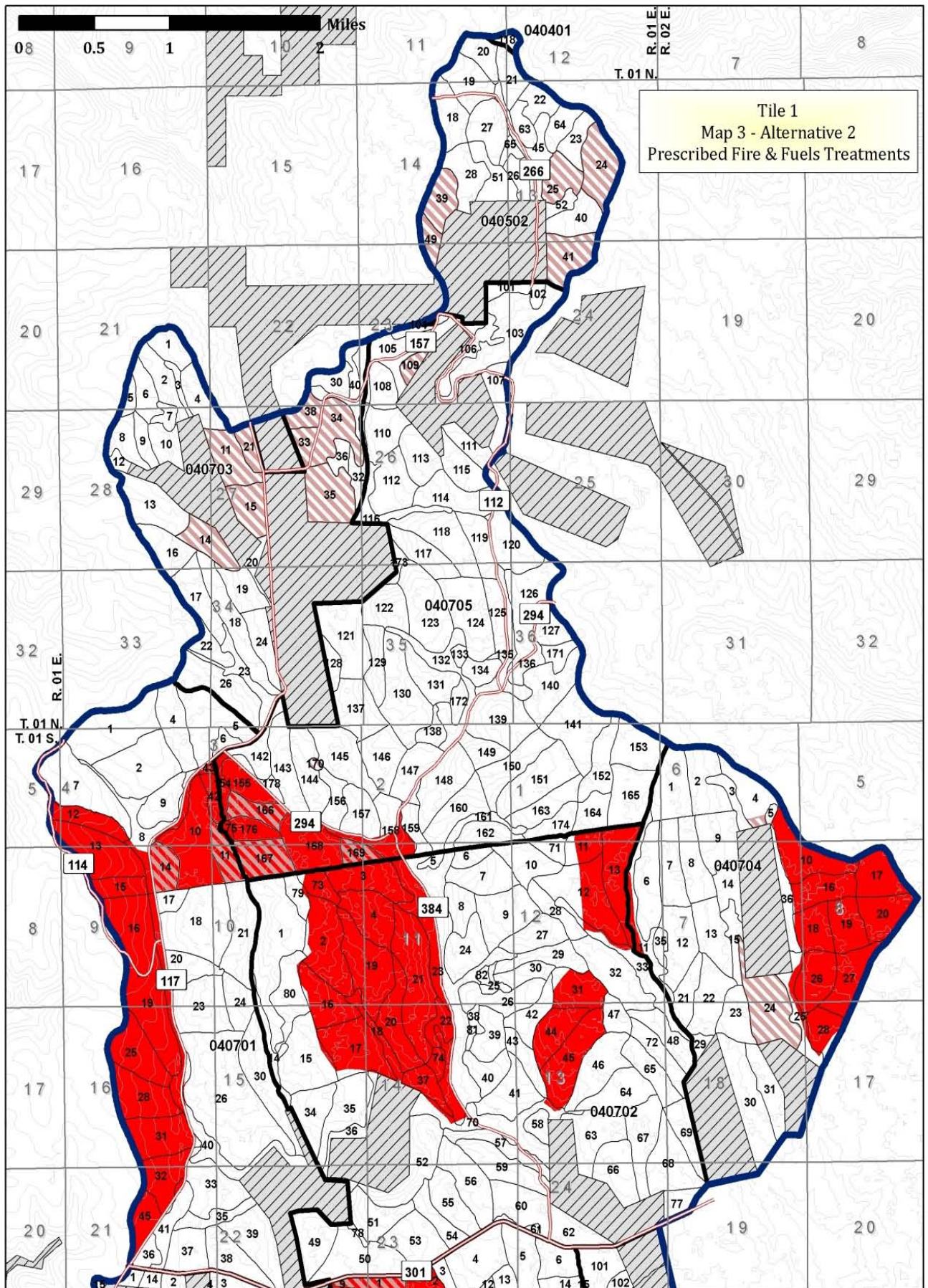


Map 3 - Alternative 2 Prescribed Fire & Fuels Treatments Briggs Spring Project Area

-  Prescribed Fire
-  Deadfall
-  Mechanical Fuels Treatment
-  Forest Service Roads
-  Briggs Spring Project Boundary
-  Briggs Spring Location Boundary
-  Other Ownership

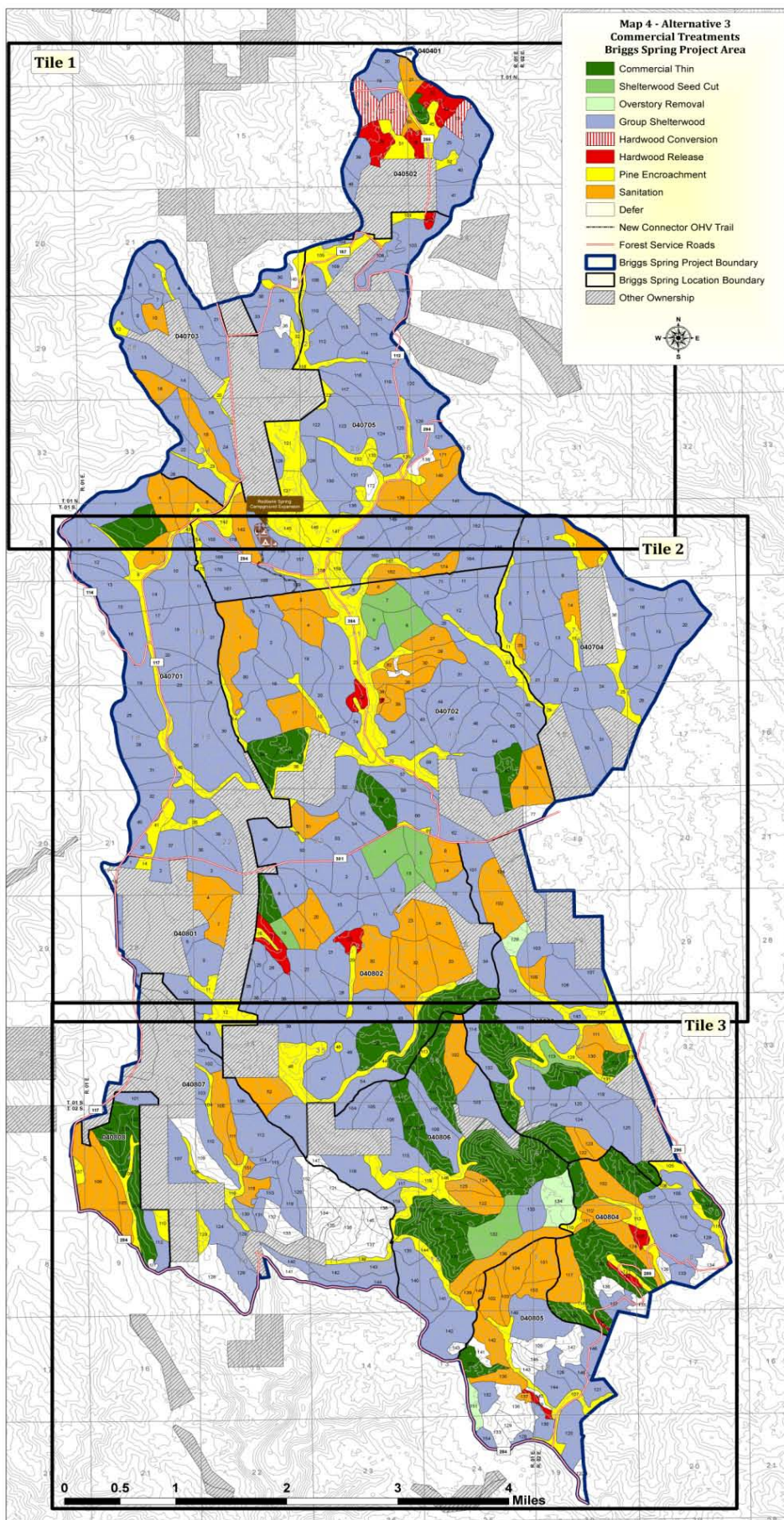


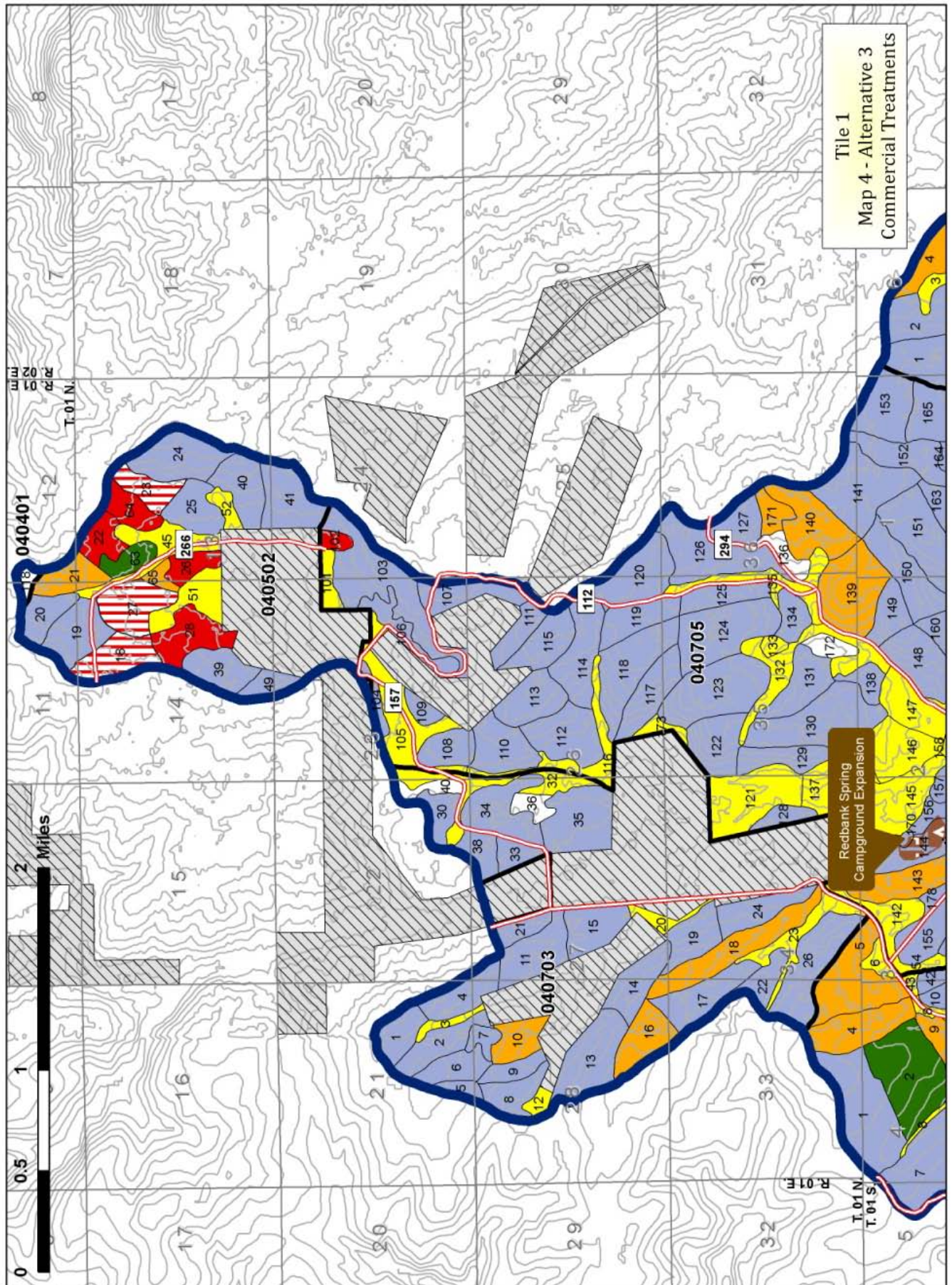


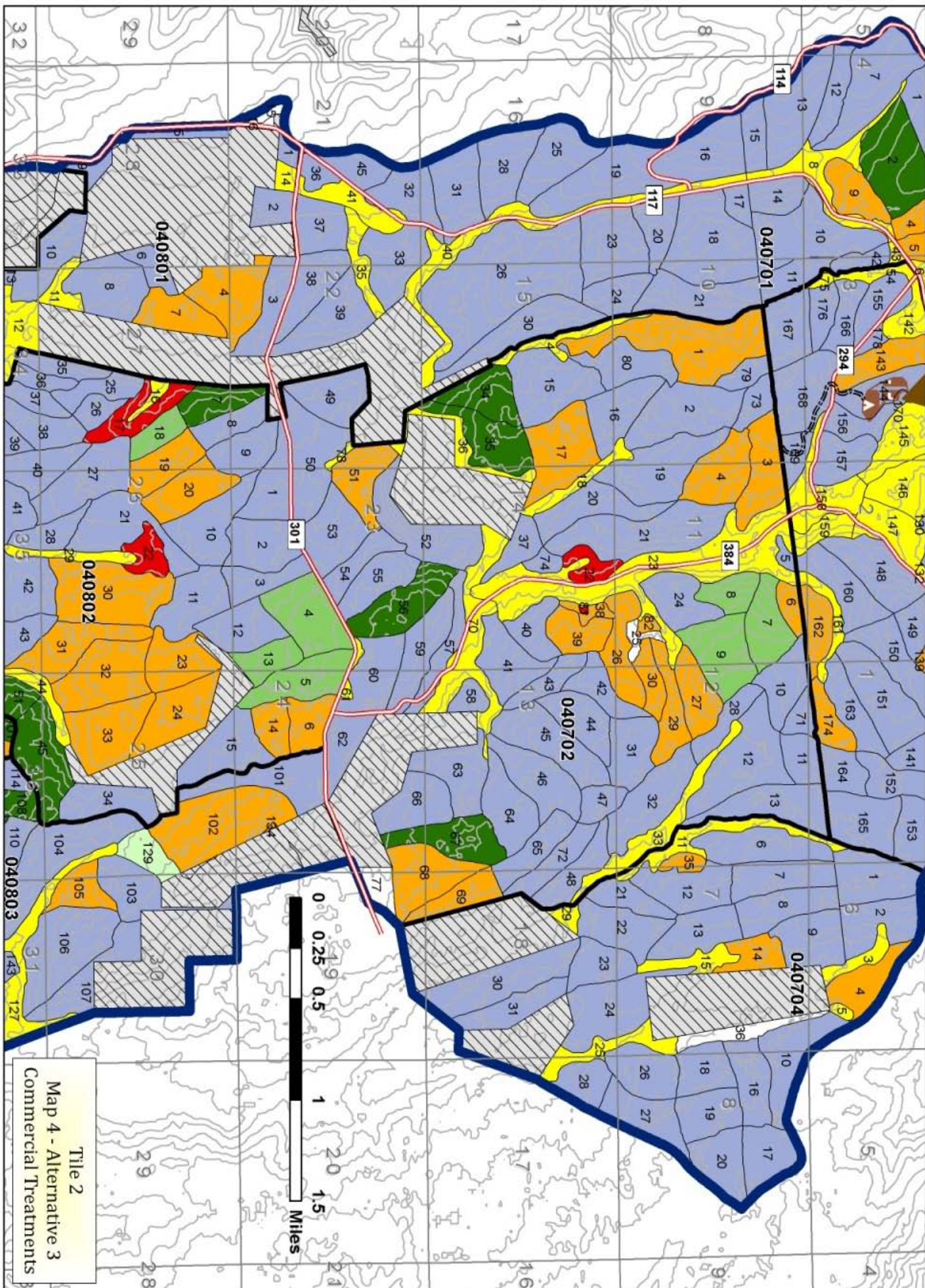


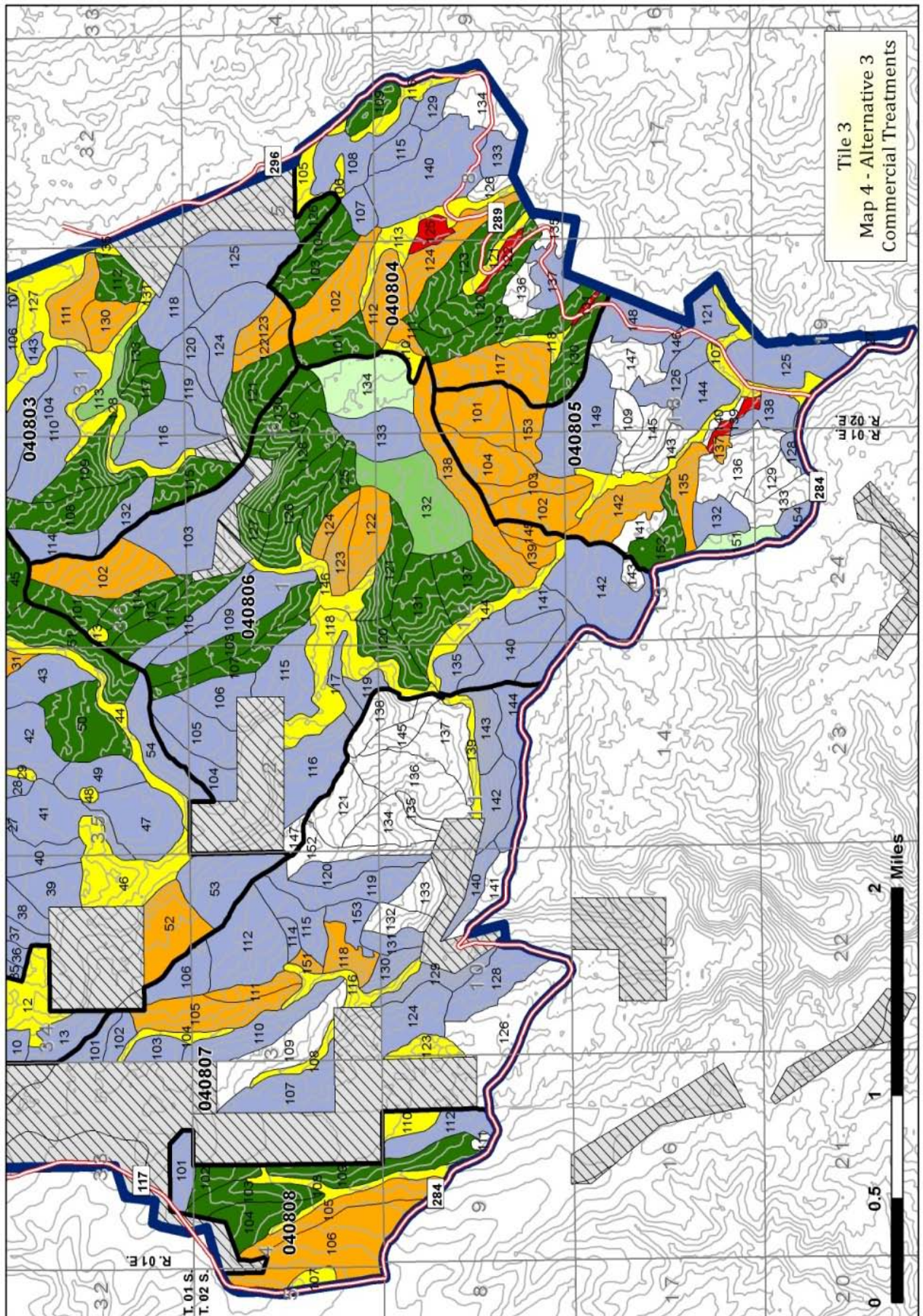




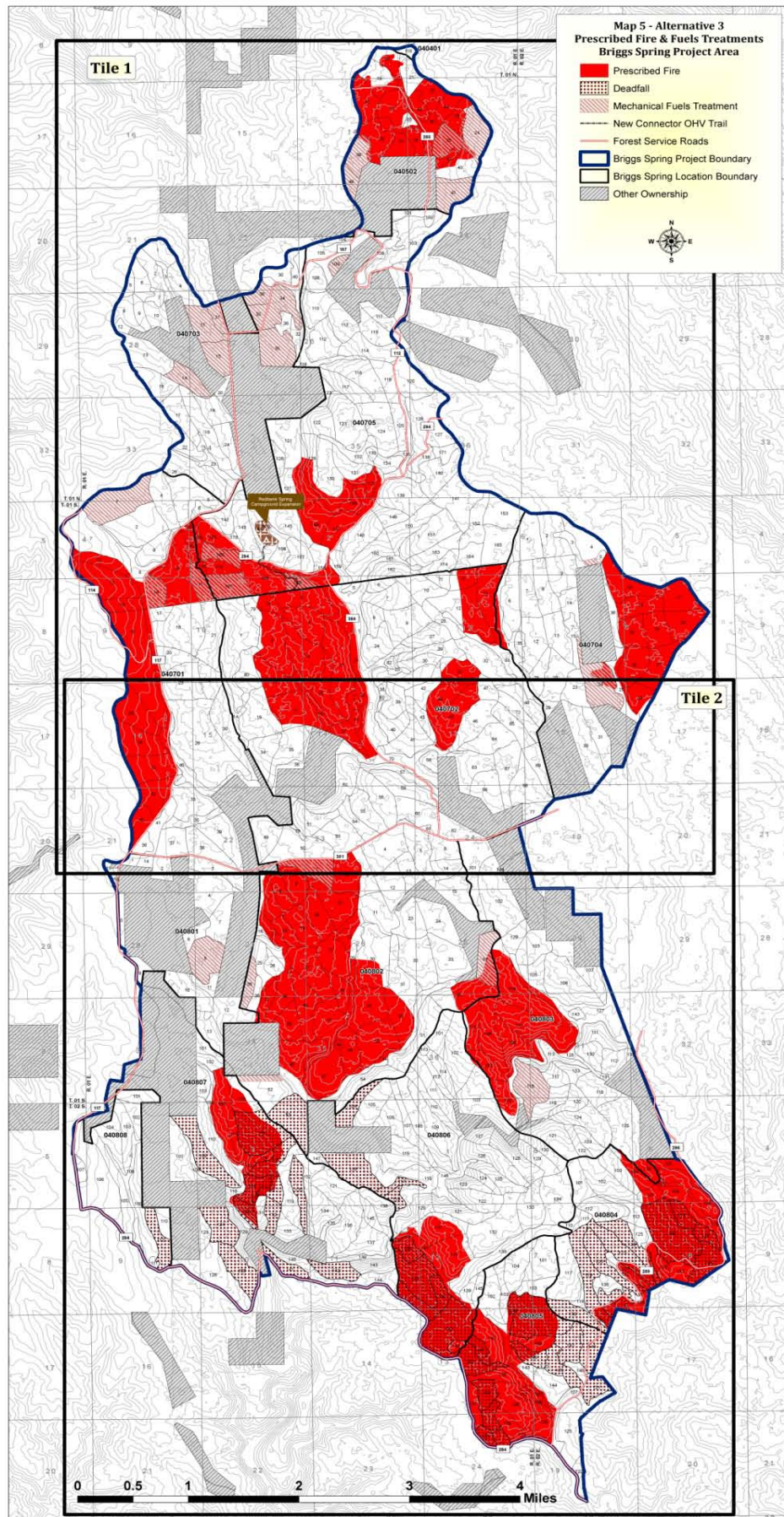


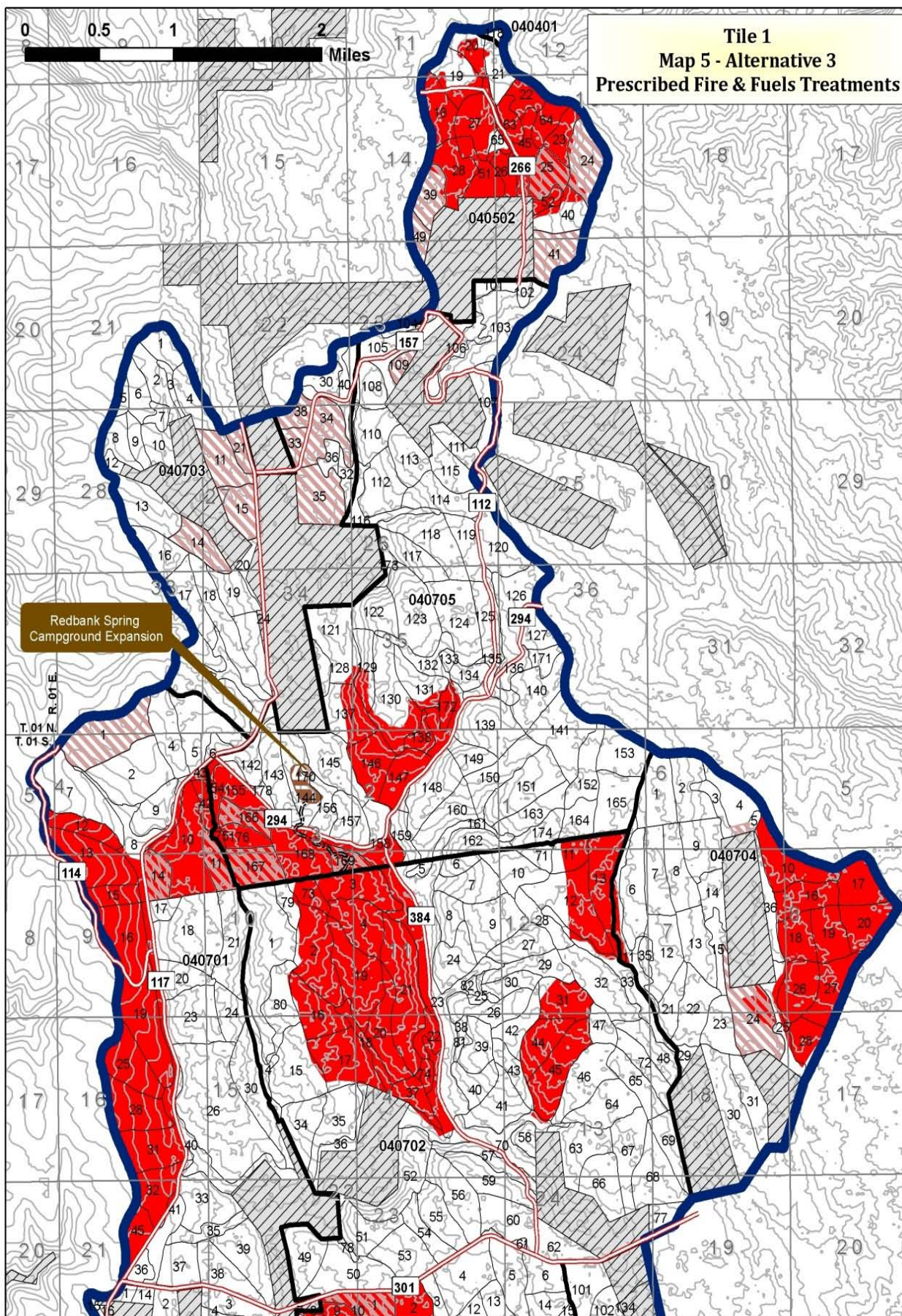


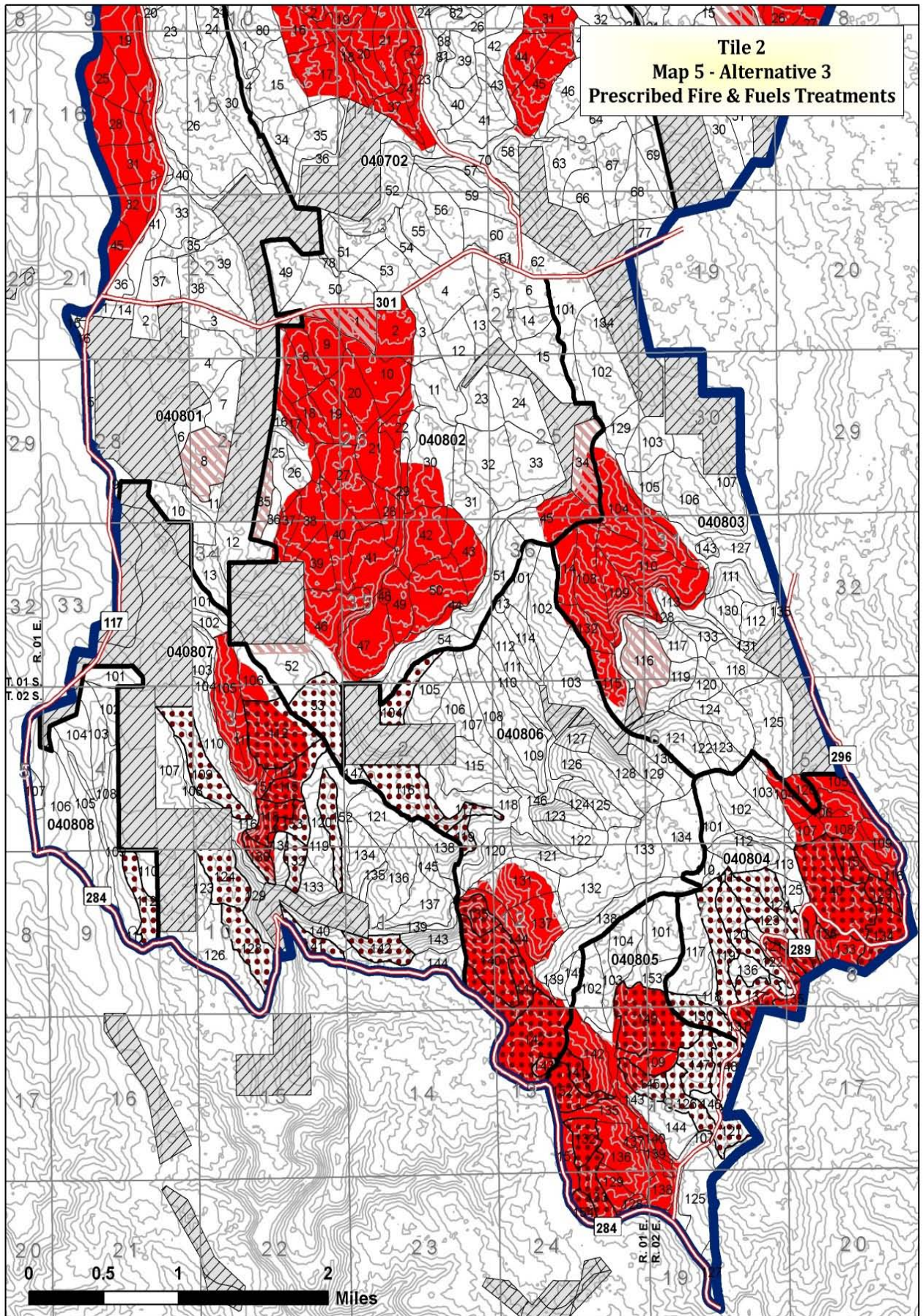


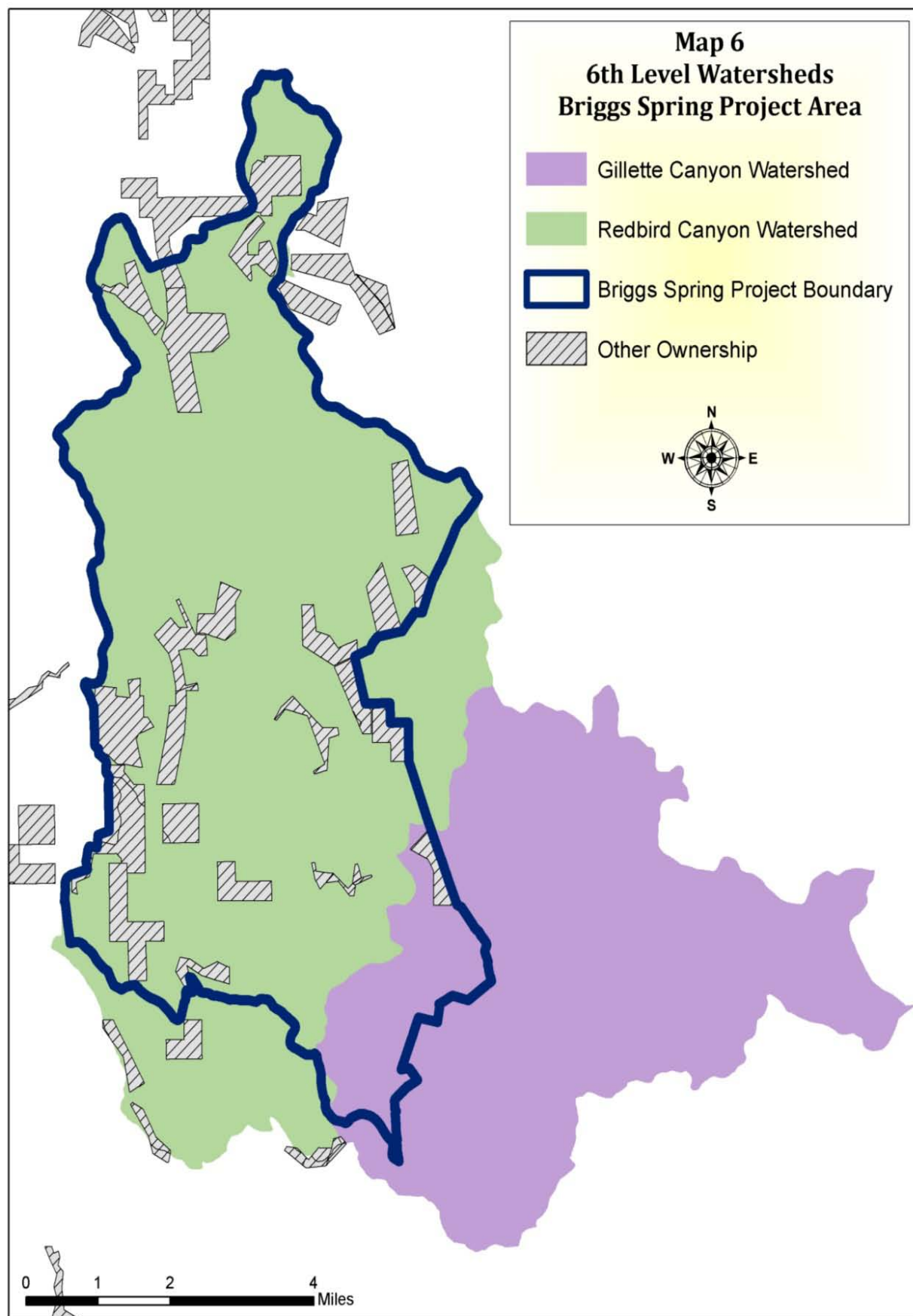


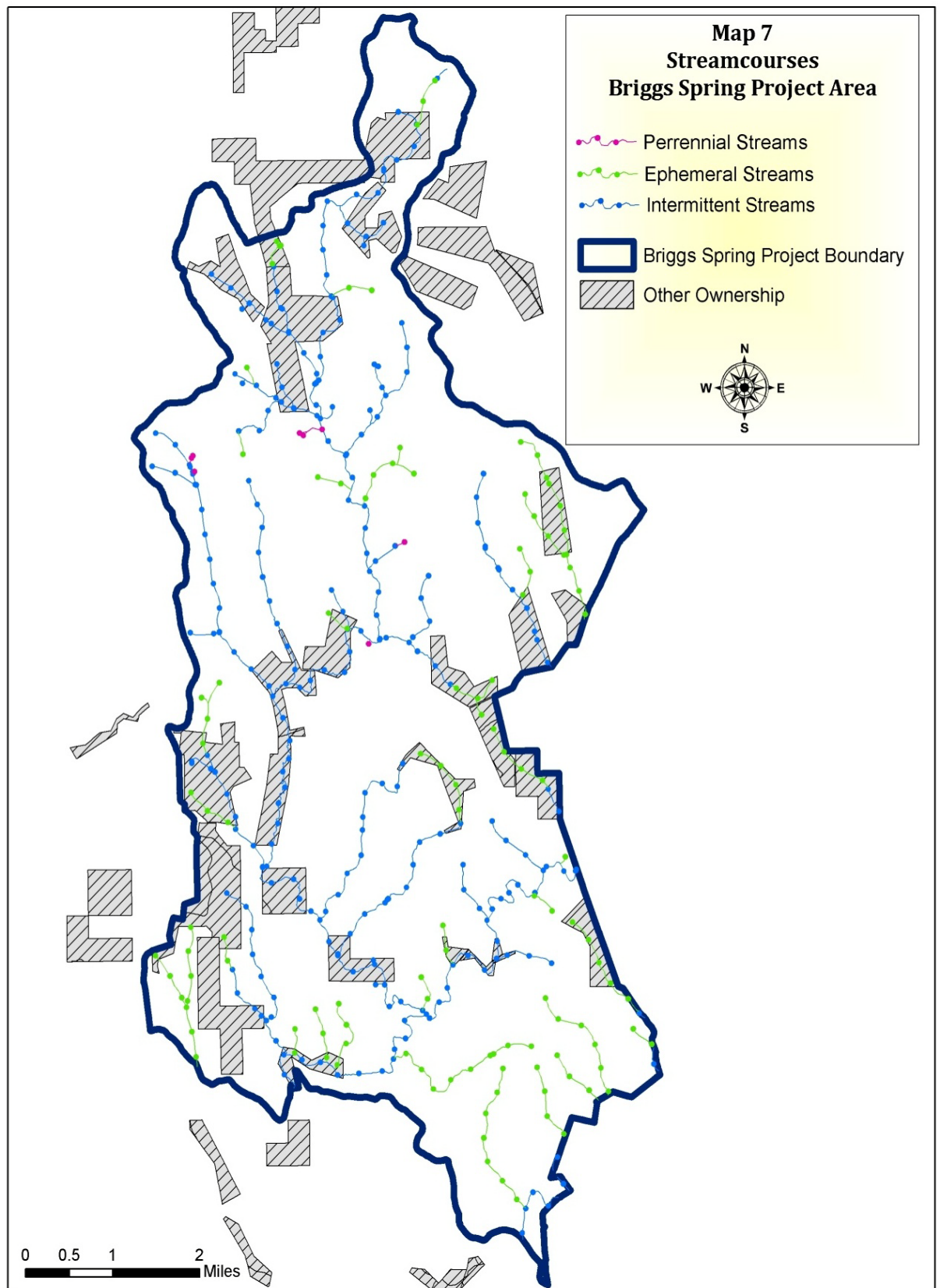


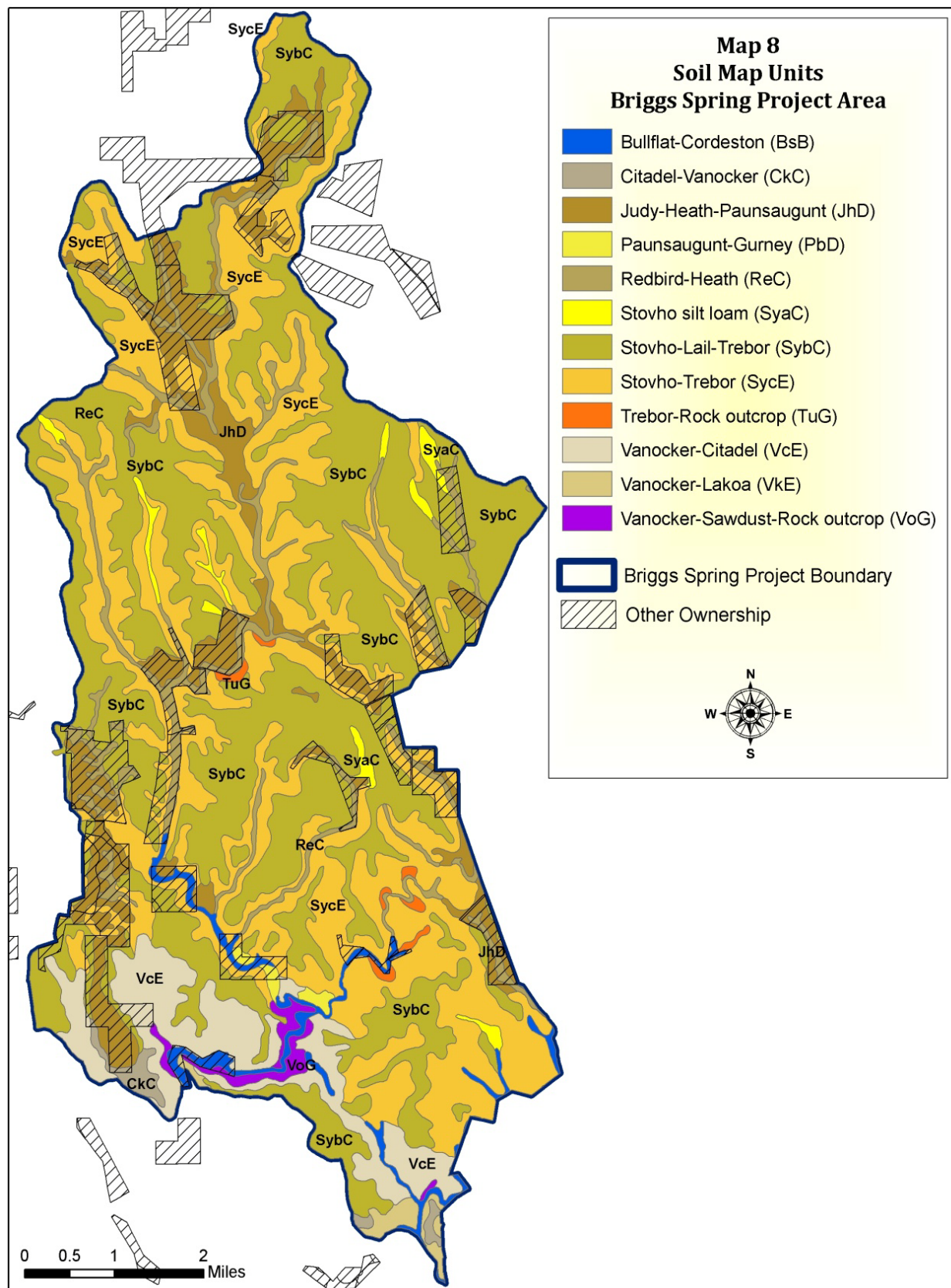


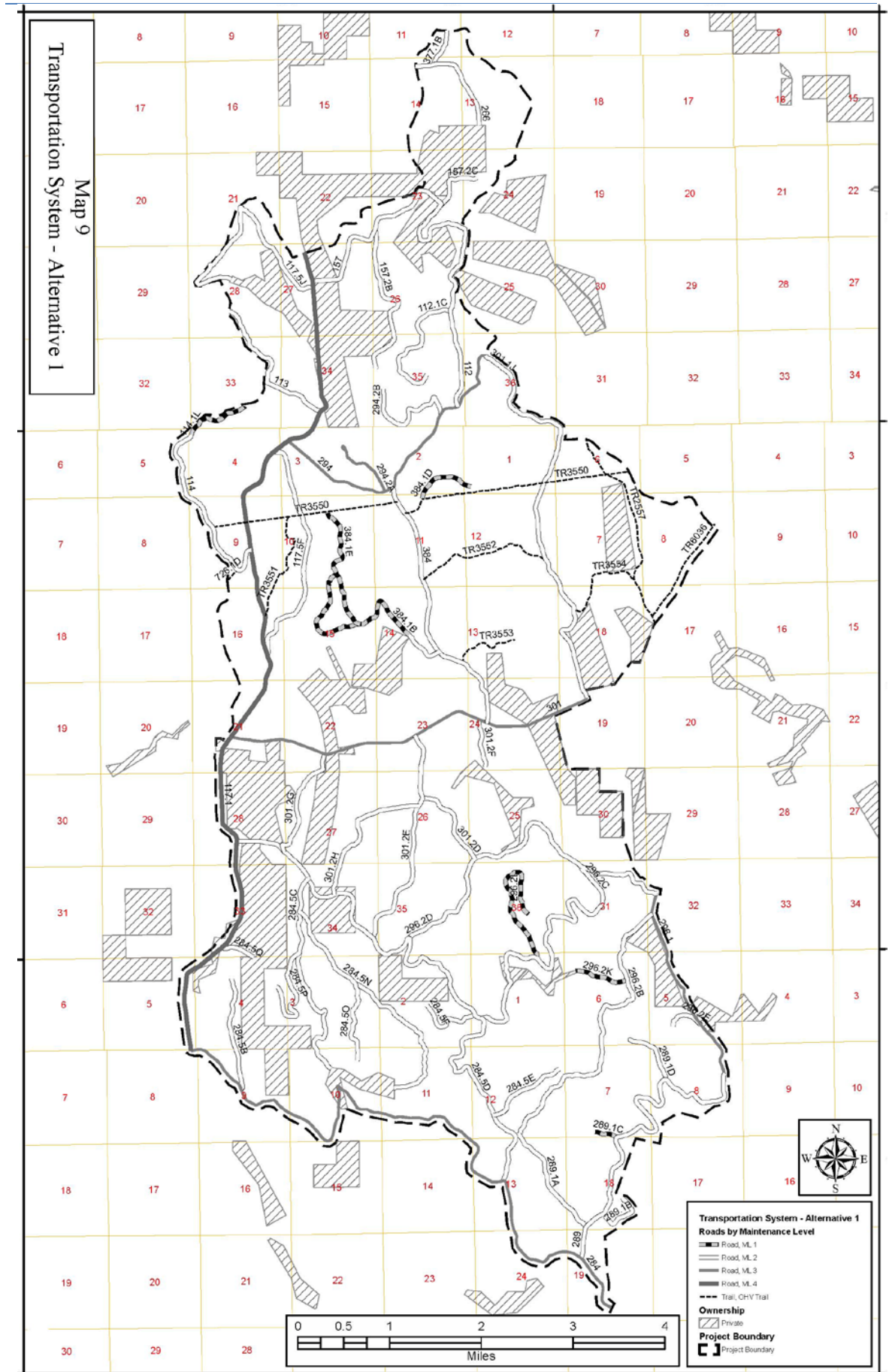


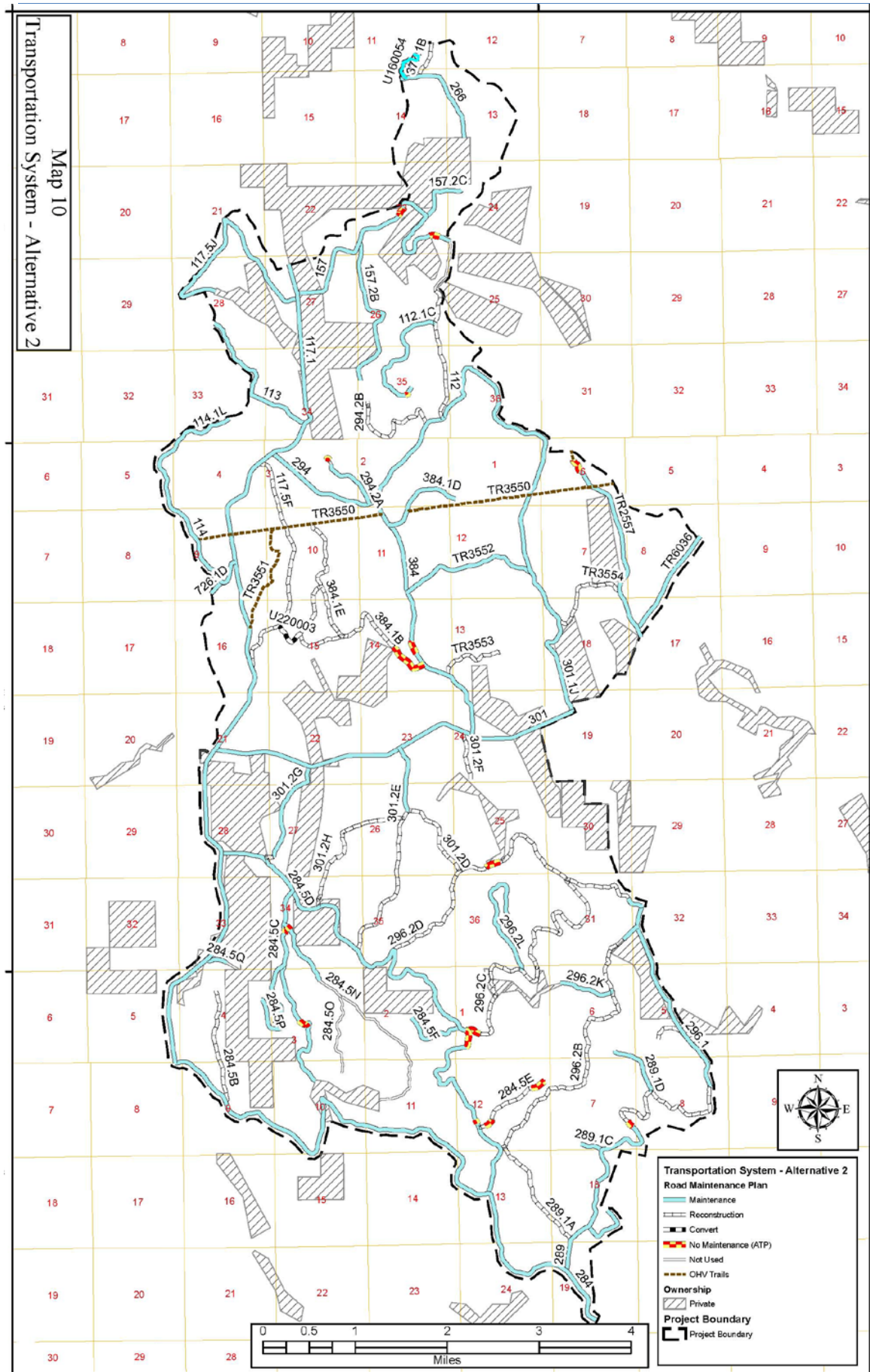














Appendix B: DESIGN CRITERIA

Introduction

The following design criteria are listed by resource area and do not suggest any particular order of priority. All activities proposed in this project would require implementation of these design criteria.

Heritage

- ❖ All eligible and unevaluated sites will be avoided during project activities. There are 25 known cultural resources determined eligible for listing on the National Register of Historic Places.
- ❖ If during the course of any ground disturbance related to this project, any bones, artifacts, foundations, or other indications of past human occupation of the area are uncovered, all operations will cease within a 100-meter radius of the site location and a District Archaeologist notified immediately. The SHPO and regional THPOs will be notified of the discovery and provided an opportunity to comment. Any cultural resources located during project implementation will be protected based on the recommendations of the District Archaeologist and the SHPO.
- ❖ Mechanical Treatments: the following design criteria must be implemented to protect the known sites in the project area from adverse effects of mechanical treatments.
 - All cultural resources that have the potential to be affected by project activities will be flagged or otherwise posted for avoidance.
 - No burn piles will be placed within the boundaries of eligible or unevaluated sites.
 - All vehicles, timber harvesting equipment, or other machinery must not be stored or parked within the boundaries of the above eligible or unevaluated sites. Vehicles would be confined to existing and marked Forest Service roads if and when traversing through cultural resources, unless travel through site boundaries is specifically not allowed as stated in the site specific recommendations.
 - No road maintenance, blading or modification of roads through eligible and unevaluated sites will be conducted without the specified clearance and on-site presence of a district archaeologist.
- ❖ Prescribed Fire Treatments: the following design criteria, developed through scientific studies of fire effects on cultural resources must be implemented to protect the known sites in the project area from the adverse effects of prescribed fire (USDA, 2003).
 - All cultural resources that have the potential to be affected by project activities will be flagged or otherwise posted. In some cases, burning through sites may be allowed, but specified features must be avoided by

- ground disturbing effects (e.g. road cuts, dozer lines, handlines, staging areas, and mop-up).
- o Wetline through cultural resources instead of using ground disturbing handlines.
- o Fire retardant possesses a risk of damaging archaeological sites and is not allowed within site boundaries.
- o Fire is allowed within the site boundaries of cultural resources provided that the following on-site fire behavior criteria are met: There are 8 known sites that will burn under $400^{\circ}\text{C} < 1$ hour without any preparation and **may be** burned through. There are 17 cultural resource sites that contain material which is easily destroyed by fire or would burn greater than $400^{\circ} > 1$ hour, and were preparation is not feasible due to the amount of fuel loading. These **17 sites cannot be burned through** and must be avoided during implementation of all prescribed burning. Consult with heritage resource specialist prior to any burning.

Fire/Fuels

- ❖ All prescribed burn treatments will meet with the provisions of the Clean Air Act. District personnel would monitor burn conditions, and the SASEM (Smoke Model) or equivalent program would be used to assure provisions are met. The impacts of burning on metropolitan areas such as Rapid City would be assessed at the time of burning.
- ❖ Smoke impacts would be minimized utilizing the following design criteria and are incorporated into the burn plan as appropriate:
 - o Limit treatment area size.
 - o Specify wind directions and speed.
 - o Specify minimum mixing heights to ensure dispersal of emissions.
 - o Stagger ignitions.
- ❖ Whole tree yarding would be required in the harvest units listed in Table B-1 where prescribed burning is planned.

Table B-1. Sites where whole tree yarding is **required**

Location	Site
040701	10, 16, 32, 45
040702	3-6, 12, 13, 17, 19, 20-22, 31, 37, 42-45, 74
040704	10, 16-20, 26-28
040802	7-10, 17-22, 27, 28, 37-43, 45, 49, 50
040803	104, 108-110, 115, 126
040804	104, 108, 109, 115, 119, 120, 122-124, 130, 131
040805	135, 137, 139, 142, 151, 152
040806	131, 137, 144

040807	105, 111, 118, 151
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- ❖ Revegetation of prescribed burned areas will be promoted by:
 - Following broadcast burning, seed to initiate revegetation if ground cover is 60 percent or less and slopes are 30 percent or more.
 - If piled and burned fuel creates ash piles deeper than three inches, scatter the ash, scarify and mix it with mineral soil, or bury it. **Guideline 4106**
- ❖ Prescribed burn plans will identify acceptable levels of tree mortality for seedlings/saplings, poles and sawtimber; burning prescriptions will be estimated to meet these levels. **Guideline 4108**
- ❖ Slash piles that are scheduled for burning should be located outside of meadows that contribute to Waters of the United States. Use a buffer distance designed to keep sediment, ash and debris out of channels. **Guideline 4111**
- ❖ Activity fuels would be treated along forest collector roads and forest development trails to meet the adopted Scenic Integrity Objectives (SIO). Along arterial roads, remove 70-90 percent of activity fuels up to 300 feet from roads edge. Debris piles would be burned as soon as practical after remaining on-site for at least 2 years. Where mechanical treatment and prescribed burning is proposed within the same site, mechanical treatments would be completed prior to burning.
- ❖ The threat of wildfire to public and private developments will be reduced by following the standards in the National Fire Protection Association Publication 1144, "Protection of Life and Property from Wildfire" and reduce the fuel loading from habitat improvement treatments to acceptable standards.

Minerals

- ❖ Although there is a potential for cave resources in the project area, no caves have been identified to date which require management as set forth in the Forest Plan. In the event that cave resources are identified during the course of the Briggs Spring project, the location will be reported to the wildlife biologist, archeologist and geologist for recommendation on resource protection measures, according to the Forest Plan.

Botany/Rangeland/Weeds

- ❖ Known noxious weed infestations would be treated with herbicides and/or biological controls after treatments to reduce infestations and allow native vegetation to compete with non-natives. Areas would be retreated as necessary.
- ❖ Areas infested with noxious weeds may be treated with herbicide prior to disturbance to help reduce seed dispersal from existing plants.
- ❖ Disturbed areas such as skid trails, burned slash piles and temporary roads would be seeded with certified weed-free seed. **Standard 1110**
- ❖ When possible, avoid disturbances to grassland and meadows with activities such as large slash piling, skidding, and temporary road construction.

- ❖ Restore or rebuild all fences damaged during project activities.
- ❖ When temporary roads and skid trails are to be constructed, locate beside existing fences, if possible. Such clearing will help with the maintenance of those improvements.
- ❖ All livestock gates would remain shut from June 1st – October 15th.
- ❖ Defer prescribed burned areas from livestock grazing for a portion or all of the following growing season to ensure regrowth of forage species. **Guideline 4107**
- ❖ Deck piles and landings should be no closer than 200' from any spring with exclosure fences. Heavy equipment would not be allowed to operate within wet areas to prevent noxious weed growth near existing springs.

Recreation

- ❖ Use of system trails needed for project implementation would be coordinated with recreation specialist.
- ❖ All system trail signs and markers would be protected during harvest activities.
- ❖ Exclude snowmobile trails from harvest activities from December 15-March 31, annually. Note that snowmobile trail #13 includes a portion located on Six Mile Road (FSR 301); this portion can be located either on the road bed, if the road is not plowed or being used for logging traffic, or it can be located on the road edge if the road is plowed.
- ❖ Signing of harvest activities would be placed at trailheads, bulletin boards and trail intersections to ensure public safety.
- ❖ Any logging slash should be removed from recreational sites, such as campgrounds prior to the opening date of May 15, annually.
- ❖ Protect the Redbank Spring campground improvements from vegetation management activities during its full operational period from May 15th to October 15th annually. Protect campground facilities and improvements during all periods of vegetation management occurring in the campground.
- ❖ Avoid piling slash or placing landing piles in campgrounds or on trails (4 feet each side of the centerline of trails). Slash or logs would be removed and any disturbed ground recontoured and seeded prior to the start of the primary use recreation season on May 15th annually.

Scenery

- ❖ For all overstory removals and shelterwood seed cut treatments, transition ('feather') the vegetation edge from dense canopy (in the adjacent non-treated areas) into this unit.
- ❖ In all harvest units along FSRs: 117 (Boles Canyon), 294 (South Castle Creek), 301 (Six Mile), 296 (Redbird-Gillette Canyon), 284 (Custer-Limestone), and 294.2A (Redbank Spring Campground access), within 300 feet of these routes, and around campgrounds, the following design criteria should be used:

- Where possible along roads and trails, remaining vegetation should be in a variety of sizes and spacing to maintain a more natural appearance.
- Log decks within 300 feet of campgrounds and travel corridors would be returned to original contours, scarify to eliminate compaction (as necessary), and reseeded with native grass seed.
- Slash would be cleaned up to natural levels within 300 feet of campgrounds and travel corridors. This could be accomplished by scattering and burning, piling and burning, or chipping) after harvesting.
- Slash needs to be treated in accordance with Forest Plan **Guideline 5606**.
- When thinning dense stands, avoid creating a residual forested stand with evenly spaced trees if possible.
- All temporary roads and skid trails within ¼ mile of developed recreation areas should be returned to a natural appearance by eliminating the cut/fill slope to match the adjacent contours. Re-seed and place natural levels of down debris across these routes.
- ❖ In the Redbank Spring & New Moon developed recreation areas and for 300 feet around them, maintain some of the largest trees to ensure long-term large diameter trees, and their character will be present.
- ❖ Fuel treatments along private land boundaries would transition into the surrounding forest. These areas are essential shaded fuel breaks. Avoid creating ‘corridors’ of cleared understory areas by laying out the outer (forest side) of the unit in a curvilinear layout.

Transportation

- ❖ After project implementation any temporary roads would have slash dropped or spread over the road to prevent future unauthorized use. Boulders and berms may also be used to close these roads.

Wildlife

- ❖ The sites in Table B-2 would have slash lopped and scattered within 200’ of the site edge in the direction of the nearby pond/spring; if proposed for prescribed burning, do not burn down woody material, juniper and regeneration within 200’ of the site edge:

Table B-2. Sites requiring lop and scatter within 200’ of adjacent pond or spring

Location	Site
040702	40 - (Briggs Spring) – extend the 200’ wide lop and scatter treatment for the length of the west side of site 40 adjacent to site 23. Proposed for commercial and non-commercial vegetative treatments in Alternatives 2 and 3.
040702	52, 56, 57 - (White Spring) – lop and scatter 200’ radius from spring enclosure fence into these 3 sites. Proposed for commercial and non-commercial vegetative treatments in Alternatives 2 and 3.

040703	14 - (beef pasture spring, north side, along private land) – lop and scatter 200' radius from spring. Site proposed for mechanical fuels in Alternatives 2 and 3. Commercial treatment is proposed in Alternative 3.
040704	2 - (Redbird Spring) – lop and scatter 200' radius from spring enclosure fence near upper pond. Site proposed for commercial treatment in Alternative 3.
040705	134 - (Multiplex Spring) – extend the 200' wide lop and scatter treatment for the length of the west side of site. Proposed for commercial and non-commercial vegetative treatments in Alternatives 2 and 3.
040705	156 - (Redbank Spring Reservoir) – extend the 200' wide lop and scatter treatment for the length of the north side of the site. Proposed for commercial and non-commercial vegetative treatments in Alternatives 2 and 3.
040807	105, 110, 111 - (Park Spring) – sites 105 and 111 are proposed for sanitation if needed and prescribed burning in Alternatives 2 and 3. Site 110 is deferred in Alternative 2 but is proposed for commercial treatment in Alternative 3. If sites 105 and 111 are sanitized, lop and scatter the south tips of the sites to a depth of 200'. If site 110 is treated than lop and scatter the south tip of the site from Park Spring south.

- ❖ When prescribed burning in sites 040702-23, 040705-132 and 040802-44 protect the existing fences around Willow Spring, Briggs Spring, Multiplex Spring, Junes Pools and Herrin Wildlife Ponds. No burning would occur within the fences in order to maintain residual grass cover for amphibians.
- ❖ No snags will be cut unless deemed a safety hazard. Snags determined to be a safety hazard should be felled and left in place, where feasible. Existing snags and down woody material (>10" diameter) will be protected during prescribed burning where feasibility and safety permits. **Standards 2301, 2304, 2305, 2308, and Objectives 211, 212**
- ❖ Retain existing large woody debris in mechanically treated sites including the sites proposed for whole tree yarding. Do not pull existing logs out of the site while removing recently cut trees. **Guideline 2307**
- ❖ If piles are created while accomplishing mechanical vegetation treatments, including mechanical fuel treatments, leave 1 pile per 2 acres for small mammal habitat. Piles do not need to be any particular size; as a pile size guideline, aim for approximately 10' x 10' and 6' in height. This will benefit small mammal predatory species by creating near-ground structure for prey species. **Standard 3117**
- ❖ Screening cover for big game will be retained within 200' of the road in the following areas proposed for non-commercial treatments (**Guideline 3203**). Any planned burning should have a mortality limit of 0-5% of seedlings and saplings within these areas. Mechanical thinning should not occur within 200' of the road in these areas. Sites proposed for non-commercial treatments that need screening

cover (seedlings/saplings) retained within 200' of the arterial or collector road are shown in Table B-3.

Table B-3. Sites where screening cover adjacent to roads must be maintained

Location	Site	Road	Proposed treatment
040701	10	117.1	Mechanical thin and prescribed fire
040701	18	117.1	Mechanical thin
040701	20	117.1	Mechanical thin
040701	23	117.1	Mechanical thin
040701	38	301	Mechanical thin
040702	50	301	Mechanical thin
040702	54	301	Mechanical thin
040702	55	301	Mechanical thin
040702	56	301	Mechanical thin
040705	126	294	Mechanical thin
040801	8	284.5D	Mechanical fuels
040801	9	117.1	Mechanical thin
040801	10	284.5D	Mechanical thin
040802	47	284.5D	Mechanical fuels and prescribed fire
040803	101	301	Mechanical thin
040805	151	284	Prescribed fire
040806	142- east end	284	Mechanical fuels and prescribed fire
040806	120	284.5D	Mechanical thin
040808	109	284	Mechanical thin

- ❖ Allow only 0-5% mortality of pine regeneration in site 040702-73 when prescribed burning.
- ❖ To allow for hiding cover in sites listed in Table B-4, do not thin pine regeneration during timber stand improvement (post sale) treatments along specified roads.

Table B-4. Sites where hiding cover is to be retained

Location	Site	Road
040802	30, 31	296.2D
		301.2D
		301.2E

- ❖ If new raptor nests are found apply recommended spatial and activity time restrictions for the nest area. Restrictions would be dependent on raptor species and if the nest area is active. **Standards 3115 and 3204**
- ❖ Known raptor nests will be protected (**Standard 3204**).

- ❖ “From April 1 through August 15, 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-half mile of all active goshawk nests up until the nest has failed or fledglings have dispersed” (**Standard 3111**). Prior to starting any activities in the sites listed in Table B-5, consult with a district biologist. A biologist will check the known raptor nests for any indication of use. If no use is detected the treatment activities may be allowed to proceed.

Table B-5: Sites proposed for treatment within a ½ mile of northern goshawk nest territories requiring protection

Location	Site	Alternatives proposing treatment	Treatments proposed	Territory	Comments*
040802	11	2 and 3	Commercial and non-commercial thinning	Herrin-Miller	Buffer: 0.5 miles April 1- August 15
040802	22	2 and 3	Hardwood release and prescribed burning	Herrin-Miller	
040802	23, 24, 32, 33	2 and 3	Sanitation if needed	Herrin-Miller	
040802	23, 24, 32, 33	3	Non-commercial thinning	Herrin-Miller	
040802	30	2 and 3	Commercial (south 1/3) and non-commercial thinning; sanitation if needed	Herrin-Miller	
040802	15	2 and 3	Non-commercial thinning	Herrin-Miller	
040802	12, 15	3	Commercial thinning	Herrin-Miller	
040802	31	2 and 3	Sanitation if needed and non-commercial thinning	Herrin-Miller	
040802	42, 43, 45	2 and 3	Commercial and non-commercial thinning; prescribed fire	Herrin-Miller	
040802	44	2 and 3	Pine encroachment treatment and prescribed fire	Herrin-Miller	
040802	51	2 and 3	Commercial and non-commercial thinning	Herrin-Miller	
040804	117	2 and 3	Sanitation if needed	Dumbuk	Buffer: 0.5 miles April 1- August 15
040805	101, 102, 103, 104, 153	2 and 3	Sanitation if needed	Dumbuk	
040805	107	2 and 3	Pine encroachment and prescribed fire	Dumbuk	
040805	141	2 and 3	Mechanical fuels and prescribed fire	Dumbuk	
040805	142	2 and 3	Sanitation if needed and prescribed fire	Dumbuk	
040805	149	2 and 3	Mechanical fuels and prescribed fire	Dumbuk	

040805	149	3	Commercial thinning	Dumbuk	
040806	132	2 and 3	Commercial thinning	Dumbuk	
040806	137	2 and 3	Commercial and non-commercial thinning; prescribed fire	Dumbuk	
040806	138, 139, 145	2 and 3	Sanitation if needed	Dumbuk	
040806	140, 142	2 and 3	Mechanical fuels and prescribed fire	Dumbuk	
040806	140, 142	3	Commercial thinning	Dumbuk	
040806	141	2	Sanitation, mechanical fuels and prescribed fire	Dumbuk	
040806	141	3	Commercial thinning, mechanical fuels and prescribed fire	Dumbuk	
040806	144	2 and 3	Pine encroachment and prescribed fire	Dumbuk	

*The spatial buffer of 0.5 miles has a corresponding time period buffer when activity, such as commercial, non-commercial and fuels treatments including prescribed burning, is not to take place.

- ❖ In addition to the sites listed in the table above, there would be time restrictions (April 1-August 15, annually) for new activity related to project implementation on roads adjacent to the two goshawk territories.
 - If the Herrin-Miller territory is active then FSR 301.2D (the entire length) and FSR 296.2D (within ½ mile of the junction with 301.2D) will have new use timing restrictions in place, for activities related to timber harvest.
 - If the Dumbuk territory is active then FSR 284.5E (the entire length), FSR 296.2B (between FSR 284.5D and U220036), and FSR 289.1A (from the junction with FSR 296.2B south to U220036), U220035 and U220036 will have new use timing restrictions in place, for activities related to timber harvest. A portion of FSR 284.5D is located within ½ mile of the goshawk nests in the Dumbuk territory. The timing restriction is not being recommended on this road. Other roads discussed above will have the timing restriction in place which will minimize additional disturbance within the territory. **Standard 3111.** Use of this road is also required to implement the proposed projects during the summer months.
- ❖ If R2 sensitive species or species of local concern is found after a contract or permit is issued, consult with the district wildlife biologist to coordinate mitigation measures. **Standard 3115**
- ❖ If northern leopard frogs are observed in the project area during any project activities, consultation with a district wildlife biologist would occur before any project activities are implemented.
- ❖ If, during any activities in the project area, red-bellied snakes are observed or potential hibernacula are found, consult with a district wildlife biologist. If a hibernacula/breeding site is found a spatial restriction may be established around the riparian area and the hibernacula.

- ❖ Retain all spruce trees within 600 feet of the spring near the border of sites 040705-103 and 040705-106 for wildlife cover as well as enhanced vegetative diversity for forest birds.
- ❖ Retain a denser canopy (> 60 BA) in the northern 1/3 of site 040802-51 within 200 feet of the meadow site 040802-44. The denser canopy will allow for more moisture on the ground in the site as well as provide some hiding cover for big game. This site may be used as upland habitat for sensitive northern leopard frogs if present in the Herrin wildlife ponds within site 44.
- ❖ Within site 040705-126 retain a denser canopy (> 60 BA) and lop and scatter slash within 200' of the springs in site 040705-135.
- ❖ Ten percent of the SS4 ponderosa pine acreage in the management area will have an average tree size of "very large". **Objective 5.1-204.** In the sites listed in Table B-6, retain very large tree size (16" DBH and greater) of ponderosa pine trees:

Table B-6. Sites with large tree retention needs

Location	Site
040701	10
040802	7, 8, 9
040803	110 (east end)
040808	108 (only if large pine trees are not producing regeneration within the meadow)

- ❖ There is one Frest site present in the project area that showed presence of a species of local concern snail. The Frest site is in 040701-36 along Road 117.1. No vegetative commercial treatment is planned in Alternative 2, however a POL treatment (post sale) is proposed. In Alternative 3 the site is proposed for group shelterwood commercial harvest with a POL treatment. The Frest site (approximately ¼ acre) needs to be avoided during mechanical treatments under either alternative. A district biologist can flag the site boundary prior to any vegetative treatments. **Standard 3103**
- ❖ Where it is not a concern for fuels and/or the silviculturist, leave slashed tops from commercially harvested pine trees within aspen clones and within 100 feet of the clone. This will help provide barriers to inhibit ungulate browsing on regenerating aspen.
- ❖ Broadcast prescribed burning in structural stage 3B or 4B sites should be designed to limit mortality in all size classes to less than 10%.
- ❖ Within the hardwood stands listed in Table B-7, hinging of remaining non-commercial conifers would occur to protect aspen regeneration from browsing.

Table B-7. Aspen sites which require hinging of non-commercial sized trees

Location	Site
040401	118
040502	18-28, 39, 40, 45, 51, 52, 63, 64
040704	24

040705	121, 129-132, 137, 138, 146, 147, 172
040802	7-10, 17-22, 27, 28, 37-43, 45, 49, 50
040803	104, 108-110, 115, 126
040804	104, 108, 109, 115, 119, 120, 122-124, 130, 131
040805	135, 137, 139, 142, 151, 152
040806	131, 137, 144
040807	105, 111, 118, 151

Silviculture

- ❖ Activity fuel should be removed, lopped, scattered or piled for later burning. Slash piles, other than those left for wildlife habitat (**Standard 3117**), should be burned within one year. This will reduce the risk of Ips beetle caused mortality.
- ❖ Prescribe burning mortality limits in ponderosa pine – The percentages listed in Table B-8 are not a target to strive for but rather a range in which to operate during a prescribe burn. Broadcast prescribe burning should be designed to limit mortality in the following tree diameter sizes:

Table B-8. Allowable mortality due to prescribed burning in pine sites

Ponderosa Pine	Percent Mortality
> 16.0" DBH	< 5%
9.0" – 16.0" DBH	< 15%
5.0" – 8.9" DBH	< 20%
1.0" – 4.9" DBH	< 30%
> 500 seedlings/acre	< 50%
300 – 500 seedlings/acre	< 25%
100 – 300 seedlings/acre	< 10%
No Rx burning within pine plantations.	

- ❖ Prescribe burning mortality limits in aspen – The percentages listed in Table B-9 are not a target to strive for but rather a range a maximum allowable mortality that would occur due to a prescribe burn. Broadcast prescribe burning should be designed to limit mortality in the following tree diameter sizes:

Table B-9. Allowable mortality due to prescribed burning in aspen sites

Aspen	Percent Mortality
> 3.0" DBH (All age classes)	≤ 10%
< 3.0" DBH (All seedlings & saplings)	≤ 5%

- ❖ The most current Black Hills NF “Visual Marking Guides” would be followed for tree marking within distance of arterial and collector roads and private land with dwellings.
- ❖ The practices outlined in “Best Management Practices for the control of Non-Point Pollution from Silvicultural and Related Road Activities” will be followed.

- ❖ Within harvest units, conifer trees identified as insect infested would be removed in order to reduce the potential for future infestations.
- ❖ Aspen stands should be whole tree harvested when removing commercial sized conifers to insure conifers can be removed without excess damage to remaining aspen. This will also eliminate shading of the ground by logging slash. If conifer slash is to be piled and burned, piles need to be placed at least one (aspen) tree height away from the edge of the aspen to avoid damage to the roots from the intense fire (Sheppard, 10-2004).
- ❖ Remove all conifers from designated aspen clones within conifer harvest units. Conifers less than 9-inches DBH shall be removed post harvest or hinged to provide protection to aspen suckers. Fencing the aspen regeneration will keep cattle from browsing on the aspen suckers but will not keep the elk and deer out. Other temporary barriers will need to be developed to prevent browsing by elk and deer.

Soils and Hydrology

- ❖ Include all USFS Region 2 Watershed Conservation Practices (WCPs), Forest Plan standards and guidelines, South Dakota Best Management Practices (BMPs), and industry standard methods for protecting geologic, soil and water resources.
- ❖ Use existing roads and trails to the extent practical. Minimize construction of new trails or temporary roads.
- ❖ Rehabilitate and close temporary roads as soon as possible after activities are completed. Scarification will include scarification, seeding and physical barriers of slash or rock to block access.
- ❖ All roads and trails will have drainage control structures installed as needed, and be regularly maintained prior to, during and following operations, including seasonal shutdowns. Drainage structure spacing should use the following guidelines shown in Table B-10.

Table B-10. Drainage structure spacing guidelines for roads and trails

Road or Trail Grade	Maximum Spacing between Structures
2%	250 feet
5%	135 feet
10%	80 feet
15%	60 feet
20%	45 feet

- ❖ If winter road use occurs – maintain roads as needed to keep the road surface drained during thaw and breakup periods; do not use riparian areas, wetlands or streams for snow storage or disposal; minimize use of sand, salt or other de-icing substances (i.e. Mag-Chloride).

Protected Stream Courses and Springs:

- ❖ Protected stream courses within the project area include all or portions of the following streams; Antelope Draw, Gillette Canyon, Jenks Draw, Redbird Canyon, and Redbird Draw (see Map 7 in Appendix A).
- ❖ Avoid crossing protected stream courses to the extent practical. If a stream crossing is absolutely necessary, consult a hydrologist to identify a stable crossing location and any site-specific needs.
- ❖ Protected springs within the project area include:

Table B-11. Protected springs in the Briggs Spring project area

Spring Name	Location	Site(s)
Cabin Spring	040502	23
Upper Antelope Spring Complex	040701	8
Lower Antelope Spring Complex	040701	8
Willow Spring Complex	040702	23
Briggs Spring/Pond	040702	23
White Spring/Ponds	040702	52
Beef Pasture Spring	040703	14
Old Camp Spring Complex	040703	26
Redbird Spring Complex	040704	2
North Cigarette Spring/Pond	040704	9
Cigarette Spring/Pond	040704	21, 22
Multiplex Springs Complex	040705	132, 133
Baseline Spring/Pond	040705	137
Redbank Spring Complex	040705	145, 170
Herrin Spring/WPA Well and Pond	040802	44
Bert Howey Spring	040806	103
Howell Spring	040806	116, 118
Rogers Spring/Pond	040806	132, 138

- ❖ Within the 100 foot Water Influence Zone (WIZ), either side of a protected stream course or spring/wetland, the following will apply:
 - Management activities within the WIZ must be done in such a manner as to limit damage to riparian vegetation, soil disturbance rutting, and sediment delivery.
 - Avoid ground based equipment operations within WIZ to the extent possible, except at designated crossings or where otherwise approved by a hydrologist.
 - Approved equipment operations within the WIZ will be during dry or frozen soil conditions, unless otherwise approved by a hydrologist.
 - Do not place temporary roads or skid trails within WIZ except at designated crossings or if otherwise approved by a hydrologist.
 - Do not locate landings or other slash piles within the WIZ.

- Ensure one-end log suspension within the WIZ.
- Do not ignite prescribed fire within the WIZ. Prescribed burning may occur within a WIZ, but must not be initiated in the WIZ.
- Protected stream courses, ponds or wetlands, and other wet areas within the WIZ should not be used as natural barriers for firelines unless a hydrologist approves this on a site specific basis.
- Manage prescribed fire in the WIZ to achieve a low intensity burn to protect soils.
- ❖ Remove slash and debris that inadvertently enters stream courses
- ❖ Protected stream courses and known spring/wetlands requiring protection will be identified on the sale area map.
- ❖ Do not store or locate refueling sites within 150 feet of streams, wetlands, springs or ephemeral streams. Inspect equipment for leaks and remedy leaks right away. Any leaks or spills should be cleaned up immediately.
- ❖ Conduct water drafting for prescribed fire operations at locations which minimize adverse effects to water quality.

100-Year Floodplains:

- ❖ There are 100 year floodplains associated with Redbird draw, Redbird Canyon and Gillette Canyon see Table B-2 and Floodplain map in project file. The following applies to activities within the 100-year floodplain:
 - Do not locate landings and piles within the 100-year floodplain so as not to restrict any potential flood flows or damage floodplain processes.
 - Any vegetation felled and left in place should not restrict potential flood flows or create a debris-dam.
- ❖ Avoid locating staging areas or other concentrated uses within 100-year floodplains.

Table B-12. 100-Year floodplains in the Briggs Spring project area

Floodplain Area	Acres	Location	Site(s)
Redbird Draw	35	40701	44
	77	40702	22, 23, 36, 52, 57, 70, 75
	51	40801	12, 13, 19
	42	40802	7, 46, 47, 53, 57
	36	40806	115, 118, 149
Redbird Canyon	6	40803	127
	46	40807	129, 139, 142, 143, 148
Gillette Canyon	10	40804	105, 109, 116, 129, 134
	4	40805	107, 121, 125, 148

Soils:

- ❖ Restrict roads, landings, skid trails and concentrated-use sites to designated sites to limit additional soil disturbance.
- ❖ All off-road, ground-based equipment operations should be minimized as possible, and should take place during dry or frozen conditions to limit soil compaction, rutting and soil erosion.
- ❖ Avoid soil disturbing actions during periods of heavy rain or wet soils to prevent rutting, compaction, erosion and sediment delivery to streams.
- ❖ Avoid ground-based harvest and skidding equipment operations on sustained slopes steeper than 40%.
- ❖ Avoid placing temporary roads and skid trails within ephemeral drainages to prevent soil rutting and compaction.
- ❖ When machine piling of slash occurs, leave topsoil in place and avoid displacing soils into piles or windrows.
- ❖ Rehabilitate landings and burned slash piles by scarifying and seeding these areas. Rehabilitate other disturbed sites, such as firelines, staging areas, and safety zones.
- ❖ During vegetation management activities on ponderosa pine sites, retain an average of at least 50 linear feet per acre of coarse woody debris with a minimum diameter of 10 inches. **(standard 2308s)**
- ❖ Shelterwood harvest on the following sites should retain 50% or more of fine logging slash **(guideline 1102a)** Fine slash should be evenly distributed through the unit.

Table B-13. Stand locations and sites that contain soil components low in topsoil organic matter within the Briggs Spring project area

Stand Location	Site(s)	Acres within Stand Location	Percent of Stand Location (within the Project Area)
040401	118	10	100%
040502	18-28, 39-41, 45, 49, 51, 52, 59-61, 63-65	847	80%
040601	75	0.2	100%
040701	1, 2, 4-16, 18-21, 23-26, 28, 30-33, 35-45	1,360	54%
040702	1-24, 26-37, 39-77, 79, 80	2,265	55%
040703	1, 2, 4-9, 11-21, 23, 24, 26, 30, 32-36, 38, 40, 42, 43	908	77%
040704	1-36	1,445	76%
040705	101-107, 109, 111, 113-132, 137-160, 162-172, 174-178	1,637	48%
040801	1-19	596	56%
040802	1-15, 17-28, 30-43, 45-57	1,869	62%
040803	101-115, 117-137, 140-143	821	38%

040804	101-108, 110-113, 117, 119, 120, 123-125, 130, 137	188	16%
040805	101-104, 107, 109, 125-129, 132, 133, 135, 136, 138-142, 147, 149, 151-154	449	38%
040806	101-113, 115-117, 119-126, 128-134, 137-145, 147, 149	825	34%
040807	101-103, 105-107, 109-112, 114, 115, 118-121, 123, 124, 130-133, 140-142, 144-150, 152, 153	970	39%
040808	101-107, 109, 110, 112	234	46%

- ❖ Skidding through hardwood stands should be minimized to protect the moist soils in these areas and to prevent soil compaction and rutting.
- ❖ Avoid locating landings and piles scheduled for burning within hardwood stands to protect soils.
- ❖ Ground based operations occurring within and directly adjacent to hardwood stands should occur when soils are frozen.
- ❖ Conduct prescribed fire operations within hardwood stands with the minimum fire intensity necessary to achieve objectives.
- ❖ Conduct prescribed fires and pile burning when soil and humus are moist to minimize fire intensity and soil heating.
- ❖ Use low intensity prescribed fire on steep slopes or highly erodible soils.
- ❖ Locate and construct fire control lines to the minimum size and standard necessary to contain the fire and meet overall objectives.

Appendix C: MONITORING PLAN

Monitoring Plan for the Briggs Spring Project

Introduction

The Forest Plan identifies specific items to be monitored, and the Monitoring Implementation Guide (USDA Forest Service, 2005) describes monitoring protocols that have been established for numerous resources, as directed by the Forest Plan. The Monitoring Implementation Guide identifies frequency and methods of data collection, unit of measure, sampling design, expected precision and reliability, reporting frequency, data storage location, and costs for each monitoring item identified by the Forest Plan. This guide is subject to periodic adjustments. For additional information, refer to the Forest Plan (Chapter 4), and the Monitoring Implementation Guide.

The ID Team for the Briggs Spring project compiled additional monitoring objectives/items, which are summarized below. These items provide emphasis regarding particular resource monitoring needs in the project area. Monitoring would be prioritized by the responsible line officer if funding is unavailable to implement all items listed or referenced in this Monitoring Plan.

Soils and Hydrology

To ensure that soil and water resources are not impaired due to project activities, Best Management Practices (BMPs) are applied. BMP monitoring occurs during and after management activities. BMP implementation monitoring would occur during management activities, primarily through contract administration or oversight of Forest Service crew work.

Project specific design criteria for soil and water protection will be incorporated into any contracts or internal work orders used to implement the proposed activities. The effectiveness and implementation of these design criteria would be monitored as stated above for BMPs and during the annual Implementation and Effectiveness field review. Additional monitoring may occur based on needs as identified by the project hydrology and soils specialist.

Fuels

All fuels treatments would be recorded in the FACTS database. Prescribed fire surveys would be conducted following prescribed burning to ensure resource objectives are being met.

Monitoring of smoke conditions during burning operations would be done to comply with the provisions of the Clean Air Act. District personnel utilize the SASEM (Smoke Model), or an equivalent program to assure provisions are being met. The impacts on metropolitan areas such as Rapid City would be assessed at the time of burning.

Noxious Weeds

Areas of weed infestation would be monitored and the effectiveness of the weed treatments measured. Areas should be re-treated as necessary.

Wildlife

Hell Canyon district biologist would monitor known goshawk nests every summer for activity and breeding success. The biologist would coordinate with implementation crews to ensure that timing restrictions are followed in active territories. Occurrences and sighting of wildlife species would be documented during field visits and monitoring trips.

Heritage

Post project site monitoring is a useful method for determining the effectiveness of avoidance measures. Twenty percent (20% rounded up to the nearest whole number) of eligible and unevaluated cultural resources in the vicinity of treatment areas will be revisited and monitored for effects from the Briggs Spring Project following implementation. The selection of sites to be monitored is at the discretion of a District Archaeologist, and results will be sent to SHPO in the form of a site monitoring report.

Appendix D:
TREATMENTS and
POST SALE ACTIVITIES BY SITE

Alternative 2 Treatments and Post-Sale Activities

Alternative Prescription Abbreviations:

CTHIN – Commercial Thin
 GRSH – Group Shelterwood
 HDWC – Hardwood Conversion
 HDWR – Hardwood Release
 OSR – Overstory Removal
 PE – Pine Encroachment
 POL – POL Thinning
 SWSC – Shelterwood Seed Cut

Cover Type Abbreviations:

TPP – Ponderosa Pine
 TAA – Aspen
 GRA – Grass, meadow

Location/Site	Site Acres	Post Sale Cover Type	Alternative 2 Prescription	Alternative 2 Post Sale Activities	Alternative 2 Prescribe Burning Acres
40401-118	10	TAA	DEFER		
40502-18	47	TPP	HWDC	HWDR	
40502-19	49	TPP	GRSH	POL, HWDR	
40502-20	30	TPP	GRSH	POL, HWDR	
40502-21	33	TPP	SANITATION		
40502-22	27	TAA	HWDR	HWDR	
40502-23	28	TPP	HWDC	HWDR, POL	
40502-24	62	TPP	DEFER	FUELS	
40502-25	37	TPP	GRSH	FUELS	
40502-26	20	TAA	HWDR	HWDR	
40502-27	48	TPP	HWDC	HWDR	
40502-28	47	TAA	HWDR	HWDR	
40502-39	40	TPP	DEFER	FUELS	
40502-40	44	TPP	GRSH	POL	
40502-41	55	TPP	SANITATION	FUELS	
40502-45	45	GRA	PE	PE	
40502-49	20	TPP	DEFER	FUELS	
40502-51	37	GRA	PE	PE	
40502-52	12	GRA	PE	PE	
40502-63	20	TPP	CTHIN	POL	
40502-64	27	TAA	HWDR	HWDR	
40502-65	9	TPP	SANITATION		
40701-1	100	TPP	GRSH	POL	
40701-2	95	TPP	CTHIN	POL	
40701-4	54	TPP	SANITATION		
40701-5	81	TPP	SANITATION		
40701-6	11	GRA	PE	PE	
40701-7	97	TPP	GRSH	POL	
40701-8	58	GRA	PE	PE	17
40701-9	41	TPP	SANITATION		

40701-10	94	TPP	GRSH	POL	94
40701-11	31	TPP	DEFER	FUELS	30
40701-12	35	TPP	SANITATION	POL	34
40701-13	83	TPP	SANITATION	POL	83
40701-14	32	TPP	DEFER	FUELS	31
40701-15	28	TPP	SANITATION		28
40701-16	75	TPP	GRSH	POL	75
40701-17	15	TPP	DEFER	POL	
40701-18	110	TPP	GRSH	POL	
40701-19	93	TPP	SANITATION	POL	93
40701-20	35	TPP	SANITATION	POL	
40701-21	71	TPP	SANITATION		
40701-23	73	TPP	GRSH	POL	
40701-24	34	TPP	SANITATION		
40701-25	63	TPP	SANITATION	POL	63
40701-26	220	TPP	GRSH	POL	
40701-28	64	TPP	SANITATION		62
40701-30	72	TPP	SANITATION		
40701-31	65	TPP	SANITATION	HWDR	63
40701-32	51	TPP	GRSH	POL,HWDR	50
40701-33	63	TPP	SANITATION	POL	
40701-35	25	GRA	PE	PE	
40701-36	17	TPP	DEFER	POL	
40701-37	45	TPP	GRSH	POL	
40701-38	53	TPP	GRSH	POL	
40701-39	67	TPP	GRSH	POL	
40701-40	90	GRA	PE	PE	41
40701-41	35	GRA	PE	PE	
40701-42	17	TPP	DEFER		17
40701-43	4	GRA	PE	PE	4
40701-45	33	TPP	GRSH	POL	33
40702-1	131	TPP	SANITATION		
40702-2	85	TPP	DEFER	POL	83
40702-3	59	TPP	SANITATION		59
40702-4	58	TPP	SANITATION		58
40702-5	7	TPP	GRSH		
40702-6	17	TPP	SANITATION		
40702-7	50	TPP	SWSC		
40702-8	30	TPP	SWSC		
40702-9	68	TPP	SWSC		
40702-10	45	TPP	SANITATION		
40702-11	29	TPP	SANITATION		20
40702-12	92	TPP	GRSH	POL	56
40702-13	68	TPP	GRSH	POL	68
40702-14	25	GRA	PE	PE	
40702-15	81	TPP	GRSH	POL	
40702-16	53	TPP	DEFER	POL	53
40702-17	78	TPP	SANITATION		75
40702-18	22	GRA	PE	PE	22
40702-19	84	TPP	GRSH	POL	84
40702-20	56	TPP	GRSH	POL	56
40702-21	109	TPP	GRSH	POL	109
40702-22	22	TAA	HWDR	HWDR	22
40702-23	203	GRA	PE	PE	78

40702-24	48	TPP	GRSH	POL	
40702-25	9	TAA	DEFER		
40702-26	50	TPP	SANITATION		
40702-27	42	TPP	SANITATION		
40702-28	29	TPP	DEFER		
40702-29	40	TPP	SANITATION		
40702-30	24	TPP	SANITATION		
40702-31	50	TPP	GRSH	POL	44
40702-32	73	TPP	GRSH	POL	
40702-33	52	GRA	PE	PE	5
40702-34	49	TPP	CTHIN	NO POL	
40702-35	61	TPP	CTHIN	POL, HWDR	
40702-36	24	GRA	PE	PE	
40702-37	27	TPP	GRSH	POL, HWDR	27
40702-38	10	TPP	SANITATION		
40702-39	37	TPP	SANITATION		
40702-40	33	TPP	GRSH	POL	
40702-41	56	TPP	GRSH	POL	
40702-42	35	TPP	GRSH	POL	
40702-43	28	TPP	GRSH	POL	
40702-44	47	TPP	GRSH	POL	47
40702-45	74	TPP	GRSH	POL	74
40702-46	63	TPP	GRSH	POL	
40702-47	23	TPP	GRSH	POL	
40702-48	40	TPP	GRSH	POL	
40702-49	55	TPP	GRSH	POL, HWDR	
40702-50	82	TPP	GRSH	POL, HWDR	
40702-51	49	TPP	SANITATION		
40702-52	76	TPP	GRSH	POL, HWDR	
40702-53	62	TPP	GRSH	POL, HWDR	
40702-54	32	TPP	GRSH	POL, HWDR	
40702-55	47	TPP	GRSH	POL	
40702-56	66	TPP	CTHIN	POL	
40702-57	35	TPP	GRSH	FUELS	
40702-58	16	TPP	SANITATION		
40702-59	58	TPP	DEFER	POL	
40702-60	59	TPP	DEFER	POL	
40702-61	7	GRA	PE	PE	
40702-62	39	TPP	DEFER	POL	
40702-63	58	TPP	GRSH	POL, HWDR	
40702-64	57	TPP	GRSH	POL	
40702-65	40	TPP	GRSH	POL	
40702-66	55	TPP	GRSH	POL, HWDR	
40702-67	58	TPP	SWSC	POL, HWDR	
40702-68	68	TPP	SANITATION		
40702-69	36	TPP	SANITATION		
40702-70	82	GRA	PE	PE	5
40702-71	18	TPP	SANITATION		
40702-72	36	TPP	DEFER		
40702-73	22	TPP	DEFER	NO POL	20
40702-74	11	TPP	GRSH	POL	11
40702-77	25	TPP	DEFER		
40702-78	4	GRA	PE	PE	
40702-79	18	TPP	DEFER		

40702-80	50	TPP	DEFER	POL	
40702-81	1	TAA	HWDR	HWDR	
40702-82	5	TPP	SANITATION		
40703-1	32	TPP	DEFER		
40703-2	38	TPP	SANITATION		
40703-3	9	GRA	PE	PE	
40703-4	41	TPP	SANITATION	POL	
40703-5	12	TPP	DEFER		
40703-6	30	TPP	SANITATION		
40703-7	12	TPP	DEFER	POL	
40703-8	32	TPP	SANITATION	POL	
40703-9	19	TPP	SANITATION		
40703-10	29	TPP	SANITATION		
40703-11	50	TPP	DEFER	FUELS	
40703-12	9	GRA	PE	PE	
40703-13	69	TPP	GRSH	POL	
40703-14	39	TPP	DEFER	FUELS	
40703-15	43	TPP	SANITATION	FUELS	
40703-16	44	TPP	SANITATION		
40703-17	51	TPP	SANITATION		
40703-18	68	TPP	SANITATION		
40703-19	37	TPP	DEFER		
40703-20	12	GRA	PE	PE	
40703-21	20	TPP	SANITATION	FUELS	
40703-22	24	TPP	DEFER		
40703-23	36	GRA	PE	PE	
40703-24	36	TPP	DEFER		
40703-26	74	TPP	SANITATION		
40703-30	25	TPP	SANITATION		
40703-32	49	GRA	PE	PE	
40703-33	18	TPP	SANITATION	FUELS	
40703-34	56	TPP	SANITATION	FUELS	
40703-35	68	TPP	SANITATION	FUELS	
40703-36	14	TAA	DEFER		
40703-38	25	TPP	SANITATION	FUELS	
40703-40	15	TAA	DEFER		
40704-1	64	TPP	DEFER		
40704-2	58	TPP	DEFER		
40704-3	18	GRA	PE	PE	
40704-4	49	TPP	SANITATION	FUELS	
40704-5	4	GRA	PE	PE	
40704-6	64	TPP	GRSH	POL	
40704-7	52	TPP	SANITATION		
40704-8	51	TPP	SANITATION		
40704-9	55	TPP	GRSH	POL	
40704-10	69	TPP	GRSH	POL	68
40704-11	46	GRA	PE	PE	12
40704-12	60	TPP	SANITATION		
40704-13	53	TPP	SANITATION		
40704-14	30	TPP	SANITATION		
40704-15	23	GRA	PE	PE	
40704-16	47	TPP	GRSH	POL	46
40704-17	51	TPP	GRSH	POL	50
40704-18	42	TPP	GRSH	POL	41

40704-19	46	TPP	GRSH	POL	46
40704-20	51	TPP	GRSH	POL	50
40704-21	32	TPP	SANITATION		
40704-22	56	TPP	GRSH	POL	
40704-23	40	TPP	GRSH	POL	
40704-24	82	TPP	DEFER	FUELS	
40704-25	35	GRA	PE	PE	10
40704-26	52	TPP	GRSH	POL	52
40704-27	56	TPP	GRSH	POL	55
40704-28	35	TPP	GRSH		30
40704-29	9	GRA	PE	PE	
40704-30	87	TPP	GRSH	POL	
40704-31	44	TPP	GRSH	POL	
40704-35	12	TPP	SANITATION		
40704-36	27	TPP	DEFER	POL	
40705-101	15	GRA	PE	PE	
40705-102	9	TAA	DEFER		
40705-103	109	TPP	GRSH	POL	
40705-104	13	TPP	DEFER		
40705-105	69	GRA	PE	PE	
40705-106	32	TPP	GRSH	POL	
40705-107	41	TPP	DEFER		
40705-108	30	TPP	DEFER		
40705-109	12	TPP	SANITATION	FUELS	
40705-110	46	TPP	GRSH	POL	
40705-111	25	TPP	DEFER		
40705-112	56	TPP	GRSH	POL	
40705-113	43	TPP	GRSH	POL	
40705-114	58	TPP	GRSH	POL	
40705-115	40	TPP	GRSH	POL	
40705-116	38	GRA	PE	PE	
40705-117	44	TPP	GRSH	POL	
40705-118	71	TPP	GRSH	POL	
40705-119	38	TPP	GRSH	POL	
40705-120	63	TPP	DEFER		
40705-121	77	GRA	PE	PE	
40705-122	46	TPP	GRSH	POL	
40705-123	85	TPP	GRSH	POL	
40705-124	79	TPP	GRSH	POL	
40705-125	30	TPP	GRSH	POL	
40705-126	78	TPP	GRSH	POL	
40705-127	32	TPP	GRSH	POL	
40705-128	16	TPP	GRSH	POL, HWDR	
40705-129	33	TPP	GRSH	POL, HWDR	
40705-130	91	TPP	DEFER		
40705-131	43	TPP	DEFER		
40705-132	58	GRA	PE	PE	
40705-133	7	GRA	PE	PE	
40705-134	21	TPP	GRSH	POL	
40705-135	42	GRA	PE	PE	
40705-136	17	TAA	DEFER		
40705-137	59	GRA	PE	PE	
40705-138	17	TPP	DEFER		
40705-139	76	TPP	SANITATION		

40705-140	63	TPP	SANITATION		
40705-141	80	TPP	DEFER		
40705-142	35	GRA	PE	PE	
40705-143	59	TPP	SANITATION		
40705-144	54	TPP	DEFER		
40705-145	66	GRA	PE	PE	
40705-146	53	GRA	PE	PE	
40705-147	48	GRA	PE	PE	
40705-148	67	TPP	DEFER		
40705-149	28	TPP	DEFER		
40705-150	56	TPP	SANITATION		
40705-151	78	TPP	SANITATION		
40705-152	45	TPP	SANITATION		
40705-153	54	TPP	GRSH		
40705-154	14	GRA	PE	PE	14
40705-155	33	TPP	DEFER		31
40705-156	28	TPP	GRSH	POL, HWDR	
40705-157	43	TPP	DEFER		
40705-158	56	GRA	PE	PE	35
40705-159	22	GRA	PE	PE	
40705-160	54	TPP	DEFER		
40705-161	19	GRA	PE	PE	
40705-162	35	TPP	SANITATION		
40705-163	42	TPP	SANITATION		
40705-164	31	TPP	GRSH	POL	
40705-165	62	TPP	GRSH	POL	
40705-166	32	TPP	DEFER	FUELS	32
40705-167	51	TPP	DEFER	FUELS	49
40705-168	69	TPP	DEFER		67
40705-169	20	TPP	DEFER	FUELS	20
40705-170	3	TPP	DEFER	FUELS	
40705-171	17	TPP	SANITATION		
40705-172	14	TPP	DEFER		
40705-173	10	GRA	PE	PE	
40705-174	28	TPP	SANITATION		
40705-175	5	GRA	PE	PE	5
40705-176	24	TPP	DEFER		24
40705-178	14	TPP	GRSH	HWDR	
40801-1	10	TPP	DEFER	POL	
40801-2	25	TPP	SANITATION	POL	
40801-3	46	TPP	DEFER		
40801-4	70	TPP	SANITATION		
40801-5	19	TPP	DEFER	POL	
40801-6	22	TPP	SANITATION		
40801-7	45	TPP	SANITATION		
40801-8	67	TPP	SANITATION	FUELS	
40801-9	16	TPP	DEFER	POL	
40801-10	53	TPP	GRSH	POL	
40801-11	18	GRA	PE	PE	
40801-12	58	GRA	PE	PE	
40801-13	38	TPP	GRSH	POL	
40801-14	10	GRA	PE	PE	
40801-15	7	TPP	DEFER		
40801-16	6	GRA	DEFER		

40802-1	47	TPP	DEFER	FUELS	47
40802-2	55	TPP	DEFER		55
40802-3	35	TPP	DEFER		
40802-4	75	TPP	SWSC		
40802-5	59	TPP	SWSC		
40802-6	36	TPP	SANITATION		
40802-7	37	TPP	CTHIN		29
40802-8	32	TPP	GRSH		32
40802-9	42	TPP	GRSH		42
40802-10	65	TPP	GRSH	POL, HWDR	65
40802-11	59	TPP	GRSH	POL	
40802-12	51	TPP	DEFER		
40802-13	32	TPP	SWSC		
40802-14	29	TPP	SANITATION		
40802-15	65	TPP	DEFER	POL	
40802-16	8	GRA	PE	PE	
40802-17	41	TAA	HWDR	HWDR	27
40802-18	26	TPP	SWSC		26
40802-19	44	TPP	SANITATION		44
40802-20	52	TPP	SANITATION		51
40802-21	74	TPP	GRSH	POL	70
40802-22	25	TAA	HWDR	HWDR	14
40802-23	52	TPP	SANITATION		
40802-24	62	TPP	SANITATION		
40802-25	31	TPP	GRSH	POL	5
40802-26	19	TPP	GRSH	POL	
40802-27	74	TPP	GRSH	POL	74
40802-28	30	TPP	GRSH	POL	30
40802-29	20	GRA	PE	PE	14
40802-30	106	TPP	SANITATION	POL	40
40802-31	63	TPP	SANITATION		
40802-32	84	TPP	SANITATION		
40802-33	72	TPP	SANITATION		
40802-34	50	TPP	DEFER	FUELS	22
40802-35	26	TPP	SANITATION	FUELS	
40802-36	17	TPP	GRSH	POL, HWDR	
40802-37	23	TPP	GRSH	POL	23
40802-38	43	TPP	GRSH	POL	43
40802-39	41	TPP	GRSH	POL	41
40802-40	61	TPP	GRSH	POL	61
40802-41	72	TPP	GRSH	POL	72
40802-42	70	TPP	GRSH	POL	70
40802-43	53	TPP	GRSH	POL	52
40802-44	58	GRA	PE	PE	9
40802-45	74	TPP	CTHIN	POL	49
40802-46	91	GRA	PE	PE	69
40802-47	78	TPP	SANITATION	FUELS	77
40802-48	4	GRA	PE	PE	4
40802-49	41	TPP	GRSH	POL	41
40802-50	79	TPP	CTHIN	POL	79
40802-51	73	TPP	CTHIN	POL	
40802-52	69	TPP	SANITATION	FUELS	
40802-53	75	TPP	DEFER	FUELS	
40802-54	53	TPP	SANITATION		

40803-101	69	TPP	GRSH	POL	
40803-102	119	TPP	SANITATION		
40803-103	54	TPP	GRSH	POL	
40803-104	111	TPP	GRSH	POL	103
40803-105	33	TPP	SANITATION		
40803-106	102	TPP	DEFER		
40803-107	55	TPP	GRSH	POL	
40803-108	69	TPP	CTHIN	POL	69
40803-109	50	TPP	CTHIN	POL	50
40803-110	100	TPP	GRSH	POL	100
40803-111	42	TPP	SANITATION		
40803-112	30	TPP	CTHIN	POL	
40803-113	33	TPP	SWSC	HWDR	
40803-114	36	TPP	DEFER		32
40803-115	43	TPP	CTHIN	POL	32
40803-116	68	TPP	DEFER	FUELS	
40803-117	24	TPP	CTHIN	POL	
40803-118	49	TPP	DEFER	POL	
40803-119	37	TPP	DEFER		
40803-120	30	TPP	DEFER		
40803-121	61	TPP	CTHIN	POL	
40803-122	18	TPP	SANITATION		
40803-123	25	TPP	SANITATION		
40803-124	66	TPP	DEFER	POL	
40803-125	100	TPP	DEFER		
40803-126	18	TPP	CTHIN	HWDR	18
40803-127	105	GRA	PE	PE	14
40803-128	52	GRA	PE	PE	21
40803-129	28	TPP	OSR	POL	
40803-130	30	TPP	SANITATION		
40803-131	4	GRA	PE	PE	
40803-132	31	TPP	DEFER		31
40803-133	21	TPP	CTHIN	POL	
40803-134	1	TPP	SANITATION		
40803-135	4	GRA	PE	PE	
40803-143	8	TPP	DEFER		
40804-101	40	TPP	CTHIN	POL	
40804-102	69	TPP	SANITATION		
40804-103	41	TPP	CTHIN	POL, HWDR	
40804-104	28	TPP	CTHIN	POL	24
40804-105	25	GRA	PE	PE	25
40804-106	6	GRA	PE	PE	6
40804-107	19	TPP	DEFER		17
40804-108	56	TPP	GRSH	POL, HWDR	56
40804-109	27	TPP	CTHIN	POL	26
40804-110	11	GRA	PE	PE	
40804-111	10	TPP	SANITATION		
40804-112	47	TPP	SANITATION		
40804-113	44	GRA	PE	PE	12
40804-115	24	TPP	GRSH	POL, Deadfall	24
40804-116	28	GRA	PE	PE	24
40804-117	80	TPP	SANITATION		
40804-118	11	GRA	PE	PE	

40804-119	73	TPP	CTHIN	POL, Deadfall	10
40804-120	56	TPP	CTHIN	POL, Deadfall	3
40804-121	15	GRA	PE	PE	9
40804-122	11	TAA	HWDR	HWDR	6
40804-123	64	TPP	CTHIN	POL, Deadfall	15
40804-124	50	TPP	SANITATION	DEADFALL	10
40804-125	15	TAA	HWDR	HWDR	12
40804-126	12	TPP	DEFER		
40804-129	20	TPP	DEFER	DEADFALL	20
40804-130	44	TPP	CTHIN	POL, Deadfall	
40804-131	3	TAA	HWDR	HWDR	
40804-133	24	TPP	DEFER		24
40804-134	47	TPP	DEFER	DEADFALL	45
40804-135	20	TPP	DEFER		16
40804-136	22	TPP	DEFER		
40804-137	37	TPP	DEFER	DEADFALL	19
40804-140	125	TPP	DEFER	DEADFALL	123
40805-101	64	TPP	SANITATION		
40805-102	49	TPP	SANITATION		
40805-103	27	TPP	SANITATION		
40805-104	51	TPP	SANITATION		
40805-107	80	GRA	PE	PE	33
40805-109	27	TPP	DEFER		27
40805-121	28	TPP	DEFER	Deadfall, HWDR	
40805-125	77	TPP	DEFER		
40805-126	38	TPP	DEFER	DEADFALL	
40805-127	18	TPP	DEFER		
40805-128	10	TPP	DEFER		10
40805-129	23	TPP	DEFER		23
40805-132	29	TPP	DEFER	DEADFALL	29
40805-133	34	TPP	DEFER	DEADFALL	34
40805-135	33	TPP	SANITATION		33
40805-136	63	TPP	DEFER		63
40805-137	6	TPP	SANITATION		6
40805-138	29	TPP	DEFER		29
40805-139	10	TAA	HWDR	HWDR	10
40805-140	7	TAA	DEFER	HWDR	7
40805-141	18	TPP	DEFER	DEADFALL	18
40805-142	56	TPP	SANITATION		56
40805-143	18	TPP	DEFER		7
40805-144	43	TPP	GRSH	POL	
40805-145	29	TPP	DEFER	DEADFALL	15
40805-146	13	TPP	DEFER		
40805-147	44	TPP	DEFER	DEADFALL	
40805-148	48	TPP	DEFER	DEADFALL	
40805-149	110	TPP	DEFER	DEADFALL	100
40805-151	26	TPP	OSR		26
40805-152	39	TPP	CTHIN	POL, deadfall	39
40805-153	28	TPP	SANITATION		

40805-154	16	TPP	DEFER	DEADFALL	15
40806-101	35	TPP	CTHIN	POL	
40806-102	84	TPP	SANITATION		
40806-103	96	TPP	DEFER	POL	
40806-104	37	TPP	DEFER	DEADFALL	
40806-105	55	TPP	DEFER	POL	
40806-106	39	TPP	DEFER		
40806-107	41	TPP	CTHIN	POL	
40806-108	62	TPP	CTHIN	POL	
40806-109	74	TPP	DEFER		
40806-110	34	TPP	DEFER		
40806-111	48	TPP	CTHIN	POL	
40806-112	20	TPP	CTHIN	POL	
40806-113	5	GRA	PE	PE	
40806-114	25	TPP	CTHIN	POL	
40806-115	61	TPP	DEFER		
40806-116	72	TPP	SANITATION	DEADFALL	
40806-117	18	TPP	DEFER	DEADFALL	
40806-118	95	GRA	PE	PE	
40806-119	15	TPP	DEFER	DEADFALL	
40806-120	40	TPP	CTHIN	POL, HWDR	
40806-121	45	TPP	CTHIN	HWDR	
40806-122	49	TPP	SANITATION		
40806-123	26	TPP	SANITATION		
40806-124	18	TPP	SANITATION		
40806-125	37	TPP	CTHIN	HWDR	
40806-126	66	TPP	CTHIN	POL	
40806-127	21	TPP	CTHIN	POL	
40806-128	52	TPP	CTHIN	POL	
40806-129	34	TPP	CTHIN	POL	
40806-130	30	TPP	CTHIN	POL	
40806-131	70	TPP	CTHIN	POL	48
40806-132	106	TPP	SWSC		
40806-133	56	TPP	DEFER	POL	
40806-134	84	TPP	OSR	POL	
40806-135	26	TPP	DEFER	DEADFALL	26
40806-137	65	TPP	CTHIN	POL	59
40806-138	91	TPP	SANITATION		
40806-139	15	TPP	SANITATION		
40806-140	77	TPP	DEFER	DEADFALL	77
40806-141	53	TPP	SANITATION	DEADFALL	52
40806-142	112	TPP	DEFER	DEADFALL	110
40806-143	9	GRA	PE	DEFER	8
40806-144	38	GRA	PE	PE	35
40806-145	15	TPP	SANITATION		
40806-146	38	GRA	PE	PE	
40806-147	10	TPP	DEFER		
40807-101	19	TPP	DEFER		
40807-102	16	TPP	DEFER		
40807-103	21	TPP	DEFER		
40807-104	14	GRA	PE	PE	
40807-105	69	TPP	SANITATION		67
40807-106	39	TPP	SANITATION		20
40807-107	67	TPP	DEFER		

40807-108	13	GRA	PE	PE	
40807-109	74	TPP	DEFER	DEADFALL	
40807-110	63	TPP	DEFER		
40807-111	21	TPP	SANITATION		21
40807-112	94	TPP	DEFER	DEADFALL	79
40807-114	9	TPP	DEFER		9
40807-115	40	TPP	SANITATION	DEADFALL	28
40807-116	32	GRA	PE	PE	9
40807-118	29	TPP	SANITATION	DEADFALL	29
40807-119	57	TPP	DEFER		
40807-120	38	TPP	DEFER	DEADFALL	
40807-121	53	TPP	DEFER		
40807-123	21	GRA	PE	PE	
40807-124	54	TPP	DEFER	DEADFALL	
40807-126	102	TPP	DEFER		
40807-128	60	TPP	DEFER	DEADFALL	
40807-129	29	TPP	GRSH	POL	
40807-130	21	TPP	SANITATION	DEADFALL	17
40807-131	19	TPP	DEFER		
40807-132	24	TPP	DEFER	DEADFALL	
40807-133	28	TPP	DEFER		
40807-134	44	TPP	DEFER		
40807-135	8	GRA	DEFER	DEFER	
40807-136	80	TPP	DEFER		
40807-137	58	TPP	DEFER		
40807-138	36	TPP	DEFER		
40807-139	20	GRA	PE	PE	
40807-140	22	TPP	DEFER		
40807-141	28	TPP	DEFER	DEADFALL	
40807-142	38	TPP	DEFER	DEADFALL	
40807-143	34	TPP	DEFER		
40807-144	53	TPP	DEFER		
40807-145	25	TPP	DEFER		
40807-151	7	TPP	SANITATION		7
40807-152	38	TPP	DEFER		
40807-153	24	TPP	DEFER	DEADFALL	10
40808-101	29	TPP	DEFER		
40808-102	23	TPP	CTHIN	POL	
40808-103	40	TPP	CTHIN	POL	
40808-104	44	TPP	CTHIN	POL	
40808-105	56	TPP	SANITATION		
40808-106	139	TPP	SANITATION		
40808-107	14	GRA	PE	PE	
40808-108	34	GRA	PE	PE	
40808-109	67	TPP	CTHIN	POL	
40808-110	21	GRA	PE	PE	
40808-111	5	TPP	DEFER		
40808-112	41	TPP	DEFER	DEADFALL	
Total Acres	24,548				6,295

Alternative 3 Treatments and Post-Sale Activities

Alternative Prescription Abbreviations:

CTHIN – Commercial Thin
 GRSH – Group Shelterwood
 HDWC – Hardwood Conversion
 HDWR – Hardwood Release
 OSR – Overstory Removal
 PE – Pine Encroachment
 POL – POL Thinning
 SWSC – Shelterwood Seed Cut

Cover Type Abbreviations:

TPP – Ponderosa Pine
 TAA – Aspen
 GRA – Grass, meadow

Location/Site	Site Acres	Post Sale Cover Type	Alternative 2 Prescription	Alternative 2 Post Sale Activities	Alternative 2 Prescribe Burning Acres
40401-118	10	TAA	DEFER		
40502-18	47	TPP	HWDC	HWDR	47
40502-19	49	TPP	GRSH	POL, HWDR	19
40502-20	30	TPP	GRSH	POL, HWDR	17
40502-21	33	TPP	SANITATION		
40502-22	27	TAA	HWDR	HWDR	27
40502-23	28	TPP	HWDC	POL, HWDR	27
40502-24	62	TPP	GRSH	FUELS	
40502-25	37	TPP	GRSH	FUELS	37
40502-26	20	TAA	HWDR	HWDR	20
40502-27	48	TAA	HWDC	HWDR	48
40502-28	47	TAA	HWDR	HWDR	47
40502-39	40	TPP	GRSH	FUELS	6
40502-40	44	TPP	GRSH	POL	9
40502-41	55	TPP	GRSH	FUELS	
40502-45	45	GRA	PE	PE	45
40502-49	20	TPP	GRSH	FUELS	
40502-51	37	GRA	PE	PE	37
40502-52	12	GRA	PE	PE	12
40502-63	20	TPP	CTHIN	POL	20
40502-64	27	TAA	HWDR	HWDR	27
40502-65	9	TPP	SANITATION		9
40701-1	100	TPP	GRSH	FUELS	
40701-2	95	TPP	CTHIN	POL	
40701-4	54	TPP	SANITATION		
40701-5	81	TPP	SANITATION		
40701-6	11	GRA	PE	PE	
40701-7	97	TPP	GRSH	POL	
40701-8	58	GRA	PE	PE	17
40701-9	41	TPP	SANITATION		
40701-10	94	TPP	GRSH	POL	94
40701-11	31	TPP	GRSH	FUELS	30

40701-12	35	TPP	GRSH	POL	34
40701-13	83	TPP	GRSH	POL	83
40701-14	32	TPP	GRSH	FUELS	31
40701-15	28	TPP	GRSH		28
40701-16	75	TPP	GRSH	POL	75
40701-17	15	TPP	GRSH	POL	
40701-18	110	TPP	GRSH	POL	
40701-19	93	TPP	GRSH	POL	93
40701-20	35	TPP	GRSH	POL	
40701-21	71	TPP	GRSH		
40701-23	73	TPP	GRSH	POL	
40701-24	34	TPP	GRSH		
40701-25	63	TPP	GRSH	POL	63
40701-26	220	TPP	GRSH	POL	
40701-28	64	TPP	GRSH		62
40701-30	72	TPP	GRSH		
40701-31	65	TPP	GRSH	HWDR	63
40701-32	51	TPP	GRSH	POL, HWDR	50
40701-33	63	TPP	GRSH	POL	
40701-35	25	GRA	PE	PE	
40701-36	17	TPP	GRSH	POL	
40701-37	45	TPP	GRSH	POL	
40701-38	53	TPP	GRSH	POL	
40701-39	67	TPP	GRSH	POL	
40701-40	90	GRA	PE	PE	41
40701-41	35	GRA	PE	PE	
40701-42	17	TPP	GRSH		17
40701-43	4	GRA	PE	PE	4
40701-45	33	TPP	GRSH	POL	33
40702-1	131	TPP	SANITATION		
40702-2	85	TPP	GRSH	POL	83
40702-3	59	TPP	SANITATION		59
40702-4	58	TPP	SANITATION		58
40702-5	7	TPP	GRSH		
40702-6	17	TPP	SANITATION		
40702-7	50	TPP	SWSC		
40702-8	30	TPP	SWSC		
40702-9	68	TPP	SWSC		
40702-10	45	TPP	GRSH		
40702-11	29	TPP	GRSH		20
40702-12	92	TPP	GRSH	POL	56
40702-13	68	TPP	GRSH	POL	68
40702-14	25	GRA	PE	PE	
40702-15	81	TPP	GRSH	POL	
40702-16	53	TPP	GRSH	POL	53
40702-17	78	TPP	SANITATION		75
40702-18	22	GRA	PE	PE	22
40702-19	84	TPP	GRSH	POL	84
40702-20	56	TPP	GRSH	POL	56
40702-21	109	TPP	GRSH	POL	109
40702-22	22	TAA	HWDR	HWDR	22
40702-23	203	GRA	PE	PE	78
40702-24	48	TPP	GRSH	POL	
40702-25	9	TAA	DEFER		

40702-26	50	TPP	SANITATION		
40702-27	42	TPP	SANITATION		
40702-28	29	TPP	GRSH		
40702-29	40	TPP	SANITATION		
40702-30	24	TPP	SANITATION		
40702-31	50	TPP	GRSH	POL	44
40702-32	73	TPP	GRSH	POL	
40702-33	52	GRA	PE	PE	5
40702-34	49	TPP	CTHIN		
40702-35	61	TPP	CTHIN	POL, HWDR	
40702-36	24	GRA	PE	PE	
40702-37	27	TPP	GRSH	POL, HWDR	27
40702-38	10	TPP	SANITATION		
40702-39	37	TPP	SANITATION		
40702-40	33	TPP	GRSH	POL	
40702-41	56	TPP	GRSH	POL	
40702-42	35	TPP	GRSH	POL	
40702-43	28	TPP	GRSH	POL	
40702-44	47	TPP	GRSH	POL	47
40702-45	74	TPP	GRSH	POL	74
40702-46	63	TPP	GRSH	POL	
40702-47	23	TPP	GRSH	POL	
40702-48	40	TPP	GRSH	POL	
40702-49	55	TPP	GRSH	POL, HWDR	
40702-50	82	TPP	GRSH	POL, HWDR	
40702-51	49	TPP	SANITATION		
40702-52	76	TPP	GRSH	POL, HWDR	
40702-53	62	TPP	GRSH	POL, HWDR	
40702-54	32	TPP	GRSH	POL, HWDR	
40702-55	47	TPP	GRSH	POL	
40702-56	66	TPP	CTHIN	POL	
40702-57	35	TPP	GRSH	FUELS	
40702-58	16	TPP	GRSH		
40702-59	58	TPP	GRSH	POL	
40702-60	59	TPP	GRSH	POL	
40702-61	7	GRA	PE	PE	
40702-62	39	TPP	GRSH	POL	
40702-63	58	TPP	GRSH	POL, HWDR	
40702-64	57	TPP	GRSH	POL	
40702-65	40	TPP	GRSH	POL	
40702-66	55	TPP	GRSH	POL, HWDR	
40702-67	58	TPP	SWSC	POL, HWDR	
40702-68	68	TPP	SANITATION		
40702-69	36	TPP	SANITATION		
40702-70	82	GRA	PE	PE	5
40702-71	18	TPP	GRSH		
40702-72	36	TPP	GRSH		
40702-73	22	TPP	GRSH		20
40702-74	11	TPP	GRSH	POL	11
40702-77	25	TPP	DEFER		
40702-78	4	GRA	PE	PE	
40702-79	18	TPP	GRSH		
40702-80	50	TPP	GRSH	POL	
40702-81	1	TAA	HWDR	HWDR	

40702-82	5	TPP	SANITATION		
40703-1	32	TPP	GRSH		
40703-2	38	TPP	GRSH		
40703-3	9	GRA	PE	PE	
40703-4	41	TPP	GRSH	POL	
40703-5	12	TPP	GRSH		
40703-6	30	TPP	GRSH		
40703-7	12	TPP	GRSH	POL	
40703-8	32	TPP	GRSH	POL	
40703-9	19	TPP	GRSH		
40703-10	29	TPP	SANITATION		
40703-11	50	TPP	GRSH	FUELS	
40703-12	9	GRA	PE	PE	
40703-13	69	TPP	GRSH	POL	
40703-14	39	TPP	GRSH	FUELS	
40703-15	43	TPP	GRSH	FUELS	
40703-16	44	TPP	SANITATION		
40703-17	51	TPP	GRSH		
40703-18	68	TPP	SANITATION		
40703-19	37	TPP	GRSH		
40703-20	12	GRA	PE	PE	
40703-21	20	TPP	GRSH	FUELS	
40703-22	24	TPP	GRSH		
40703-23	36	GRA	PE	PE	
40703-24	36	TPP	GRSH		
40703-26	74	TPP	GRSH		
40703-30	25	TPP	GRSH		
40703-32	49	GRA	PE	PE	
40703-33	18	TPP	GRSH	FUELS	
40703-34	56	TPP	GRSH	FUELS	
40703-35	68	TPP	GRSH	FUELS	
40703-36	14	TAA	DEFER		
40703-38	25	TPP	GRSH	FUELS	
40703-40	15	TAA	DEFER		
40704-1	64	TPP	GRSH		
40704-2	58	TPP	GRSH		
40704-3	18	GRA	PE	PE	
40704-4	49	TPP	SANITATION	FUELS	
40704-5	4	GRA	PE	PE	
40704-6	64	TPP	GRSH	POL	
40704-7	52	TPP	GRSH		
40704-8	51	TPP	GRSH		
40704-9	55	TPP	GRSH	POL	
40704-10	69	TPP	GRSH	POL	68
40704-11	46	GRA	PE	PE	12
40704-12	60	TPP	GRSH		
40704-13	53	TPP	GRSH		
40704-14	30	TPP	SANITATION		
40704-15	23	GRA	PE	PE	
40704-16	47	TPP	GRSH	POL	46
40704-17	51	TPP	GRSH	POL	50
40704-18	42	TPP	GRSH	POL	41
40704-19	46	TPP	GRSH	POL	46
40704-20	51	TPP	GRSH	POL	50

40704-21	32	TPP	GRSH		
40704-22	56	TPP	GRSH	POL	
40704-23	40	TPP	GRSH	POL	
40704-24	82	TPP	GRSH	FUELS	19
40704-25	35	GRA	PE	PE	10
40704-26	52	TPP	GRSH	POL	52
40704-27	56	TPP	GRSH	POL	55
40704-28	35	TPP	GRSH		30
40704-29	9	GRA	PE	PE	
40704-30	87	TPP	GRSH	POL	
40704-31	44	TPP	GRSH	POL	
40704-35	12	TPP	SANITATION		
40704-36	27	TPP	DEFER	POL	
40705-101	15	GRA	PE	PE	
40705-102	9	TAA	HWDR		
40705-103	109	TPP	GRSH	POL	
40705-104	13	TPP	GRSH		
40705-105	69	GRA	PE	PE	
40705-106	32	TPP	GRSH	POL	
40705-107	41	TPP	GRSH		
40705-108	30	TPP	GRSH		
40705-109	12	TPP	GRSH	FUELS	
40705-110	46	TPP	GRSH	POL	
40705-111	25	TPP	GRSH		
40705-112	56	TPP	GRSH	POL	
40705-113	43	TPP	GRSH	POL	
40705-114	58	TPP	GRSH	POL	
40705-115	40	TPP	GRSH	POL	
40705-116	38	GRA	PE	PE	
40705-117	44	TPP	GRSH	POL	
40705-118	71	TPP	GRSH	POL	
40705-119	38	TPP	GRSH	POL	
40705-120	63	TPP	GRSH		
40705-121	77	GRA	PE	PE	5
40705-122	46	TPP	GRSH	POL	
40705-123	85	TPP	GRSH	POL	
40705-124	79	TPP	GRSH	POL	
40705-125	30	TPP	GRSH	POL	
40705-126	78	TPP	GRSH	POL	
40705-127	32	TPP	GRSH	POL	
40705-128	16	TPP	GRSH	POL, HWDR	
40705-129	33	TPP	GRSH	POL, HWDR	11
40705-130	91	TPP	GRSH	POL	29
40705-131	43	TPP	GRSH	POL	7
40705-132	58	GRA	PE	PE	23
40705-133	7	GRA	PE	PE	
40705-134	21	TPP	GRSH	POL	
40705-135	42	GRA	PE	PE	
40705-136	17	TAA	DEFER		
40705-137	59	GRA	PE	PE	34
40705-138	17	TPP	GRSH	POL	17
40705-139	76	TPP	SANITATION		
40705-140	63	TPP	SANITATION		
40705-141	80	TPP	GRSH		

40705-142	35	GRA	PE	PE	
40705-143	59	TPP	SANITATION		
40705-144	54	TPP	GRSH	POL	
40705-145	66	GRA	PE	PE	
40705-146	53	GRA	PE	PE	52
40705-147	48	GRA	PE	PE	42
40705-148	67	TPP	DEFER		
40705-149	28	TPP	DEFER		
40705-150	56	TPP	SANITATION		
40705-151	78	TPP	SANITATION		
40705-152	45	TPP	SANITATION		
40705-153	54	TPP	GRSH		
40705-154	14	GRA	PE	PE	14
40705-155	33	TPP	GRSH		31
40705-156	28	TPP	GRSH	POL, HWDR	
40705-157	43	TPP	GRSH		
40705-158	56	GRA	PE	PE	35
40705-159	22	GRA	PE	PE	
40705-160	54	TPP	GRSH		
40705-161	19	GRA	PE	PE	
40705-162	35	TPP	SANITATION		
40705-163	42	TPP	GRSH		
40705-164	31	TPP	GRSH	POL	
40705-165	62	TPP	GRSH	POL	
40705-166	32	TPP	GRSH	FUELS	32
40705-167	51	TPP	GRSH	FUELS	49
40705-168	69	TPP	GRSH		67
40705-169	20	TPP	GRSH	FUELS	20
40705-170	3	TPP	GRSH	FUELS	
40705-171	17	TPP	SANITATION		
40705-172	14	TPP	DEFER		14
40705-173	10	GRA	PE	PE	
40705-174	28	TPP	SANITATION		
40705-175	5	GRA	PE	PE	5
40705-176	24	TPP	GRSH		24
40705-178	14	TPP	GRSH	HWDR	
40801-1	10	TPP	GRSH	POL	
40801-2	25	TPP	GRSH	POL	
40801-3	46	TPP	GRSH		
40801-4	70	TPP	SANITATION		
40801-5	19	TPP	GRSH	POL	
40801-6	22	TPP	GRSH		
40801-7	45	TPP	SANITATION		
40801-8	67	TPP	GRSH	FUELS	
40801-9	16	TPP	GRSH	POL	
40801-10	53	TPP	GRSH	POL	
40801-11	18	GRA	PE	PE	
40801-12	58	GRA	PE	PE	
40801-13	38	TPP	GRSH	POL	
40801-14	10	GRA	PE	PE	
40801-15	7	TPP	DEFER		
40801-16	6	GRA	DEFER		
40802-1	47	TPP	GRSH	FUELS	47
40802-2	55	TPP	GRSH		55

40802-3	35	TPP	GRSH		
40802-4	75	TPP	SWSC		
40802-5	59	TPP	SWSC		
40802-6	36	TPP	SANITATION		
40802-7	37	TPP	CTHIN		29
40802-8	32	TPP	GRSH		32
40802-9	42	TPP	GRSH		42
40802-10	65	TPP	GRSH	POL, HWDR	65
40802-11	59	TPP	GRSH	POL	
40802-12	51	TPP	DEFER		
40802-13	32	TPP	SWSC		
40802-14	29	TPP	SANITATION		
40802-15	65	TPP	GRSH	POL	
40802-16	8	GRA	PE	PE	
40802-17	41	TAA	HWDR	HWDR	27
40802-18	26	TPP	SWSC		26
40802-19	44	TPP	SANITATION		44
40802-20	52	TPP	SANITATION		51
40802-21	74	TPP	GRSH	POL	70
40802-22	25	TAA	HWDR	HWDR	14
40802-23	52	TPP	SANITATION	POL	
40802-24	62	TPP	SANITATION	POL	
40802-25	31	TPP	GRSH	POL	5
40802-26	19	TPP	GRSH	POL	
40802-27	74	TPP	GRSH	POL	74
40802-28	30	TPP	GRSH	POL	30
40802-29	20	GRA	PE	PE	14
40802-30	106	TPP	SANITATION	POL	40
40802-31	63	TPP	SANITATION	POL	
40802-32	84	TPP	SANITATION	POL	
40802-33	72	TPP	SANITATION	POL	
40802-34	50	TPP	GRSH	FUELS	22
40802-35	26	TPP	GRSH	FUELS	
40802-36	17	TPP	GRSH	POL, HWDR	
40802-37	23	TPP	GRSH	POL	23
40802-38	43	TPP	GRSH	POL	43
40802-39	41	TPP	GRSH	POL	41
40802-40	61	TPP	GRSH	POL	61
40802-41	72	TPP	GRSH	POL	72
40802-42	70	TPP	GRSH	POL	70
40802-43	53	TPP	GRSH	POL	52
40802-44	58	GRA	PE	PE	9
40802-45	74	TPP	CTHIN	POL	49
40802-46	91	GRA	PE	PE	69
40802-47	78	TPP	GRSH	POL	77
40802-48	4	GRA	PE	PE	4
40802-49	41	TPP	GRSH	POL	41
40802-50	79	TPP	CTHIN	POL	79
40802-51	73	TPP	CTHIN	POL	
40802-52	69	TPP	SANITATION	FUELS	
40802-53	75	TPP	GRSH	FUELS	
40802-54	53	TPP	GRSH		
40803-101	69	TPP	GRSH	POL	
40803-102	119	TPP	SANITATION		

40803-103	54	TPP	GRSH	POL	
40803-104	111	TPP	GRSH	POL	103
40803-105	33	TPP	SANITATION		
40803-106	102	TPP	GRSH		
40803-107	55	TPP	GRSH	POL	
40803-108	69	TPP	CTHIN	POL	69
40803-109	50	TPP	CTHIN	POL	50
40803-110	100	TPP	GRSH	POL	100
40803-111	42	TPP	SANITATION		
40803-112	30	TPP	CTHIN	POL	
40803-113	33	TPP	SWSC	HWDR	
40803-114	36	TPP	GRSH		32
40803-115	43	TPP	CTHIN	POL	32
40803-116	68	TPP	GRSH	FUELS	
40803-117	24	TPP	CTHIN	POL	
40803-118	49	TPP	GRSH	POL	
40803-119	37	TPP	GRSH		
40803-120	30	TPP	GRSH		
40803-121	61	TPP	CTHIN	POL	
40803-122	18	TPP	SANITATION		
40803-123	25	TPP	SANITATION		
40803-124	66	TPP	GRSH	POL	
40803-125	100	TPP	GRSH		
40803-126	18	TPP	CTHIN	HWDR	18
40803-127	105	GRA	PE	PE	14
40803-128	52	GRA	PE	PE	21
40803-129	28	TPP	OSR	POL	
40803-130	30	TPP	SANITATION		
40803-131	4	GRA	PE	PE	
40803-132	31	TPP	GRSH		31
40803-133	21	TPP	CTHIN	POL	
40803-134	1	TPP	SANITATION		
40803-135	4	GRA	PE	PE	
40803-143	8	TPP	GRSH		
40804-101	40	TPP	CTHIN	POL	
40804-102	69	TPP	SANITATION		
40804-103	41	TPP	CTHIN	POL, HWDR	
40804-104	28	TPP	CTHIN	POL	24
40804-105	25	GRA	PE	PE	25
40804-106	6	GRA	PE	PE	6
40804-107	19	TPP	GRSH		17
40804-108	56	TPP	GRSH	POL, HWDR	56
40804-109	27	TPP	CTHIN	POL	26
40804-110	11	GRA	PE	PE	
40804-111	10	TPP	SANITATION		
40804-112	47	TPP	SANITATION		
40804-113	44	GRA	PE	PE	12
40804-115	24	TPP	GRSH	POL, Deadfall	24
40804-116	28	GRA	PE	PE	24
40804-117	80	TPP	SANITATION		
40804-118	11	GRA	PE	PE	
40804-119	73	TPP	CTHIN	POL, Deadfall	10

40804-120	56	TPP	CTHIN	POL, Deadfall	3
40804-121	15	GRA	PE	PE	9
40804-122	11	TAA	HWDR	HWDR	6
40804-123	64	TPP	CTHIN	POL, Deadfall	15
40804-124	50	TPP	SANITATION	DEADFALL	10
40804-125	15	TAA	HWDR	HWDR	
40804-126	12	TPP	DEFER		12
40804-129	20	TPP	GRSH	DEADFALL	20
40804-130	44	TPP	CTHIN	POL, Deadfall	
40804-131	3	TAA	HWDR	HWDR	
40804-133	24	TPP	GRSH		24
40804-134	47	TPP	DEFER	DEADFALL	45
40804-135	20	TPP	DEFER		16
40804-136	22	TPP	DEFER		
40804-137	37	TPP	GRSH	DEADFALL	19
40804-140	125	TPP	GRSH	DEADFALL	123
40805-101	64	TPP	SANITATION		
40805-102	49	TPP	SANITATION		
40805-103	27	TPP	SANITATION		
40805-104	51	TPP	SANITATION		
40805-107	80	GRA	PE	PE	33
40805-109	27	TPP	DEFER		27
40805-121	28	TPP	GRSH	Deadfall, HWDR	
40805-125	77	TPP	GRSH		
40805-126	38	TPP	GRSH	DEADFALL	
40805-127	18	TPP	DEFER		
40805-128	10	TPP	GRSH		10
40805-129	23	TPP	DEFER		23
40805-132	29	TPP	GRSH	DEADFALL	29
40805-133	34	TPP	DEFER	DEADFALL	34
40805-135	33	TPP	SANITATION		33
40805-136	63	TPP	DEFER		63
40805-137	6	TPP	SANITATION		6
40805-138	29	TPP	GRSH		29
40805-139	10	TAA	HWDR	HWDR	10
40805-140	7	TAA	DEFER	HWDR	7
40805-141	18	TPP	DEFER	DEADFALL	18
40805-142	56	TPP	SANITATION		56
40805-143	18	TPP	DEFER		7
40805-144	43	TPP	GRSH		
40805-145	29	TPP	DEFER	DEADFALL	15
40805-146	13	TPP	GRSH		
40805-147	44	TPP	DEFER	DEADFALL	
40805-148	48	TPP	GRSH	DEADFALL	
40805-149	110	TPP	GRSH	DEADFALL	100
40805-151	26	TPP	OSR		26
40805-152	39	TPP	CTHIN	POL, deadfall	39
40805-153	28	TPP	SANITATION		
40805-154	16	TPP	GRSH	DEADFALL	15
40806-101	35	TPP	CTHIN	POL	

40806-102	84	TPP	SANITATION		
40806-103	96	TPP	GRSH	POL	
40806-104	37	TPP	GRSH	DEADFALL	
40806-105	55	TPP	GRSH	POL	
40806-106	39	TPP	GRSH		
40806-107	41	TPP	CTHIN	POL	
40806-108	62	TPP	CTHIN	POL	
40806-109	74	TPP	GRSH		
40806-110	34	TPP	GRSH		
40806-111	48	TPP	CTHIN	POL	
40806-112	20	TPP	CTHIN	POL	
40806-113	5	GRA	PE	PE	
40806-114	25	TPP	CTHIN	POL	
40806-115	61	TPP	GRSH		
40806-116	72	TPP	GRSH	DEADFALL	
40806-117	18	TPP	GRSH	DEADFALL	
40806-118	95	GRA	PE	PE	
40806-119	15	TPP	GRSH	DEADFALL	
40806-120	40	TPP	CTHIN	POL, HWDR	
40806-121	45	TPP	CTHIN	HWDR	
40806-122	49	TPP	SANITATION		
40806-123	26	TPP	SANITATION		
40806-124	18	TPP	SANITATION		
40806-125	37	TPP	CTHIN	HWDR	
40806-126	66	TPP	CTHIN	POL	
40806-127	21	TPP	CTHIN	POL	
40806-128	52	TPP	CTHIN	POL	
40806-129	34	TPP	CTHIN	POL	
40806-130	30	TPP	CTHIN	POL	
40806-131	70	TPP	CTHIN	POL	48
40806-132	106	TPP	SWSC		
40806-133	56	TPP	GRSH	POL	
40806-134	84	TPP	OSR	POL	
40806-135	26	TPP	GRSH	DEADFALL	26
40806-137	65	TPP	CTHIN	POL	59
40806-138	91	TPP	SANITATION		
40806-139	15	TPP	SANITATION		
40806-140	77	TPP	GRSH	DEADFALL	77
40806-141	53	TPP	GRSH	DEADFALL	52
40806-142	112	TPP	GRSH	DEADFALL	110
40806-143	9	GRA	DEFER		8
40806-144	38	GRA	PE	PE	35
40806-145	15	TPP	SANITATION		
40806-146	38	GRA	PE	PE	
40806-147	10	TPP	DEFER		
40807-101	19	TPP	GRSH		
40807-102	16	TPP	GRSH		
40807-103	21	TPP	GRSH		
40807-104	14	GRA	PE	PE	
40807-105	69	TPP	SANITATION		67
40807-106	39	TPP	GRSH		20
40807-107	67	TPP	GRSH		
40807-108	13	GRA	PE	PE	
40807-109	74	TPP	DEFER	DEADFALL	

40807-110	63	TPP	GRSH		
40807-111	21	TPP	SANITATION		21
40807-112	94	TPP	GRSH	DEADFALL	78
40807-114	9	TPP	GRSH		9
40807-115	40	TPP	GRSH	DEADFALL	28
40807-116	32	GRA	PE	PE	9
40807-118	29	TPP	SANITATION	DEADFALL	29
40807-119	57	TPP	GRSH		
40807-120	38	TPP	GRSH	DEADFALL	
40807-121	53	TPP	DEFER		
40807-123	21	GRA	PE	PE	
40807-124	54	TPP	GRSH	DEADFALL	
40807-126	102	TPP	DEFER		
40807-128	60	TPP	GRSH	DEADFALL	
40807-129	29	TPP	GRSH	POL	
40807-130	21	TPP	GRSH	DEADFALL	17
40807-131	19	TPP	GRSH		
40807-132	24	TPP	DEFER	DEADFALL	
40807-133	28	TPP	DEFER		
40807-134	44	TPP	DEFER		
40807-135	8	GRA	DEFER		
40807-136	80	TPP	DEFER		
40807-137	58	TPP	DEFER		
40807-138	36	TPP	DEFER		
40807-139	20	GRA	PE	PE	
40807-140	22	TPP	GRSH		
40807-141	28	TPP	DEFER	DEADFALL	
40807-142	38	TPP	GRSH	DEADFALL	
40807-143	34	TPP	GRSH		
40807-144	53	TPP	GRSH		
40807-145	25	TPP	DEFER		
40807-151	7	TPP	SANITATION		7
40807-152	38	TPP	DEFER		10
40807-153	24	TPP	GRSH	DEADFALL	
40808-101	29	TPP	GRSH		
40808-102	23	TPP	CTHIN	POL	
40808-103	40	TPP	CTHIN	POL	
40808-104	44	TPP	CTHIN	POL	
40808-105	56	TPP	SANITATION		
40808-106	139	TPP	SANITATION		
40808-107	14	GRA	PE	PE	
40808-108	34	GRA	PE	PE	
40808-109	67	TPP	CTHIN	POL	
40808-110	21	GRA	PE	PE	
40808-111	5	TPP	DEFER		
40808-112	41	TPP	GRSH	DEADFALL	
Total Acres	24,548				7,009

Riparian Fencing/Protection

Buck and Pole Fence (6240- option A): Alternatives 2 and 3

Construct buck and pole fence to protect water sources Redbank Spring (040705-145) and Willow Spring (040702-23).

FY 2011 estimated cost for 200 feet = \$3,096

800 feet planned: $4 \times \$3,096 = \$12,384$

Install Elk Cable: Alternatives 2 and 3

Install a length of elk cable on existing riparian exclosure fences to prevent elk knocking down the fence at Willow Spring (040702-23) and Herrin Wildlife Ponds (040802-44).

2500 feet planned: 40 cents/foot for cable = \$1,000;

Additional supplies and labor = \$1,500

Total estimate = \$2,500

Shrubs

Willow Planting with Protective Cages (6080): Alternatives 2 and 3

Collect native willow cuttings and grow at Bessey Nursery. Plant 200 willows per acre split between Willow Spring (040702-23) and Herrin Wildlife Ponds (040802-44). One cage per 5 willows.

FY 2011 estimated cost per acre = \$1,598.72

1 acre planned: $1 \times \$1,598.72 = \$1,598.72$

Habitat Access Management

Habitat Access Management- Berms (6240): Alternatives 2 and 3

Close with an earthen berm (or boulders) roads identified as non-essential, such as user created roads.

FY 2011 estimate per berm (closure) = \$419.00

20 closures planned: $20 \times \$419.00 = \$8,380.00$

Habitat Access Management- Carsonite Posts: Alternatives 2 and 3

Place carsonite post where user created roads are to be closed in the action alternatives.

FY 2011 estimate per carsonite post = \$40.00

50 carsonite posts planned: $50 \times \$40.00 = \$2,000.00$

Appendix E:

FINDINGS: SILVICULTURE

Silvicultural Findings of Compliance with Laws, Regulations, and Policy Briggs Spring EA

The following findings are made based on the environmental analysis and the silvicultural prescription:

Consistency with plans [16 U.S.C. 1604 (i)]:

1. Timber harvest would occur on lands suited for timber production or would occur in areas where timber harvest is permitted and is necessary to help achieve other resource management objectives.

All areas to be harvested are in the 5.1 Management Area (MA) – Resource Production Emphasis. Theme: *“These areas are managed for wood products, water yield, and forage production, while providing other commercial products, visual quality, diversity of wildlife and a variety of other goods and services. Numerous open roads provide commercial access and roaded recreation opportunities, while closed roads provide non-motorized recreation opportunities.”*

Table E-1. Alternative 2 treatment acres in MA 5.1

Treatment	MA 5.1
Commercial Thinning	2,204
Overstory Removal	138
Shelterwood Seed Cut	479
Group Shelterwood	6,376
Hardwood Conversion	123
Hardwood Release	250
Sanitation	6,063
Pine Encroachment	2,674

Table E-2. Alternative 3 treatment acres in MA 5.1

Treatment	MA 5.1
Commercial Thinning	2,204
Overstory Removal	138
Shelterwood Seed Cut	479
Group Shelterwood	13,845
Hardwood Conversion	123
Hardwood Release	259
Sanitation	3,678

Pine Encroachment	2,674
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2. Silvicultural treatments are consistent with the Forest Plan.

Forest Plan Standard 2408, Phase II Amendment, page II-25, for acceptable silvicultural systems.

Timber Harvest [16 U.S.C. 1604 (g)(3)(E)]:

1. Soil, slope, or other watershed conditions will not be irreversibly damaged;
See the Briggs Spring Hydrology specialist report.
2. There is assurance that the lands can be adequately restocked within five years after final regeneration harvest.

All stands within the project area that are to receive shelterwood removals can be adequately restocked within 5 years of harvest. The minimum tree stocking standards for Region 2 will be met. Region 2 minimum stocking standards are described in FSH 2409.26b Reforestation Handbook R2 Amendment No. 2409.26b – 93-2.

Regeneration surveys will be accomplished on all shelterwood seed cuts (3rd and 5th years), and on all selection cuts (5th year) to assure the stands have regenerated properly. There will be no clearcutting in the Briggs project area.

3. Streams, streambanks, shorelines, lakes, wetlands, and other bodies of water are protected from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment where harvests are likely to seriously and adversely affect water conditions or fish habitat.

See the Briggs Spring Hydrology specialist report.

4. The harvesting system to be used was not selected primarily because it will give the greatest dollar return or the greatest unit output of timber.

Even-aged Regeneration Harvests [16 U.S.C. 1604 (g)(3)(F)]:

1. For clearcutting, it is the optimum method.
Clearcutting will not be used in the Briggs Spring project area.
2. Clearcuts, coppice cuts, seed tree, and shelterwood regeneration harvests are appropriate to meeting the objectives and requirements of the Forest Plan.

Forest Plan Standard 2408, Phase II Amendment, page II-25, for acceptable silvicultural systems.

3. An interdisciplinary review was completed and the potential environmental, biological, aesthetic, engineering, and economic impacts were assessed and the cutting methods are consistent with the multiple use of the project area.

See the Briggs Spring specialist reports.

4. Cut blocks, patches, or strips are shaped and blended to the extent practicable with the natural terrain.

See the Briggs Spring Visual Quality specialist report.

5. Even-aged regeneration harvests made in one operation meet the 40-acre maximum size limit requirement.

Forest Plan Standard 2101, Phase II Amendment, page II-17.

6. Harvest will be consistent with the protection of soil, watershed, fish, wildlife, recreation, esthetic resources, cultural and historic resources, and the regeneration of timber resources.

See: Briggs Spring Botany BE and specialist report
Briggs Spring Wildlife BE and specialist report
Briggs Spring Hydrology specialist report
Briggs Spring Heritage specialist report
Briggs Spring Recreation specialist report

Culmination of Mean Annual Increment [16 U.S.C. 1604 (m)]:

Stands of trees harvested have generally reached the culmination of mean annual increment of growth (CMAI).

Page II-26 of the Black Hills Forest Plan Guideline 2411. Regeneration harvests of even-aged timber stands should not be undertaken until the stands have generally reached (or surpassed 95% of the) culmination of the mean annual increment measured in cubic feet.

CMAI occurs when the periodic annual increment equals the mean annual increment (MAI). MAI is calculated by adding the current stand volume with any mortality or previous removal and then dividing by the stand age.

Finding prepared by: _____ Date: _____
Nancy S. Bayne, Certified Silviculturist

Finding recommended by: _____ Date: _____
Nancy S. Bayne, Certified Silviculturist

Finding accepted by: _____ Date: _____
Lynn D. Kolund, District Ranger

Appendix F:
PAST, PRESENT, AND FUTURE
ACTIVITIES

Past, Present, and Reasonably Foreseeable Future Activities

The following is a summary of activities within the Briggs Spring project area.

Past History

The Briggs area has been commercially harvested many times in the past. Present day records (RIS database, old harvest atlas, and the thinning atlas) indicate commercial harvest activity from the 1970s to the present along with precommercial thinning, weed and release, and mechanical site prep.

Redbank, Dumbuk, and Thumb are the most recent timber sales in the analysis area. Redbank and Dumbuk closed FY2004 and all post sale activities are to be completed by FY2012 and Thumb closed FY2007 and all post sale activities are to be completed by FY2012. Portions of the Stateline and Run timber sales and the Cattle Salvage sale were also within the Briggs area. The Cattle Salvage sale was sold in August 2004 to salvage mountain pine beetle infested timber and closed in 2005. Run closed in FY2005 and Stateline closed in FY2006. All post sale activities are to be completed by FY2010 in Run and FY2011 in Stateline.

Precommercial thinning has been used a great deal in the analysis area during the 1980s and 1990s with weed and release only used within the last decade. Since the 1980s until present, more than 6700 acres have been treated by precommercial thinning methods throughout the analysis area.

The grasses in some of the locations grow to form a thick matt of grass, which prevents ponderosa pine seedlings from getting established. To provide a seedbed mechanical site prep was used to expose mineral soil in the area to encourage natural regeneration in the ponderosa pine. In the early 1990s, 636 acres were mechanically site prepped.

In 2000 the Jasper Fire burned the southern end of the Dumbuk timber sale. Some of the area was salvage logged after the fire.

Some of the private land has been logged in the past and a few parcels of private land burned in the Jasper Fire of 2000. Most of the private land is mostly used for grazing cattle. There are a few parcels that are used for summer residences and hunting.

Present

Current timber sales located with the project area are as follows:

The Thumb timber sale encompasses most of the northern half of the project area on the north side of the Six-mile Road (FDR 301). This sale closed in 2000 and post sale activities will be on going until 2000. The Redbank timber sale is also located in the northern half of the analysis area on the northwest end. Redbank sale closed fiscal year 2004 and post sale activities will be ongoing until 2009. The Dumbuk timber sale is south of the Six-mile Road (FDR 301) and runs down to the Custer-Limestone Road (FDR 284). Dumbuk was completed in fiscal year 2005 and post sale activities will end in 2010.

The Stateline timber sale (west side) closed in the summer of 2006 and post sale activities will be ongoing until 2011. The Run timber (west side) sale closed in 2005 and a few post sale activities will continue until 2010.

Current timber sales adjacent to the project areas are as follows:

The Nest timber sale, northeast of Briggs, closed in fiscal year 2008 and post sale activities will be on-going until 2013. West of the Briggs analysis area is the Nottingham timber sale that was recently sold in December 2008. Nottingham is in the Mallo area. South of Nottingham is the Friar Tuck timber sale. Friar Tuck is to sell fiscal year 2010. To the south of Friar Tuck is the Sherwood timber sale. Sherwood runs north from the Summit Ridge Road (FDR 265). The Coulsen timber sale is to the northeast of the project area. This sale closed in fiscal year 2009 and post sale activities will be on-going through 2014.

The private land is used for cattle grazing, residences, and hunting opportunities.

Reasonably Foreseeable

All the timber sales within the boundaries of the planning area have all completed any post sale vegetative treatments except for Run. In fiscal year 2009 Run will finished up with weed and release. All remaining timber activities from these sales will only include regeneration surveys.

In areas adjacent to the Briggs analysis area, the Nest and Coulsen timber sales will begin post sale activities. There will be no timber vegetative treatments in Nest only regeneration surveys. Coulsen will have weed and release, precommercial thinning, and aspen release. All commercial harvesting activities in Nottingham and Sherwood timber sales will continue and commercial harvesting will start up once Friar Tuck timber sale has been sold.

The adjacent Pole Creek analysis area is on the Mystic District north of the Six-mile Road and is east of Briggs. This project would entail prescribe burning only and could be implemented as early as spring 2009 or fall 2009.

The private land will be used for grazing cattle, summer residences, and hunting.

Appendix G:

**SUMMARY: BIOLOGICAL
ASSESSMENT and BIOLOGICAL
EVALUATION**

Summary of Botany and Wildlife

Biological Assessment and Biological Evaluation

Introduction

This is a summary of the Briggs Spring project Biological Assessment/Biological Evaluations (BA/BEs), and is a review and analysis of actions proposed in the Briggs Spring Project Draft Environmental Assessment. The full BA/BEs are in the Briggs Spring project file. The purpose of a BA/BE is to determine how the proposed action and alternatives to the proposed action will affect federally listed species or sensitive species listed by the Rocky Mountain Region (FSM 2670, R2 2600-94-2). The Briggs Spring BA/BEs are prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act of 1973 (19 U.S.C. 1536 (c)), and follow standards established in Forest Service Manual direction (2672.42) and the Code of Federal Regulations (50 CFR S402). The Briggs Spring BA/BEs tier directly to the EIS for the revised Black Hills National Forest Land and Resource Management Plan (Forest Plan) as amended, the BA/BE completed for the Forest Plan revision, and the BA/BE prepared for the Phase II Amendment (USDA Forest Service, 2006).

Pre-field Review and Field Reconnaissance

Botany

Federally Listed Plant Species

The U.S. Fish and Wildlife Service (USFWS) website list for Threatened and Endangered species was accessed on September 14, 2010 for the state of South Dakota. There are **no threatened or endangered plant species habitat known to occur in the State of South Dakota**, nor does habitat that could support threatened or endangered plant species known from adjacent states occur in the project area (USFWS, 2010a).

Region 2 Sensitive Plant Species

The Region 2 Forest Service sensitive species list was updated by the Regional Forester on June 9, 2009 (USDA Forest Service, 2009). All R2 sensitive plant species potentially occurring in the Black Hills National Forest were considered in the evaluation. Based on the pre-field review, **no Region 2 sensitive plant species or suitable habitat has been located within the project area**. A pre-field review was conducted of available information to assemble occurrence records, describe habitat needs and ecological requirements, and determine whether field reconnaissance is needed to complete the analysis. Sources of information included botanical surveys, Forest Service records and files, local professional judgment, and published research.

Wildlife

Federally Listed Animal Species

There are no federally listed wildlife species in the Briggs Spring project area. A list of federally threatened, endangered and proposed species has been provided by the U.S.

Fish and Wildlife Service (USFWS), South Dakota State Office, and was last updated on December 21, 2010 (USFWS, 2011). The South Dakota State Office is the primary center for all of the Black Hills, including Wyoming. The USFWS lists the following endangered and/or threatened species for Pennington County, South Dakota: whooping crane, least tern and black-footed ferret.

The whooping crane and least tern have been removed from the list of species considered on the Black Hills National Forest under section 7 consultation (letter of concurrence from D. Gober, Field Supervisor, USFWS, Pierre, South Dakota, dated August 8, 2003). Although the black-footed ferret is listed for Pennington County, it is an experimental population located in eastern Pennington County, where they have been re-introduced into Badlands National Park and the Conata Basin of Buffalo Gap National Grassland. Habitat for the black-footed ferret is not present in the project area. There are no prairie dog colonies present. It was determined that management activities on the Forest would have 'no effect' on these species since the Black Hills National Forest lacks suitable habitat.

Region 2 Sensitive Plant Species

The current sensitive species list for the Rocky Mountain Region (R2) was renewed on June 9, 2009. Sensitive species for the Black Hills National Forest are listed on the R2 threatened, endangered and sensitive species home page (USDA Forest Service, 2010a). There are now 26 species on the Region 2 sensitive species list that could be present in the Black Hills.

The pre-field review of Region 2 Sensitive Species and Federally Endangered and Threatened and Proposed species was completed using survey results, district records, communication with District personnel, literature reviews, on-line databases and the South Dakota Natural Heritage Database. The following R2 sensitive species have been found within the project area: bald eagle, northern goshawk, northern harrier, black-backed woodpecker, northern leopard frog and Black Hills redbelly snake.

The following table lists an endangered species (black-footed ferret) and Region 2 sensitive species that may be present in the Black Hills. Of the 26 R2 sensitive species in the table, thirteen have suitable habitat in the Briggs Spring project area and may be impacted by the alternatives (Table G-1).

Table G-1. Expected occurrence of Threatened, Endangered, Proposed and R2 Sensitive Species within Briggs Spring project area

Species	Status ¹	Species Present ²	Habitat Present/ Analysis Provided ³	Habitat Description
Black-footed ferret (<i>Mustela nigripes</i>)	XN	NO	NO	Prairie dog towns (USFWS, 2008a). No reintroduction sites or other known occupied habitat in Black Hills.
Bald eagle (<i>Haliaeetus leucocephalus</i>)	S	YES	YES	Winter resident in the Black Hills and spring/fall migrant. Usually found near unfrozen water or carrion in winter (Tallman et al., 2002).
Rocky Mountain				Open habitats such as grasslands, talus

Table G-1. Expected occurrence of Threatened, Endangered, Proposed and R2 Sensitive Species within Briggs Spring project area

Species	Status ¹	Species Present ²	Habitat Present/ Analysis Provided ³	Habitat Description
bighorn sheep (<i>Ovis canadensis canadensis</i>)	S	NO	NO	slopes, and rock outcrops where forage plants are abundant and escape cover is nearby (Beecham et al., 2007).
Fringed myotis (<i>Myotis thysanodes</i>)	S	NO	YES	Forages on insects in a variety of habitats including grasslands and forested areas. Roosts in a variety of structures including caves, mines, and buildings (Schmidt, 2003a).
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	S	NO	YES	Forages on insects in a variety of habitats including forested and wet areas. Roosts in a variety of structures including caves, mines, and buildings (Schmidt, 2003b).
Black-tailed prairie dog (<i>Cynomys ludovicianus</i>)	S	NO	NO	Short-grass and mixed-grass prairies (USFWS, 2008b).
American marten (<i>Martes americana</i>)	S	NO	NO	Spruce forests with complex near-ground structure, extending into adjacent ponderosa pine stands (Buskirk, 2002).
Northern goshawk (<i>Accipiter gentilis</i>)	S	YES	YES	Forages in a variety of forested areas and small openings; nests primarily in dense mature conifer forests (Erickson, 1987).
Ferruginous hawk (<i>Buteo regalis</i>)	S	NO	NO	Unbroken semiarid grassland with elevated nesting sites available. Prefer areas with high densities of rodents and lagomorphs (Johnsgard, 1990).
American peregrine falcon (<i>Falco peregrinus anatum</i>)	S	NO	NO	Tall cliffs and open areas near water (Johnsgard, 1990).
Northern harrier (<i>Circus cyaneus</i>)	S	YES	YES	Prairies, open fields and marshes (Tallman et al., 2002).
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	S	NO	NO	Low elevation riparian areas and woodlands characterized with cottonwood-willow or bur oak (Panjabi, 2003).
Burrowing owl (<i>Athene cunicularia</i>)	S	NO	NO	Dry grasslands and pastures, usually associated with prairie dogs or ground squirrels (Tallman et al., 2002).
Flammulated owl (<i>Otus flammeolus</i>)	S	NO	YES	Open ponderosa pine forests (McCallum, 1994).
Lewis's woodpecker (<i>Melanerpes lewis</i>)	S	NO	YES	Open burned areas with large snags; oak and cottonwood forests (Anderson, 2003; Panjabi, 2003).
Black-backed woodpecker (<i>Picoides arcticus</i>)	S	YES	YES	Burned areas with a high density of pre-burn snags; dense and/or mature forests with a high snag density (Anderson, 2003; Panjabi, 2003).
American three-toed woodpecker	S	NO	NO	Almost exclusively in mature spruce forests (Giroir et al., 2007).

Table G-1. Expected occurrence of Threatened, Endangered, Proposed and R2 Sensitive Species within Briggs Spring project area

Species	Status ¹	Species Present ²	Habitat Present/ Analysis Provided ³	Habitat Description
(<i>Picoides dorsalis</i>)				
Loggerhead shrike (<i>Lanius ludovicianus</i>)	S	NO	NO	Open country with scattered, low deciduous thickets (Tallman et al., 2002).
Grasshopper sparrow (<i>Ammodramus savannarum</i>)	S	NO	YES	Found almost exclusively in native mixed-grass prairies (Panjabi, 2003).
Long-billed curlew (<i>Numenius americanus</i>)	S	NO	NO	Considered native prairie specialists requiring shortgrass or mixed-grass prairie habitat with nearly flat topography (Sedgwick, 2006).
Northern leopard frog (<i>Rana pipiens</i>)	S	YES	YES	Riparian and wetland areas for tadpoles, subadults, and breeding adults; upland habitats for foraging adults (Smith, 2003).
Black Hills redbelly snake (<i>Storeria occipitomaculata pahasapae</i>)	S	YES	YES	Wet meadows, woodlands, and forest-meadow edge habitat in the Black Hills (Smith and Stephens, 2003).
Lake chub (<i>Couesius plumbeus</i>)	S	NO	NO	Streams or lakes with clear, cool water and clean cobble/gravel substrate; only known population in Deerfield Reservoir (Isaak et al. 2003).
Finescale dace (<i>Phoxinus neogaeus</i>)	S	NO	NO	Small lakes and cool, boggy environments associated with springs or beaver dams; isolated to the Redwater Drainage – no documented occurrences in the South Dakota portion of the Black Hills National Forest (Isaak et al., 2003).
Mountain sucker (<i>Catostomus platyrhynchus</i>)	S	NO	NO	Large rivers, lakes, reservoirs, prairie streams but most often in cool, clear, moderately swift mountain streams with mud, cobble, or boulder substrate (Isaak et al., 2003).
Cooper's mountain snail (<i>Oreohelix strigosa cooperi</i>)	S	NO	YES	Lowland wooded or riparian areas on limestone soils (Frest and Johannes, 2002).
Regal fritillary butterfly (<i>Speyeria idalia</i>)	S	NO	YES	Tall-grass prairie and extensive grasslands with violets (Royer and Marrone, 1992).

¹ XN = Experimental Population, T = Threatened, P = Proposed, S = Sensitive

² Confirmed records of species in area.

³ Suitable habitat known or suspected to occur. Species not present and with no habitat in the project area will not be further analyzed in this document because they would not be affected by the proposed project alternatives.

Determinations Summary – Fauna (Wildlife)

The determination of effects on federally listed animal species and Region 2 Sensitive Species in this BA/BE were made as the result of the information gathered in the pre-field review, field reconnaissance, and effects analysis for all alternatives. Because analysis considered management activities of all alternatives and associated design criteria, only one determination is made for each species, which applies to all alternatives. The basis for these determinations was potential habitat, distribution, and effects from proposed activities. The determination language is set forth in Forest Service Manual 2670 and by the USFWS.

The Phase II Forest Plan Amendment FEIS (USDA Forest Service 2005b) evaluated population viability, and determined that all federally listed and sensitive species are likely to persist on the Forest over the next 50 years if standards and guidelines are followed, and if conditions move toward Forest Plan objectives. All standards and guidelines will be followed in all action alternatives of the Briggs Spring project. Furthermore, all alternatives are consistent with Objective 221, which is to conserve or enhance habitat for sensitive species. Therefore, persistence of all R2 sensitive species would not be affected by any alternative of the Briggs Spring project.

With implementation of Forest Plan direction and project-specific design criteria, the following determinations are made for R2 Sensitive Species:

Species	Alternative 1 Determination	Alternatives 2 and 3 Determination
Bald eagle	NI	NI
Fringed myotis	MAII	MAII
Townsend's big-eared bat	NI	MAII
Northern goshawk	NI	MAII
Northern harrier	NI	MAII
Flammulated owl	MAII	MAII
Lewis's woodpecker	MAII	MAII
Black-backed woodpecker	MAII	MAII
Grasshopper sparrow	NI	MAII
Northern leopard frog	NI	MAII
Black Hills redbelly snake	NI	MAII
Cooper's mountain snail	NI	MAII
Regal fritillary butterfly	NI	MAII

NI = No impact

MAII = May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.