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Service

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# Draft Environmental Impact Statement

## Spruce Gulch Bark Beetle and Fuels Reduction Project

Laramie Ranger District, Medicine Bow-Routt National Forests  
Albany and Carbon Counties, Wyoming

T.12 & 13N, R.78, 79, & 80W.





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## Frequently Used Acronyms

<b>ATV</b>	All-terrain Vehicle
<b>BA</b>	Basal Area
<b>BE</b>	Biological Evaluation
<b>BMP</b>	Best Management Practice
<b>CFR</b>	Code of Federal Regulation
<b>CMAI</b>	Culmination of Mean Annual Increment
<b>CWD</b>	Coarse Woody Debris
<b>DBH</b>	Diameter at Breast Height
<b>ECA</b>	Equivalent Clearcut Acre
<b>EIS</b>	Environmental Impact Statement
<b>FM</b>	Fuel Model
<b>FRCC</b>	Fire Regime Condition Class
<b>FSH</b>	Forest Service Handbook
<b>FSM</b>	Forest Service Manual
<b>FWD</b>	Fine Woody Debris
<b>GFA</b>	General Forest Area
<b>HD</b>	High Density
<b>HFRA</b>	Healthy Forests Restoration Act
<b>HFT</b>	Habitat Functional Type
<b>HRV</b>	Historic Range of Variability
<b>HSS</b>	Habitat Structural Stage
<b>ID</b>	Interdisciplinary
<b>LAU</b>	Lynx Analysis Unit
<b>LCAS</b>	Lynx Conservation Assessment and Strategy
<b>LD</b>	Low Density
<b>LWD</b>	Large Woody Debris
<b>MA</b>	Management Area
<b>MBRT</b>	Medicine Bow Rail Trail
<b>MIS</b>	Management Indicator Species
<b>MPB</b>	Mountain Pine Beetle
<b>NEPA</b>	National Environmental Policy Act
<b>NFMA</b>	National Forest Management Act
<b>NFSR</b>	National Forest System Road
<b>OHV</b>	Off-highway Vehicle
<b>PNV</b>	Present Net Value
<b>POL</b>	Products Other than Logs
<b>ROS</b>	Recreation Opportunity Spectrum
<b>SHR</b>	Stand Hazard Rating
<b>SIO</b>	Scenic Integrity Objective
<b>SLC</b>	Species of Local Concern
<b>SOM</b>	Soil Organic Material
<b>TES</b>	Threatened, Endangered, and Sensitive
<b>WCP</b>	Watershed Conservation Practices
<b>WIZ</b>	Water Influence Zone
<b>WUI</b>	Wildland-urban Interface

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**Spruce Gulch Bark Beetle and Fuels Reduction Project  
Draft  
Environmental Impact Statement  
Albany and Carbon Counties, Wyoming**

**Lead Agency:** USDA Forest Service

**Cooperating Agencies:** None

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**Abstract:** The Laramie Ranger District of the Medicine Bow-Routt National Forests has prepared this Draft Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act (NEPA), the Healthy Forests Restoration Act (HFRA), and other relevant Federal and State laws and regulations. The District proposes to implement bark beetle related salvage and suppression silvicultural treatments and fuels abatement treatments within the Spruce Gulch Bark Beetle and Fuels Reduction analysis area, as guided by the Revised Medicine Bow National Forest Land and Resource Management Plan (Forest Plan 2003). The analysis area is currently experiencing a mountain pine beetle epidemic. Therefore, the focus of the actions is to aggressively manage lodgepole pine stands to reduce the widespread beetle-caused tree mortality and to reduce the risk for large scale, high intensity wildfires. Three alternatives are considered in detail: Alternative 1: No Action, Proposed Action: Forest Health Emphasis (agency preferred alternative), and Alternative 2: Fuels Management Emphasis. Under the No Action alternative, no vegetative or fuels abatement treatments would be implemented. Under the Proposed Action, salvage and suppression silvicultural treatments and hazardous fuels abatement treatments would be implemented on approximately 4,370 acres, and under Alternative 2: Fuels Management Emphasis, hazardous fuels abatement treatments would be implemented on approximately 2,350 acres. This Draft EIS discloses the direct, indirect, and cumulative environmental impacts resulting from the Proposed Action and alternatives.

Reviewers should provide the Forest Service with their comments during the review period for the Draft EIS. This will enable the Forest Service to analyze and respond to the comments at one time and to use information acquired in the preparation of the Final EIS, thus avoiding undue delay in the decision-making process. Reviewers have an obligation to structure their participation in the NEPA process so that it is meaningful and alerts the agency to the reviewers' position and contentions. Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 553 (1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the final environmental impact statement. City of Angoon v. Hodel (9<sup>th</sup> Circuit, 1986) and Wisconsin Heritages, Inc. v. Harris, 490 F. Supp. 1334, 1338 (E.D. Wis. 1980). Comments on the Draft EIS should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3).

**Send Comments to:** Melissa M. Martin, Project Coordinator  
2468 Jackson Street  
Laramie, WY 82070

**Date Comments Must Be Received:** 45 days from the date the Notice of Availability for the Draft EIS is published in the Federal Register

## SUMMARY

The Laramie Ranger District of the Medicine Bow-Routt National Forests is proposing to implement bark beetle salvage and suppression vegetative treatments and hazardous fuels abatement treatments within the Spruce Gulch analysis area. The analysis area is located approximately 40 miles southwest of Laramie, Wyoming and 25 miles north of Walden, Colorado in T.12 & 13N., R. 78 – 80W., 6<sup>th</sup> principle meridian. The analysis area encompasses approximately 32,322 acres. This includes 31,782 acres of National Forest system (NFS) land, 390 acres of private land, and 150 acres of State of Wyoming land. Resource management actions proposed in this Draft Environmental Impact Statement (EIS) apply to NFS land only.

The action alternatives analyzed in this Draft EIS were designed to reduce the effects of tree mortality and hazardous fuel loadings associated with an on-going mountain pine beetle (MPB) epidemic. They were also designed to help protect forested areas on adjacent private and state lands and to alleviate potential adverse effects of the beetle epidemic on forest resources within the Spruce Gulch analysis area.

Data specific to the Spruce Gulch analysis area shows that beetle activity has been steadily increasing over the last several years with a significant spike in activity occurring between 2006 and 2007. During this timeframe, acres impacted by the beetles increased from roughly 5,500 to over 15,400, representing a 180 percent increase in beetle activity and resultant tree mortality in a one year period. This dramatic increase in bark beetle populations and tree mortality, along with current weather conditions and remaining abundant food source, indicate that conditions are favorable for continued, widespread losses to bark beetles in this area.

This Draft EIS was prepared in compliance with the Revised Medicine Bow Land and Resource Management Plan (Forest Plan 2003), the National Environmental Policy Act (NEPA), and other relevant Federal and State laws and regulations including the Healthy Forests Restoration Act (HFRA) of 2003. The HFRA contains a variety of provisions to expedite environmental analysis and treatment of lands that are at risk of wildland fire, have experienced windthrow or blowdown, or are at risk of insect and disease epidemics. On October 1, 2007, the Forest Supervisor of the Medicine Bow-Routt National Forests determined that the Spruce Gulch Bark Beetle and Fuels Reduction project is an “authorized project” under Section 102(a)(4) (insect and disease epidemics) of the HFRA.

The HFRA seeks to gain public support for decisions associated with authorized projects by emphasizing collaboration and public involvement early in the project development and analysis phases. Accordingly, collaboration for this project occurred with private landowners, industry representatives, State and local government officials, and members of public interest groups during November and December of 2007. Various other opportunities for collaboration and public involvement included: mailing scoping packages to approximately 245 individuals, groups, and agencies on January 16, 2008; publishing a Notice of Intent in the Federal Register on January 17, 2008; publishing a newspaper article in the Laramie Boomerang on January 25, 2008; and hosting an Open House meeting in Laramie, Wyoming on January 31, 2008.

The Forest Service received 33 comment letters in response to the collaboration and public involvement efforts. Information contained in the letters was used to define significant issues related to the project proposal. Significant issues include “Clearcutting” and “Treat areas adjacent to wildland-urban interface (WUI) areas only.” These issues were used to develop an

alternative to the Proposed Action. The alternatives analyzed in detail in this Draft EIS are briefly described below:

**Alternative 1: No Action** - The NEPA and Forest Service policy require the study of a No Action alternative to provide a baseline for comparing the effects of the Proposed Action and other alternatives (40 CFR 1502.14(d) and Forest Service Handbook 1909.14.1). Under the No Action alternative, no salvage, suppression, or fuels abatement treatments would occur within the Spruce Gulch analysis area. This alternative represents no attempt to actively respond to the Purpose and Need for Action or to the issues raised during scoping.

**Proposed Action: Forest Health Emphasis** - The Proposed Action includes aggressive vegetative and fuels abatement treatments designed to: salvage conifer trees killed by the mountain pine beetle (MPB) epidemic; improve the health and resiliency of treated stands to future beetle attack; restore healthy ecological conditions; and manage hazardous fuel loading to minimize the potential for large, high intensity/high severity wildfires. Vegetative treatments include 1,859 acres of clearcutting, 146 acres of clearcutting – products other than logs (POL), 38 acres of overstory removal, and 2,329 acres of adaptive management prescriptions for a total of 4,372 acres treated acres. Adaptive management prescriptions include clearcut, salvage, sanitation/salvage, shelterwood, group selection, individual tree selection, commercial thinning, and overstory removal. Approximately 1,113 of the 4,372 acres proposed for treatment fall within Management Area (MA) 7.1 - Residential/Forest Interface; these acres would be managed using a combination of silvicultural treatments to reduce hazardous fuels. The remaining 3,259 acres are located within Forest Plan MA 5.15 - Forest Products, Ecological Maintenance and Restoration.

**Alternative 2 – Fuels Management Emphasis:** Alternative 2 was developed to address the significant issues identified above. Consequently, vegetative treatments would be concentrated around WUI areas to protect communities and structures and along major forest roads to enhance ingress and egress in the event of a large scale, high intensity wildfire. By concentrating treatments in these areas, the number of acres proposed for clearcutting would automatically be reduced.

Vegetative treatments would include 772 acres of clearcutting and 1,580 acres of adaptive management prescriptions for a total of 2,352 treated acres. Approximately 1,113 of the 2,352 acres proposed for treatment fall within MA 7.1 - Residential/Forest Interface; these acres would be managed to reduce hazardous fuels. The remaining 1,239 acres are located along major forest roads; as previously mentioned, these areas would be treated to enhance ingress and egress along the routes in the event of a large scale, high intensity wildfire.

**Forest Plan Consistency:** A Forest Plan consistency analysis was completed for all of the alternatives to determine their consistency with Forest-wide, Geographic Area, and Management Area direction and standards and guidelines. The analysis determined the following: the Proposed Action: Forest Health Emphasis is consistent with all Forest Plan direction and standards and guidelines; the No Action alternative and Alternative 2: Fuels Management Emphasis do not comply with Forest Plan MA 5.15 guidelines for Vegetation and Integrated Pest Management (pp. 2-59 to 2-60 and 2-62 to 2-63, respectively); and the No Action alternative does not comply with Fire and Fuels guideline #1 in MA 5.15 (p. 2-62) or with Fire and Fuels standard #1 in MA 7.1 (p. 2-70).

The Purpose and Need for the Spruce Gulch Bark Beetle and Fuels Reduction Project provides the focus and scope of the proposal as related to National and Forest level policy and direction. Given the Purpose and Need, the Responsible Official (Laramie District Ranger) will review the Proposed Action and the alternatives, the issues identified during scoping, and the environmental consequences of implementing the proposal and alternatives. This information will provide the basis for the Responsible Official to make the following determinations:

- Whether or not the proposed activities and alternatives: a) are responsive to the issues raised during Scoping (40 CFR 1501.7); b) are consistent with Forest Plan direction; c) meet the Purpose and Need for Action; and d) are consistent with other related laws and regulations for National Forest management activities.
- Whether or not the information contained in this EIS is sufficient to make an informed decision.
- Whether or not the vegetative and fuels abatement treatments should be implemented and, if so, in what manner and in which locations.
- The types of design criteria and/or monitoring requirements necessary for project implementation.

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# CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

## 1.1 Introduction

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The Laramie Ranger District of the Medicine Bow-Routt National Forests has prepared this Draft Environmental Impact Statement (EIS) in accordance with the Revised Medicine Bow Land and Resource Management Plan (Forest Plan 2003), the National Environmental Policy Act (NEPA), and other relevant Federal and State laws and regulations including the Healthy Forests Restoration Act (HFRA) of 2003. This Draft EIS discloses the direct, indirect, and cumulative environmental impacts that would result from the Proposed Action and alternatives to that action. The document is organized into four chapters:

- **Chapter 1. Purpose and Need for Action** - The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving the purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- **Chapter 2: Alternatives, including the Proposed Action** - This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. The alternatives were developed based on significant issues raised by the public and other agencies. This discussion also identifies design criteria intended to reduce or prevent undesirable effects resulting from management activities. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- **Chapter 3: Affected Environment and Environmental Consequence** - This chapter describes the environmental effects of implementing the proposed action and other alternatives.
- **Chapter 4: Consultation and Coordination** - This chapter provides a list of preparers and agencies consulted during the development of the Draft EIS.
- **Appendices:** The appendices provide more detailed information to support the analyses presented in the Draft EIS.
- **Index:** The index provides page numbers by document topic.

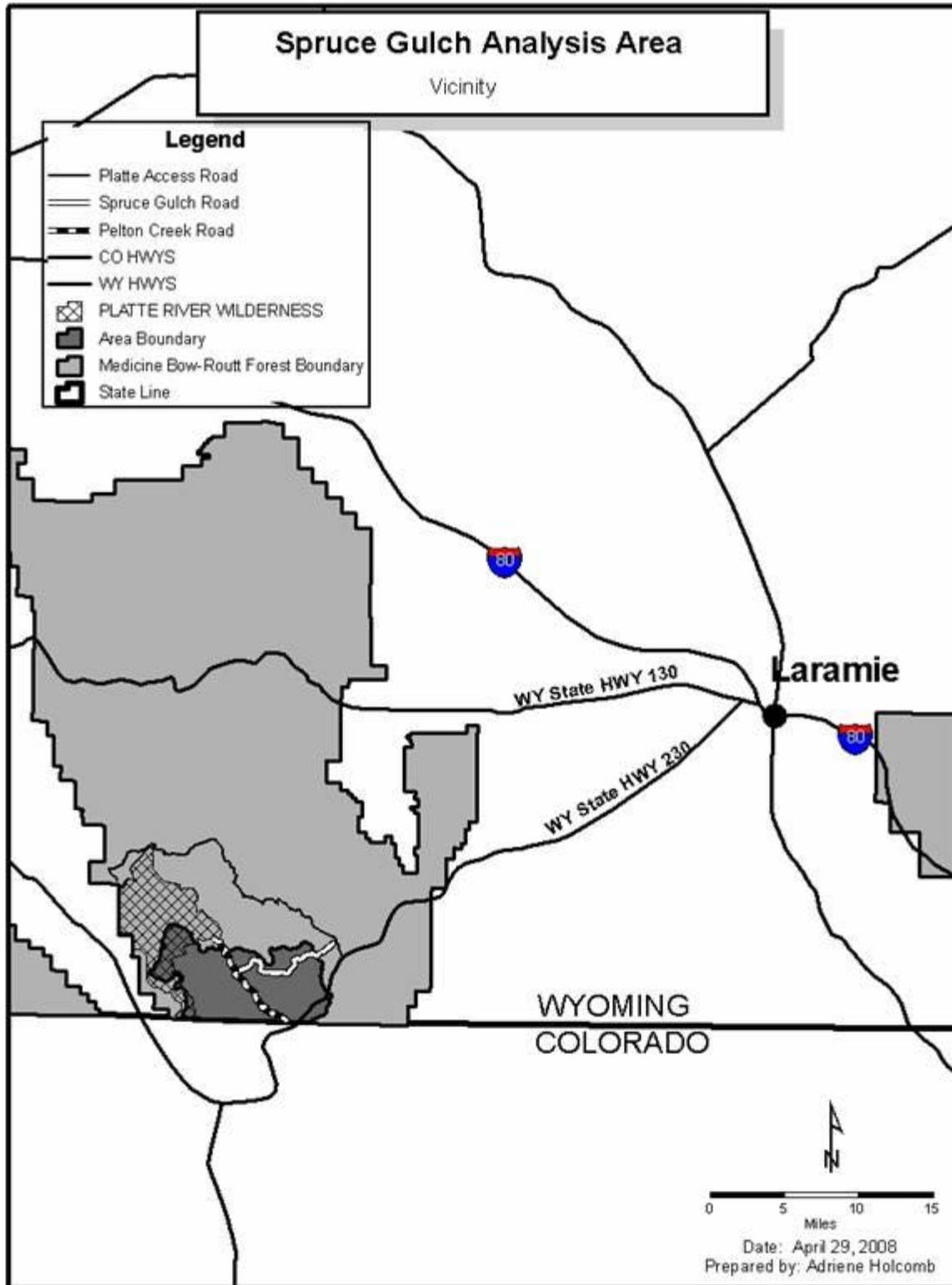
Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at 2468 Jackson Street, Laramie, WY 82070.

## 1.2 Analysis Area Location

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The Spruce Gulch analysis area is located approximately 40 miles southwest of Laramie, Wyoming and 25 miles north of Walden, Colorado (see Map 1.1). It is located entirely on the Laramie Ranger District of Medicine Bow-Routt National Forests in Albany and Carbon Counties, Wyoming, T.12N. & T.13N., R.78W., 79W., & 80W. The analysis area encompasses approximately 32,322 acres, most of which are located within the Pelton Creek watershed and its related tributaries. There are approximately 390 acres of private land and 150 acres of State of Wyoming land within the analysis area boundary. Although roughly 4,185 acres in the western portion of the analysis area are located within the Platte River Wilderness Area, no vegetation or fuels abatement treatments are proposed in Wilderness. The main access routes into the area are via National Forest System Road (NFSR) 898 (Pelton Creek Road), NFSR 530 (Spruce Gulch Road), and State Highway 230 which passes through the southeastern part of the area.

Map 1.1: Vicinity Map



## 1.3 Background Information

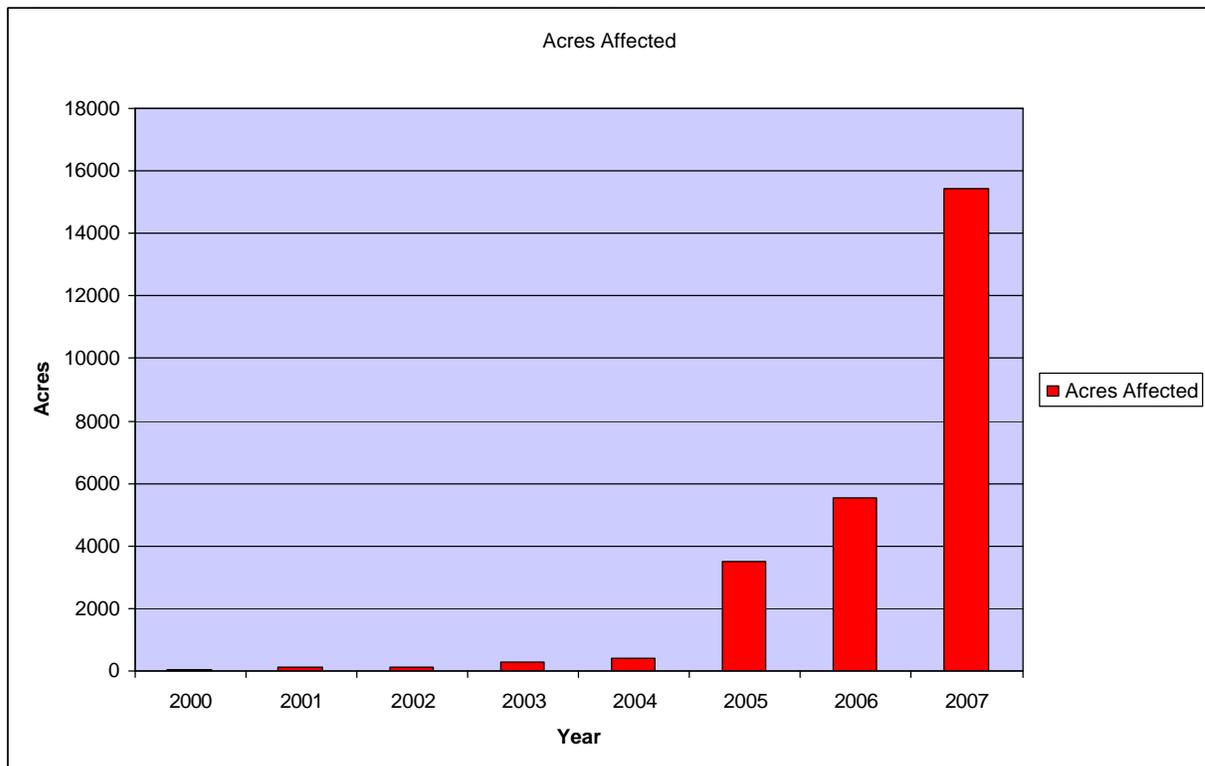
### Bark Beetles

While mountain pine beetles (*Dendroctonus ponderosae*) and spruce bark beetles (*Dendroctonus rufipennis*) are always present in low numbers, recent years have seen a dramatic increase in beetle activity and conifer tree mortality on the Medicine Bow National Forest. In 1996, for example, aerial survey data revealed negligible amounts of forested vegetation impacted by mountain pine beetle (MPB) and spruce bark beetle (SBB). By 2006, that number had increased to roughly 75,000 acres and by 2007 the number of acres impacted by the beetles had escalated to over 178,000 acres. These figures represent a 142 percent increase in bark beetle activity and resultant tree mortality on the Forest within a one year period.

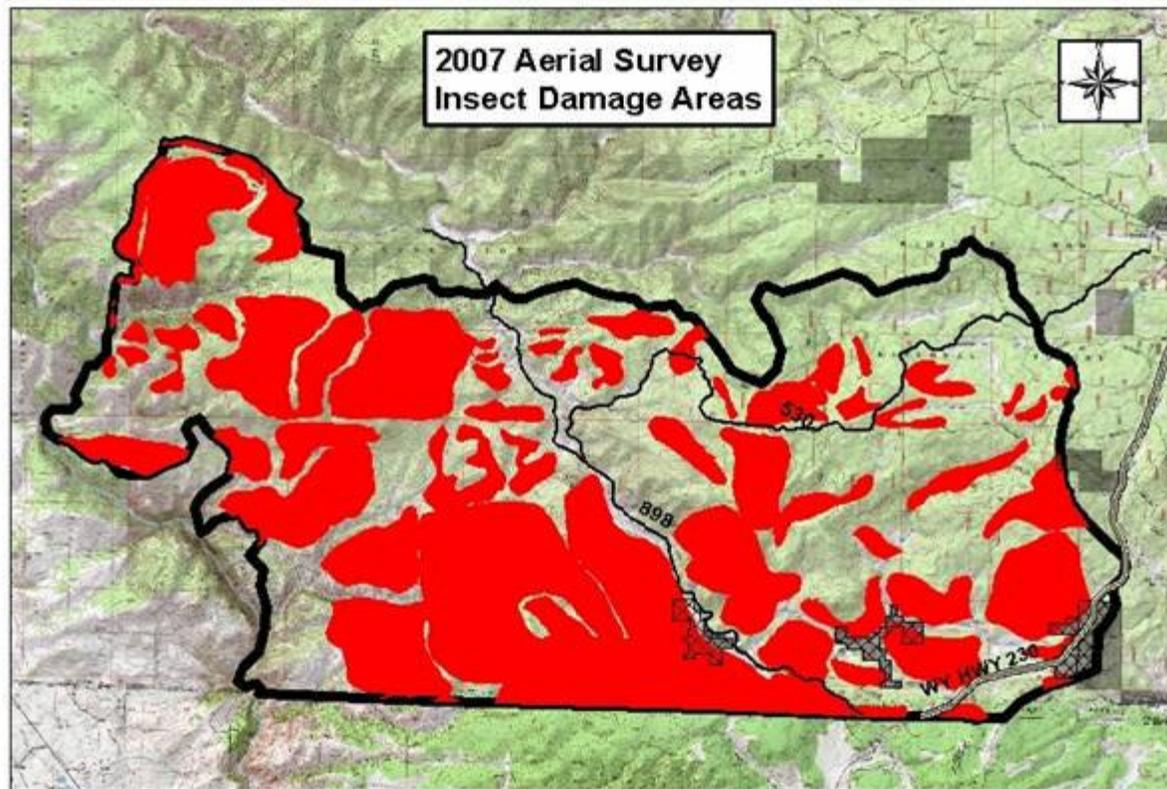
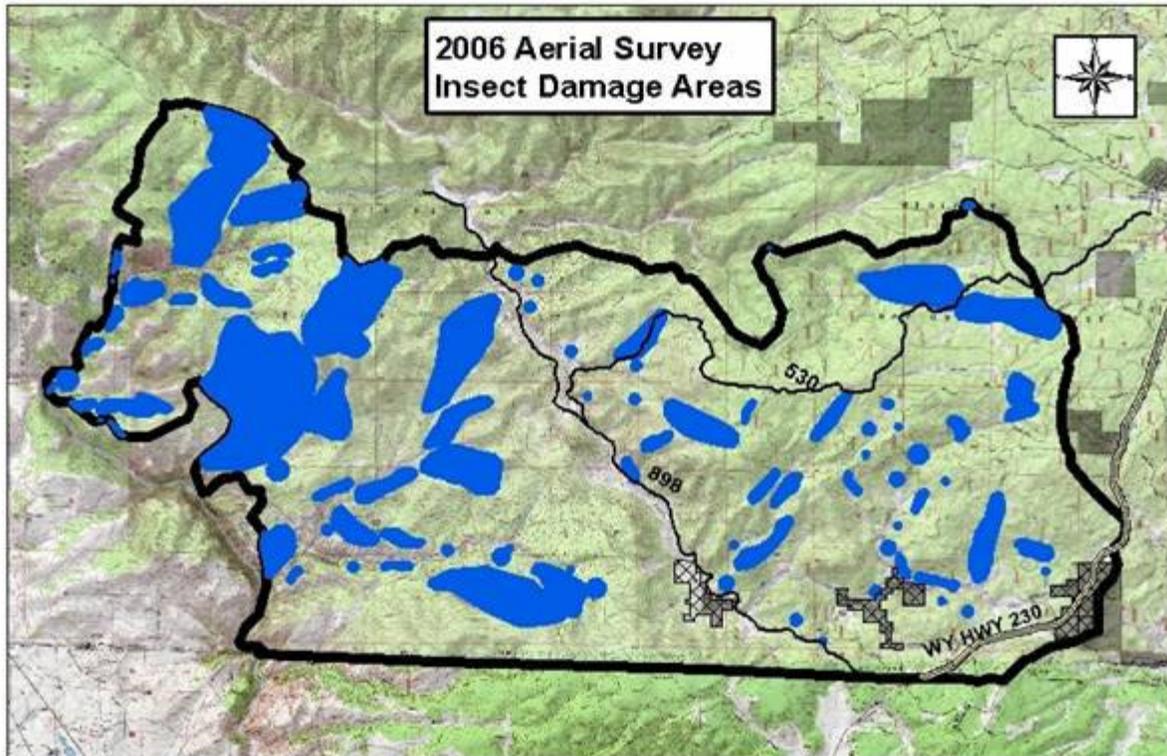
Aerial survey data specific to the Spruce Gulch analysis area demonstrate similar findings. For example, data from 2000 show a minor amount of acreage affected by the bark beetle. By 2006, acres impacted had increased to over 5,500 acres, and by 2007, roughly 15,400 acres had been impacted by the bark beetles. These figures represent a 180 percent increase in beetle activity and resultant tree mortality in a one year period (see Map 1.2).

Data compiled between 2000 and 2007 indicate that losses of lodgepole pine, and the minor component of spruce, have increased significantly in number and extent within the Spruce Gulch analysis area over the past seven years (see Figure 1.1). Stand data collected during the 2007 ground surveys further indicate that conditions are favorable for continued, widespread losses to bark beetles.

**Figure 1.1: MPB and SBB Mortality in the Spruce Gulch Analysis Area (2000 – 2007)**



Map 1.2: 2006 – 2007 Insect Damage Areas



In an attempt to define and track the effects of the MPB, the Lakewood Service Center in Lakewood Colorado analyzed aerial and ground survey data sets of National Forests (NFs) at risk for MBP infestations. The analysis included all or portions of the White River, Arapaho, and Routt NFs in northern Colorado and portions of the Medicine Bow NF in southern Wyoming. Results of the analysis, as documented in Report LSC-07-06, confirmed the following: 1) MPBs are at epidemic levels in northern Colorado and southern Wyoming; and 2) they are not likely to depart from their current course unless a period of prolonged and severe low temperatures (<-30° F) occurs during late fall-winter-early spring months.

Information contained in Report LSC-07-06 provided the technical basis for the Rocky Mountain Regional Office of the USDA Forest Service to issue a Mountain Pine Beetle Epidemic Declaration for northern Colorado and southern Wyoming. The declaration was issued on June 25, 2007 and allows Forest Supervisors of the affected NFs to implement streamlined NEPA authorities offered by the HFRA. Forest Supervisors may use HFRA authorities if they determine that ecosystem components are threatened by the beetles.

On October 1, 2007, Mary H. Peterson, Forest Supervisor of the Medicine Bow-Routt NFs determined that the current bark beetle situation poses a threat to ecosystem components and to wildland-urban interface areas in and adjacent to the Spruce Gulch analysis area. Therefore, she concluded that the *Spruce Gulch Bark Beetle and Fuels Reduction Project* is an authorized project under Section 102(a)(4) (insect and disease epidemics) of the HFRA. HFRA provides for expedited environmental analysis and treatments of lands that are at risk of wildland fire, have experienced windthrow or blowdown, or are at risk of insect and disease epidemics. Accordingly, the environmental analysis associated with the Spruce Gulch project was completed according to Section 104 of the HFRA.

### **Wildland-urban interface**

The National Fire Plan identified wildland-urban interface (WUI) areas as having the highest priority for reducing wildfire risks. Under the National Fire Plan and the Revised Medicine Bow National Forest Land and Resource Management Plan (Forest Plan 2003), the Forest Service is directed to work cooperatively with private and county officials on thinning, planned burns, and forest restoration projects within these interface areas.

In 2004, Land Stewardship Associates, in collaboration with the Forest Service and Albany County Fire, completed the Albany County Wildfire Hazard Assessment and Mitigation Plan for WUI communities within Albany County. The Plan identified Mountain Home/Wycolo, Wold Tract, Pelton Creek properties, and Porter Ranch as high priority projects in Albany County. All of these areas are within or adjacent to the Spruce Gulch analysis area. A number of these private landowners have completed or are in the process of thinning trees to protect their land from beetles and wildfire.

## **1.4 Purpose and Need for Action**

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The Forest Service has responsibility for implementing the Forest Plan by completing analysis and evaluation of site-specific projects. The Forest Plan guides natural resource management activities and provides the Forest Service, forest users and the public with an overall strategy for managing the Forest. The intent of the Forest Plan is to manage National Forest System lands for multiple-use and not for any single purpose.

Based on Forest Plan Direction, the HFRA, and a comparison of the existing condition and the desired future condition, the **purpose** of the Proposed Action: Forest Health Emphasis is to:

- 1) Salvage forest products from forested lands classified as being suitable for timber production to keep them positively contributing the Forest's Allowable Sale Quantity (ASQ).
- 2) Reduce the effects of tree mortality associated with the MPB epidemic to restore healthy ecological conditions and scenic quality.
- 3) Accelerate regeneration of forested stands killed by the MPB.
- 4) Manage hazardous fuel loading associated with the MPB epidemic and salvage operations to minimize the potential for large high intensity/high severity wildfires.

The project is **needed** because there is an active MBP epidemic occurring within the analysis area. The epidemic is continuing to gain strength where approximately 60 percent of the lodgepole pine stands are in a moderate to high risk from MPB impacts based on tree diameter and stand density.

This action responds to the goals and objectives outlined in the Forest Plan and helps move the project area towards desired conditions described in that plan. Forest Plan goals and objectives for this analysis include:

**GOAL 1 - Ensure Sustainable Ecosystems:** Promote ecosystem health and conservation using a collaborative approach to sustain the Nation's forests, grasslands, and watersheds. (p. 1-2)

**Subgoal 1.c:** When appropriate or where necessary to meet resource management objectives, increase the amount of forests and rangelands restored to or maintained in a healthy condition with reduced risk and damage from fires, insects and diseases, and invasive species. (p. 1-5)

**Objective 2:** Within 15 years, implement vegetation management practices to reduce the threat of wildfire damage to communities and to reduce fuel loadings in the interface next to homes, cabins, and other structures. (p. 1-5)

**Objective 3:** Within 10 years, implement vegetation management activities in areas most susceptible to losses from insects and disease as directed in management area and geographic area direction. (p. 1-6)

- **Strategy c:** Implement fuel reduction and treatment activities beginning with fire regimes I, II, and III and condition classes 2 and 3. (p. 1-6)
- **Strategy d:** Reduce activity fuels resulting from all projects/activities to acceptable levels in a cost effective manner, in consideration of wildlife and soil direction for retention of downed wood. (p. 1-6)
- **Strategy f:** Limit mortality from insect and disease outbreaks in management areas where primary emphasis is timber production or developed recreation. (p. 1-6)
- **Strategy g:** Plan management activities by considering the potential for insect and disease outbreaks. Design management activities to meet or enhance management area objectives. (p. 1-6)

**GOAL 2 – Multiple Benefits to People:** Provide a variety of uses, values, products, and services for present and future generations by managing within the capability of sustainable ecosystems. (p. 1-7)

**Subgoal 2.c:** Improve the capability of the Nation’s forests and rangelands to provide a desired sustainable level of uses, values, products, and services. (p. 1-9)

**Objective 1:** Between the Medicine Bow and Routt National Forests, implement a consistent timber program each year. (p. 1-9)

**GOAL 4 - Effective Public Service:** Ensure the acquisition and use of an appropriate corporate infrastructure to enable the efficient delivery of a variety of uses. (p. 1-12)

**Subgoal 4a:** Improve the safety and economy of Forest Service roads, trails, facilities, and operations, and provide greater security for the public and employees. (p. 1-12)

## 1.5 Proposed Action: Forest Health Emphasis

Under the Proposed Action, the Laramie Ranger District of the Medicine Bow-Routt National Forests would implement a variety of bark beetle related salvage and suppression silvicultural treatments and hazardous fuels abatement treatments on approximately 4,372 acres. Current estimates identify 1,859 acres of clearcutting; 146 acres of clearcutting – products other than logs (POL)<sup>1</sup>; 38 acres of overstory removal; and 2,329 acres of adaptive management prescriptions. Adaptive management prescriptions include clearcut, salvage, sanitation/salvage, shelterwood, group selection, individual tree selection, commercial thinning, and overstory removal. Although treatment locations (units) have been determined, adaptive management strategies are proposed because it would be difficult, at this point in time, to determine the exact timing, treatment types, and specific amounts of treatment type that would best address the rapidly spreading MPB epidemic. The treatment units would be located within Forest Plan Management Areas (MA) 5.15 - Forest Products, Ecological Maintenance and Restoration and MA 7.1 - Residential/Forest Interface.

Approximately 1,113 of the 4,372 acres identified above fall within MA 7.1; these acres would be managed using a combination of silvicultural treatments to reduce hazardous fuels. Management activities would generally occur within less than one-half mile, or as identified within specific community wildfire protection plans, from the identified communities. Appropriate treatment boundaries would be based on site-specific conditions such as topography, vegetation conditions, and fuel loadings.

Approximately 0.5 miles of system road construction, 3.7 miles of temporary road construction, and 7.8 miles of road reconstruction could be required for project implementation. Following project completion, all temporary roads would be decommissioned and closed. All newly constructed system roads would be physically closed to motorized vehicle use; however, their templates would be retained for future management entries.

If approved, the Laramie District would like to implement the Proposed Action beginning in the fall of 2008. A more detailed description of the Proposed Action: Forest Health Emphasis can be found on Draft EIS pages 16 – 20.

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<sup>1</sup> POL units are generally comprised of smaller, pole size timber.

## 1.6 Forest Plan Direction

In addition to goals and objectives, the Forest Plan provides guidance at three different geographic scales. The broadest scale, which outlines the most general and basic direction, is applicable to the entire forest (Forest-wide standards and guidelines). From there, the direction becomes more focused and applies to Geographic Areas and Management Areas, respectively. Any proposal to implement the Forest Plan, including the Spruce Gulch Bark Beetle and Fuels Reduction Project, must consider the direction provided at each scale. The following information identifies how the Proposed Action responds to direction provided at the three geographic scales.

### 1.6.1 Forest-wide Standards and Guidelines

Forest-wide standards and guidelines are listed in the Forest Plan on pages 1-25 through 1-64. Standards are actions that must be followed or are required limits to activities to achieve forest goals. Deviations from standards must be analyzed and documented in a forest plan amendment. Guidelines are advisable courses of action that should be followed to achieve forest goals. Deviations from guidelines must be analyzed during project level analysis and documented in a project decision document; they do not require a forest plan amendment.

Forest-wide standards and guidelines pertinent to the Spruce Gulch Bark Beetle and Fuels Reduction Project are listed in Appendix A. Forest Service resource specialists analyzed the standards and guidelines to determine compliance with Forest Plan direction. Forest Plan compliance determinations are included under each resource section in Chapter 3 of this Draft EIS.

### 1.6.2 Geographic Area Direction

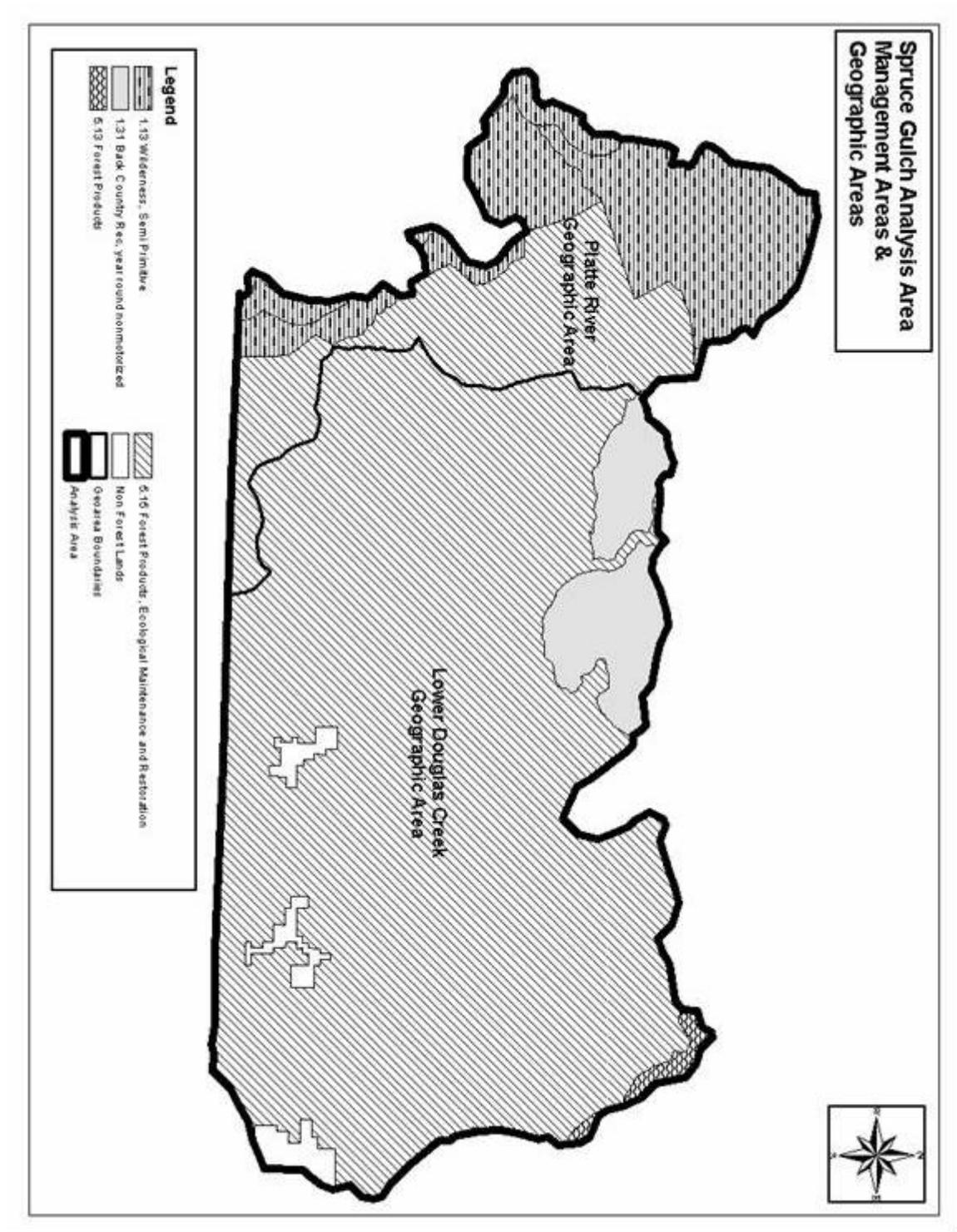
Analyses at the geographic area level provide a framework for short and long-term projects, for monitoring the effectiveness of Forest-wide goals and Management Area standards and guidelines, and for achieving Forest-wide goals and objectives. A geographic area (GA) is a watershed or aggregation of watersheds, 125,000 acres or smaller, in which management is directed toward achieving a specified desired condition. Geographic areas link the Forest Plan to management at a landscape or watershed scale. The Spruce Gulch analysis area includes portions of two (2) Geographic Areas in the Snowy Range (see Map 1.3 and Table 1.1).

**Table 1.1: Geographic Area Acres within the Analysis Area**

Geographic Area (GA)	Total GA Acres	Analysis Area Acres & % of GA
Lower Douglas Creek	101,910	24,462 (24%)
Platte River	59,955	7,860 (13%)
<b>TOTAL</b>	<b>161,865</b>	<b>*32,322</b>

\*Includes private land in total.

Map 1.3: Geographic Areas and Management Areas



The Forest Plan contains the following GA direction that is pertinent to this analysis:

### ***Lower Douglas Creek GA***

#### *Desired Condition:*

- Lodgepole pine will continue to be the dominant cover type, with increasing amounts of aspen in the lower elevation drainages in the southern and eastern portions. In areas allocated to Management Areas 5.13 and 5.15, a variety of successional stages will be present. (p. 3-71)
- Natural processes and vegetation patterns will be apparent in the area. This area will be dominated by older late successional habitats with occasional increases of early successional habitats. (p. 3-71)

### ***Platte River GA***

#### *Desired Condition:*

- Lodgepole pine will continue to be the dominant cover type. In areas allocated to Management Areas 5.13 and 5.15, a variety of tree sizes and successional habitats will be present. (p. 3-87)
- Natural processes and vegetation patterns will be apparent in these areas. Forested portions of these areas will be dominated by older late successional habitats with occasional increases of early successional habitats as a result of fire, insects, and disease. (p. 3-87)

Neither the Lower Douglas Creek GA nor the Platte River GA contains Forest Plan standards and guidelines specific to the Spruce Gulch project.

## **1.6.3 Management Area Direction**

Management emphasis within the analysis area and geographic areas is distributed among several Forest Plan Management Area (MA) prescriptions (see Table 1.2). Each MA prescription has a certain emphasis that directs management activities on that particular piece of land. The description of each prescription includes: theme, setting, desired condition, and standards and guidelines. This information can be found in Forest Plan Chapter 2, pp. 2-1 through 2-80.

Vegetation treatments associated with the Spruce Gulch project would be located within MA 5.15 and MA 7.1. MA standards and guidelines pertinent to the Spruce Gulch Bark Beetle and Fuels Reduction project are listed in Appendix A. Forest Service resource specialists analyzed the standards and guidelines to determine compliance with Forest Plan direction. Forest Plan compliance determinations are included under each resource section in Chapter 3 of this Draft EIS.

**Table 1.2: Management Areas and Acres within the Analysis Area (AA)**

#	Management Area (MA) Prescription	Acres in AA
1.13	Wilderness, Semi-primitive	4,185
1.31	Backcountry Recreation, Year-round Nonmotorized	1,725
5.13	Forest Products	214
5.15	Forest Products, Ecological Maintenance and Restoration	25,658
7.1	Residential/Forest Interface	*
	Private Lands	390
	State Lands	150
	<b>TOTAL</b>	<b>32,322</b>

\*The Forest Plan does not include acreage estimates for this MA. Their boundaries are determined at the project level.



**MA 5.15 – Forest Products, Ecological**

**Maintenance and Restoration Considering the Historic Range of Variability:**

The intent of this MA is to maintain or restore healthy ecological conditions while providing forage production, scenic quality, wildlife habitat, recreational opportunities, and an array of other goods and services. The goal is to achieve a vegetation composition, structure, and pattern in a range of successional stages to move toward and eventually meet the natural range of ecological conditions. Harvested stands are to mimic the size, shape, and juxtaposition on the landscape of natural disturbances; therefore, created openings may range from just a few acres to as much as 1,000 acres

in size, averaging 250 acres in size. Wildfires are suppressed and forested areas are to be managed to locally restrict insect infestations and disease outbreaks. Transportation guidelines include the closure of non-essential roads to enhance or develop large areas for wildlife security and nonmotorized recreation opportunities.



**MA 7.1 – Residential/Forest Interface:**

The intent of this MA is to manage NFS lands adjacent to residential interfaces to minimize the risk of catastrophic fires and insect and disease epidemics. The residential interfaces are generally characterized by private residences that are often occupied year-round. Resource use is not planned on a sustainable basis but may occur in concert with surrounding private land values. Motorized transportation is common.

## 1.7 Decision Framework

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Laramie District Ranger, Larry W. Sandoval, Jr., is the Responsible Official for the Spruce Gulch Bark Beetle and Fuels Reduction Project. Given the purpose and need for the project, he will review the Proposed Action, the other alternatives, and the environmental consequences associated with each alternative before making the following decisions:

- Whether or not the proposed activities and alternatives: a) are responsive to the issues raised during Scoping (40 CFR 1501.7); b) are consistent with Forest Plan direction; c) meet the Purpose and Need for Action; and d) are consistent with other related laws and regulations for National Forest management activities.
- Whether or not the information contained in this EIS is sufficient to make an informed decision.
- Whether or not the vegetative and fuels abatement treatments should be implemented and, if so, in what manner and in which locations.
- The types of design criteria and/or monitoring requirements necessary for project implementation.

## 1.8 Public Involvement

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**Collaborative Efforts:** As required by Title I, Section 104 of the HFRA, the Forest Service engaged in a collaborative process with local stakeholders prior to developing the Proposed Action. Members of the collaborative group included, but were not limited to, private landowners within or adjacent to the analysis area boundary, industry representatives, State and local government officials, and members of public interest groups. The collaborators participated in three meetings hosted by the Forest Service during the months of November and December of 2007. As a result of the collaborative effort and recommendations provided by

Forest Service resource specialists, the original proposal was substantially reduced, both in terms of acres proposed for harvest and miles of road to be constructed. The initial proposal included 6,143 acres of vegetative harvest and 13.2 miles of new road construction; the Proposed Action analyzed in this Draft EIS includes 4,372 acres of proposed vegetative treatments and 4.2 miles of road construction (0.5 miles of new system road and 3.7 miles of temporary road).

**Scoping Efforts:** The Notice of Intent (NOI) initiating the scoping process (40 CFR 1502.7) for the Draft EIS was published in the Federal Register on January 17, 2008. The NOI asked for public comments on the Proposed Action from January 17, 2008 to February 15, 2008. As part of the scoping process, the agency also mailed scoping packages to 243 organizations and individuals. To inform the general public of the proposal, the scoping package was posted to the Medicine Bow-Routt National Forests web-site on January 17, 2008. A News Release was also prepared and an article was published in the Laramie Boomerang on January 25, 2008. Finally, the Forest Service hosted an Open House meeting in Laramie, Wyoming on January 31, 2008. Forest Service personnel were available to answer questions related to the proposal. The Forest Service received 33 written comment letters in response to the scoping efforts.

## 1.9 Issues

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The Forest Service generally separates environmental issues into two groups:

**1) Significant Issues:**

a) Environmental issues used to develop alternatives that meet the purpose and need of the Proposed Action (Forest Service Handbook 1909.15, Section 12.32-33).

**2) Non-significant Issues:**

a) Environmental issues that can be addressed using Best Management Practices (BMPs), alternative design features, Forest Plan standards and guidelines, or other mitigation measures.

b) Environmental issues that are beyond the scope of the analysis, or already decided by law, regulation, Forest Service policy, or other higher level decisions.

c) Information that is irrelevant to the decision to be made.

d) Information that is conjectural and not supported by scientific or factual evidence.

The implementing regulations for the National Environmental Policy Act (NEPA) are described in 40 CFR, Chapter V-Council on Environmental Quality, Part 1500 to 1508. The regulations require this delineation of issues in Sec. 1501.7(a)(3); "...Identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3), narrowing the discussion of these issues in the statement to a brief presentation of why they will not have a significant effect on the human environment..."

Consistent with these regulations, the interdisciplinary (ID) team assigned to this project reviewed the public comments received in response to the Proposed Action and identified the issues raised. In addition, the Responsible Official approved the list of significant issues on March 28, 2008, in compliance with FSH 1909.15, Section 12.32. All of the issues associated with this project are categorized and listed below.

### 1.9.1 Significant Issues

Significant issues were used to develop an alternative to the Proposed Action. Indicators were developed for each issue category. Indicators are measurable ways of displaying how the issues could be affected by project implementation.

#### **Issue 1: Clearcutting**

There is a concern over the use of clearcutting and the cumulative effects of past harvesting and logging slash on other area resources, including interior forest wildlife. There is also a concern that clearcutting will increase the rate of wildfire spread, increase the risk of blow-downs, and create conditions more conducive to the spread of invasive plant and animal species.

#### **Indicators:**

- Acres of past timber harvest
- Acres proposed for clearcut/percent of total acres treated
- Acres of treatment in wildlife security areas

- Change in fuel profile
- Change in fire behavior

## Issue 2: Treat Areas Adjacent to Wildland-Urban Interface (WUI) Areas Only

There is a concern that too many acres are proposed for harvest. Commentors indicated that nothing can be done to slow or stop the epidemic; therefore, vegetative treatments should be implemented only in those areas immediately adjacent to homes and communities to ensure their protection. Units proposed outside of WUI areas should remain uncut to protect other resource values.

### Indicators:

- Total acres treated
- Acres of fuels treatments (adjacent to WUIs and major forest roads)
- Percent of total fuels acres treated
- Percent of total project acres treated

## 1.9.2 Non-significant Issues

**1) Aspects of the Purpose and Need statement are moot given the extent of the MPB epidemic:** Several commentors indicated that, given the extent of the MPB epidemic, the Forest Service could neither reduce the spread of MPBs and spruce bark beetles nor reduce current bark beetle populations, as indicated in the January 16, 2008 scoping document. **Response:** We agree with these comments; thus, the Purpose and Need statement was modified to eliminate such references. The revised Purpose and Need statement is described on Draft EIS pages 5 - 7.

**2) Compliance with Threatened and Endangered Species (TES) standard 11:** Forest Plan TES standard 11 allows no loss or degradation of known or historic habitat for the boreal toad, wood frog, or northern leopard frog. Commentors indicated that proposed vegetative treatments would impact amphibian habitat by reducing shade and increasing soil moisture losses. **Response:** Project design criterion 52 excludes vegetative and slash treatments within 300 feet of existing known sites as well as potential breeding habitats. Therefore, amphibian habitat will be protected.

**3) Impacts to water supplies:** Commentors indicated that the proposed clearcut units would accelerate sediment loading into reservoirs and other water bodies, thereby impacting state water supplies. **Response:** Standard BMPs outlined in the Watershed Conservation Practices (WCP) Handbook (FSH 2509.25) (USDA Forest Service, 2006) will be included in the selected alternative to ensure compliance with State of Wyoming Water Quality Standards and Wyoming Nonpoint Source Management Plan (WYDEQ, 2000). With application of the BMPs, sediment delivery to streams and other water bodies from the harvest units is expected to be minimal. This is particularly true due to the location of units, buffer strips between units and waterways, the amount of debris left in the units, and buffer strips which can trap sediment.

**4) Guidelines for Adaptive Management are needed:** Under the Proposed Action, over 2,300 acres have an adaptive management prescription; adaptive management prescriptions include clearcut, salvage, sanitation/salvage, shelterwood, group selection, individual tree selection, commercial thinning, and overstory removal. Given the number of acres with this prescription and the range of silvicultural options, commentors recommended that guidelines for decision making for each unit be clearly identified in the Draft EIS. **Response:** Appendix B of the Draft

EIS contains guidelines for applying the various silvicultural options proposed under the adaptive management prescription. While it would be difficult, at this point in time, to determine the exact timing, treatment types, and specific amounts of treatment type that would best address the rapidly spreading MPB epidemic, the appendix does provide a framework that will be applied at the time of project implementation.

## **CHAPTER 2: ALTERNATIVES, INCLUDING THE PROPOSED ACTION**

### **2.1 Introduction**

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This chapter describes and compares the alternatives considered for the Spruce Gulch Bark Beetle and Fuels Reduction Project. It includes a detailed description of the No Action alternative (Alternative 1), the Proposed Action: Forest Health Emphasis, and one other action alternative (Alternative 2: Fuels Management Emphasis). It also provides a brief overview of those alternatives that were considered by the Interdisciplinary (ID) Team but eliminated from detailed development and study. Finally, this chapter presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public.

### **2.2 Alternative Development Process**

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The Forest Service ID Team used all known sources of resource information, field-related surveys, Forest Plan direction, professional knowledge, and public concerns identified during the collaborative process when developing the Proposed Action. Design criteria were built into the Proposed Action to resolve issues and concerns raised internally by agency resource specialists and externally by the collaborative group. Following the close of the scoping period (February 15, 2008), issues identified in the public comment letters were used to further refine the Proposed Action: Forest Health Emphasis, to develop an additional alternative (Alternative 2: Fuels Management Emphasis), and to develop additional design criteria for resource protection. The three alternatives analyzed in detail, as described below, and those considered but eliminated from detailed study (Draft EIS p. 32) constitute the range of alternatives for this analysis.

### **2.3 Alternatives Considered in Detail**

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#### **ALTERNATIVE 1: No Action**

National Environmental Policy Act (NEPA) regulations require the analysis of a No Action alternative; they also require that it be used as a baseline for comparing the environmental consequences of the other alternatives (40 CFR 1502.14(d) and Forest Service Handbook 1909.14.1).

The No Action alternative represents no attempt to actively respond to the Purpose and Need for Action or to the issues raised during scoping. There would be no effort to modify existing vegetation or related fuel conditions associated with the MPB epidemic in the Spruce Gulch analysis area. Fuel breaks or thinning would not occur adjacent to private land. Opportunities to designate better quality stands for late succession management would be foregone. In essence,

natural processes would be allowed to occur without human intervention. Current management activities, such as livestock grazing, fire suppression, and road maintenance would continue.

## **PROPOSED ACTION: Forest Health Emphasis (Agency Preferred Alternative)**

Under the Proposed Action, the Laramie Ranger District of the Medicine Bow-Routt National Forests would implement a variety of bark beetle related salvage and suppression silvicultural treatments and hazardous fuels abatement treatments on approximately 4,372 acres in the Spruce Gulch analysis area. Current estimates identify 1,859 acres of clearcutting; 146 acres of clearcutting – POL; 38 acres of overstory removal; and 2,329 acres of adaptive management prescriptions (see Tables 2.1 and 2.3 and Map 2.1). The treatments would be located within Forest Plan MA 5.15 - Forest Products, Ecological Maintenance and Restoration and MA 7.1 - Residential/Forest Interface.

Adaptive management prescriptions include clearcut, salvage, sanitation/salvage, shelterwood, group selection, individual tree selection, commercial thinning, and overstory removal. Prescription descriptions are provided in Section 2.3.4. Although treatment locations (units) have been determined for the adaptive management prescriptions, it would be difficult to determine the exact timing, treatment types, and specific amounts of treatment that would best address the rapidly spreading MPB epidemic at this point in time. Appendix B of the Draft EIS contains guidelines for applying the various silvicultural options proposed under the adaptive management prescriptions.

**Table 2.1: Harvest Acres by Silvicultural Prescription – Proposed Action**

<b>Treatment</b>	<b>Proposed Action (acres)</b>
Clearcut	1,859
Clearcut-POL	146
Overstory Removal	38
Adaptive Management	1,896
Adaptive Management-Lynx (30% retention)*	433
<b>TOTAL</b>	<b>4,372 acres</b>

\* Adaptive Management units for lynx require that 30 percent of the overstory (forest canopy) is retained.

Roughly 1,113 of the 4,372 acres identified above fall within MA 7.1; these acres would be managed using a combination of silvicultural treatments to reduce hazardous fuels. Management activities would generally occur within less than one-half mile, or as identified within specific community wildfire protection plans, from the identified communities. Treatment boundaries would be based on site-specific conditions such as topography, vegetation conditions, and fuel loadings. Roughly 1,239 of the 4,372 acres are located along major forest roads; these areas would be treated to better ensure ingress and egress in the event of a catastrophic wildfire.

Approximately 0.5 miles of system road construction, 3.7 miles of temporary road construction, and 7.8 miles of road reconstruction could be required for project implementation (see Table 2.2). Following project completion, all temporary roads would be decommissioned and closed. All newly constructed system roads would be physically closed (gated); however, their templates would be retained for future management entries. Reconstructed roads would keep the same maintenance level as identified in the Travel Management – Eastern Snowy Range Decision 1 (June 21, 2007): 501.03 (part of), 516.G, 530.RC, and 898.01 would be decommissioned;

NFSRs 501, 530.Q, 530.QA, 534, and 898.D would remain low standard, primitive 2-track roads (level 2) open to public travel; and NFSR 530.QA.01 would move to a maintenance level 1 road (closed and gated). If approved, the Laramie Ranger District would likely begin implementing the Proposed Action in the fall of 2008.

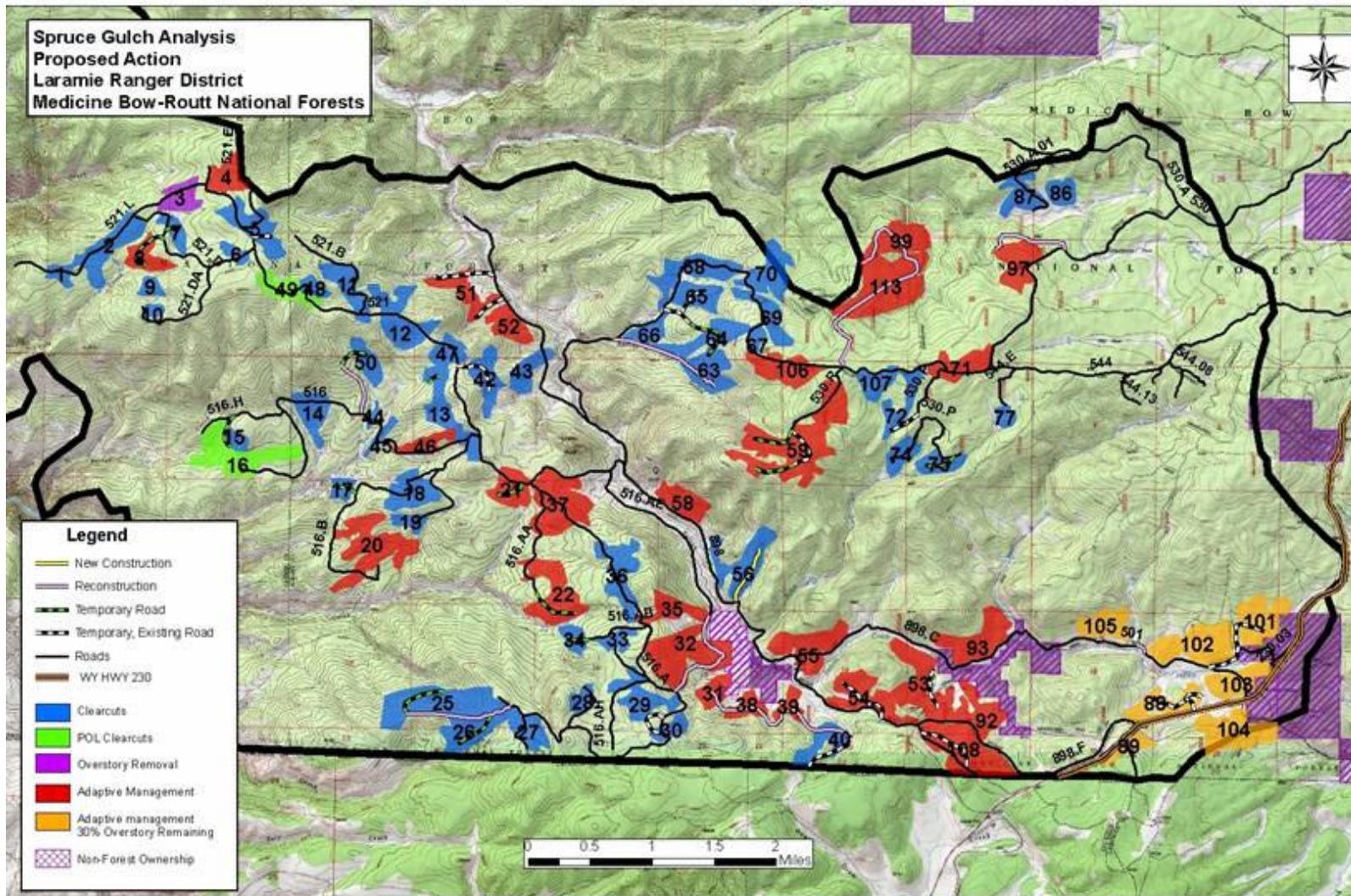
**Table 2.2: Road Construction – Proposed Action**

<b>Proposed Action: Forest Health Emphasis</b>			
<b>Type of Road</b>	<b>New Construction</b>	<b>Reconstruction</b>	<b>Total Miles</b>
<b>System</b>	0.5 miles	7.8 miles	8.3 miles
<b>Temporary</b>	3.7 miles	n/a	3.7 miles
<b>TOTAL</b>	<b>4.2 miles</b>	<b>7.8 miles</b>	<b>12 miles</b>

**Note:** Direction contained in the Forest Plan generally limits the size of openings created by even-aged management (e.g. clearcuts) to 40 acres (p. 1-35). Exceptions are granted, however, in areas that have experienced natural catastrophic conditions such as fire, insect or disease attacks, or windstorms. The Proposed Action: Forest Health Emphasis currently proposes a clearcut prescription on 49 units, 22 of which exceed the 40 acre maximum size limitation. The largest proposed clearcut area is 236 acres and is a combination of three adjacent units. The majority of the other units are between 41 and 80 acres. These larger clearcut units fall primarily within Management Area 5.15 (Ecological Restoration) which allows created openings as large as 250 acres (Forest Plan page 2-63, Vegetation Guideline #2).

Projects exceeding the 40 acre maximum size limitation typically require a 60-day comment period. The 60-day comment period does not need to run concurrently and may be distributed over several comment periods. In the case of the Spruce Gulch Bark Beetle and Fuels Reduction Project, the 60-day comment requirement is being met via the comment period associated with the January 18, 2008 scoping letter and the 45-day comment period required for this Draft EIS.

Map 2.1: Proposed Action: Forest Health Emphasis



\* Larger maps are available at the Laramie Ranger District Office, 2468 Jackson St., Laramie, WY or on the Forest Service’s web-site at <http://www.fs.fed.us/r2/mbr/projects/foresthealth/index.shtml>.

**Table 2.3: Units, Treatments, and Insect Infestations – Proposed Action**

Unit #	Silviculture Prescription	Acres	% MPB Infestation	Fuels Treatment
1	Clearcut	15	50	
2	Clearcut	72	68	
3	Overstory Removal	38	50	
4	Salvage*	38	76	
5	Clearcut	64	40	X
6	Clearcut	13	60	
7	Clearcut	21	69	
8	Salvage*	35	75	
9	Clearcut	13	67	
10	Clearcut	9	77	
11	Clearcut	50	55	X
12	Clearcut	80	86	X
13	Clearcut	70	94	X
14	Clearcut	45	77	
15	Clearcut	18	50	
16	Clearcut-POL	102	82	
17	Clearcut	16	75	
18	Clearcut	57	72	
19	Clearcut	17	50	
20	Salvage*	108	88	
21	Salvage*	48	75	X
22	Sanitation/Salvage*	88	38	
25	Clearcut	138	68	
26	Clearcut	59	75	
27	Clearcut	39	56	
28	Clearcut	20	50	
29	Clearcut	59	40	X
30	Clearcut	21	70	X
31	Sanitation/Salvage*	28	40	X
32	Sanitation/Salvage*	124	41	X
33	Clearcut	19	25	
34	Clearcut	21	30	
35	Sanitation/Salvage*	40	20	X
36	Clearcut	71	25	X
37	Sanitation/Salvage*	113	30	X
38	Commercial Thin*	26	25	X
39	Commercial Thin*	21	25	X
40	Clearcut	39	77	
42	Clearcut	47	50	
43	Clearcut	36	78	X
44	Clearcut	4	75	
45	Clearcut	10	75	
46	Sanitation/Salvage*	26	50	X
47	Clearcut	31	40	X
48	Clearcut	16	60	
49	Clearcut-POL	44	50	
50	Clearcut	30	50	
51	Sanitation/Salvage*	45	35	
52	Salvage*	41	81	X
53	Sanitation/Salvage*	86	56	X

**Table 2.3 (Cont'd): Units, Treatments, and Insect Infestations – Proposed Action**

Unit #	Silviculture Prescription	Acres	% MPB	Fuels Treatment
54	Sanitation/Salvage*	79	48	X
55	Sanitation/Salvage*	79	75	X
56	Clearcut	72	75	X
58	Salvage*	44	85	
59	Sanitation/Salvage*	184	57	
63	Clearcut	58	70	
64	Clearcut	52	70	
65	Clearcut	41	60	X
66	Clearcut	24	92	X
67	Clearcut	11	35	X
68	Clearcut	70	82	X
69	Clearcut	41	70	X
70	Clearcut	61	95	X
71	Sanitation/Salvage*	51	25	X
72	Clearcut	36	25	
74	Clearcut	27	75	
75	Clearcut	30	75	
77	Clearcut	13	15	
86	Clearcut	26	10	
87	Clearcut	43	10	
88	Sanitation/Salvage**	46	52	X
89	Sanitation/Salvage**	23	50	X
92	Sanitation/Salvage*	67	50	X
93	Salvage*	80	82	X
97	Sanitation/Salvage*	60	15	X
99	Overstory Removal*	63	50	
101	Sanitation/Salvage**	74	75	X
102	Sanitation/Salvage**	99	75	X
103	Sanitation/Salvage**	54	32	X
104	Sanitation/Salvage**	90	30	X
105	Sanitation/Salvage**	47	50	X
106	Salvage*	63	75	X
107	Clearcut	34	64	X
108	Sanitation/Salvage*	115	60	X
113	Overstory Removal*	144	30	
<b>Total</b>		<b>4,372</b>		

\*Adaptive Management Unit with anticipated treatment.

\*\* Adaptive Management Unit for Lynx which require 30% overstory retention.

## ALTERNATIVE 2: Fuels Management Emphasis

Alternative 2 was developed to address the significant issues identified in Section 1.9.1 (Draft EIS p. 13). Consequently, vegetative treatments would be concentrated around WUI areas to protect communities and structures; they would also be concentrated along major forest roads to enhance ingress and egress and to protect public safety in the event of a large-scale catastrophic wildfire. By concentrating treatments in these areas, the number of acres proposed for clearcutting would automatically be reduced.

Under Alternative 2, the Laramie Ranger District would harvest timber on approximately 2,352 acres within the Spruce Gulch analysis area. Silvicultural treatments would include 772 acres of clearcutting and 1,580 acres of adaptive management prescriptions (see Tables 2.4 and 2.6 and Map 2.2). Appendix B of the Draft EIS contains guidelines for applying the various silvicultural options proposed under the adaptive management prescription.

**Table 2.4: Harvest Acres by Silvicultural Prescription – Alternative 2**

Treatment	Alternative 2 (acres)
Clearcut	772
Adaptive Management	1,147
Adaptive Management-Lynx (30% retention)	433
<b>TOTAL</b>	<b>2,352 acres</b>

Approximately 1,113 of the 2,352 acres proposed for treatment under Alternative 2 fall within MA 7.1 - Residential/Forest Interface; these acres would be managed using a combination of silvicultural treatments to reduce hazardous fuels. Management activities would generally occur less than one-half mile, or as identified within specific community wildfire protection plans, from the identified communities. Appropriate treatment boundaries would be based on site-specific conditions such as topography, vegetation conditions, and fuel loadings. The remaining 1,239 acres are located along major forest roads; these areas would be treated to better ensure ingress and egress along the routes in the event of a catastrophic wildfire.

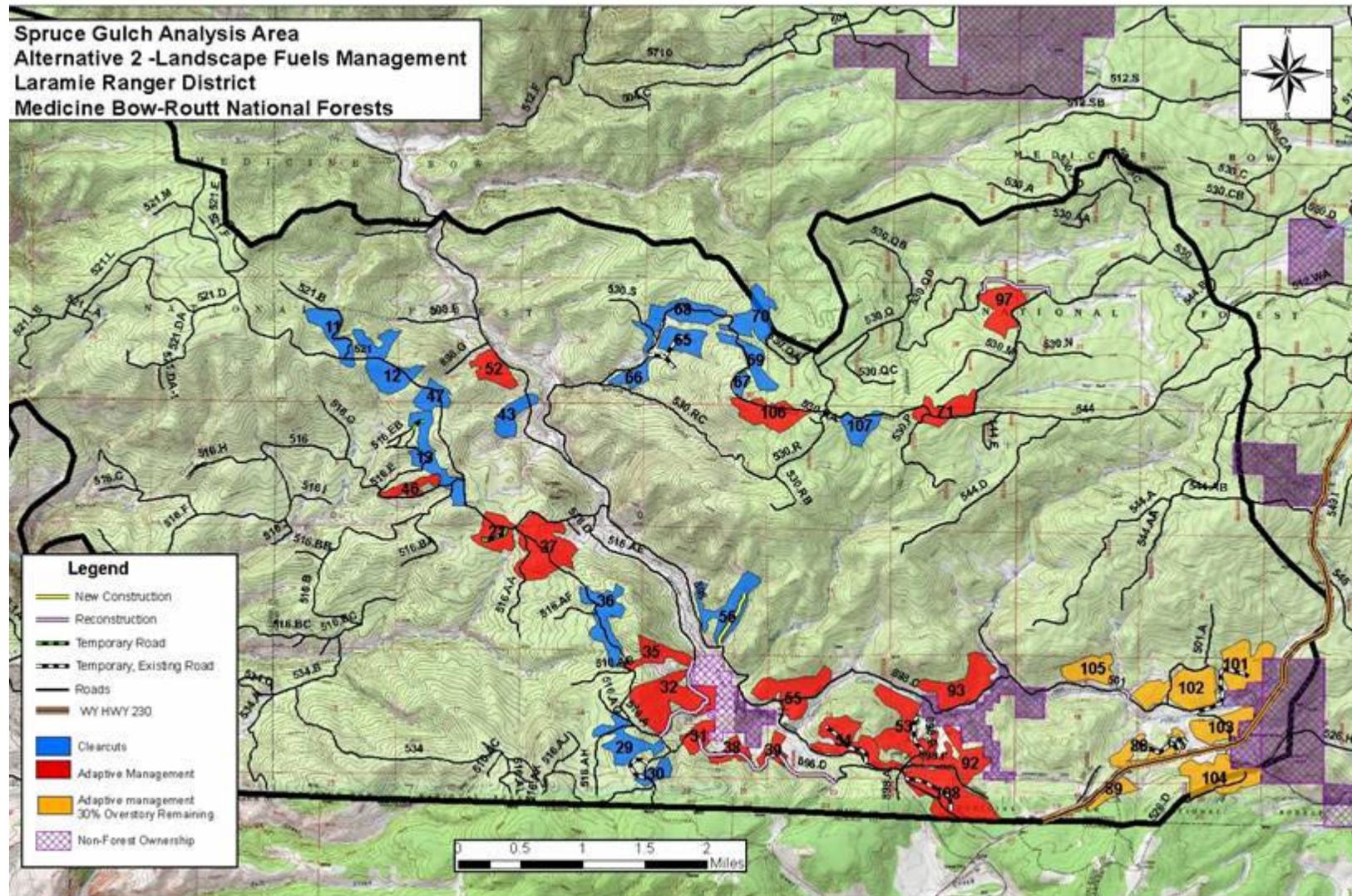
To obtain the timber, 0.5 miles of system road would be constructed, 3.4 miles of system road would be reconstructed, and 0.4 miles of temporary road would be constructed (see Table 2.5). Following project completion, all temporary roads would be decommissioned and closed. All newly constructed system roads would be physically closed to motorized vehicle use; however, their templates would be retained for future management entries. Reconstructed roads would keep the same maintenance level as identified in the Travel Management – Eastern Snowy Range: Decision 1(June 21, 2007): NFSRs 501, 530.Q, 530.QA, 534, and 898.D would remain low standard, primitive 2-track roads (level 2) open to public travel; and NFSR 530.QA.01 would move to a maintenance level 1 road (closed and gated). If approved, the Laramie Ranger District would likely begin implementing Alternative 2 in the fall of 2008.

**Table 2.5: Road Construction – Alternative 2**

Alternative 2: Fuels Management Emphasis			
Type of Road	New Construction	Reconstruction	Total Miles
<b>System</b>	0.5 miles	3.4 miles	3.9 miles
<b>Temporary</b>	0.4 miles	n/a	0.4 miles
<b>TOTAL</b>	<b>0.9 miles</b>	<b>3.4 miles</b>	<b>4.3 miles</b>

**Note:** Alternative 2 proposes a clearcut prescription on 15 units, 10 of which exceed the 40 acre maximum size limitation. The “noted” information for the Proposed Action, as described on Draft EIS page 17, also applies here.

Map 2.2: Alternative 2: Fuels Management Emphasis



\* Larger maps are available at the Laramie Ranger District Office, 2468 Jackson St., Laramie, WY or on the Forest Service’s web-site at <http://www.fs.fed.us/r2/mbr/projects/foresthealth/index.shtml>.

**Table 2.6: Units, Treatments, and Insect Infestations – Alternative 2**

Unit #	Silviculture Prescription	Acres	% MPB Infestation	Fuels Treatment
11	Clearcut	50	55	X
12	Clearcut	80	86	X
13	Clearcut	70	94	X
21	Salvage*	48	75	X
29	Clearcut	59	40	X
30	Clearcut	21	70	X
31	Sanitation/Salvage*	28	40	X
32	Sanitation/Salvage*	124	41	X
35	Sanitation/Salvage*	40	20	X
36	Clearcut	71	25	X
37	Sanitation/Salvage*	113	30	X
38	Commercial Thin*	26	25	X
39	Commercial Thin*	21	25	X
43	Clearcut	36	78	X
46	Sanitation/Salvage*	26	50	X
47	Clearcut	31	40	X
52	Salvage*	41	81	X
53	Sanitation/Salvage*	86	56	X
54	Sanitation/Salvage*	79	48	X
55	Sanitation/Salvage*	79	75	X
56	Clearcut	72	75	X
65	Clearcut	41	60	X
66	Clearcut	24	92	X
67	Clearcut	11	35	X
68	Clearcut	70	82	X
69	Clearcut	41	70	X
70	Clearcut	61	95	X
71	Sanitation/Salvage*	51	25	X
88	Sanitation/Salvage**	46	52	X
89	Sanitation/Salvage**	23	50	X
92	Sanitation/Salvage*	67	50	X
93	Salvage*	80	82	X
97	Sanitation/Salvage*	60	15	X
101	Sanitation/Salvage**	74	75	X
102	Sanitation/Salvage**	99	75	X
103	Sanitation/Salvage**	54	32	X
104	Sanitation/Salvage**	90	30	X
105	Sanitation/Salvage**	47	50	X
106	Salvage*	63	75	X
107	Clearcut	34	64	X
108	Sanitation/Salvage*	115	60	X
<b>Total</b>		<b>2,352</b>		

\*Adaptive Management Unit with anticipated treatment.

\*\* Adaptive Management Unit for Lynx which require 30% overstory retention.

### 2.3.1 Vegetation Treatment Design – Action Alternatives

Situated within MA 5.15 - Ecological Restoration-Forest Products and MA 7.1 -Wildland-Residential Interface, silvicultural treatments include predetermined harvest prescriptions and adaptive management strategies to address regeneration, salvage, suppression, and protection of forested vegetation. Given the level of the MPB epidemic, the proposed treatments are designed largely to salvage and reforest areas where high tree mortality has already occurred. They are also designed, where possible, to allow options to reduce beetle spread and to reduce the future threat of beetle related mortality in areas that are not currently infested. Finally, project design addresses maintaining the area's desired condition for old growth for its associated values and stand conditions.

Within MA 7.1, treatment units and associated prescriptions would be implemented to aggressively treat stands to lower wildfire hazardous fuels associated with bark beetle infestations. Proposed treatment units have a moderate to high beetle hazard rating or have tree densities that are a fire hazard concern. Hazard fuel treatments include fuel breaks which may involve mechanically removing or altering the vegetation, whether live or dead, to provide a zone of lessened fuel loading in close proximity to the forest boundary and existing structures. Fuel breaks may be entire units or a portion of harvest units.

Following treatments in MA 7.1, the desired stand characteristics would include pole-sized, younger lodgepole pine with minor amounts of aspen, spruce, and fir where available. The created slash would be piled for later burning, used as firewood by the public, or chipped. Downed woody material would be treated similarly. In addition to the removal of dead and dying trees, much of the treated live vegetation would be small diameter trees (< 7" diameter at breast height) that may be removed and/or pruned, thus decreasing interlocking crowns and reducing ladder fuel components in the urban interface. Other than in clearcut or salvage harvest treatments, larger trees would only be harvested if they are diseased, suppressed, otherwise poorly formed, or if there is a need to reduce interlocking crowns and ladder fuels.

### 2.3.2 Vegetation Treatments - Adaptive Management Units

Adaptive Management is founded on common sense, experience, research, monitoring, and adjusting practices based on what is happening on the ground. It provides the ability to be flexible and to modify an action in response to natural or human activity, new information, or unforeseen events. This approach provides opportunities to make and implement decisions quickly.

It is anticipated that many of the adaptive management prescriptions associated with the Proposed Action and Alternative 2 would be applied after the beetles have killed a majority of or an entire stand. Adaptive management prescriptions include clearcut, salvage, shelterwood, sanitation/salvage, group selection, individual tree selection, commercial thinning, and overstory removal. The treatments would salvage the value from dead and dying trees and initiate a new manageable stand of timber. It should be noted that the shelterwood, group selection, and individual selection prescriptions may be unlikely in many areas given the extent of the MPB epidemic. None-the-less, these even-aged and uneven-aged methods may be applicable in localized areas and, as such, are included as available treatment options.

Some of the silvicultural treatments may be applied in a preventative sense to reduce the extent and/or intensity of outbreaks within an area. While preventative options may also be unlikely

given the current level of bark beetle infestation, they may be applicable on a localized stand basis as adaptive management choices are selected. Some of the treatments may be applied in a suppression sense where the intent is to remove infested trees while reducing the underlying susceptibility of the stands. Appendix B of the Draft EIS contains guidelines for applying the various silvicultural options proposed under the adaptive management prescription.

### 2.3.3 Vegetation Treatments – Predetermined Units

Despite the latitude of an adaptive management approach, many stands have a predetermined treatment due to existing stand conditions (e.g. clearcut, overstory removal, and sanitation/salvage harvest). This is particularly true with the prescribed clearcut treatments given the existing culmination of mean annual increment (CMAI) of growth, insect/disease infestation levels, and lack of existing regeneration. Clearcut treated stands are those that have already reached their full growth potential, are decadent or dying, or are heavily infested/infected with insects or diseases. Overstory removals typically remove an older overstory with poor form, disease and/or infestations while leaving an already established, more advanced regeneration of a desirable tree species. Sanitation/salvage is designed to enhance growth, quality, resiliency, vigor, and composition of a stand between regeneration periods. The sanitation/salvage treatments may leave stands dominated by pole-size timber and smaller as the residual stand.

### 2.3.4 Vegetation Treatment Descriptions

**CLEARCUT:** Clearcutting, where it has been determined to be the optimum silvicultural prescription, would be applied to stands that have either: achieved CMAI of growth; have a high infestation of dwarf mistletoe in association with a low to moderate infestation of bark beetle; or have a large number of dead and dying trees due to bark beetles (areas where 50% or more of the trees/acre are dead or dying) and inadequate understory to meet stocking standards. Some clearcuts are in predominately smaller pole size-class timber; these units are shown as Clearcut-POL. Slash treatments may include any of the following methods: prescribed burning, lop and scatter, machine pile and burn, machine trampling, or roller chopping. Slash treatment would be dependent on the density of the residual fuel density, topography, soils, fuels abatement considerations, and available seed source. The lodgepole pine in the Spruce Gulch area has mix of serotinous and non-serotinous cones so seed would be dispersed from a mix of seed from slash or from cones that mature and open while on trees internal or external to the clearcut. Should natural seeding result in inadequate stocking, artificial regeneration would occur to bring the sites to minimum stocking standards.

**<sup>2</sup>SHELTERWOOD – PREP CUT:** Under this first step of what is typically a three-step shelterwood, a preparatory or prep cut is made which harvests approximately 25-40 percent of the existing overstory. This first entry concentrates on removing trees with insects or diseases and/or poor form, thus leaving the healthiest trees. Along with improving the health of the stand, the objective of this first entry is to test for and to help develop wind firmness in the retained trees, setting the stand up for a future seed cut to promote new regeneration. This treatment would be applied to stands having an existing even-aged stand structure, a low incidence of MPB or spruce beetle activity (areas where less than 15% of the trees/acre basis are dead or dying), and a low to moderate infestation of dwarf mistletoe. The objective is to open up the stand by

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<sup>2</sup> This treatment may not be applicable in the Spruce Gulch analysis area due to the level of bark beetles in most stands. It may have application on a case-by-case basis in light to moderately infested stands, particularly in areas within the lynx corridor (see Draft EIS p. \*).

removing the trees in the larger diameter classes thus lowering the basal area (BA) per acre and average tree diameter per acre. Most of these stands have a good mix of species and diameter classes; consequently, removing the larger diameter trees would leave a residual stand capable of maintaining stocking and stand productivity. Slash is typically lopped and scattered unless fuels abatement needs dictate a more substantial removal.

**<sup>2</sup>SHELTERWOOD - SEED CUT:** Under this second step of what is typically a three-step shelterwood, a seed cut is made which harvests approximately 40-70 percent of the existing overstory. This second entry concentrates on removing trees with insects, diseases, and/or poor form to further open up the stand for growing space. It typically leaves the healthiest trees to provide a seed source for new regeneration. This treatment would be applied to stands with a somewhat open overstory and an established conifer understory. In most stands, the understory is a mix of species averaging 100 to 300 stems per acre and 1' to 6' in height (in some areas up to 20' in height). If available, Engelmann spruce less than 10" diameter at breast height (DBH) would be favored over other species as seed trees. Lodgepole pine having moderate to high dwarf mistletoe infection would be removed. Typically 40 - 60 trees per acre would be left to provide a seed source, to protect the site, and to help maintain a forested appearance. Slash is typically lopped and scattered unless fuels abatement needs dictate a more substantial removal.

**SHELTERWOOD – REMOVAL CUT:** Typically called an Overstory Removal, this is the final step of a two or three-step shelterwood. A removal step would be applied to stands with a uniformly established conifer understory that averages 200 to 1,000 stems per acre and 2' to 30' in height. These stands are usually the result of a past shelterwood harvest or are naturally occurring stands that simulate shelterwood type treatments. Removing the overstory has the advantages of improving the growth of the residual stand, removing trees susceptible to or infested by MPB or spruce beetle, and reducing the spread of dwarf mistletoe. Slash is typically lopped and scattered unless fuels abatement needs dictate a more substantial removal.

**<sup>2</sup>GROUP SELECTION:** Group selection would be applied to stands with a low to moderate beetle hazard rating, a low incidence of MPB or spruce beetle activity (areas where less than 15 percent of the trees/acre are dead or dying), and a low to moderate dwarf mistletoe infection. The objective is to remove clumps of beetle infested trees and clumps of larger diameter trees. Natural regeneration is expected but should natural seeding result in inadequate stocking, artificial regeneration would occur to bring the sites to minimum stocking standards. Slash is typically lopped and scattered but mechanical treatment may be necessary to reduce slash concentrations and provide scarification for seedling establishment within the group cuts.

**<sup>2</sup>INDIVIDUAL SELECTION:** A variation of the selection method, individual tree selection would be applied to stands having an existing uneven-aged stand structure, a low incidence of MPB or spruce beetle activity (areas where less than 15 percent of the trees/acre are dead or dying), and a low to moderate dwarf mistletoe infection. The objective is remove beetle infested trees and a large percentage of the trees susceptible to attack by either MPB or spruce beetle while attempting to meet a desired diameter distribution. This treatment typically allocates more trees to the medium and small diameter classes and fewer trees to the larger diameter classes.

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<sup>2</sup> This treatment may not be applicable in the Spruce Gulch analysis area due to the level of bark beetles in most stands. It may have application on a case-by-case basis in light to moderately infested stands, particularly in areas within the lynx corridor (see Draft EIS p. \*).

Stands with proportionately more, large diameter trees are most likely to be infested and suffer greater losses. Most of these stands have a good mix of species and diameter classes, and removing the larger diameter trees would leave a residual stand capable of maintaining stocking and stand productivity. Slash is typically lopped and scattered.

**SANITATION/SALVAGE:** This treatment would generally be applied to stands that have a MPB or spruce beetle incidence where 15 - 50 percent of the trees per acre are dead or dying and a generally low to moderate dwarf mistletoe level. The objective is to open up the stand by removing dead and dying trees and healthy trees in the larger diameter classes. Removing these trees would help lower the BA and average tree diameter per acre. Bark beetle activity is at varying levels within these stands and would most likely increase. Most of these stands have a good mix of diameter classes; thus, removing most of the larger diameter trees would leave a residual stand capable of maintaining stocking and stand productivity. The residual stand may be dominated by spruce-fir and/or pole-size and smaller lodgepole pine. Slash is typically lopped and scattered unless fuels abatement needs dictate a more substantial removal.

**SALVAGE:** This treatment includes removing the majority of the merchantable dead and dying timber. This treatment would be applied to stands having 50+ percent beetle infestation, an existing dead and dying overstory, and a low to moderate dwarf mistletoe level in the understory. The objective of this treatment is to reduce fuels, remove potential hazard trees, and/or to create openings for future regeneration. It is generally proposed in areas where the beetles have run their course. These stands have a mix of size classes; thus, removing most of the larger size trees would leave a residual stand capable of maintaining stocking and stand productivity. The residual stand may resemble an overstory removal with a mix of seedling/sapling and pole-sized trees and have openings that resemble patch clearcuts. Slash is typically lopped and scattered; however, mechanical treatment may be necessary to reduce slash concentrations and provide scarification for seedling establishment.

**COMMERCIAL THINNING:** Proposed for immature lodgepole pine stands, 40-50 percent of the existing overstory is typically thinned to promote a healthier stand and to produce future sawtimber. Normally the largest and most phenotypically desirable trees are retained in the stand, and damaged, diseased, intermediate, and suppressed trees are removed. The basic approach is to thin from below; however, thinning from above may be necessary in stands with moderate to high mortality due to bark beetles activity within the stand. This treatment would be applied to stands with average diameters less than 7" DBH. Slash is typically lopped and scattered unless fuels abatement is required around private properties or roadways.

## 2.4 Design Criteria - Proposed Action and Alternative 2\_\_

The ID Team identified design criteria to reduce or prevent undesirable effects resulting from management activities. Design criteria include such measures as BMPs, WCPs, Forest Plan standards and guidelines, and other environmental protection required by laws and regulations. They are as follows:

### Heritage Resources

- 1) Known or identified heritage resource sites that are located within treatment units will be evaluated for National Register eligibility. Mechanical treatments will not be allowed within 50 feet of sites that are eligible for, or listed on, the National Register of Historic Places. If treatment is necessary, these sites and the 50 foot buffer will be hand-treated.

**Noxious Weeds**

- 2) Off-road equipment shall not be moved onto the sale area without having first taken reasonable measures to make sure each piece of equipment is free of soil, seeds, vegetative matter, or other debris that could contain or hold invasive seeds. Reasonable measures are outlined in Timber Sale Contract Clause B6.35.

**Range**

- 3) Approximately 0.6 miles of an existing fence that runs thru units 21 and 37 will be reconstructed after vegetative treatments have been applied; the fence may need to be moved north of the units. Roughly 0.25 miles of fence may be needed in unit 105 to prevent livestock deviation from scheduled rotation.

**Recreation**

- 4) If logging operations are conducted during the winter season, NFSRs 516, 530, and 544 will not be plowed to a bare surface so that snowmobiling on these designated winter trails may continue. Log hauling routes will be planned to minimize impacts to trail grooming and maintenance.
- 5) Efforts will be made to coordinate winter hauling operations to minimize potential conflicts with snowmobile user experiences and safety concerns. Efforts may include increased outreach and signage, prohibiting hauling during weekends and holidays, and coordination with the Wyoming State Trails program.
- 6) Outreach efforts and informational signage will be employed alerting visitors to potential disruptions to recreation activities, especially as they pertain to recreationists on the Medicine Bow Rail Trail (MBRT), Off-road Vehicle enthusiasts in the summer, and snowmobilers who ride groomed trails in the winter.
- 7) Special use permittees operating within the analysis area will be informed in advance of any potential disruptions to their operations (i.e., snowmobile and hunting guides).
- 8) Adaptive management in units near or immediately adjacent to the MBRT will be used to minimize the negative impacts of operations on the trail structure and on the experience of trail users.
- 9) Units surrounding the MBRT will be left with as natural cutting unit boundary (curved vs. straight) as possible with vegetative screens and fingers of trees left wherever possible.
- 10) Timber hauling on the MBRT will not be allowed at any time during the spring, summer, or fall months. If winter hauling on the MBRT is the most viable option for timber hauling, it will only be considered for short distances in winter when the trail is in a solid frozen ground condition and, then, only if hauling will not cause any damage to facilities, signs, or improvements along the trail.
- 11) In those units where temporary roads are being constructed or utilized, road decommissioning will be completed in a manner that prohibits and/or discourages user created trails (particularly in those units adjacent to Roadless or Wilderness area boundaries).

**Retention of Spruce/Fir Regeneration**

- 12) Management activities that may cause more than 25 percent mortality in established spruce/fir regeneration patches greater than ¼ acre in size will be avoided.

**Road Decommissioning**

- 13) Road decommissioning activities will include adequate drainage (waterbars or drain dips) to prevent erosion and/or failure of the road surface.
- 14) Culverts will be removed from decommissioned roads and road fill material will be removed to restore stream channel geometry. Fill material will not be stockpiled in floodplains. Site-

specific erosion control and bank stabilization measures will be developed and implemented for each culvert removal on flowing streams.

- 15) Erosion control, such as straw mulch or erosion blankets, will be used to reduce erosion of newly disturbed soil adjacent to all stream channels and within any floodplains. These areas will be seeded with native seeds (as feasible) to increase rate of revegetation.
- 16) All fill material will be removed from portions of decommissioned roads that currently encroach on the stream channel and/or floodplain to restore stream channel and floodplain width and to reduce future erosion of road fill.

### **Roads, Landings**

- 17) Where ground disturbing road reconstruction activities occur less than 100 feet from Spruce Gulch Creek on road 530.RC, an on-site review will be conducted to determine which, if any, of the following measures should be implemented to minimize sediment transport during project implementation: 1) install and maintain sediment traps below drainage features (e.g. culverts, drivable dips); 2) install and maintain sediment barriers (e.g. silt fence, straw bales, slash filter windrows); and 3) surface road with aggregate.
- 18) Staging areas and refueling locations will be located at least 300 feet from streams and wetlands.
- 19) If avoidable, natural stream channels will not be relocated. Where feasible, return flow to natural channels.
- 20) If roads or trails must enter wetlands, bridges or raised prisms with diffuse drainage will be used to sustain flow patterns. Crossing bottoms will be set at natural levels of channel beds and wet meadow surfaces. Actions that may dewater or reduce water budgets in wetlands will be avoided.
- 21) Where feasible, roads will be constructed with rolling grades instead of ditches and culverts.
- 22) Cross drains will be installed to disperse runoff into filter strips and minimize connected disturbed areas. Make cuts, fills, and road surfaces strongly resistant to erosion between each stream crossing and at least the nearest cross drain.
- 23) If necessary, filter strips and sediment traps will be used to keep all sand-sized sediment on the land; disconnect disturbed soil from streams, lakes, and wetlands. Disperse runoff into filter strips. Restrict roads, landings, skid trails, concentrated-use sites, and similar soil disturbances to designated sites.
- 24) Road ditches and cross drains will be designed to limit flow to ditch capacity and prevent ditch erosion and failure.
- 25) Key sediment traps will be cleaned when 80 percent full. Remove sediment to a stable, gentle, upland site and re-vegetate.

### **Road Stream Crossings**

- 26) Any culvert installations, removals, or other in-channel construction activities on flowing streams will require a site specific erosion control plan to reduce turbidity and fine sediments. These projects should be evaluated to determine if a waiver to the state water quality rule is necessary (which allows a maximum turbidity increase of 10 NTU).

### **Scenic Resources**

- 27) Damage to natural features such as rock outcrops, young healthy trees of lodgepole pine, spruce/fir and understory of trees and shrubs will be minimized; cut stumps as low to the ground as feasible and remove heavy slash within the immediate foreground (approximately 25 to 200 feet from edges of road) of Wyoming State Highway 230, Pelton Creek Road (NFSR 898), Spruce Gulch Road (NFSR 530) and Medicine Bow Trail.

- 28) Units will be designed to mimic natural openings by following natural contour lines and creating irregular and undulating edges. Where feasible, unit edges will be located adjacent to existing aspen and spruce/fir stands.
- 29) When proposed units are located adjacent to past block shaped units, linear edges will be eliminated by designing proposed unit edges to cut across edges of past units as to eliminate linear edges and restore to a desired natural appearing landscape pattern.

**Soils**

30) The following effective groundcover criteria will be used for all harvest units:

<b>Required Minimum Percent Effective Ground Cover</b>		
<b>Erosion Hazard Class</b>	<b>First Year After Disturbance</b>	<b>Second Year After Disturbance</b>
Low	20-30	30-40
Moderate	30-45	40-60
High	45-60	60-75

- 31) Mandatory dry-site operation or winter logging will be required in units with severe compaction hazard.
- 32) Whole tree skidding will not be allowed except in fuel reduction emphasis areas.
- 33) Equipment use will be controlled. Skidding will be restricted to designated skid trails to the best degree possible.
- 34) Subsoil or scarify detrimentally compacted areas of temporary roads, landings, and main skid trails.
- 35) If subsoiling is necessary, teeth will be lifted every 75 to 100 feet so as to not introduce a continuous furrow.
- 36) Scatter slash on skid trails to provide groundcover and minimize surface erosion. Ensure at least 50 percent groundcover on skid trails following completion of use. All skid trails will be closed in the same season of use.
- 37) Slash piles not located on landings or designated slash disposal areas will be limited to approximately 300 square feet. After piles are burned, they will be spread out and the site will be planted or seeded.
- 38) Chipped material should be applied at a rate of no more than 3 inches depth at 25-50 percent ground cover within the activity area. Areas exceeding depth and cover limits will be re-spread using hand tools.
- 39) Temporary roads will be constructed and maintained with the following drainage spacing guidelines:

<b>Recommended Maximum Distance Between Rolling Dips (meters)</b>		
<b>Road Grade %</b>	<b>Low to Non-Erodible Soils</b>	<b>Erodible Soils</b>
0-3	120	75
4-6	90	50
7-9	75	40
10-12	60	35
12+	50	30

40) Closed and/or rehabilitated temporary roads and skid trails will utilize the following water bar spacing guidelines:

<b>Recommended Water Bar Spacing (meters)</b>		
<b>Road/Trail Grade %</b>	<b>Low to Non-Erodible Soils</b>	<b>Erodible Soils</b>
0-5	75	40
6-10	60	30
11-15	45	20
16-20	35	15
21-30	30	12
30+	15	10

- 41) Water bars will not be drained into ephemeral draws on dissected slopes.
- 42) Ground cover will be established or maintained on disturbed areas (temporary roads, landings, skid trails, etc.). These actions will be current with harvest operations and will be completed immediately preceding seasonal periods of precipitation or runoff to reduce erosion and the spread of noxious weeds.

### **Timber Harvest and Fuels Activities**

- 43) Heavy equipment will be kept out of streams, swales, lakes, riparian areas, wetlands, and hydric soils except to cross at designated points. If necessary, build crossings or to do restoration work. Equipment may be used in these areas if protected by at least 1 foot of packed snow or 2 inches of frozen soil. (Watershed Conservation Practices handbook, R2 Amendment 2509.25-2001-1)
- 44) Keep heavy equipment out of streams during fish spawning incubation and emergence periods. Field inventory and assessments will be conducted before ground disturbing activities to determine which streams and specific dates.
- 45) Ensure at least one-end log suspension in the Water Influence Zone (WIZ). Fell trees in a way that protects vegetation in the WIZ from damage. Keep log landings and skid trails out of the WIZ, including swales. (Watershed Conservation Practices handbook, R2 Amendment 2509.25-2001-1)
- 46) Tree harvest will be allowed within riparian areas, and within 100 feet of intermittent and perennial streams, only if on-site analysis shows that long-term hydrologic and riparian function, channel stability, riparian and stream habitat will be maintained or improved.

### **Unharvested Retention Areas**

- 47) In MA 5.15, retention areas within clearcut units will be identified at the site with visible marking to ensure that these areas are protected during and after harvest operations.
- 48) Retention areas will include riparian buffers, edges of natural openings, areas with active decay and cavities, spruce/fir patches, areas with existing regeneration or multi-storied canopy, and areas with diverse flora. Where feasible, locate retention areas to include red squirrel middens.
- 49) Where feasible, retention clumps will be no more than 100 meters apart and will be approximately ¼ acre or larger in size.
- 50) Where feasible, retention clumps will contain trees 10 inches in diameter or greater.
- 51) Where possible, incorporate snag, snag recruit, and coarse wood retention requirements into retention clumps (FP pg. 1-37, Table 1-11).

### **Wildlife**

- 52) **TES Amphibian Species:** Vegetation and slash treatments will be excluded in areas within 300 feet of ponds, lakes, standing water, and wetlands.

- 53) Boreal Owls: Vegetation and slash treatments will be excluded within 100 feet of boreal owl nest boxes. This criterion applies to units 68 and 70.
- 54) Northern Goshawk and Other TES Species: Pursuant to Timber Sale contract standard provisions B6.24 and C6.24#, upon discovery of a TES wildlife species nesting/breeding (or other essential) site, active logging or other contract operations will be suspended in the immediate vicinity until a wildlife biologist assesses the situation and determines appropriate action(s) to take for protection of habitat or individual animals.
  - Appropriate action(s) include(s): Imposition of a seasonal restriction to protect a TES species from disruption/harassment or habitat destruction; changes in timber marking (and included timber species or quantities) to protect or maintain existing habitat(s); or complete withdrawal of included timber within a specified protection area
- 55) Northern Goshawk: Prior to award of timber sale contract, accepted and standardized goshawk protocol surveys will be conducted within treatment units containing nesting habitat and in nesting habitat within 3/8 mile of treatment units containing nesting habitat.
- 56) Canada Lynx: In lynx linkage corridors, where timber harvest would remove overstory cover and create openings greater than 300 feet between patches of cover, at least 30 percent green overstory canopy closure will be retained and averaged over the treatment unit.
  - Canopy closure may be retained in clumps or distributed evenly throughout the treatment unit. If clumps are retained, ensure that gaps in overstory canopy do not exceed 300 feet.
  - In treatment units where available green overstory canopy is less than 30% due to insect and/or disease mortality, retain all green trees and sufficient clumps of dead and dying trees to total 30% of treatment unit acres.
  - This applies to treatment units 88, 89, 101, 102, 103, 104, and 105.

## 2.5 Monitoring - Proposed Action and Alternative 2\_\_\_\_\_

Monitoring is done to assure that Forest Plan standards and guidelines are being met and adhered to during project implementation. The following specific items were identified by the ID Team as needing monitoring during preparation and implementation of potential projects:

**Table 2.7: Monitoring Requirements**

Monitoring Requirement	Monitoring Type	Responsibility	Frequency
BMP and Design Criteria effectiveness	Visual inspections	Contract Administrator and IDT members	Annual through project completion
Implementation and effectiveness of road decommissioning	Visual inspections	Hydrologist	Annually for first two years after roads are decommissioned

## 2.6 Alternatives Eliminated from Detailed Study\_\_\_\_\_

Federal agencies are required by NEPA to rigorously explore and objectively evaluate a range of reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not considered in detail (40 CFR 1502.14). Public involvement and collaborative efforts resulted in two alternatives that were considered but eliminated from detailed study in this Draft EIS. The reasons for their elimination are provided below.

### **Original Proposed Action**

The original Proposed Action included vegetative treatments on approximately 6,143 acres and construction of 13.2 miles of new system and temporary roads. This original proposal was designed to maximize treatments in commercial timber lands impacted by the bark beetle epidemic as well as to treat stands within the WUI areas within the Spruce Gulch analysis area. This proposal was originally presented during the collaborative efforts that occurred during November and December of 2007, as directed under HFRA, Section 104 (f). A description of the original proposal was also included in the January 2008 scoping letter.

The primary focus of this alternative was to achieve the desired conditions in the Spruce Gulch analysis area as rapidly as possible by aggressively applying Revised Forest Plan direction for integrated pest management. The vegetation management practices proposed would have maximized a mix of ecological and human needs including commercial wood products before loss of value (MA 5.15). They would also have more aggressively treated stands impacted or threatened by the MPB epidemic to reduce hazardous fuels (MA 7.1).

This alternative was eliminated from detailed study for the following reasons:

- 1) During the collaborative process, the Forest Service worked with local stakeholders to determine their values and desired outcomes for the Spruce Gulch analysis area. The collaborative group indicated that priority treatment areas should include: WUI areas and evacuation routes; areas that were generally accessible and that would require minimal road construction; areas in need of ecological restoration; and areas where fire hazards were high. As a result of this process, the Forest Service eliminated potential units that did not meet these priorities; and
- 2) Preliminary analyses indicated that the cumulative effects of past management activities, coupled with the intensity and pattern of new activities, including road construction, would likely exceed Forest Plan standards and guidelines, particularly for wildlife and mapped and inventoried old growth.

### **Uneven-aged Management (No Clearcutting)**

This alternative would have used only selective harvesting or uneven-aged management prescriptions to treat potential harvest units within the analysis area. This alternative was eliminated from detailed study because it does not comply with Forest plan goals, objectives, and desired condition for the area. The Forest Plan outlines clear direction regarding management of forested stands that are infested with insects and diseases (p. 1-50). It also indicates that priority should be given to covertypes identified as having a high to moderate risk for insect and disease infestation (p. 1-50). The majority of the forested acres within the Spruce Gulch analysis area fall in this category.

Further, the majority of the timber type in the Spruce Gulch analysis area is lodgepole pine, a shade intolerant species. Clearcutting is a proven harvest method that can be used to create openings for regeneration and growth of intolerant tree species such as lodgepole pine. While clearcutting is not the only option for these species, it is often identified as the optimum method. The National Forest Management Act of 1976 directs the Forest Service to use clearcutting when it is determined to be the optimum method to meet land management objectives. The

silvicultural report completed for this analysis contains an optimum method determination (April 2008) for proposed clearcut units.

## 2.7 Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the tables is focused on activities where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives. Table 2.8 compares alternative components; Table 2.9 compares how the alternatives address the Purpose and Need for Action; Table 2.10 compares how the issues raised during scoping would be affected by the alternatives; and Table 2.11 compares how the individual resource areas would be affected by the alternatives. The information presented in Table 13 represents a summary of the Environmental Consequences information presented in Chapter 3: Affected Environment and Environmental Consequences” of this Draft EIS.

**Table 2.8: Alternative Components**

<b>Treatment</b>	<b>Alternative 1: No Action</b>	<b>Proposed Action: Forest Health Emphasis</b>	<b>Alternative 2: Fuels Management Emphasis</b>
Clearcut	0 acres	1,859 acres	772 acres
Clearcut - POL	0 acres	146 acres	0 acres
Overstory Removal	0 acres	38 acres	0 acres
Adaptive Management	0 acres	1,896 acres	1,147 acres
Adaptive Management – Lynx (30% retention)	0 acres	433 acres	433 acres
<b>TOTAL</b>	<b>0 acres</b>	<b>4,372 acres</b>	<b>2,352 acres</b>
Clearcut Units over 40 acres	0	22	10
<b>Road Activities</b>			
<b>New Construction:</b>			
System	0 miles	0.5 miles	0.5 miles
Temporary	0 miles	3.7 miles	0.4 miles
<b>Reconstruction:</b>	0 miles	7.8 miles	3.4 miles
<b>TOTAL</b>	<b>0 miles</b>	<b>12 miles</b>	<b>4.3 miles</b>

**Table 2.9: Comparison of Alternatives - Purpose and Need**

<b>Purpose &amp; Need</b>	<b>Alternative 1: No Action</b>	<b>Proposed Action: Forest Health Emphasis</b>	<b>Alternative 2: Fuels Management Emphasis</b>
<b>Salvage forest products to keep suitable lands producing and contributing to the ASQ</b>	With 0 acres of harvest treatment, the No Action alternative would not address this need.	With 4,372 acres of dead and dying trees proposed for harvest, the Proposed Action best addresses this need.	With 2,352 acres of dead and dying trees proposed for harvest, Alternative 2 addresses this need, but to a lesser degree than the Proposed action.
<b>Reduce the effects of tree mortality to restore healthy ecological conditions and scenic quality</b>	No	The 4,372 acres of proposed treatment are situated in stands that have a moderate to high beetle hazard rating and/or stands with known beetle epicenters. Silvicultural treatments would reduce beetle hazard ratings in treated units, thereby improving overall stand health.	The 2,352 acres of proposed treatment are situated in stands that have a moderate to high beetle hazard rating and/or stands with known beetle epicenters. Therefore, Alternative 2 addresses this need, but to a lesser degree than the Proposed Action.
<b>Accelerate regeneration of forested stands killed by MPBs</b>	No	The Proposed Action best addresses this need due to the amount of even-aged silvicultural prescriptions (1,897 acres) proposed. Units with even-aged prescriptions would essentially be “beetle proofed” in the short-term. The subsequent lodgepole pine or spruce-fir regeneration in these stands would have a low susceptibility to beetle for next 60 to 80 years.	Alternative 2 addresses this need but to a lesser degree than the Proposed Action due to the reduced amount of even-aged silvicultural prescriptions proposed (772 acres).
<b>Manage hazardous fuel loadings to minimize the potential for high intensity/high severity wildfires</b>	No	The Proposed Action and Alternative 2 meet this need equally well. Both propose 2,352 acres of fuels treatments around WUIs and along major forest roads.	The Proposed Action and Alternative 2 meet this need equally well. Both propose 2,352 acres of fuels treatments around WUIs and along major forest roads.

**Table 2.10: Comparison of Alternatives - Significant Issues**

<b>Issue Indicators</b>	<b>Alternative 1 – No Action</b>	<b>Proposed Action: Forest Health Emphasis</b>	<b>Alternative 2: Fuels Management Emphasis</b>
<b>Issue 1 – Clearcutting</b>			
- Acres of past timber harvest	3,902	3,902	3,902
- Proposed clearcut acres/% of total acres treated	0 / 0	1,859 (43%)	772 (33%)
- Acres of treatment in wildlife security areas	0	0	0
- Changes in fuel modeling	Moves from fuel model (FM) 8 to FM 10 during the epidemic and to FM 12 post-epidemic (i.e., moves from lower to higher fire hazard)	Treatments would likely maintain or more closely approximate FM 8	Treatments would likely maintain or more closely approximate FMs 8 and 10.
- Changes in fuel behavior	Because no vegetative treatments would occur, the potential for high intensity, high severity crown fires (short-term) and ground fires (long-term) is expected.	The potential for crown fires would be reduced the most; slash treatments would dictate on-the-ground fire behavior	The potential for crown fires would be reduced, but less than under the Proposed Action; slash treatments would dictate on-the-ground fire behavior
<b>Issue 2 - Treat Areas Adjacent to Wildland-Urban Interface (WUI) Areas Only</b>			
Total acres treated	0	4,372	2,352
Acres of fuels treatments	0	1,113 (WUIs) 1,239 (roads) 2,352 (total)	1,113 (WUIs) 1,239 (roads) 2,352 (total)
Percent of total fuels acres treated	n/a	100	100
Percent of total project acres treated		54	100

The information provided in the **Table 2.11** reflects the maximum treatment potential for the **Proposed Action: Forest Health Emphasis and Alternative 2: Fuels Management Emphasis**. The information reflects an analysis assumption that units with an adaptive management prescription would be clearcut. This approach was taken for analysis purposes to ensure that the direct, indirect, and cumulative effects of project implementation would be analyzed in a comprehensive and systematic manner.

**Table 2.11: Comparison of Alternatives – Resource Impacts**

Resource	Alternative 1: No Action	Proposed Action: Forest Health Emphasis	Alternative 2: Fuels Management Emphasis
<b>Forested Vegetation/Insects and Diseases</b>	Vegetative treatments would not occur. Individual tree mortality would continue due to the high infestation levels of bark beetle and also due to the presence of dwarf mistletoe. Stand health can be expected to continue to decline (Draft EIS pp. 46 - 48). <b>This alternative does not comply with Forest Plan MA 5.15 guidelines for Vegetation and Integrated Pest Management (pp. 2-59 to 2-60 and 2-62 to 2-63, respectively).</b>	4,372 acres of forested vegetation would be treated. Proposed partial cut treatments would greatly reduce beetle infestation potential and spread. Regeneration treatments would be effective in putting high beetle mortality stands back into production contributing both to the maintenance of the overall Forest’s allowable sale quantity (ASQ) and ecological sustainability (Draft EIS pp. 48 - 49).	2,372 acres of forested vegetation would be treated. This alternative would be effective in addressing fuels reductions in the WUI units and the other fuels priority units; however, economic viability is substantially reduced. Without some of the other stands that have more economic value, units proposed under Alternative 2 would be less likely to be treated in a commercial type setting. Fewer stands that currently have high mortality or infestations would be treated (Draft EIS p. 49). <b>This alternative does not comply with Forest Plan MA 5.15 guidelines for Vegetation and Integrated Pest Management (pp. 2-59 to 2-60 and 2-62 to 2-63, respectively).</b>
<b>Ecology</b>	<b>Old Growth:</b> No changes to mapped and inventoried old growth acres (Draft EIS p. 50). <b>Fragmentation:</b> Changes to patch size and pattern of interior forest would be influenced by natural disturbances only (Draft EIS p. 53).	<b>Old Growth:</b> No changes to mapped and inventoried old growth acres (Draft EIS p. 51). <b>Fragmentation:</b> Average early seral patch size would increase from 25.1 acres to 106 acres. Average mid-seral, high density patch size would decrease from 254.3 acres to 157.9 acres and average late seral patch size would decrease from 70.7 acres to 61.1 acres (Draft EIS p. 54).	<b>Old Growth:</b> No changes to mapped and inventoried old growth acres (Draft EIS p. 51). <b>Fragmentation:</b> Average early seral patch size would increase from 25.1 acres to 54.5 acres. Average mid-seral patch size would decrease from 254.3 acres to 187.8 acres and average late seral patch size would decrease from 70.7 acres to 65.1 acres (Draft EIS p. 54).

Table 2.11 (Cont'd): Comparison of Alternatives – Resource Impacts

Resource	Alternative 1: No Action	Proposed Action: Forest Health Emphasis	Alternative 2: Fuels Management Emphasis
<b>Fire and Fuels</b>	The effects of the MPB epidemic would drastically alter stand characteristics. Changes to fuel characteristics and an increase in fire behavior are expected. FMs would move from 8 to 10 during the epidemic and to 12 post-epidemic (i.e., moves from lower to higher fire hazard). Increased risks for structure damage in WUIs; reduced opportunities for ingress/egress along major forest roads in the event of a wildfire (Draft EIS pp. 58 - 59). <b>This alternative does not comply with Forest Plan Fire and Fuels guideline #1 in MA 5.15 (p. 2-62) or with Fire and Fuels standard #1 in MA 7.1 (p. 2-70).</b>	Removing standing dead trees would reduce canopy fire behavior. During and post beetle epidemic, the Proposed Action would move or maintain the analysis area closer to the desired condition (FM 8) from a fire and fuels management standpoint. WUI areas would be afforded greater protection. Opportunities for increased ingress/egress along major forest roads would be increased (Draft EIS pp. 59 - 61).	Removing standing dead trees would reduce canopy fire behavior, but to a lesser degree than under the Proposed Action. During and post beetle epidemic, Alternative 2 would move or maintain the analysis area closer to the desired condition (FM 8) from a fire and fuels management standpoint, albeit to a lesser degree than the Proposed Action. Effects to WUIs and ingress/egress would be the same as under the Proposed Action (Draft EIS p. 61).
<b>Engineering</b>	Increased road maintenance needs are anticipated due to expected increases in water yield and peak flows. Annual and deferred road maintenance costs would increase (Draft EIS p. 62).	This alternative would require 0.5 miles of system road construction; 7.8 miles of road reconstruction; and 3.7 miles of temporary road construction. Pre-use maintenance would be needed on 65 miles of existing road. Reconstruction and maintenance of system roads via sale activities would help address deferred maintenance needs and reduce required annual maintenance (Draft EIS pp. 62 - 63).	This alternative would require 0.5 miles of system road construction; 3.4 miles of road reconstruction; and 0.4 miles of temporary road construction. Pre-use maintenance would be needed on 45 miles of existing road. Reconstruction and maintenance of system roads via sale activities would help address deferred maintenance needs and reduce required annual maintenance, but to a lesser degree than the Proposed Action (Draft EIS p. 63).
<b>Economics</b>	No costs or outputs are associated with the No Action alternative; therefore, the Present Net Value (PNV) is zero and a benefit/cost (b/c) ratio is not applicable (Draft EIS p. 66).	Short-term (10 years) PNV = -\$1,777,259 Short-term b/c ratio = 0.25  Long-term (43 years) PNV = -\$1,946,419 Long-term b/c ratio = 0.23 (Draft EIS p. 66)	Short-term PNV = -\$971,667 Short-term b/c ratio = 0.23  Long-term PNV = -\$1,059,721 Long-term b/c ratio = 0.22 (Draft EIS p. 66)

Table 2.11 (Cont'd): Comparison of Alternatives – Resource Impacts

Resource	Alternative 1: No Action	Proposed Action: Forest Health Emphasis	Alternative 2: Fuels Management Emphasis
<b>Soils</b>	In the short-term, lodgepole pine mortality would continue; dead trees would fall and be incorporated soil as coarse woody debris. No additional erosion, compaction, or soil displacement above the existing condition. In the long-term, there may be an increased risk of severe wildfires. Such fires could detrimentally impact the soil resources in terms of increased erosion and changes to soil chemical, physical, and biological properties (Draft EIS pp. 68 – 69).	Effects include increased rates of soil displacement, compaction, and erosion. The removal of vegetative cover would expose the soil surface to the erosive forces of rainfall. Ground disturbing activities associated with mechanized timber harvest would increase soil surface exposure and erosion rates and may also result in soil displacement and rutting. There would be no irreversible or irretrievable impacts to the soil resource (Draft EIS pp. 69 – 71).	Effects from implementing Alternative 2 would be similar to the Proposed Action, but at a reduced areal extent due to fewer acres of vegetative treatment and reduced road needs (Draft EIS pp. 69 - 71).
<b>Hydrology</b>	There would be no direct, indirect or cumulative effects to water resources in the short-term. In the long-term, the risk of adverse effects to water resources would be increased due to increased erosion, sedimentation, and runoff (Draft EIS p. 72).	Sediment delivery to streams is expected to be minimal due to the location of units, buffer strips between units and waterways, and amount of debris left in the units and buffer strips which can trap sediment. No direct effects to streamflows. Direct effects to riparian areas under the Proposed Action would be limited (Draft EIS pp. 73 - 75).	Effects from implementing Alternative 2 would be similar to the Proposed Action, but at a reduced areal extent due to fewer acres of vegetative treatment and reduced road needs (Draft EIS p. 75).
<b>Fisheries</b>	No direct or indirect adverse effects on sediment filtering, fish populations, or fish habitat from management actions. Tree mortality caused by the MPB has the potential to positively affect large woody debris recruitment to stream channels as trees fall down. Increased mortality of riparian trees due to MPB activity could reduce shading and potentially increase water temperatures (Draft EIS pp. 77 - 78).	Potential reduction in shade, sediment filtering, and large woody debris in area streams. Effects would be minimized through design features that establish a protective buffer limiting activities within the water influence zone (WIZ <sup>3</sup> ) and precludes harvest of streamside trees. Short-term increases in sediment due to road construction/reconstruction activities (Draft EIS pp. 78 - 79).	Effects from implementing Alternative 2 would be similar to the Proposed Action, but at a reduced areal extent due to fewer acres of vegetative treatment and reduced road needs (Draft EIS p. 80).

<sup>3</sup> The water influence zone (WIZ) includes the geomorphic floodplain, riparian ecosystem, and inner gorge. Its minimum horizontal width (from top of each bank) is **the greater of 100 feet or the mean height of mature dominant late-seral vegetation**. It includes adjacent unstable and highly erodible soils.

**Table 2.11 (Cont'd): Comparison of Alternatives – Resource Impacts**

Resource	Alternative 1: No Action	Proposed Action: Forest Health Emphasis	Alternative 2: Fuels Management Emphasis
<b>Wildlife</b>	Habitat would continue to be provided for Management Indicator Species, Region 2 Sensitive Wildlife Species, and Threatened, Endangered, and Proposed Species (Draft EIS pp. 88 - 101).	<b>Biological Determinations:</b> Water, foraging habitat, roosting habitat, breeding/nesting habitat, and prey animals would be sufficient to support populations for MIS (Draft EIS pp. 89 - 92). “May affect but is not likely to cause a trend toward federal listing or a loss of viability” for Region 2 Sensitive Species (Draft EIS p. 93). “May affect but is not likely to adversely affect” federally listed species (Draft EIS p. 101).	<b>Biological Determinations:</b> Water, foraging habitat, roosting habitat, breeding/nesting habitat, and prey animals would be sufficient to support populations for MIS (Draft EIS pp. 89 - 92). “May affect but is not likely to cause a trend toward federal listing or a loss of viability” for Region 2 Sensitive Species (Draft EIS p. 93). “May affect but is not likely to adversely affect” federally listed species (Draft EIS p. 101).
<b>Botany</b>	<b>Biological Determinations:</b> “No Effect” for federally listed plant species (Draft EIS p. 102). “May adversely affect individuals, but not likely to cause a trend toward federal listing or a loss of viability” for Region 2 sensitive plant species (Draft EIS p. 104). “No loss of viability” for plant species of local concern (Draft EIS p. 107).	<b>Biological Determinations:</b> “No Effect” for federally listed plant species (Draft EIS p. 102). “May adversely affect individuals, but not likely to cause a trend toward federal listing or a loss of viability” for Region 2 sensitive plant species (Draft EIS p. 104). “No loss of viability” for plant species of local concern (Draft EIS p. 107).	<b>Biological Determinations:</b> “No Effect” for federally listed plant species (Draft EIS p. 102). “May adversely affect individuals, but not likely to cause a trend toward federal listing or a loss of viability” for Region 2 sensitive plant species (Draft EIS p. 104). “No loss of viability” for plant species of local concern (Draft EIS p. 107).
<b>Recreation</b>	With no actions taken to mitigate the spread of the epidemic, and no actions taken to remove diseased or dead trees, the negative effects on the recreating public and the natural resources on which they rely would grow more widespread over time (Draft EIS pp. 109 - 112).	Non-motorized recreationists who use the MBRT around the Pelton Creek trailhead would experience substantial impacts during project implementation. Motorized recreationists who ride trails that pass through proposed cutting units would also experience substantial impacts. Both types of trail users would encounter effects of logging operations and vegetation treatment types including: slash piles, mechanically created openings, noise, dust and traffic from heavy machinery and log trucks. Effects to non-trail recreationists would vary depending on the proximity of treatment units to their recreation activity and time of year (Draft EIS pp. 112 - 114).	Effects from implementing Alternative 2 would be similar to the Proposed Action, but at a reduced areal extent due to fewer acres of vegetative treatment and reduced road needs (Draft EIS pp. 114 - 115).

**Table 2.11 (Cont'd): Comparison of Alternatives – Resource Impacts**

Resource	Alternative 1: No Action	Proposed Action: Forest Health Emphasis	Alternative 2: Fuels Management Emphasis
<b>Heritage Resources</b>	There would likely be an adverse effect to significant sites from dead trees falling on the above ground features or by the accumulation of heavy fuels around them. Heavy fuel loading could result in catastrophic fires which are known to affect both historic and prehistoric resources through direct and indirect methods (Draft EIS p. 117).	Application of design criterion #1 would ensure that historic properties are protected. Without treatment, the risk of adverse effects to heritage resources would be increased due to damage by unrestricted falling trees and catastrophic fire (Draft EIS p. 117).	Application of design criterion #1 would ensure that historic properties are protected. Without treatment, the risk of adverse effects to heritage resources would be increased due to damage by unrestricted falling trees and catastrophic fire (Draft EIS p. 117).
<b>Scenery</b>	Scenic impacts by MBPs would vary. Heavy beetle killed stands located adjacent to travel ways and campsites would be noticed by forest visitors. Some areas would not be noticed due to camouflaging and screening by surrounding landform and vegetative pattern (Draft EIS p. 119).	Most units would be consistent with adopted scenic integrity objectives (SIO) as long as design criteria are followed. Some units in the foreground zone of Highway 230, Pelton Creek Road (NFSR 898), Six Mile Gap road (NFSR 516), Platte Ridge (NFSR 521), and the Spruce Gulch Road (NFSR 530) would appear as Low SIO instead of Moderate SIO due to the removal of most beetle-killed trees for public safety, fuel reduction and to allow for regeneration of new green healthy trees (Draft EIS p. 120).	Effects from implementing Alternative 2 would be identical to the Proposed Action, but at a reduced areal extent due to fewer acres of vegetative treatment and reduced road needs (Draft EIS p. 120).
<b>Range</b>	No direct effects from project implementation. As tree mortality increases from the beetle epidemic continues, additional transitory range may be created (Draft EIS p. 122).	Effects from project implementation would be minimal. Additional fencing may be required around unit 105 to prevent livestock movement between grazing allotments. Vegetative treatments would create additional transitory rangelands (Draft EIS pp. 122 - 123).	Effects from implementing Alternative 2 would be similar to the Proposed Action, but at a reduced areal extent due to fewer acres of vegetative treatment and reduced road needs (Draft EIS p. 124).

## CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

### 3.1 Introduction

This section summarizes the physical, biological, and social environments of the analysis area and the effects of implementing each alternative on that environment. The affected environment (or existing condition) for each resource area is described first and establishes a baseline for comparison of the alternatives. The second part of each resource section describes the potential environmental effects of implementing the various alternatives on that resource. The information contained in this section presents the scientific and analytical basis for the comparison of alternatives presented in Tables 11 through 13 above. Complete copies of the resource reports are available for public review at the Laramie Ranger District Office, 2468 Jackson Street, Laramie, WY 82070.

**NOTE:** The **Environmental Consequences information is based on the maximum treatment potential** identified for the Proposed Action: Forest Health Emphasis and Alternative 2: Fuels Management Emphasis (i.e., resource analyses were conducted using the assumption that all units with an adaptive management prescription would be clearcut). This approach was used for analysis purposes to ensure that the cumulative effects of project implementation were analyzed in a comprehensive and systematic manner. However, taking this approach means that the acreages, mileages, and effects displayed in the resources sections described below could be overstated.

### 3.2 Summary of Cumulative Effects

The following table provides a tabular display of past, present, and reasonably foreseeable management activity and natural processes within or adjacent to the analysis area since 1970. This information was used by Forest Service resource specialists when conducting cumulative effects analyses for the Spruce Gulch project.

**Table 3.1: Summary of Cumulative Effects in the Spruce Gulch Analysis Area**

Analysis Area (AA)		Acres
Pelton Creek watershed and its related tributaries (total acres)		32,322
National Forest Land		31,782
Private Land		390
State Land		150
System Roads		Miles
Existing Collector		32.6
Existing Local		81.5
New Construction - System		0.5
<b>TOTAL</b>		<b>114.6</b>
<b>Total Acres</b>		<b>916.8</b>

**Table 3.1 (Cont'd): Summary of Cumulative Effects in the Spruce Gulch Analysis Area**

<b>Past Harvest Activity Since 1970</b>	<b>Year</b>	<b>Acres Harvested</b>
Unnamed sales	1970	1,334
Horatio Rocks	1974	715
Mountain Home	1976	61
Miller Lake	1984	235
Douglas Point	1990	300
Platte Ridge	1991	1,257
<b>TOTAL</b>		<b>3,902</b>
<b>Percent AA</b>		12.1
<b>Existing Natural Disturbances</b>		<b>Acres (Percent of AA)</b>
Beetle Infestation		15,400 (48)
Dwarf Mistletoe (total)		21,225 (65.6)
- Low/Moderate Rating		11,790 (36.5)
- High Rating		9,435 (29.2)
<b>Past Natural Disturbances</b>	<b>Year</b>	<b>Acres Disturbed</b>
Six-mile Wildfire	2003	~200
<b>Percent of AA</b>		1.5
<b>Current Projects – Spruce Gulch</b>	<b>Year</b>	<b>Acres/Percent of Area</b>
Proposed Action (acres)	2008	4,372
- Percent of AA		13.5
Alternative 2 (acres)		2,352
- Percent of AA		10.0
West Beaver and Platte River Allotment Management Plan (AMP)	AMP was approved on 9/28/82. Livestock grazing has occurred to present: 392 cow/calf pairs from 6/11 to 9/30 annually	No timber removal. The analysis area includes roughly 4,185 acres of the Platte River AMP.
Laramie District Pre-commercial Thinning	2008	1,700
Travel Management – Eastern Snowy Range	2007	Designates 44.9 motorized trails in the analysis area (23.7 miles of ATV trails and 21.2 miles of motorcycle trails). Closes 43.7 miles of routes in the analysis area (41.7 miles of unauthorized routes and 1.7 miles of system routes).
<b>Foreseeable Future Projects</b>		
Forest-wide Hazard Tree Removal Project	2008	Up to 2,500 acres of hazardous tree removal could occur in the analysis area boundary.

### 3.3 Forested Vegetation/Insects and Diseases \_\_\_\_\_

**Affected Environment**

**Forested Vegetation**

General vegetation zones in the Spruce Gulch analysis area include lodgepole pine forests, Engelmann spruce-subalpine fir (spruce-fir) forests, sagebrush-steppe, aspen, and riparian areas. These plant communities are separated along gradients of elevation and topography where important determinants such as temperature, effective precipitation, and hydrologic regime affect their growth. Roughly 96 percent of the analysis area is forested. Due to the lower elevation (7,500 – 9,300 feet) and southern or nearly flat aspects, 88 percent of the area is dominated by stands of lodgepole pine. Around 3 percent of these areas also include scattered pockets of aspen. Another 3 percent of the area, particularly in the higher elevations, is dominated by spruce-fir forest. The lower elevation stands are interspersed with a number of small meadows and larger parks near the Platte River.

Roughly 83 percent of the lodgepole pine cover type is in a medium/large size class (5.0 to 15.9 inches in diameter) while the remaining 13 percent is in a seedling/sapling size class (less than 4.9 inches in diameter). A majority of the stands are more than 80 years old. Average DBH ranges from 7 to 12 inches and average BA per acre is 118 sq ft. Roughly 1 percent of the area dominated by spruce-fir is in the seedling/sapling size class, 98 percent is in the medium/large size class, and less than 1 percent is in the very large size class (16.0 inches and greater in diameter). A majority of these stands are also more than 80 years old. Average DBH ranges from 9 to 12 inches and average BA per acre is 118 sq ft. Spruce-fir stands tend to be variable in composition. They range from 90-100 percent spruce-fir to more mixed species stands with only 60-70 percent spruce-fir and the remainder comprised of lodgepole pine.

**Dwarf Mistletoe and Other Diseases**

Dwarf mistletoe is present at some level in approximately 68 percent of the analysis area’s lodgepole pine stands (see Table 3.2). Dwarf mistletoe is a parasitic plant that deforms and weakens trees and causes rot, thus making them more susceptible to insects and disease. Mature and overmature lodgepole pine with low to high levels of dwarf mistletoe are more vulnerable to MPB infestations. Other diseases impacting many of these same stands include comandra rust and Western Gall Rust. All three diseases reduce tree growth, vigor, and tree volume, increase tree mortality, and increase susceptibility to insect attacks, wind, and drought. These diseases also contribute to poor cone and seed production and cause abnormal wood growth. All of the diseases contribute heavily to the poor health observed in many of the analysis area’s lodgepole pine stands.

**Table 3.2: Existing Dwarf Mistletoe Ratings**

Average Dwarf Mistletoe Stand Rating*	Acres / (%)
No infection	7,274 / (22)
Low – moderate	11,790 / (38)
High	9,435 / (30)
No Rating	2,473 / (8)

(Source: Forest RIS/R2Veg Data Base)

\*Average stand rating based on the Hawksworth 6-class dwarf mistletoe rating system.

### Mountain Pine Beetle (MPB) and Spruce Beetle (SB)

Aerial survey data (2000 – 2007) of the Spruce Gulch analysis area was examined for SB and MPB related mortality in Engelmann spruce and lodgepole pine stands, respectively. The data demonstrate an increasing number of spruce trees killed by SB and lodgepole pine trees killed by MPB. For example, the number of acres affected by both beetles increased from 34 acres in 2000 to over 15,400 in 2007. These findings indicate that losses of spruce and lodgepole pine have increased significantly in number and extent within the Spruce Gulch analysis area over the past seven years and exceed endemic-level losses.

Aerial surveys only detect infested trees after they have begun to fade; this takes at least one year following infestation in lodgepole pine trees. Consequently, a field survey was completed in 2007 to further assess bark beetle related impacts. The survey results indicate an average of 57 percent dead, recent dead, and recent hit (MPB and SB) trees per acre in stands surveyed.

### Hazard Classifications

Stand hazard rating (SHR) is a measure of the degree of damage that can be expected in a stand if a beetle outbreak occurs. Current tree inventory data for the area indicate that most of the stands are in a moderate risk category for MPB and SB while others are either in a high risk or low risk category. Lodgepole pine stands that have a moderate risk are typically greater than 60 years old, contain trees with diameters that average 7” or greater, and are located below 9,800’ in elevation (Amman and other, 1977). Spruce-fir stands that have a moderate risk typically contain trees with average diameter of 12” – 16”, 100 – 150 square feet of basal area per acre, 50 – 65% spruce in the canopy, and site indexes of 80 – 120 (Schmid and Frye 1976). Stands that have a high risk are typically greater than 80 years old, contain trees with diameters that average 8” or greater, and are located below 8,800’ in elevation (Amman and other, 1977). Table 3.3 depicts the beetle hazard rating for lodgepole pine and spruce-fir cover types.

**Table 3.3: Existing Beetle Hazard Ratings based on Current Inventory Data**

Beetle Hazard Rating	Lodgepole Pine (acres)	Spruce-fir (acres)
Low	4,951	7
Moderate	17,083	6
High	6,615	1,004

The dramatic increase in beetle populations and subsequent tree mortality, along with the current weather conditions and an abundant lodgepole pine and spruce-fir food source, indicate that epidemic levels will continue to spread in the Spruce Gulch analysis area. Under a worst-case scenario, the epidemic has the potential to cause widespread mortality across large acreages of contiguous lodgepole pine and spruce-fir forests on federal, state, and private land in the Snowy Mountain Range.

### MA 5.15 – Forest Products, Ecological Maintenance, and Restoration Considering the Historic Range of Variability (HRV)

The majority of the units proposed for treatment fall within MA 5.15. Management emphasis in this area is to maintain or restore healthy ecological conditions through a variety of management activities while providing a mix of ecological and human needs including commercial wood products. The Spruce Gulch analysis area is characterized by lodgepole pine with minor amounts of spruce/fir stands that can be managed for wood fiber to create conditions similar to the HRV.

Forest vegetation is to be managed to develop a range of successional stages from seedlings to late successional stands. Priority is given to harvesting successional stages that are more common than the typical HRV, especially in the 80-120 year age classes. All available silvicultural systems may be used. A relatively high level of disturbance is accepted in areas that have lesser wildlife habitat value as the landscape moves closer to the HRV. Insect and disease outbreaks will be managed to prevent spread except where compatible with site-specific management objectives and conditions. Use of temporary roads for management activities is preferred. Effective decommissioning of temporary roads following project implementation is a priority.

## Environmental Consequences

### ALTERNATIVE 1: No Action

#### Direct and Indirect Effects:

In most environmental analyses the No Action alternative represents a static, relatively unchanging baseline of an analysis area's existing condition and is used to compare the potential effects of the action alternatives. Due to the existing bark beetle epidemic in the Spruce Gulch analysis area, however, the No Action alternative would have major implications to the timber resource. Individual tree mortality would continue at higher than normal rates due to the high infestation levels of bark beetle. Tree mortality would also continue due to the presence of dwarf mistletoe, Western gall rust, comandra rust, and other natural processes. Stand health would continue to decline.

In all management areas, the bark beetle epidemic is creating considerably different stand conditions than what is typically expected. Entire stands are being impacted, rather than individual trees or groups of trees, since higher hazard lodgepole pine stands are relatively pure and even-aged. All but the smaller individuals within a stand are being killed, leaving no dominant and co-dominant trees in the overstory. After several years, when many of the dead trees have fallen, fire hazards would be higher than normal. If fires did occur, they would release the stored seed from serotinous cones (cones that do not open at maturity and persist on the tree) to regenerate the stand with a new even-aged stand of lodgepole pine seedlings.

In stands with a high percentage of non-serotinous cones (cones which open at maturity and disperse their seed), regeneration of the stands may be slow and patchy. As mortality progresses through the stand the seed source could be lost. Fires in these stands could kill any remaining seed source trees and established regeneration, thus changing the site to more of a grass/forb type. In some cases, a lack of fire and subsequent deadfall would impede new tree regeneration and result in a slow re-establishment of a mix of subalpine fir, Engelmann spruce, and lodgepole pine. In still other cases, aspen could recapture some sites.

In some units surveyed in the Spruce Gulch analysis area almost all lodgepole pine trees were infested. In these cases, large beetle populations would most likely emerge next year but begin to diminish due to a lack of uninfested host material. In other areas, however, fewer than 50 percent of the trees were infested and the remaining trees are suitable for infestation next year. There is a high likelihood that this outbreak would proceed like the large outbreaks in northern Colorado where most lodgepole pines have been killed across entire watersheds.

Young seedling/sapling stands would continue to grow and eventually become stagnated similar to current overstocked poletimber stands in the watershed. Implementation of the No Action alternative would forego opportunities to: regenerate decadent, unhealthy stands; partial cut immature and mature stands to release trees and remove diseased and unhealthy trees; and commercially thin stagnated stands. In addition, taking no action would not allow management to: precommercially thin young seedling/sapling stands; reduce the presence and spread of insects and disease; and reduce fuels buildup and fire risks to valuable forest resources. This alternative directly conflicts with Forest Plan goals, objectives, strategies, and standards and guidelines for vegetation and integrated pest management and would not allow the creation of greater vegetation patch sizes similar to the HRV.

### **Cumulative Effects:**

There is no threat of ecological collapse or loss of ecological function from beetle outbreaks and/or subsequent wildfires. Beetle populations naturally experience boom and bust cycles, and forests have proven resilient, if not dependent on these cycles (Alexander, 1981). Disturbances become problematic, however, when they threaten the uses for which forests are managed. Where expected disturbances can be influenced or controlled and where we choose to do so for specific reasons is heavily dependent on what past management actions have occurred before the disturbance event occurs.

Past timber management practices in MAs 5.13 and 5.15 on the Forest have had a positive influence on existing, young stands. Areas that have been regenerated (clearcut, overstory removal, etc.) or that have received partial harvest treatments (thinning, sanitation/salvage, etc.) are less susceptible to bark beetle attack and aggregation. These past silvicultural treatments reduced the stand age, basal area, trees per acre, and arrangement of host trees, all of which reduce the attractiveness to beetles. Although many of the past treatments were not specifically designed to reduce bark beetle habitat, they accomplished that effect to some degree. Until the current beetle epidemic, past timber management in the form of clearcutting, shelterwood removal, or overstory removal effectively reduced stand beetle susceptibility on National Forest lands in the Spruce Gulch analysis area.

In the spruce-fir type, future management practices would be greatly affected by bark beetle mortality. The loss of spruce would reduce options for how a stand may be managed in the future. These stands would probably become dominated by subalpine fir, which persists for long periods and is a less desirable timber species. Rotation ages may need to be lengthened because of the relatively slow growth of fir as compared to spruce. Increased dead fuel loads would increase the fire hazard in these stands. If these stands were to burn, recovery after fire would be slow.

In the lodgepole pine type, MPB caused mortality could result in an almost complete loss of growing stock of timber. This loss could set the stands back to a very early successional status. Increased dead fuel loads could also increase the fire hazard in these stands. If these stands were to burn, recovery after fire would be slow.

Virtually all of the suitable timber stands in MAs 5.13 and 5.15 are important for their short- or long-term contribution to the goals for production of commercially valuable wood products. However, stands susceptible to bark beetle infestation are, almost by definition, the more productive, higher value, and higher volume stands. If all of the suitable moderate and high hazard stands in the Spruce Gulch analysis area are attacked as assumed, they would no longer

meet quality and quantity objectives set out in the Forest Plan in the short term. Furthermore, the epidemic has the potential to cause widespread mortality across acres of contiguous lodgepole pine and spruce-fir forests on federal, state and private land in the Snowy Mountain Range outside the analysis area.

## **PROPOSED ACTION: Forest Health Emphasis**

### **Direct and Indirect Effects:**

The Proposed Action is an aggressive proposal designed to address the current bark beetle epidemic in the area. The proposed partial cut treatments that target larger infested trees and those that are adjacent to beetle infested trees would greatly reduce infestation potential and spread. Stands with a shelterwood or overstory removal prescription are expected to leave an understory of healthy regeneration after the overstories are removed. Regeneration treatments (e.g. clearcutting and salvage) would be effective in putting high beetle mortality stands back into production contributing both to the maintenance of the overall Forest's allowable sale quantity (ASQ) and to ecological sustainability. Treatments would reduce beetle spread and restrict beetle populations to localized areas. The subsequent lodgepole pine or spruce-fir regeneration in these stands would have a low susceptibility to beetle for next 60 to 80 years.

Stands treated with suppression prescriptions, such as shelterwood seed cut and sanitation/salvage, would continue to be dominated by mature forest cover of live lodgepole pine and spruce-fir; stocking would, however, be reduced. Indirect effects include the potential for windfall following the thinning. Some amount of blowdown within the stands as well as along the edges would be expected. Even with careful logging practices, some damage to trees is also expected due the tight spacing of the trees.

Dwarf mistletoe is generally light to moderate in stands with proposed suppression treatments. The treatments would indirectly produce conditions that are ideal for the spread of mistletoe to the remaining timber if it is present in appreciable amounts. However, mistletoe affects stands very slowly. Therefore, it is unlikely that severe mistletoe infections would have the time necessary to cause serious growth losses in the remaining understory. Thus, the understory is expected to remain in a healthy condition, with more management options available, until well after the beetle epidemic subsides.

Preventive actions in the form of shelterwood prep, selection, and commercial thin are proposed in areas currently un-infested or that have a low beetle infestation. A number of studies conducted on National Forests across the Rocky Mountain west have found that thinning these types of stands can greatly minimize future bark beetle mortality. In the short-term, the preventative treatments would change stand micro-site conditions and would increase sunlight intensity, wind movement, and air temperature. This subtle change in micro-site conditions appears to be disruptive to beetle spread and infestation. In the long-term, reduced tree competition and increased tree vigor from the preventive thin would allow the retained trees to produce more sap or resin. Thus, they would be better able to ward off future beetle attacks.

Preventative treatments could subject the stands to a certain amount of risk for windthrow. These areas are not particularly high hazard areas for windthrow (Alexander, 1986), but it should be recognized that there is potential for further stand damage or even loss should high winds hit the stands in the first few years. Preventative treatments would also indirectly produce conditions that are ideal for the spread of mistletoe through remaining timber, if it is present in

appreciable amounts. As mentioned above, mistletoe affects stands very slowly. Therefore, it is unlikely that severe mistletoe infections would have the time necessary to cause serious growth losses.

### **Cumulative Effects:**

The Proposed Action would treat far more acres than Alternative 2 and would, therefore, advance the vegetation more quickly toward Forest Plan desired future conditions. The cumulative effects of past harvests and future harvests have created and would continue to create additional acres of early habitat structural stages. Timber harvesting would create larger vegetation patch sizes similar in size and age class distribution found in the HRV.

## **ALTERNATIVE 2: Fuels Management Emphasis**

### **Direct and Indirect Effects:**

This alternative was designed to address the significant issues of fire hazards related to private inholdings and areas that are important for egress for escape routes; thus, units that do not have a fuels priority would not be treated. Fewer stands that currently have high mortality or infestations would be treated. Although Alternative 2 would be effective in addressing fuels reductions in the WUI units and the other fuels priority units, it would not be economically viable. Without some of the other stands that have more economic value, fuels units would be less likely to be treated in a commercial type setting.

### **Cumulative Effects:**

Wind throw could be a significant future issue in areas where beetle activity would naturally open up stands beyond what would be prescribed using silvicultural guidelines. Spruce bark beetle populations could also be increased. Spruce blow down is recognized in the literature as the predominant factor in the buildup of spruce bark beetle populations. Timber harvesting would create larger vegetation patch sizes similar in size and age class distribution found in the HRV, albeit not to the same extent as the Proposed Action.

## **FOREST PLAN CONSISTENCY**

Neither the No Action alternative nor Alternative 2 would be consistent with Forest Plan MA 5.15 guidelines for Vegetation or Integrated Pest Management (p. 2-59 to 2-60 and 2-62 to 2-63, respectively):

- Forests would not be managed such that insect outbreaks remain locally restricted. Suppression treatments aimed at meeting this objective would not be accomplished, thereby increasing the opportunity for beetle populations to increase.
- The forests in these areas would not be managed to produce sawtimber in an economically efficient manner. Post epidemic forest management would probably concentrate on restoration activities such as salvage and reforestation rather than on the production of “regular program” timber sales.
- The forest would not be managed using treatments that maintain acceptable growth rates nor would they favor commercially valuable tree species. Area spruce-fir and lodgepole pine stands would show a rapid deceleration in the rate of volume accumulation post-epidemic.

- Vegetation would not be managed to emulate or restore healthy ecological conditions. Structure and stages of the stands would not meet the HRV needed to provide for wildlife, timber and range. There would be less ability to manage the stands in many different successional stages to meet the desired balance.

The Proposed Action is consistent with Forest Plan standards and guidelines for Vegetation and Integrated Pest Management. None of the alternatives analyzed in this Draft EIS would result in irreversible or irretrievable effects to the timber resource.

## 3.4 Ecology

The Ecology section is divided into two “sub-sections” including: 3.4.1) Old Growth; and 3.4.2) Fragmentation of Interior Forest. Both sub-sections describe the affected environment first, followed by the effects associated with the alternatives.

### 3.4.1 Old Growth

#### Affected Environment

Old growth forests represent the later stages of stand development which typically differ from earlier stages in a variety of characteristics. These characteristics may include tree size, accumulations of large dead woody material, number of tree top layers, species composition, and ecosystem function. It can require 80-200 years for forest stands within different cover types to develop the characteristics of old growth (Mehl 1992).

According to Tolbert (2008), the Snowy Range Mountains currently contain 55,201 acres of mapped and inventoried old growth lodgepole pine trees and 34,701 acres of mapped and inventoried old growth spruce-fir trees. These figures account for 19 percent of all lodgepole pine acres and 30 percent of all spruce-fir acres in the Snowy Range Mountains. The Spruce Gulch analysis area contains 4,363.5 acres of mapped and inventoried old growth lodgepole pine trees and 193.5 acres of mapped and inventoried old growth spruce-fir (Holcomb 2008). These figures account for 15.6 percent of all lodgepole pine acres (28,052 total acres) and 20 percent of all spruce-fir acres (951 total acres) in the Spruce Gulch analysis area.

#### Environmental Consequences

### ALTERNATIVE 1: No Action

#### Direct and Indirect Effects:

There would no vegetative treatments or fuels abatement treatments in inventoried and mapped old growth stands in the Spruce Gulch analysis area. Trees would fall naturally over time. On occasion, the natural falling of dead standing trees would cause the death and/or fall of live standing trees. This occurrence would not, in and of itself, remove a stand from consideration for old growth. Mapped and inventoried old growth acres in the analysis area would remain unchanged.

### **Cumulative Effects:**

Extensive timber harvesting to support tie drives during the settlement era resulted in forests of similar ages in the analysis area. Past timber harvest activity, since the MBNF forest was established, has created areas of younger forest. Old growth is expected to develop over long time periods (>150 years for lodgepole pine cover type and >200 years for spruce-fir cover type). There are currently 3,520 acres in young forest (Middlebrook 2008) within the Spruce Gulch analysis area. In the long-term, these younger forests would develop old growth characteristics.

The on-going MPB epidemic is expected to kill 80-100 percent of the live, large lodgepole pine trees before it subsides (Witcosky pers. comm. 2008, Cain pers. comm. 2008). Where tree death is not 100 percent, old forest character may remain. Stand character may change over time in areas where tree death is extensive such that the stand/area takes on the function of a young forest. Over time, young forest areas would again mature and take on old forest character (150-200 years).

The Six Mile fire burned about 206 acres of green timber in 2003. Over the next 10 years, the Forest-wide Hazardous Tree Removal and Fuels Reduction project is expected to remove up to 2,500 acres of hazardous trees. Tree removal could create gaps up to 300 feet along select Forest Service roads in the Spruce Gulch analysis area. These areas would regenerate over time and provide old growth character in 150-200 years. The retention of old growth across mountain ranges was analyzed and incorporated into the Forest Plan with the expected incidence of insects and diseases and the predicted timber sale program level. Old growth acreages required by the Forest Plan are within the historic range of variability (Dillon et al. 2005, Roche 2003) and are expected to retain old growth resource values over the life of the Plan (10-15 years).

## **PROPOSED ACTION: Forest Health Emphasis and ALTERNATIVE 2: Fuels Management Emphasis**

### **Direct and Indirect Effects:**

None of the treatment areas associated with the action alternatives are within inventoried and mapped old growth (Tolbert 2008). Therefore, mapped and inventoried old growth acres in the analysis area would remain unchanged.

### **Cumulative Effects:**

Neither the Proposed Action nor Alternative 2 propose any actions within inventoried and mapped old growth. Old growth acreages required by the Forest Plan are within the historic range of variability (Dillon et al. 2005, Roche 2003) and are expected to retain old growth resource values over the life of the Plan (10-15 years). Over time, acres proposed for harvest in non-inventoried and mapped old growth areas would regenerate, grow, and mature and would be available to provide old forest character in 150-200 years.

## **FOREST PLAN CONSISTENCY**

Based on the information presented above, all alternatives would comply with Forest Plan standards pertinent to mapped and inventoried old growth (p. 1-31). They would also comply with Vegetation Standard 2 in MA 5.15 (p. 2-63). This standard prohibits vegetation treatment in inventoried and mapped spruce-fir or lodgepole pine old growth stands.

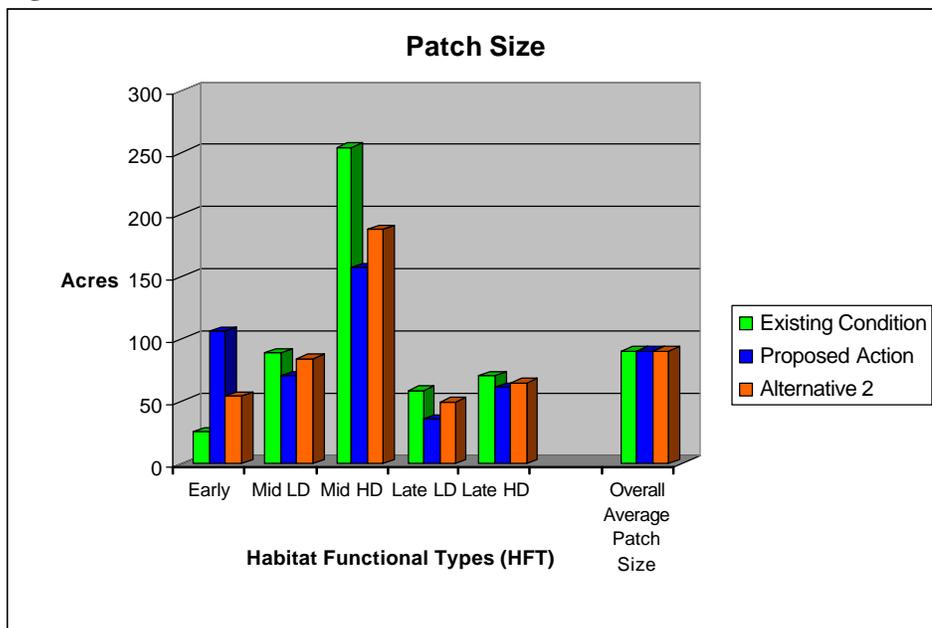
### 3.4.2 Fragmentation of Interior Forest

#### Affected Environment

Forest fragmentation is described as a broad-scale process in which forest tracts are progressively subdivided into smaller, geometrically more complex and isolated forest fragments (Roche 2003). This can occur as a result of both natural processes and human land use activities (Harris 1984). Currently about 20 percent of the Spruce Gulch analysis area is made up of natural (e.g. parks and meadows) and human-caused openings or patches (e.g. roads and past timber harvest units).

Patch size and isolation, road effects, and edge/interior are key indicators of fragmentation. Patch sizes and shapes were analyzed for the Spruce Gulch analysis using the R2Veg forest database and Aggregation models within ArcGIS software. All forest cover types were pooled to achieve a better understanding of and to quantify landscape patterns of overstory vegetation; they were then grouped into habitat functional types (HFT). Groupings that make up a patch consist of stands of similar ecological function with stand boundaries no more than 50 meters apart. Figure 3.1 depicts the groupings.

**Figure 3.1: Forest Patch Size – All Alternatives**



\*Early – Early Seral; Mid LD – Mid-seral, low density cover; Mid HD – Mid seral, high density cover; Late LD – Late seral, low density cover; and Late HD – Late seral, medium-high density cover  
 \*\* The HFTs are based on stand exam data before the MPB epidemic

As displayed in Figure 3.1, existing patch sizes within the Early HFT are fairly small, averaging about 25 acres in size. These patches are primarily the result of clearcut activities that occurred in the analysis area over the past 40-50 years. Existing Mid LD HFT patches are larger, averaging about 90 acres in size. These patches represent stands 50-140 years old that may have been affected by partial timber removal, high-grading, or poor growing sites. Mid HD stands likely regenerated from fire or timber harvest disturbance around the turn of the century and have not been treated by management actions. Patch size of Mid HD stands are notably higher than all other categories, averaging 254 acres. Late LD and Late HD stands consist of stands older

than 140 years. The difference between the low and high density structures is likely due to past thinning, salvage, selection treatments, or poor growing sites. Patch sizes within existing Late LD and HD stands are relatively low in the analysis area, averaging about 60 and 71 acres, respectively. By comparison, mean patch sizes for lodgepole pine and spruce-fir Late HFT in the Snowy Range as a whole are 81 acres and 105 acres, respectively. Mean patch sizes for lodgepole pine and spruce-fir Early HFT in the Snowy Range are 28 acres and 32 acres, respectively (USDA 2003b).

## Environmental Consequences

### ALTERNATIVE 1: No Action

#### Direct and Indirect Effects:

Under the No Action alternative, vegetative treatments and road construction/reconstruction activities would not occur. Changes to patch size and pattern of interior forest would be influenced only by natural disturbance (i.e. the MPB epidemic).

#### Cumulative Effects:

As previously mentioned, the analysis area had extensive timber harvesting to support tie drives during the settlement era which created extensive patches of similar ages. Past timber harvest since the MBNF forest was established, and within the analysis area, may have fragmented what were probably once continuous stands of similar aged forest. However, the extent of the continuity is unknown.

The total amount of past timber removal is unknown. Based on Laramie Ranger District records maintained in GIS, approximately 3,140 acres of clearcut harvest occurred from 1962 to 1993 within the Spruce Gulch analysis area. These harvests created areas of younger forest within the overall matrix of mid and late forest stands. Using the home range width of a small carnivore, such as American marten, to define the cumulative effects area, roughly 4,526 acres (7.3%) contain stands 50 years old or less. Most of these stands are isolated and dispersed from each other. The analysis area also contains road corridors associated with the past timber harvest activity. The Six Mile fire burned about 206 acres of live, mature forest in 2003. This is located primarily in one patch. Within the Spruce Gulch analysis area, up to 2,500 acres of tree removal proposed under the Hazard Tree Removal project could create gaps up to 300 feet along select Forest Service roads. The Hazard Tree Removal project could accentuate the width of the linear road corridors within the project area. There would be increases in edge effects associated with roads and less so with trails from the Hazard Tree Project implementation. Edge effects include differences in sunlight and micro-climate (Roche 2008).

The on-going MPB epidemic is expected to kill 80-100 percent of the live, large lodgepole pine trees before it subsides (Witcosky pers. comm. 2008, Cain pers. comm. 2008). As this occurs, the dead areas would regenerate to young forest but would retain the patch character (core area). Core area or forest stand interior is defined as the area within a patch beyond some specified edge distance or buffer width (McGarigal et al. 1995).

The older harvest areas would have some different characteristics than adjacent areas affected by the beetle epidemic (number of standing snags and down woody debris profiles). To some extent, these differences would be less perceptible as trees fall over after death (some of the

beetle killed trees will fall into harvest units). The presence of large patches of older forest would dramatically decrease as the results of beetle epidemic become apparent.

For the next period of about 80 years, there would be large patches of young to mid-aged forest; there would also be some noticeable differences between harvested areas and beetle killed areas. After 80-100 years, the differences between the harvest areas and the beetle killed areas would become less perceptible and the forest function would be similar. This would create very large patches with large core areas of older forest.

Where pre-commercial thinning occurs, the tree growth may increase and these areas may have larger trees more quickly than other non-thinned stands. However, the effect to the function of forest patches would be minimal from the extent of pre-commercial thinning anticipated.

## PROPOSED ACTION: Forest Health Emphasis

### Direct and Indirect Effects:

Patch size would vary in magnitude by HFT under the Proposed Action (see Figure 3.1 and Table 3.4). Patch size would be reduced in the Mid and Late HFTs, but would increase in the Early HFT. The increase in Early HFT would be noticeable in the short-term, but would eventually transform into larger patches of Mid and Late HFTs in 100 to 140 years. In the short-term, however, such gains in the size of Early HFTs would correspond to a decreased patch size in Late HFTs. These patches are already relatively small when compared to Mid HFT patches. When all HFTs are pooled, the average overall patch size would be unchanged among all alternatives. In comparison to patch sizes determined for the entire Snowy Range (USDA 2003b), the Proposed Action would improve patch size for future development (Early HFT), but fall below existing sizes for Late HFT. In time, patch size in the analysis area would more closely approximate the HRV.

**Table 3.4: Forest Patch Sizes (acres) by Alternative**

HFT	Existing Condition	Proposed Action	Alternative 2
Early	25.1	106.0	54.5
Mid LD	88.8	70.7	84.4
Mid HD	254.3	157.9	187.8
Late LD	59.2	35.8	49.8
Late HD	70.7	61.1	65.1
<b>Overall Average Patch Size</b>	<b>89.7</b>	<b>90.7</b>	<b>89.8</b>

## ALTERNATIVE 2: Fuels Management Emphasis

### Direct and Indirect Effects:

Effects of Alternative 2 would be similar to the Proposed Action, but to a lesser degree. The most noticeable differences between the two alternatives would be in the Early and Mid HD HFTs.

### Cumulative Effects – Proposed Action and Alternative 2

The Proposed Action and Alternative 2 would add forest harvest patches to the landscape. In some instances, these new harvest units are adjacent to older harvest units (by design).

Although they would be perceived as a different aged patch than the adjacent units for a period of 30-60 years, as these older harvest units approach maturity in 80-100 years, the height and character of the older and younger units would merge and provide larger patch sizes with greater core area. This same process would occur where proposed units are adjacent to the Six Mile fire area. The harvest areas would have some different characteristics than adjacent areas affected by the beetle epidemic (number of standing snags and down woody debris profiles). To some extent, these differences would be less noticeable as trees fall over after death (some of the beetle killed trees will fall into harvest units). The presence of large patches of older forest would dramatically decrease as the results of beetle epidemic become apparent.

For the next period of about 80 years, there would be large patches of young to mid-aged forest; there would also be some noticeable difference between harvested areas and beetle killed areas. After 80-100 years, the differences between the harvest areas and the beetle killed areas would become less perceptible and the forest function will be similar. This would create very large patches with large core areas of older forest.

Where pre-commercial thinning occurs, the tree growth may increase and these areas may have larger trees more quickly than other non-thinned stands. However, the effect to the function of forest patches would be minimal given the extent of pre-commercial thinning anticipated.

More acres would be treated and more miles of temporary road would be constructed under the Proposed Action than under Alternative 2. Consequently, the effects of this alternative would be greater than under Alternative 2.

## FOREST PLAN COMPLIANCE

All alternatives would comply with Forest Plan MA 5.15 direction to return the area to patch sizes similar to the HRV (p. 2-63). This would occur more quickly under the Proposed Action, followed by Alternative 2. None of the alternatives analyzed in this Draft EIS would result in irreversible or irretrievable effects to ecological resources.

## 3.5 Fire and Fuels

### Affected Environment

#### Fire History

Prior to human settlement (1569-1867), the frequency of fires was low, but the size of each fire was larger than what typically occurs today (Dillion et. al 2005). For example, large fires (roughly 6,175 acres) occurred in the Snowy Range around 1680 and again around 1743 (3,705 acres) (Kipfmueller and Baker 2000). Much larger fires probably occurred; however, because of the extensive timber harvest that occurred after settlement, a large portion of the tree record data has been lost. It is these fire events and past management activities that initiated the extensive even-aged forests that exist today in the analysis area and throughout much of the Medicine Bow National Forest. More recent fire history records indicate that 35 fires have burned in the analysis area between 1970 and 2007.

#### Fire Regime

The natural fire regime is a general classification of the role fire would play across the landscape in the absence of human intervention (Agee 1993, Brown 1995). The elements that make up a fire regime are fire frequency and severity and are related to the types of vegetation on the

landscape. Five fire regime groups, expressed as fire return interval and severity, are described in Table 3.5.

**Table 3.5: Fire Regimes**

Fire Regime Group	Frequency (Fire Return Interval)	Severity
I	0-35 years	low severity
II	0-35 years	stand replacement severity
III	35-100+ years	mixed severity
IV	35-100+ years	stand replacement severity
V	>200 years	stand replacement severity

The fire regime group and the effects of fire related to dominant cover species found in the analysis area are briefly addressed below (adapted from the Fire Effects Information System 2002):

**Engelmann spruce** (*Picea engelmannii*) – Usually associated with fire regime group V, Engelmann spruce is easily killed by crown fires. It is also easily killed by surface fires because fine fuels, which concentrate under mature trees, burn slowly and girdle the thin-barked bole.

**Subalpine fir** (*Abies lasiocarpa*) - Usually associated with fire regime group V, subalpine fir is one of the least fire-resistant western conifers and is easily killed by crown fires. Like Engelmann spruce, it is also susceptible to surface fires because of the amount of fine fuels that concentrate under mature trees.

**Lodgepole pine** (*Pinus contorta* var. *latifolia*) - Usually associated with fire regime group III or IV, lodgepole pine is more damaged by surface fire than crown fire because its thin bark has poor insulating properties. Seeds are generally well protected from heat inside closed cones (serotinous). This allows lodgepole to regenerate following both high and low-intensity fires.

### Condition Class

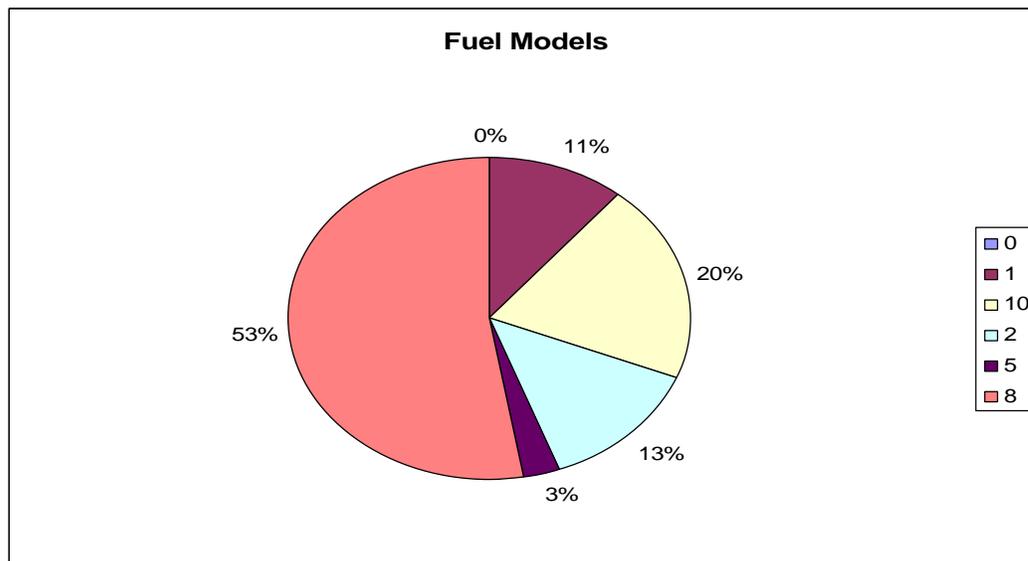
Condition class (CC) or Fire Regime Condition Class (FRCC) is a classification of the amount of departure from the historical fire regime (Hann & Bunnell 2001). Departure can occur through human manipulation or intervention and from historical fire cycles, such as fire suppression, grazing, or road building. The overall landscape within the analysis area is classified as **Fire Regime IV and Condition Class 2**. Condition Class 2 is defined as, “Fire Regimes that have been moderately altered from the historical range. The risk of losing key ecosystem components is moderate. Fire frequency has departed from one or two return intervals (increased or decreased) which could result in moderate change to the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from the historical range.”

### Fuel Modeling

Fuel models (FMs) were assigned to the mature and beetle killed vegetation that could be selected for harvest within the analysis area. Fuel models are tools to help realistically estimate fire behavior (Anderson, 1982). The Fuel Model processing provides analysis for fire behavior/fire hazard and fuel transitions scenarios at current and post-MPB epidemic conditions.

FMs 0 – 5 consist primarily of non-combustibles, parks and meadows, or willow and riparian complexes and would not be impacted by project implementation. FMs 8 and 10 are relevant to the analysis due to the amount of vegetative treatments proposed in those complexes. FM 8 is associated with dry lodgepole pine, and is best described as closed canopy stands of short needle conifer. Fuel model 8 can support crown fire but usually only under ideal conditions of high temperatures, low humidity, and wind. FM 10 is associated with mature forest types that have down, woody material and the presence of insects and diseases. Significant fire control problems can be associated with this complex. Fuel models and the percentages found within the analysis area are depicted in Figure 3.2 below.

**Figure 3.2: Fuel Models and Percentage of Area within the Analysis Area**



### Fire Behavior

MPB mortality alters fuel and fire behavior in lodgepole pine forests. Crown fire hazard is higher than in non MPB affected stands during the 1-3 years post-epidemic while most of the needles are retained on the dead trees. It is also higher following snag fall and stand re-initiation when surface fuel loadings are extremely high. As the epidemic wanes, the transition from standing dead to collapsing conditions is easily recognizable; this generally occurs 5 years post infestation. As the process continues, FMs transition from 8 to 10, with some areas transitioning to FM 12 (significant mortality with heavy downed material). FM 8 generally exhibits very acceptable fire behavior while FM 10 increases fire behavior dramatically. With FM 12, fires become difficult to control until a break or change in fuel conditions is encountered.

### Fire Risk

Fire risk is generally defined as the probability of a fire occurrence; historical fire records can be used to determine probable risk of fire occurrence. Fire risk is a measure of fire starts on a 1,000 acre basis over a ten year period (per decade). As previously mentioned, records indicate that there have been a total of 35 fires in the 32,322 acre analysis area over a 37-year time period (between 1970 and 2007). This equates to a risk rating of **Low**.

### Local Fire Responsibility and Responsibilities

The Forest Service does not have jurisdiction for non-federal in-holdings. Protection of private land and private residences are the responsibility of the Albany County Fire District. Private

ownerships within the analysis area include: Mountain Home/WyColo, Wold Tract, Porter Ranch, and Pelton Creek Properties. With the exception of Pelton Creek, all of these properties have been identified in the **Albany County Wildfire Hazard and Risk Assessment Plan** as wildland urban interface. According to the Forest Plan (2003), treatment boundaries will generally occur less than one half mile from the identified communities and will be based on site-specific conditions such as topography, vegetation conditions, and fuel loadings (p. 2-69). Teamwork and collaboration between government agencies and property owners is essential.

## Environmental Consequences

### ALTERNATIVE 1: No Action

#### Direct and Indirect Effects:

Under this alternative, silvicultural treatments or suppression actions in association with the MPB epidemic would not be implemented. Fuel loadings and fire behavior would not be modified other than by natural vegetation and disturbance dynamics through time. The effects of the MPB attack would drastically alter stand characteristics, thus changing fuel characteristics and fire behavior. Fuel models would likely change through time from FM 8 to FMs 10 and 12. These changes would be less desirable from a fire control and safety (firefighter and public) standpoint, primarily as a result of more intense crown fires and longer flame lengths. However, these conditions are within the natural ecological progression of this forest complex and associated fire regime IV. Under the No Action alternative, there may be an increased need for wildfire management actions with less likelihood of success through the epidemic and post epidemic time period.

The smoke generated from a fire that has no suppression action taken is considered an indirect effect. The smoke emissions could not be mitigated and the health and safety impacts of the smoke on the public could be considerable.

#### Cumulative Effects:

The cumulative effects boundary for the Spruce Gulch analysis area includes all land ownerships within the analysis area boundary and approximately 1 mile outside of the boundary. One mile outside the analysis area boundary is defined by the spotting distance that is likely to occur based on fuel characteristics, topographic features, 90<sup>th</sup> percentile weather conditions within the area, and professional experience. Activities occurring from 2000 through 2050 are also being considered in the cumulative effects analysis for the risk of large scale, high intensity fire. This timeframe represents the beginning of the current MPB epidemic and the estimated time into the future that the majority of the effects of the epidemic may last.

In the No Action alternative, adverse cumulative effects in terms of the risk of large scale, high intensity fire would be expected to occur over the next 15 years. Increased risks would be due primarily to the current MPB infestation and the overly dense forest and heavy fuel loadings. Tree mortality from MPB generally produces dead and dry flashy aerial fuels within the first 3 to 5 years following the epidemic. These conditions dramatically increase the risk of large scale, high intensity fires. The potential for sustained crown fires would also greatly increase. As dead needles and small branches fall to the ground, this hazard would decrease. However, within the next 5 to 10 years the dead trees would start to fall, creating heavy jackpot fuels for several years. This again would substantially increase risks by creating more intense and difficult fire behavior

conditions for firefighters. This would especially be true for ground crews, as flame lengths exceed their ability for direct attack. With this type of fire behavior, forest suppression objectives could not be met.

Under the No Action Alternative, the FRCC would not improve and would most likely continue to deteriorate, creating conditions conducive to extreme fire. Defensible space would be minimized and would result in dangerous conditions for firefighters and the general public in the event of a fire. Current access into the Spruce Gulch analysis area may also be blocked as dead trees begin to fall to the ground. Since there is no proposal to change access, this could create a major issue for firefighters by blocking ingress/egress routes for initial attack activities, as well as blocking evacuation routes, increasing the time required to perform these duties.

Fire occurring several miles outside of the analysis area could affect the Spruce Gulch area under the right conditions. Although this event would be rare and require extreme conditions, a large scale, high intensity fire would be more probable if fuels abatement treatments are not implemented. Under the right conditions, a fire start in the Spruce Gulch area would threaten, damage, or destroy improvements in the immediate area. It may also have the potential to burn into or affect surrounding communities such as Fox Park, Wold, Woods Landing, Albany, Keystone, and other scattered residences adjacent to or within the Forest.

A large scale, high intensity wildfire can result in numerous risks and effects. Homes in the path of a wildfire perhaps receive the most notoriety. However, severe wildfires can also put numerous other important values at risk including firefighter and public health and safety, critical infrastructure, critical fish and wildlife habitat, 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).

## **PROPOSED ACTION: Forest Health Emphasis**

### **Direct and Indirect Effects:**

**Vegetative Treatments:** The amount of clearcutting proposed under this alternative (1,859 acres, with the potential for an additional 2,329 acres from adaptive management prescriptions) has the potential to create substantial changes to fire behavior on the landscape (i.e. the removal of standing trees could inhibit canopy fire behavior). However, one of the primary influences on fire behavior resulting from clearcutting operations is how the slash is treated. Slash treatments may be by any of the following methods: prescribed burning, lop and scatter, and machine pile and burn, machine trampling or roller chopping. How surface fuels are treated could either inhibit or encourage surface to crown fire transition.

As one would expect, flame lengths would be lower in the units treated by piling and burning than under the lopping prescription. Under all three slash treatment scenarios, however, passive crowning could occur, although it would be to young regeneration. Even under the worst-case scenario, looking out past the five years where the slash treatments are modeled to be ineffective, flame lengths would still be at a manageable threshold. This would allow for direct attack by mechanical equipment at the head and flanks of the fire.

**Fuel Treatments:** Implementation of the Proposed Action would create a fuelbreak around and adjacent to the urban interface areas. The fuelbreaks would limit fire behavior (flame length) to

levels allowing for direct attack by hand crews, mechanical equipment, and/or aerial retardant. Opportunities for increased ingress/egress along major forest roads would be increased, thereby enhancing public safety.

**Roads:** The number of accessible roads may be considered a “double-edged sword” in terms of travel management and fire suppression. While roaded access to an area increases the risk of human-caused ignition, the same roads provide access to fire fighting personnel and equipment, aiding in shorter response times and providing access during extended attack.

Given the relatively low fire risk in the area, additional road access (0.5 miles of new road construction) is not expected to contribute to a significant amount of additional ignitions. For 37 years, from 1970 to 2007, there have been only 35 ignitions in the area. Given this low fire risk, any increase in roads would be off-set by improved motorized access to the area by fire fighting personnel.

**Smoke Emissions:** Proposed slash treatments include piling and burning in clearcut units. The smoke generated by pile burning is considered an indirect effect. However, smoke emissions can be mitigated. Burning (as required by Forest Service policy) would be accomplished only on good to excellent smoke dispersal days and after a smoke permit is received by the Wyoming DEQ (Division of Environmental Quality).

**Fuel Models:** Fuel models 0, 1, 2, and 5 would generally stay static since no treatments are identified in them. FMs 8 and 10 are pertinent to the analysis as these are complexes at risk from the MPB epidemic, have the greatest potential to experience significant changes, and would have treatments applied to them. As previously indicated, it is most desirable to limit the expansion of the higher severity fuel models (10 and 12) and promote and maintain FM 8 which exhibits lower fire hazard. In all cases, both during and post beetle epidemic, vegetative treatments associated with the Proposed Action would move or maintain the analysis area closer to the desired condition (FM 8) from a fire and fuels management standpoint.

### **Cumulative Effects:**

The Proposed Action is expected to have positive long-term cumulative effects. The proposed treatments to reduce MPB mortality combined with fuel treatments are designed to decrease the risk of large scale, high intensity fires as well as decrease fuel loading. These actions would continue to keep the forest in desirable conditions. Areas susceptible to beetle kill would also be minimized. Other projects that reduce canopy densities within the cumulative effects area would have similar positive impacts (e.g. the Forest-wide Hazardous Tree Removal and Fuels Reduction Project). These projects, combined with the treatments proposed in the Spruce Gulch analysis, would decrease the hazardous fuels much more efficiently for longer periods of time. Fuel treatments would also be far more effective if collaboration continues between landowners and other cooperators. Several landowners in the area have inquired about State and Private Forestry assistance. Some are implementing or have completed thinning treatments on their land.

With the fuel treatments proposed, fire behavior would be much more manageable, with lower intensity surface fires that could more easily managed by ground crews. This would help meet forest suppression objectives and significantly decrease the potential for sustained crown fires. The FRCC would improve as fuel composition and vegetation characteristics were returned to more historical type conditions and the risk of losing key ecosystem components would be

decreased. Defensible space would also be increased, providing increased protection for firefighters and the general public. The risk of access routes being blocked would also be reduced as a result of decreased beetle caused mortality and removal of dead and dying trees.

It is important to understand that regardless of treatment, humans and lightning would still ignite fires within the project boundary. These fires would likely have an impact on residential areas within the project boundary as well as structures within a two to three mile buffer outside of the project boundary. However, the impact would be lessened with the implementation of the Proposed Action.

## ALTERNATIVE 2: Fuels Management Emphasis

### **Direct and Indirect Effects:**

The effects of implementing Alternative 2 would be similar to the Proposed Action, but at a reduced areal extent. Vegetative treatments would move or maintain the analysis area closer to the desired condition (FM 8) from a fire and fuels management standpoint, but to a lesser degree than the Proposed Action.

### **Cumulative Effects:**

Cumulative effects would be similar to those described for the Proposed Action.

## FOREST PLAN COMPLIANCE

The No Action alternative deviates from the following Forest Plan (2003) direction:

- Fire and Fuels guideline #1 in MA 5.15 (p. 2-62) requires use of direct control or perimeter control as the wildland fire management strategy. ***With the current MPB epidemic and the possibility of large wildfires, this direction could be difficult to attain without implementation of the vegetative prescriptions.***
- Fire and Fuels standard #1 in MA 7.1 (p. 2-70) states, “to allow direct attack, treat management fuels to reduce fire intensity within 3 years after vegetation management activities are completed. ***The No Action Alternative would result in the loss of the direct attack control option.***

Both the Proposed Action and Alternative 2 would comply with Fire and Fuels direction contained in the Forest Plan, although Alternative 2 would be strategically less effective on a landscape scale.

## 3.6 Engineering

### Affected Environment

#### Transportation System

Arterial roads are major forest roads that provide primary access to forest land and forest road networks. They are typically characterized by a smooth running surface (paved or gravel), good driver sight distance, fairly gentle grades, and good drainage. The Platte River Access Road (NFSR 512) is an aggregate surfaced, arterial road that provides access from the north but is not within the analysis area. Approximately 1 mile of NFSR 512 would be utilized as a haul route.

Forest collector roads serve as connectors between major (arterial) roads and lower class (local) roads that access areas such as timber harvest units or trailheads. Collector roads may or may not have gravel surfacing but generally have good grades, alignment, and drainage. Collector roads within the analysis area include Pelton Creek (NFSR 898), Spruce Gulch (NFSR 530), Six-mile Gap (NFSR 516), Platte Ridge (NFSR 521), and Douglas Point (NFSR 544).

Local roads terminate in smaller resource areas and are usually constructed for a single resource activity, such as a timber harvest. Some local roads are closed (gated) to motorized traffic following resource management activities to reduce impacts on other resources, such as wildlife. Others provide access to popular recreation areas and are open to motorized traffic. Local roads are the lowest class of NFSRs and are characterized by narrow widths, moderate to steep grades, and primitive or native surfaces. There are 81.5 miles of existing local system roads in the analysis area. These roads are generally native surfaced, but may have some aggregate surfacing sections.

Unauthorized roads are not managed as part of the forest transportation system. They include unplanned roads, abandoned travelways, off-road vehicle tracks that have not been designated and managed as a trail, roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization, and roads that have been created by a user or groups of users for recreation, mining etc. There are currently an estimated 50 miles of unauthorized roads within the analysis area that are planned for decommissioning as a result of the Travel Management-Eastern Snowy Range Decision 1 (June 21, 2007).

**Table 3.6: Miles of Existing NFSRs within the Analysis Area by Function**

Road Type	Miles
Arterial	0
Collector	32.6
Local	81.5
<b>Total Miles</b>	<b>114.1</b>

**Environmental Consequences**

**ALTERNATIVE 1: No Action**

**Direct and Indirect Effects:**

Under the No Action alternative, needed maintenance on haul roads would continue to be deferred until funding becomes available. Increased road maintenance needs can be expected under the No Action alternative due to expected increases in water yield and peak flows (see p.72, Hydrology). Annual and deferred road maintenance costs would increase. Roads identified for closure with previous decisions may continue to see unauthorized travel until funding becomes available to effectively close the roads.

**PROPOSED ACTION: Forest Health Emphasis**

**Direct and Indirect Effects:**

Although the existing transportation system would primarily be used to access treatment units, approximately 0.5 miles of new system road construction would still be required for access

purposes. Newly constructed roads would be closed to motorized travel after use. Closure methods would provide for hydrologically, self-maintaining drainage features. Closure methods can include ripping and seeding, constructing berms and water diversion structures, removing culverts, pulling slash and stumps across the road bed, planting trees and shrubs in the roadbed, gates, and signs. The most effective closure methods would be identified on-the-ground prior to closure. Closures could be completed as part of the timber sale or with post-sale funding.

Reconstruction would be needed on approximately 7.8 miles of existing road to accommodate log truck haul and to provide for resource protection. Some of the existing roads were originally constructed to accommodate smaller hauling vehicles, and road width would need to be increased to meet current standards. Additional drainage features such as ditches, rolling dips and culverts may be needed to provide a stable surface for haul and protect against surface erosion. Some creek crossings may need to be improved with new culverts or hardened crossings. Design criteria would be implemented to ensure resource protection.

Following project completion, reconstructed roads would retain the same maintenance level as identified in the Travel Management – Eastern Snowy Range decision: NFSRs 501, 530.Q, 530.QA, and 898.D would remain level 2 roads; and NFSRs 530.QA.01 and 530.RC would move to maintenance level 1 (closed and gated) roads.

Estimates made during the planning process indicated that approximately 3.7 miles of new temporary road construction would be needed for project implementation. The exact location of these roads is not known at this time; coordination with the timber purchaser would need to occur during the sale. Other temporary roads that would be used during project implementation follow existing unauthorized routes. All temporary roads (new and unauthorized) would be decommissioned after sale activities and motorized use would be prohibited. Closure methods would be similar to level 1 roads.

Pre-use maintenance would be needed on 65 miles of existing road to support timber hauling and to provide for resource protection; some of these roads are outside the planning area. Maintenance involves reshaping the roadway, reshaping and cleaning of drainage structures, roadside brushing, minor slump and slide cleanup, and maintenance of structures such as cattleguards and gates.

Reconstruction and maintenance of the system roads through sale activities would help address deferred maintenance needs and reduce required annual maintenance.

## **ALTERNATIVE 2: Fuels Management Emphasis**

### **Direct and Indirect Effects:**

This alternative differs from the Proposed Action primarily in the reduction of miles of road reconstruction (3.4 miles) and new temporary road construction (0.4 miles) that would be needed to access harvest units. New system road construction would be the same (0.5 miles). Fewer miles of road would receive pre-maintenance (45 miles); consequently, maintenance needs would be deferred.

### **Cumulative Effects – All Alternatives:**

**Eastern Snowy Range Travel Management Decision (June 2007):** This decision identified 41.2 miles of existing unauthorized and system routes that would be converted to motorized

trails and the construction of 3.7 miles of motorized trail (44.9 total trail miles). Some of these trails may be utilized during sale activities; consequently, implementation of the “Southern Trail System” would be delayed until the Spruce Gulch project is completed. This same decision identified approximately 41.7 miles of unauthorized roads and trails and 1.7 miles of system roads that would be decommissioned within the Spruce Gulch analysis area. The decommissioning would be implemented regardless of the Spruce Gulch project. Some of these routes may be utilized as temporary roads or skid trails during sale activities; therefore, their decommissioning would also be delayed until timber sale activities are completed.

Depending on funding, implementing the motorized trails and route decommissioning may occur sooner under the No Action alternative than under the Proposed Action or Alternative 2.

**Hazard Tree Removal Analysis (planned 2008 decision):** Some clearing of hazard trees along roads, as identified in the Forest-wide Hazardous Tree Removal and Fuels Reduction project, would be accomplished with the Spruce Gulch project to provide for public safety as well as the safety of the purchaser’s activities. Design criteria identified in the hazard tree analysis would be adhered to in any clearing needed for the Spruce Gulch project.

**Other Timber Sales:** Implementation of other timber sales would utilize some of the same haul routes as the Spruce Gulch sale; these include the Devils Gate timber sale (2006) and any small sales resulting from the Hazard Tree Removal project. Required reconstruction or maintenance work along these routes would need to be coordinated during sale activities.

## FOREST PLAN COMPLIANCE

All alternatives, including the Proposed Action, are consistent with Forest Plan direction for transportation. The Forest Plan contains the following direction that is pertinent to the transportation system for this analysis:

Goal 4a: Improve the safety and economy of Forest Service roads and trails, and provide greater security for the public and employees. (p. 1-12) ***Road reconstruction and maintenance would provide for safer travel.***

Water and Aquatic standard #5: Design and construct all stream crossings and other instream structures to allow passage of water and sediment, to with stand expected flows, and allow free movement of resident aquatic life. (p. 1-29) ***Design criteria 17 – 26 (Draft EIS p. 29) would ensure compliance with this standard.***

Forest Plan desired conditions for MA 5.15 transportation system are as follows:

- Numerous open and closed roads provide commercial access, and both motorized and nonmotorized recreational opportunities.
- A relatively high level of disturbance is accepted, in areas of lesser wildlife habitat value, as the landscape moves closer to the Historic Range of Variability (HRV).
- Use of temporary roads for management activities is preferred. Effective decommissioning of temporary roads following project implementation is a priority. (p. 2-61) ***All temporary roads associated with project implementation would be decommissioned.***

Forest Plan transportation standards and guidelines for MA 5.15 include:

- close non-essential roads to enhance or develop large areas for wildlife security and nonmotorized recreation opportunities.

- Use coordinated landscape scale treatments to limit the need for frequent reentries and continued need for additional classified roads. Maximize use of temporary roads. (p. 2-62) *System roads provide for the minimum transportation system needed. Temporary roads would be utilized.*

None of the alternatives analyzed in this Draft EIS would result in irreversible or irretrievable effects to the engineering resource.

## 3.7 Economics

### Affected Environment

#### Economic Analysis

The economic analysis for the Spruce Gulch project was conducted using the software package QUICKSILVER (QUICKSILVER v. 5.003 - USDA Forest Service Economic Analysis Tool, 1997). The financial analysis includes direct costs and revenues to the Forest Service that that will occur over the next 5 to 10 years. The financial analysis does not include an estimate of non-monetary values for recreation, wildlife, and forage.

#### Financial Efficiency

Financial efficiency is a comparison of those costs and benefits that can be quantified in terms of actual dollars spent or received within the project area. When considering quantitative issues, financial efficiency analysis offers a consistent measure in dollars for comparison of alternatives. This type of analysis does not account for non-market benefits, opportunity costs, individual values, or other values, benefits, and cost that are not easily quantifiable. This is not to imply that such values are not significant or important—but to recognize that non-market values are difficult to represent with appropriate dollar figures. The values not included in this part of the analysis are often at the center of disagreements and the interest people have in forest resource projects. Therefore, financial efficiency should not be viewed as a complete answer, but as one tool decision-makers use to gain information about resources, alternatives, and trade-offs between costs and benefits.

The main criterion used in assessing economic efficiency is Present Net Value (PNV), which is defined as the value of discounted benefits, minus discounted costs. A PNV analysis includes all outputs, including timber, grazing, and recreation, to which a monetary value is assigned. The monetary values include both market and non-market values. In addition, a financial efficiency analysis is completed to determine the financial returns of each alternative. A financial efficiency analysis is the PNV of Federal revenues and costs.

Present Net Value is an economic measure that accounts for all current and future costs and benefits, within the treated units, in a single dollar figure. Future costs and benefits are estimated and discounted into today's dollars, and added to the current project costs and benefits. The result is a figure that can be compared across alternatives, representing the total financial impact over the life of the project. Because a dollar is worth more now than it would be in the future, discounted costs and benefits are small figures. For example, a benefit of \$1,000,000 in 100 years is worth about \$20,000 today, using the standard government discount rate of four percent.

For the Spruce Gulch analysis, the output level of non-market goods (e.g., recreation, hunting, water production) is not expected to change in any of the alternatives. In addition, there are no

non-Forest Service costs associated with this project. Thus, for all alternatives, the economic efficiency analysis is the same as the financial efficiency analysis. All costs, timing of the activities and outputs were developed by specialists on the interdisciplinary team.

**Environmental Consequences**

PNV and benefit/cost ratios were calculated for the Proposed Action and Alternative 2 using two scenarios: a short-term period of 10 years (2008-2018) and a long-term period of 43 years (2008 – 2051). All monetary values are expressed in constant dollars, with no allowance for inflation. A 4 percent discount rate was used. The reduction of PNV in any alternative is the economic trade-off, or opportunity cost, of achieving that alternative. Tables 3.7 and 3.8 display the short-term and long-term economic efficiency of each alternative.

**Table 3.7: Short-term Economic Efficiency by Alternative (in Thousands of Dollars)**

Short Term	Alternative 1 No Action	Proposed Action	Alternative 2
Present Net Value	N/A	-\$1,777,259	-\$971,667
Benefit/Cost Ratio	N/A	0.25	0.23

Source: Quicksilver Economic Analysis

**Table 3.8: Long-term Economic Efficiency by Alternative (in Thousands of Dollars)**

Long Term	Alternative 1 No Action	Proposed Action	Alternative 2
Present Net Value	N/A	-\$1,946,419	-\$1,059,721
Benefit/Cost Ratio	N/A	0.23	0.22

Source: Quicksilver Economic Analysis

**ALTERNATIVE 1: No Action**

**Direct and Indirect Effects:**

No costs or outputs are associated with the No Action alternative; therefore, the PNV is zero and the benefit/cost ratio is not applicable.

**PROPOSED ACTION: Forest Health Emphasis and ALTERNATIVE 2: Fuels Management Emphasis**

**Direct and Indirect Effects:**

Table 3.7 (short-term economic efficiency) indicates that both the Proposed Action and Alternative 2 would have a negative PNV and benefit/cost ratio less than one. Alternative 2 would have lower costs and lower revenues in the short-term while the Proposed Action would have higher costs and higher revenues. More acres would be harvested under the Proposed Action; while this would result in more revenue, it also includes greater costs of implementation.

Under Alternative 2, which has a greater emphasis on fuels reduction, fewer acres would be harvested; thus, less revenue would be generated and it would cost less to implement.

Table 3.8 (long-term economic efficiency) indicates that both action alternatives have a negative PNV and benefit/cost ratio less than one because estimated costs are higher than projected revenues.

Tables 3.7 and 3.8 clearly show that in both the short- and long-term periods, project implementation costs would far exceed the revenues generated by either action alternative. This is not surprising considering the depressed housing construction industry, restricted credit limits, and inflated fuel costs, all of which create negative impacts on the price of the Inland Lumber Price Index for White Woods and the Base Period Price. In short, the stumpage values of sawtimber have decreased accordingly.

Another important point to consider is the current MPB epidemic and its negative impact on the health of timbered stands, available timber supply, and the increase in forest fuel loads. A brief window of opportunity exists to salvage dead and dying lodgepole pine sawtimber suitable for lumber. A period of only 5 to 10 years may exist to salvage infested stands.

It is probable that MPB infested stands with non-serotinous (open) cones would regenerate on their own over a period of years. Assistance may be needed to help open cones and release seeds in trees containing serotinous (closed) cones. If infested stands are harvested over the next 3-5 years, they are expected to naturally restock.

## Distribution Analysis

Distribution analysis is not concerned with costs and benefits directly, or with direct values of resources, but with the equity in which resources are distributed. In essence, it is the balancing of local, regional, and national uses. By identifying local impacts and being aware of national values, decision makers can balance the benefits and costs among geographical, political, social, ethnic, and economic sectors of society. For this analysis, the distribution impact was considered from several perspectives including impacts of employment, income by alternative, and environmental justice.

**Employment and Income:** In general, the Proposed Action would have some impact to the local economies of Albany and Carbon Counties. There would be some overall change in terms of economic activity. Under Alternative 2, the situation is similar; total impact to the local economy would be limited. At the same time, recognition is given that local wood product industries rely on Forest Service timber sales to help meet their supply needs for timber. Sawmills in Encampment and Saratoga, Wyoming are currently closed but decisions to reopen or remain closed are affected by the available supply of wood through individual projects like this one.

**Environmental Justice:** A special consideration of equity and fairness in resource decision-making is encompassed in the issue of environmental justice. As in Executive Order 12898 (Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations), all Federal actions will consider potentially disproportionate effects on minority or low-income communities. Consideration of environmental justice issues should be highlighted for decision-makers. Potential impacts or changes to low-income or minority community in the

project area due to the Proposed Action and Alternative 2 should be considered. Where possible, measures should be taken to avoid impact to these communities or mitigate the adverse effects.

Within the project area, there are no communities with significant low-income or minority populations, so specific actions to address environmental justice concerns were not implemented for this project.

### **Cumulative Effects – All Alternatives**

There are many elements that influence and affect local economies. Population growth, economic growth, and economic diversity and dependency of individual counties and communities all affect local economies. It is reasonable to project that the size of scope of this project would add cumulatively to the local economy.

## **3.8 Soils**

### **Affected Environment**

Most soils occurring on forested slopes and ridge-tops within the analysis area are shallow, rocky, and coarse textured. These soils are not usually susceptible to deep compaction, but compaction of surface layers has been observed in highly trafficked areas. Many soils have high potential for erosion if protective ground cover is removed. They are also susceptible to loss of productivity if the surface organic horizon is displaced, removed, or consumed by fire. Riparian area soils and/or seasonally wet soils are highly susceptible to damage caused by operation of heavy equipment or other vehicular traffic.

Effective ground cover within the proposed treatment units is high (> 90% effective ground cover). Active erosion rates are low with the exception of some roads and other highly disturbed sites. Detrimental compaction within the analysis area is generally limited to highly disturbed sites. Field traverses conducted in September 2007 revealed high soil quality with little detrimental soil impacts in the proposed treatment units. Observed detrimental soil impacts were estimated at less than 1 percent of proposed treatment areas which is well below the 15 percent threshold for detrimental soil impacts.

Adequate amounts of coarse woody debris (CWD) and fine woody debris (FWD) are providing for sustainable rates and levels of nutrient cycling in most areas. Analysis area soils are relatively sensitive to ground disturbance and other impacts to nutrient cycling because a high proportion of their productivity is concentrated in thin, nutrient rich surface layers. FWD and CWD are relatively slow to decompose due to cold winter temperatures and limited moisture availability over much of the year.

### **Environmental Consequences**

#### **ALTERNATIVE 1: No Action**

##### **Direct and Indirect Effects:**

Under the No Action alternative, vegetative treatments and fuels abatement projects would not occur. Vegetation would be modified only by natural disturbance through time. In the short-term, current levels of lodgepole pine mortality would continue and the vast majority of these

beetle-killed trees would eventually fall and be incorporated into the soil as CWD. There would be no additional erosion, compaction, or soil displacement above the existing condition. Natural recovery of previously impacted areas would continue. FWD and CWD would continue to accumulate at accelerated rates but decompose at natural rates.

In the long-term, there may be an increased risk of high intensity, high severity wildfires from taking no action; this risk is relatively low. None-the-less, the soil resources may be detrimentally impacted if such an event did occur. Wildfires could potentially consume the protective surface ground cover and induce water repellency in the soil such that post-fire runoff is predominantly surface overland flow (Carlson 2008). This, combined with high intensity, short duration storms common in the Intermountain West, could lead to greatly increased erosion rates from high severity burned areas (MacDonald and Stednick 2003). Wildfires could also cause changes to soil chemical, physical, and biological properties. The temperature threshold of the soil and the severity of the fire would determine the amount of change in soil physical properties (DeBano et. al. 2005).

### **Cumulative Effects:**

In the absence of severe wildfire, the No Action alternative would not cumulatively add to measurable effects within the analysis area. There are no future foreseeable actions that would cumulatively add to measurable effects for the soil resource within the analysis area.

## **PROPOSED ACTION: Forest Health Emphasis and ALTERNATIVE 2: Fuels Management Emphasis**

### **Direct and Indirect Effects:**

The Proposed Action would implement a variety of silvicultural treatments on approximately 4,370 acres. The effects of implementing Alternative 2 would be identical to the Proposed Action, but at a reduced areal extent due to fewer acres treated and fewer miles of road construction and reconstruction.

Direct and indirect effects of the action alternatives include increased rates of soil displacement, erosion, and compaction above the existing condition. The removal of vegetative cover (canopy and surface) would reduce interception and expose the soil surface to the erosive forces of rainfall. Ground disturbing activities associated with mechanized timber harvest would increase soil surface exposure and erosion rates. They may also result in soil displacement and rutting. The potential to increase erosion rates would be more pronounced as slope steepness increases. Design criteria would be implemented to reduce these effects (Draft EIS pp. 27 - 32).

Pre- and post-harvest erosion scenarios were modeled using the Forest Service Water Erosion Prediction Project interface. Varying amounts of effective ground cover values were run for multiple units to demonstrate the importance of post-harvest effective ground cover in controlling soil erosion. Results of the model indicate that overall erosion rates and probabilities would be extremely low.

Clearcut units would have the highest rates of cover reduction (up to 100% in places) and the highest probability of soil erosion. Implementation of design criterion 29 would reduce post-harvest soil erosion rates.

Ground based skidding results in 20 to 40 percent soil exposure unit-wide; however, the use of designated skid trails can reduce this exposure rate to 7 to 15 percent. Implementation of design criteria 32 and 35, which limit skid trail-related impacts through layout and design, would help prevent increases in detrimental impacts in excess of the 15 percent Regional and Forest Plan soil quality standard.

Proposed slash treatments would include chipping; lopping and scattering slash to an 18 or 24 inch depth; roller chopping; machine trampling; and/or machine piling and burning. Direct effects of machine trampling and roller chopping are increased soil compaction and some soil displacement. Practices to prevent detrimental soil compaction are included in the soil design criteria (Draft EIS pp. 30 - 31). Lop and scatter of harvest-generated slash in the treatment units would provide post-harvest ground cover as well as woody debris and soil organic material (SOM) contributions. The effectiveness of ground cover in reducing post-harvest erosion is well documented. The effects of pile burning on soil productivity range from moderate to severe, depending on burn severity, soil type, and site history. Typical effects on soils would be loss of litter layer, soil organic matter, soil structure, and introduction of hydrophobicity. In the short-term, fire may sterilize soils although natural recovery is expected to occur over time.

Effects to soils from road construction activities would include increases in soil bulk density, runoff, and soil erosion. Specific design criteria to reduce soil erosion from this activity are included on Draft EIS pp. 30 – 31. Temporary roads would be closed and reclaimed after use; reduced soil productivity can be expected until the roads are successfully reclaimed.

The use and maintenance of system roads for project implementation may generate additional short-term ground disturbance and sediment production. Maintenance and use of roads that are typically lightly used, well-vegetated, and stable would generate additional watershed impacts such as sediment production and runoff. On heavily used, poorly maintained and unstable roads, maintenance actions concurrent with management activities may benefit watershed functions by reducing runoff and sediment production.

### **Cumulative Effects:**

Past measurable detrimental impacts to soils associated with wildfires, timber harvest, dispersed camping, roads, off-highway vehicle (OHV) use, and livestock grazing still exist on the landscape. Potential direct effects associated with project implementation are erosion, compaction, and impacts to nutrient cycling. Areas that were compacted or eroded by past activities are in various stages of recovery. Based on field reconnaissance, review of aerial photography, and location of proposed treatment units, the extent of past detrimental impacts is estimated to be low for project activity areas. Through prevention and implementation of design criteria, the sum of past impacts and project-related direct effects would be kept below 15 percent of any given activity area.

Currently, OHV use within the analysis area is restricted to NFSRs; observed OHV impacts are minimal and are not exceeding Forest Plan standards for the soil resource. Historic OHV use in the analysis area occurred on both NFSRs and unauthorized trails; motorized use on some of the unauthorized trails resulted in additional erosion, compaction, and sedimentation. The Travel Management – Eastern Snowy Range decision (June 2007) identified 33.5 miles of unauthorized routes that would be designated as part of the forest transportation system, 7.7 miles of system roads that would be converted to motorized trails, and 3.7 miles of motorized trail construction (44.9 miles total). Designation of the unauthorized routes would reduce impacts to soil resources

since the trails would require proper design and maintenance prior to use. Soil productivity, however, would decrease on the new trail construction segments. This same decision also identifies 43.7 miles of route closures. Soil productivity on the closed routes would increase over time. Collectively, the travel management decision is expected to benefit the soil resource.

Due to the heavily timbered nature of the proposed treatment units, forage availability is minimal to nonexistent. Canopy removal may increase forage availability within the treatment units. Increased forage availability may be accompanied by an increase in livestock utilization. This utilization would be transient in nature and should not negatively impact the soil resource.

## FOREST PLAN COMPLIANCE

All alternatives would comply with Forest Plan standards and guidelines pertinent to the soil resource (pg. 1-28). Compliance in the context of the Proposed Action and Alternative 2 is contingent on implementation of pertinent project design criteria. None of the alternatives analyzed in this Draft EIS would result in irreversible or irretrievable effects to the soil resource.

## 3.9 Hydrology

### Affected Environment

#### Watersheds and Streams

The eastern two-thirds of the analysis area are located in the Pelton Creek watershed and its related tributaries. Major perennial streams in this area include Pelton Creek and Park Run Creek. The remaining western third of the analysis area is located in the North Platte River/Sixmile watershed. Major perennial streams in this area include Elkhorn, Sixmile, Porter, and Walbright Creeks. Recent information on stream conditions in the watersheds could not be located for this assessment.

#### Wetlands, Riparian Areas, and Floodplains

Approximately 1,192 acres of wetlands, riparian areas, and floodplains exist throughout the analysis area. Palustrine (lacking flowing water) wetlands are most common and are distributed along area streams. Riparian areas are associated with lands adjacent to perennial and some intermittent streams; many of these are also considered palustrine. Floodplains, which tend to be narrow in most of the analysis area, are also associated with perennial and intermittent streams.

#### Water Quality Standards

Surface waters located within the Platte River wilderness and the mainstem of the North Platte River are classified by the Wyoming Department of Environmental Quality (WYDEQ) as Class 1 - Outstanding Waters. "Class 1 waters are those surface waters in which no further water quality degradation by point source discharges ... will be allowed. Nonpoint sources of pollution shall be controlled through implementation of appropriate best management practices" (WYDEQ 2001 p1-10). Other perennial surface waters and wetlands adjacent to perennial surface waters in the analysis area are classified as Class 2AB - Fisheries and Drinking Waters. "Class 2AB waters are those surface waters known to support or have the potential to support game fish populations ... drinking water use is attainable" (WYDEQ 2001 p1-10). Intermittent streams in the area are classified by the State of Wyoming as Class 3B if no fisheries are thought to be present. These waters support beneficial uses of aquatic life other than fish, recreation,

wildlife, agriculture and scenic value (WYDEQ 2001). The analysis area does not contain any impaired water bodies (WYDEQ 2006).

## Environmental Consequences

### ALTERNATIVE 1: No Action

#### Direct and Indirect Effects:

Under this alternative, vegetative treatments and fuels abatement projects in association with the MPB epidemic would not be implemented. Vegetation would be modified only by natural disturbance dynamics through time. Given the level of the current MPB epidemic (i.e. natural disturbance), impacts to the hydrology resource are expected despite the lack of management actions.

**Sediment:** In the long-term, there may be an increased risk of wildfire from taking no action to manipulate or remove beetle killed vegetation; this risk is relatively low. None-the-less, the increased risk of wildfire would incrementally increase the risk for adverse effects to water resources in terms of additional sediment delivery to streams. Direct effects could also result from fire suppression activities, such as the construction of firelines, especially in or near stream channels. Indirect effects could occur as a result of changes in vegetative cover, formation of water repellent soils, and increases in runoff. Erosion and sedimentation after fires is highly variable and largely dependant on fire severity (e.g. Robichaud and Waldrop 1994). Since the No Action alternative would only slightly increase the potential for extensive severe wildfire, any erosion that may occur is projected to be relatively minor. There are no known adverse effects to water resources in or downstream of the analysis area from the ~200 acre Sixmile fire that occurred in the project area in 2003.

**Flow Regimes:** The No Action alternative is not expected to have direct effects on streamflow regimes. Streamflow regimes could, however, be indirectly affected by reductions in canopy cover (15 - 25 percent) and the resultant reduction in evapotranspiration and interception losses. These actions would cause a measurable increase in runoff (MacDonald and Stednick 2003). Runoff and peak flows could also be indirectly affected by road construction. Additional details on the potential effects of treatments of MPB affected stands on water yield have been summarized by Carlson (2008).

Reductions in canopy cover were estimated for analysis area watersheds in 2000 and again in 2007 using an Equivalent Clearcut Area (ECA) method. This method normalizes for the intensity and time since a project occurred, including past harvest, fire, insect/disease and road construction activities. ECAs are shown in Table 3.9.

**Table 3.9: Estimated Percent of Canopy Reduction in Analysis Area Watersheds**

Watershed	Acres	ECA (2000)	ECA (2007) <sup>1</sup>
Pelton Creek	23,998	1,920 ac / 8%	9,466 ac / 39%
Porter Creek	1,398	42 ac / 3%	1,001 ac / 72%
Sixmile Creek	1,744	192 ac / 11%	1,015 ac / 58%
Elkhorn Creek	6,046	785 ac / 13%	4,619 ac / 76%

<sup>1</sup> Includes existing harvest and assumes 100% mortality (worst case) in existing stands w/ beetle.

The 2000 figures depict the pre-beetle epidemic situation and ECA decreases from past activities (e.g. old timber sales, fires). The 2007 figures depict past activities, recent tree mortality from the beetle epidemic, and impacts from the Sixmile fire that occurred in 2003. The 2007 figures show that MPB infestations have resulted in significant reductions in canopy cover in the analysis area watersheds. Beetle activity is expected to continue, resulting in additional reductions in the canopy cover of analysis area watersheds in coming years.

The following hydrologic effects can be expected in all analysis area watersheds. The effects would be the result of changes in water yield due to reductions in canopy cover from past harvest, road clearing, fires, and beetle activity (adapted from Carlson 2008):

- Increases in annual water yield, mostly in spring snowmelt runoff
- Increase in peak flow size
- Earlier timing of peak flows
- Moderate effects in the early years following beetle activity, greater effects 5 to 15 years out and effects persisting at a declining rate possibly up to 60 years
- Larger increases in water in high precipitation years

**Bed/bank Stability:** No direct effects to stream bed or bank stability are expected under the No Action alternative. Indirect effects to stream bed or bank stability would not occur as a result of removal of streamside vegetation, but may occur as a result of increases in water yield and streamflows. Increased streamflows can be expected to increase streambank erosion, especially in pool-riffle stream reaches, and may result in changes in stream habitat.

**Riparian Ecosystems:** Direct effects to riparian ecosystems are not likely under the No Action alternative. Indirect effects to riparian ecosystems could occur as a result of increased mortality to riparian trees due to MPB activity. Increased tree mortality is expected to increase water temperatures and increase the amount of available large woody debris which could provide terrestrial habitat in riparian areas or aquatic habitat in streams.

## **PROPOSED ACTION: Forest Health Emphasis**

### **Direct and Indirect Effects:**

**Sediment:** Direct effects of sediment delivery to streams from the harvest units would be minimal due to the location of units, buffer strips between units and waterways, and amount of debris left in the units and buffer strips which can trap sediment. Indirect effects may include increased sediment in upland areas that may be transported to nearby stream channels.

The Proposed Action includes the construction of 0.5 mile of new system road to access unit 56. This segment of road would parallel an intermittent tributary to Pelton Creek, but would not cross any streams. Although this road construction is located to minimize effects to water resources, some erosion and sedimentation to Pelton Creek is still expected. Erosion and sedimentation effects from this road would be greatest in the first few years after construction; it would gradually decrease over time as the road stabilizes. Closure of the road to public motorized uses following the sale would reduce sedimentation.

Roughly 3.7 miles of new temporary road are proposed throughout the analysis area for access to harvest units. The majority of these roads would be located in upland areas. While no perennial streams would be crossed, 11 intermittent stream crossings would be necessary. Erosion and

sedimentation can be expected during construction and use of the temporary roads, especially near the stream crossings. Temporary roads would be decommissioned after use. Therefore erosion and sedimentation is expected to return to background rates within a few years after decommissioning as these areas are stabilized by revegetation.

Reconstruction and use of existing system and temporary roads (i.e. unauthorized routes that exist on the ground but were never designed or constructed by the Forest Service) would increase erosion and sedimentation in the first few years after ground disturbance; these effects would decrease over time as the roads are reclaimed. Many of these roads are located in upland areas, are narrow, and have limited drainage. It is estimated that one perennial and 20 intermittent stream crossings would be necessary.

**Flow Regimes:** ECAs under the Proposed Action are expected to either increase slightly from the ECA (2007) figures or remain the same (see Table 3.10). The increases are minor because most of the units proposed for treatment overlap areas with moderate to high beetle infestations; canopy cover in these areas has already been reduced as a result of tree mortality or will be in the near future (3 – 15 years). Thus, increased ECAs as a result of the Proposed Action would occur only where canopy cover is reduced as a result of vegetative treatments located in areas with low beetle infestations. Indirect effects to flow regimes and water yield would be similar to those described under the No Action alternative, but with an increase in magnitude from the vegetative and fuels abatement treatments.

**Table 3.10: Estimated Increases in ECA – Proposed Action**

Watershed	Acres	ECA (2007) <sup>1</sup>	ECA w/ Proposed Action
Pelton Creek	23,998	9,466 ac / 39%	10,844 ac / 45%
Porter Creek	1,398	1,001 ac / 72%	1,001 ac / 72%
Sixmile Creek	1,744	1,015 ac / 58%	1,048 ac / 60%
Elkhorn Creek	6,046	4,619 ac / 76%	4,835 ac / 80%

<sup>1</sup>ECA (2007) figures depict past management actions, tree mortality from the beetle epidemic, and impacts from the Sixmile fire that occurred in 2003.

**Bed/bank Stability:** Stream bed/ bank stability has the potential to be directly affected by culvert placement at 32 stream/road crossings (culverts would be removed following harvest activities). In all cases, the length of stream potentially affected is less than 50 feet and in most cases less than 20 feet. Short- and long-term stream bed and bank stability would be achieved through the use of BMPs designed to stabilize streambanks at the road crossings.

Indirect effects to stream bed/bank stability from the removal of streamside vegetation are not expected because BMPs, which preclude harvest of streamside trees, would be implemented. Indirect effects from increases in water yield are expected to be similar to the No Action alternative.

**Riparian Ecosystems:** Direct effects to riparian areas from implementation of the Proposed Action would be limited for the following reasons: use of existing roads would not directly impact any new riparian areas; the majority of temporary roads would be located on upland sites; any temporary road disturbance in riparian areas would be short term; and riparian area function would return to current conditions in the long-term after the temporary roads are rehabilitated. BMPs which limit use of heavy equipment and harvest in and near riparian ecosystems would also be implemented which would further reduce potential direct impacts to riparian ecosystems.

Indirect effects to riparian ecosystems may occur due to the removal of some dead and dying trees from riparian areas. However, recommended buffers (BMPs) would leave trees adjacent to streams. These trees may fall into the stream and provide future aquatic habitat and channel roughness and move project area streams toward desired aquatic conditions.

## **ALTERNATIVE 2: Fuels Management Emphasis**

### **Direct and Indirect Effects:**

**Sediment:** Effects from implementing Alternative 2 would be similar to the Proposed Action, but at a reduced areal extent due to fewer acres of vegetative treatment and reduced road needs.

**Flow Regimes:** ECAs would remain the same (ECA (2007)) in Porter Creek, Sixmile Creek, and Elkhorn Creek and increase from 39 percent to 41 percent in Pelton Creek (see Table 3.9).

**Bed/bank Stability and Riparian Ecosystems:** Effects from implementing Alternative 2 would be similar to the Proposed Action, but at a reduced areal extent due to fewer acres of vegetative treatment and reduced road needs. Stream/road crossings would be reduced from 32 to 13.

### **Cumulative Effects – All Alternatives**

**Past Activities:** A variety of past activities have occurred in the area and may have some effect on current water resource conditions including: historic cattle grazing, fires (Sixmile), historic tie drives on Douglas Creek and some tributaries, and extensive logging and road construction.

Stream channel morphology and aquatic habitat downstream of the project area in Douglas Creek may still be affected (wider channels, limited habitat complexity, low levels of large woody debris, reduced roughness) by historic tie drives. Other past activities have had a much less dramatic effect on aquatic habitat and water quality in the analysis area.

**Present Activities:** A variety of activities are currently underway in the area and may have some effect on current water resource conditions including: cattle grazing, developed and dispersed recreation activities (including increased OHV use), and the MPB epidemic. The Travel Management - Eastern Snowy Range decision (June 2007) designated 44.9 miles of motorized trails (most of which already existed), the construction of 3.7 miles of motorized trails, and the closure of approximately 43.7 miles of roads and trails in the analysis area. Road decommissioning outlined in this decision would be implemented regardless of this project and would reduce overall erosion rates and sedimentation in the analysis area. Road decommissioning would likely occur sooner (next 2-3 years) under the No Action alternative than under the action alternatives (next 5-10 years). Some of the roads scheduled for decommissioning are planned for timber sale use; consequently, they would not be decommissioned until after timber sale activities are completed.

**Reasonable Foreseeable Future Activities:** A few reasonably foreseeable future activities may occur in the area and may have some effect on current water resource conditions including the hazard tree project (tree clearing along roads and at administrative sites).

*The cumulative effects of the past, present and reasonably foreseeable future projects were considered (magnitude, intensity, frequency) and included in the direct or indirect water resource effects described above for all of the alternatives (e.g. see ECA analysis for the Proposed Action).*

## FOREST PLAN COMPLIANCE

The No Action alternative is consistent with the Forest Plan direction and standards and guidelines for Water and Aquatics (pp. 1-28 to 1-30). The Proposed Action and Alternative 2 will comply with this direction with effective implementation of recommended BMPs. None of the alternatives analyzed in this Draft EIS would result in irreversible or irretrievable effects to the hydrology resource.

## CONSISTENCY WITH OTHER LAWS AND REGULATIONS

**Consistency with Wetlands/Floodplains Executive Orders:** This project is consistent with these executive orders. The project would maintain wetland and floodplain function through avoiding harvest in, and minimizing road related impacts to, wetlands and floodplains. The project would also use BMPs to reduce any short-term impacts to wetlands and floodplains.

**Clean Water Act:** This project would comply with the Clean Water Act and State of Wyoming State Water Quality Standards through the use of BMPs and associated monitoring.

**State of Wyoming Turbidity Waiver:** Proposed road construction and reconstruction may require a short-term exemption from turbidity standards. The work should be evaluated during road contract preparation, and a waiver secured as part of the road contract if needed prior to implementation.

**Stormwater Discharge Permit:** The need for a storm water discharge permit for road reconstruction and temporary road construction was reviewed. All road reconstruction and temporary road construction proposed for the project is for the purposes of silvicultural activities. WYDEQ guidance states “Unintended incidental use by hunters, hikers or other recreational users does not change a road status from silvicultural to non-silvicultural” (WYDEQ, 2002, p1).

The proposed installation of culverts for road reconstruction and temporary road construction was also considered in relation to the determination of the need for a stormwater discharge permit. The Environmental Protection Information Center v. Pacific Lumber Company court decision, which suggested that an NPDES permit is required due to placement of drainage features, is limited to the Northern District of California. *Therefore, road reconstruction and temporary road construction associated with this project is a silvicultural activity and is believed to be exempt from storm water discharge permit requirements per 40 CFR 122.3(e) and 40 CFR Section 122.27.*

## 3.10 Fisheries

### Affected Environment

This section of the Draft EIS deals specifically with fish species. Amphibian species are discussed in the wildlife section of the Draft EIS.

#### Fish Populations

The Wyoming Game and Fish Department completed population surveys of analysis area streams between 2005 and 2006. Population survey data, coupled with map and/or aerial photo interpretation and a review of existing site records were used to describe fish populations for this analysis.

### Management Indicator Species (MIS)<sup>4</sup>

Brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), and rainbow trout (*Oncorhynchus mykiss*) are listed in the Forest Plan (2003) as potential aquatic MIS. Management Indicator Species were used to assess impacts to fish species from changes in habitat composition, structure, or function due to ecological processes and/or Forest management activities.

The analysis area contains strong MIS populations. Although year-to-year variance is likely to create errors in any hard population estimates, the apparent trend over four decades of sampling indicates strong, stable populations of wild common trout. Most stream populations fall well within the range of estimates for moderate to strong populations in analysis area watersheds and across the Snowy Range as a whole; there is no cause for concern for recruitment at the local level in wild populations of common trout.

### Region 2 Sensitive Species

The Rocky Mountain Regional Endangered, Threatened, and Sensitive Species Lists (USFS 2007) were reviewed to determine if sensitive fish species occur within the Spruce Gulch analysis area. This review revealed no sensitive fish species within the analysis area boundary. Therefore, **Region 2 sensitive species are excluded from analysis and are not discussed further in this Draft EIS.**

### Federally Listed Species

A review of the Rocky Mountain Regional Endangered, Threatened, and Sensitive Species Lists revealed no known occurrences or potential habitat for federally threatened, endangered, or proposed fish species (USFS 2007). Therefore, **federally listed species are excluded from analysis and are not discussed further in this Draft EIS.**

## Environmental Consequences

### ALTERNATIVE 1: No Action

#### Direct and Indirect Effects:

**Fish populations and habitats:** The No Action Alternative would have no direct or indirect negative effects on fish populations or their habitat from ground disturbing activities (i.e., silvicultural treatments and road construction) or removal of overstory and/or understory riparian vegetation. Vegetation would be modified only by natural disturbance dynamics through time. Given the level of the current MPB epidemic (i.e. natural disturbance), impacts to the fisheries resource are expected despite the lack of management actions.

Under the No Action Alternative, tree mortality caused by the MPB has the potential to positively affect large woody debris (LWD) recruitment to stream channels as dead trees fall over time. LWD influences many ecological processes and plays a key, positive role in the structure and function of habitats for fish populations. In addition, many macroinvertebrates (a food source for fish) depend on LWD both directly for specific habitat needs and indirectly for food (Doloff 1993).

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<sup>4</sup> MIS are selected because changes in their populations indicate the effects of management activities on the species community as a whole.

Under the No Action alternative, increased mortality of riparian trees due to MPB activity is expected to reduce shading and potentially increase water temperatures. Higher peak water temperatures have the potential to reduce or even eliminate feeding by fish in streams. It can also increase harmful metabolic effects (Sauter et al. 2001) which could negatively affect fish populations.

The increase in MPB related tree mortality could make the analysis area more susceptible to severe wildfires. High mortality rates or emigration of fishes and other organisms may result if severe fires burn through riparian areas and across small streams. Later effects associated with the loss of vegetation may include increased erosion and elevated stream temperatures (Rieman et al. 2005). All of these factors have the potential to negatively affect fish populations and their habitats.

**Sediment:** The No Action alternative would have no direct effects on sediment since there would be no ground disturbing activities. Large areas of MPB mortality are unlikely to have direct, adverse effects on erosion and sedimentation rates because of the lack of road construction or other ground disturbance (Romme et al. 2007). Indirect increases in sedimentation could, however, occur in the event of a severe wildfire. Increased sedimentation in area streams could negatively affect fish populations and their habitats.

**MIS:** Environmental effects of the No Action alternative on MIS fish populations and aquatic habitats in the analysis area are expected to have a low degree of impact. Given the absence of recent identifiable adverse effects and the existing strong status of brook trout, brown trout, and rainbow trout populations across the analysis area watersheds, there is no concern for adverse impacts on the viability of these species.

### **Cumulative Effects:**

In the absence of a severe wildfire, the No Action Alternative would have no direct or indirect effects on fish populations or their habitat since there would be no ground disturbing activities (i.e., silvicultural treatments and road construction) or removal of overstory and/or understory riparian vegetation. Therefore, it would not contribute to the cumulative effects incurred from past timber harvests, road construction, and current recreational activities on fish populations and aquatic habitats.

## **PROPOSED ACTION: Forest Health Emphasis**

### **Direct and Indirect Effects:**

**Fish populations and habitats:** Riparian functions and values that can be directly affected by MPB related silvicultural and hazardous fuels abatement treatments include a potential reduction in shade, sediment filtering, and LWD input. Indirect effects to fish populations and direct effects to their habitat could occur as a result of the proposed silvicultural treatments by reducing shade, increasing sedimentation, and decreasing LWD recruitment. These effects would be minimized through the implementation of design features that establish a protective buffer within the water influence zone (WIZ<sup>5</sup>) and preclude harvest of streamside trees.

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<sup>5</sup> The water influence zone (WIZ) includes the geomorphic floodplain, riparian ecosystem, and inner gorge. Its minimum horizontal width (from top of each bank) is **the greater of 100 feet or the mean height of mature dominant late-seral vegetation**. It includes adjacent unstable and highly erodible soils.

New road construction, either system or temporary, has the potential to directly and indirectly affect fish populations and their habitat by increasing sedimentation, reducing riparian buffer areas where roads intersect stream corridors, and impeding fish passage at stream crossings. Direct effects on fish populations from fish passage issues are not expected; design features would provide passage of fish and other aquatic life at stream crossings.

**Sediment:** Ground disturbance and loss of protective ground cover from road construction activities would generally increase soil erosion rates and sediment delivery to streams. Elevated levels of sediment can reduce the biological productivity of aquatic systems by potentially decreasing plant growth (primary productivity). This, in turn, may have consequences to organisms that feed on the plant material and are fed upon by other organisms such as fish (DFO 2000). Additionally, sediment can negatively affect fish egg development and survival (DFO 2000). Design features that provide a protective buffer that limits activities within the WIZ and precludes harvest of streamside trees would minimize effects of sedimentation on aquatic habitats.

The Proposed Action calls for 7.8 miles of road reconstruction; this activity has the potential to temporarily increase sediment. However, existing problem areas (e.g. stream crossings and surface improvements) may be rectified as a result of the road reconstruction efforts. Consequently, sedimentation may be reduced in the long-term.

**MIS:** The Proposed Action is expected to a low degree of impact on MIS fish populations and aquatic habitats. Minimal impacts are expected due to the protection provided by the use of BMPs, WCPs, and Forest Plan standards and guidelines. Further, given the absence of recent identifiable adverse effects and the existing strong status of brook trout, brown trout, and rainbow trout populations across the analysis area watersheds, there is no concern for adverse impacts on the viability of these species.

### **Cumulative Effects:**

**Fish populations and habitats:** Design criteria to protect the WIZ in the project area would reduce existing cumulative effect risks with respect to fish populations and aquatic habitats. Most streams in the analysis area support stable populations of common trout. It is likely that the fish populations in the analysis area would continue to support stable populations of common trout when cumulative effects from past timber harvests, past road construction, and current recreational activities are considered.

**Sedimentation:** Sediment would increase in the short-term (0-5 years) due to timber harvest and road construction activities. However, as part of the Travel Management - Eastern Snowy Range project, approximately 43.7 miles of unauthorized roads are planned for decommissioning in the analysis area within the next several years. The road decommissioning would have a beneficial cumulative effect on sedimentation.

## ALTERNATIVE 2: Fuels Management Emphasis

### Direct and Indirect Effects:

**Fish populations and habitats/Sediment/MIS:** The effects of implementing Alternative 2 would be similar in nature to the Proposed Action, but at a reduced areal extent due to reduced vegetative treatments and road work.

### Cumulative Effects:

The cumulative effects of implementing Alternative 2 would be similar to the Proposed Action, but at a reduced areal extent due to reduced vegetative treatments and road work.

## FOREST PLAN COMPLIANCE

The Proposed Action and Alternative 2 will comply with aquatic resource direction in the Forest Plan (pp. 1-28 through 1-30) with effective implementation of recommended BMPs and design criteria. None of the alternatives analyzed in this Draft EIS would result in irreversible or irretrievable effects to the fisheries resource.

## 3.11 Wildlife

The Wildlife section is divided into 11 “sub-sections” including: 3.11.1) Wildlife Habitat Provided by Older Forest; 3.11.2) Fragmentation of Interior Forest; 3.11.3) Snags and Coarse Woody Debris; 3.11.4) Big Game Wildlife Species; 3.11.5) Roads as Related to Wildlife; 3.11.6) Riparian Areas; 3.11.7) Management Indicator Species; 3.11.8) Region 2 Sensitive Wildlife Species; 3.11.9) Wildlife Species of Local Concern; 3.11.10) Threatened, Endangered, and Proposed Wildlife Species; and 3.11.11) Forest Plan Compliance. All sub-sections describe the affected environment first, followed by the findings or effects associated with the alternatives.

Sub-sections 3.11.1 through 3.11.6 are relatively brief in nature. Information contained in these sections provides context for general environmental attributes that may impact groups of species. It also provides the basis for the analyses that were completed for Management Indicator Species, Region 2 Sensitive Wildlife species, Wildlife Species of Local Concern, and Threatened, Endangered, and Proposed Wildlife species (sub-sections 3.11.7 through 3.11.10, respectively).

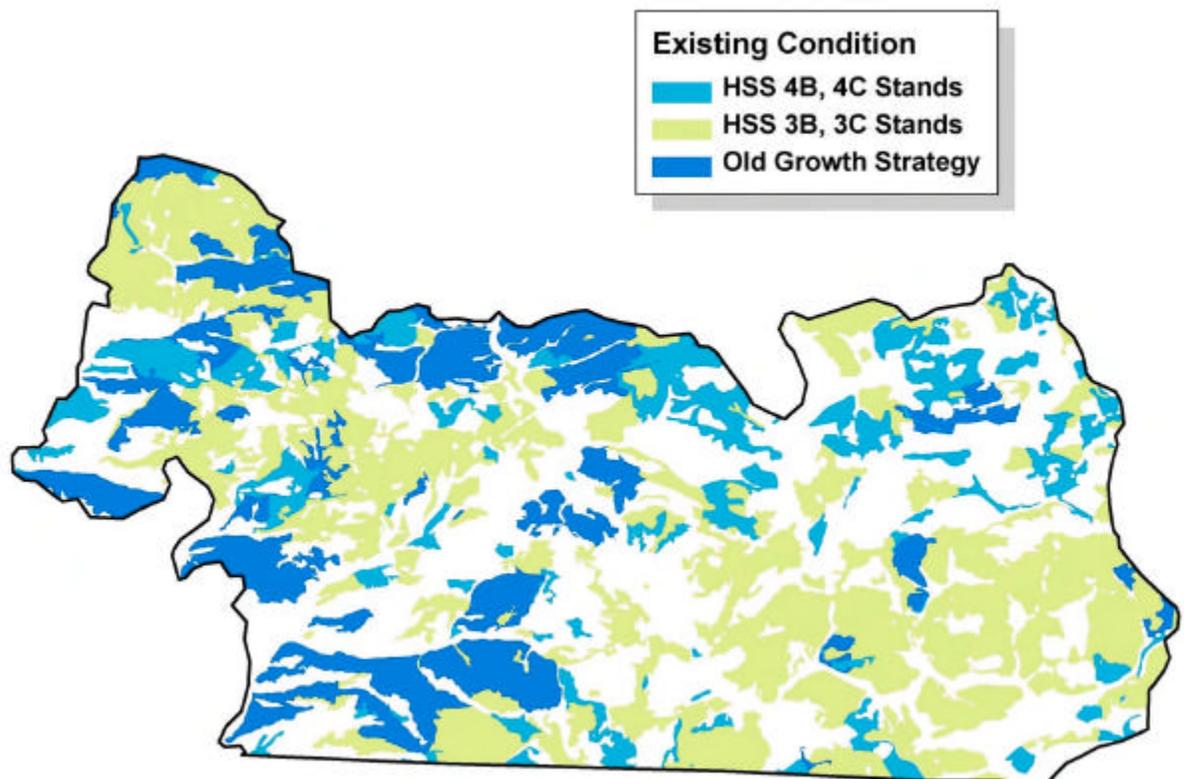
### 3.11.1 Wildlife Habitat Provided by Older Forest

#### Affected Environment

Late and old forest stands (Habitat Structural Stage 4) are currently available within the analysis area (see Figure 3.3). Although some species will utilize and readily move through younger stands, a majority of species with management status (i.e., sensitive, MIS) rely on older stands that provide a denser overstory. Forested stands in Habitat Structural Stages (HSS) 3B and 3C currently comprise a large majority of the stands within the analysis area as a consequence of large fires and human-caused disturbances in the mid to late 1800s (Dillon et al. 2005). These stands are characterized by sapling-pole size timber (1 – 9 inches DBH) with 40 to greater than 70 percent canopy closure.

Approximately 4,557 acres within the analysis area have been identified as mapped and inventoried old growth (Old Growth Strategy); these areas are to be managed for old growth attributes through time. Current conditions within these stands may or may not provide all aspects of old growth habitat, such as large overstory, multi-canopies, and abundant snags and downed logs of all stages of decay. However, these stands form a network that can provide habitat for species relying on older forests, both locally and at the landscape level.

Figure 3.3 displays the current distribution of dense, older forest stands (HSS 4), stands managed for old growth (Old Growth Strategy), and potential connective habitats (HSS 3). This figure shows that an unbroken continuity of older forests is currently lacking within the analysis area, with the exception of a few relatively intact areas in the northwestern and southwestern portions. Deficiencies of existing and managed old forest are also noted in the central and southeastern portion of the analysis area. Figures 3.4 and 3.5 display potential Old Growth, late structure, and connective habitats under the Proposed Action and Alternative 2.



**Figure 3.3: Existing Potential Old Growth, Late Structure, and Connective Habitats**

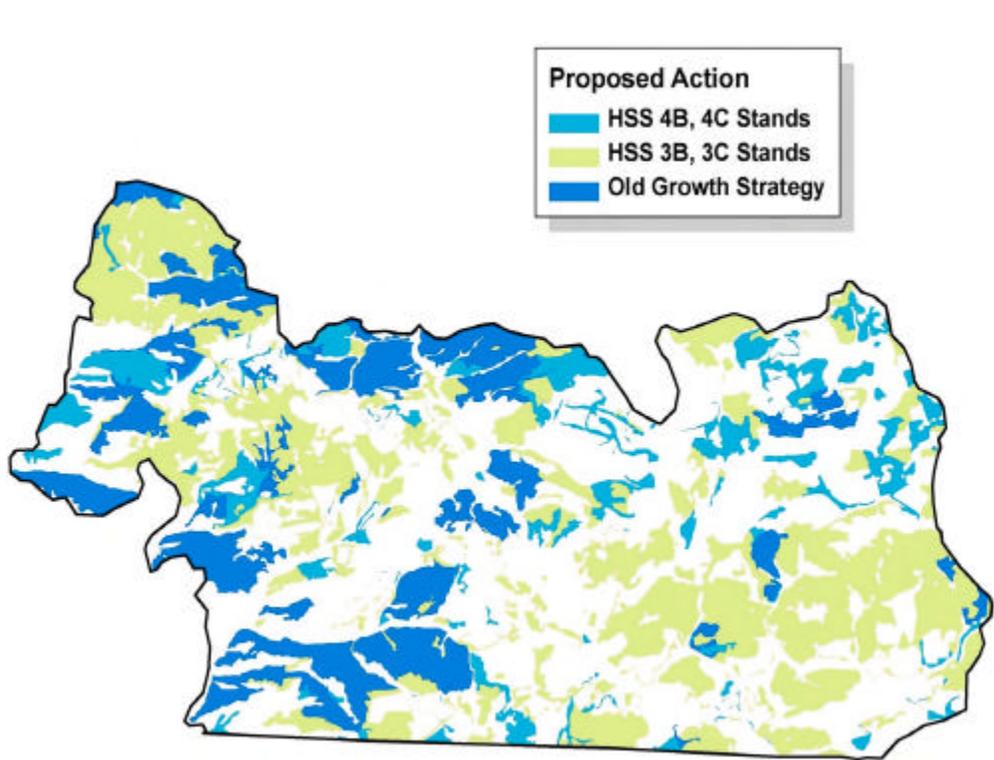


Figure 3.4: Proposed Action - Potential Old Growth, Late Structure, and Connective Habitats

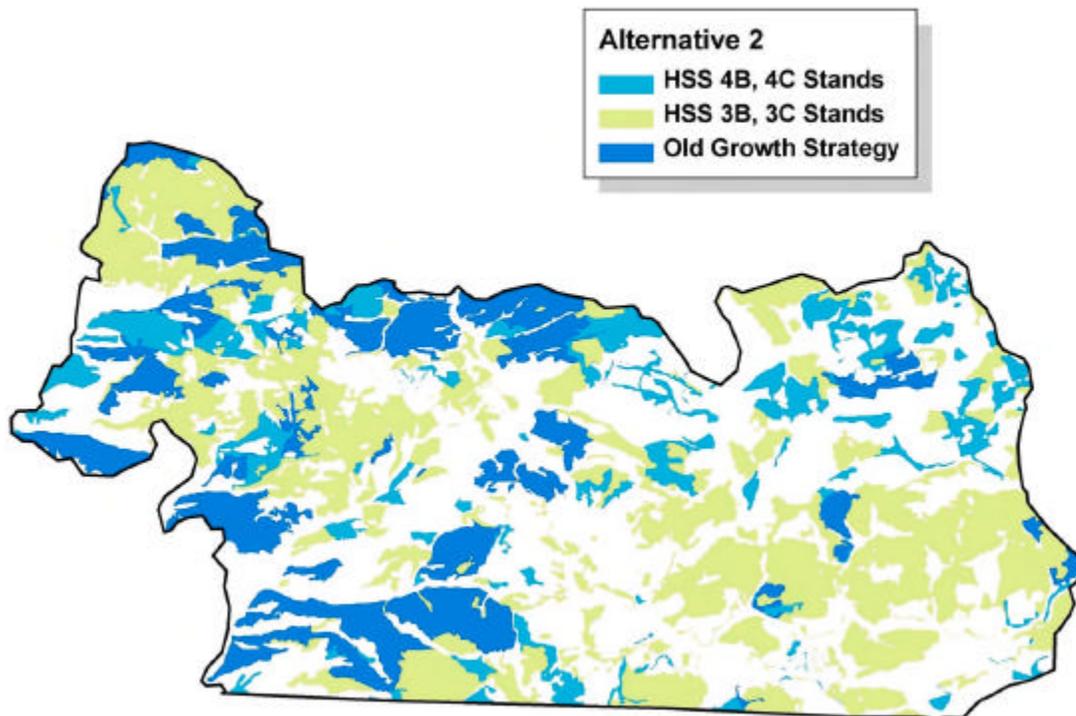


Figure 3.5: Alternative 2 - Potential Old Growth, Late Structure, and Connective Habitats

## Environmental Consequences

### Findings for Older Forest Habitat:

Under the current MPB epidemic, high levels of mortality in dense older and mid-aged stands are projected. Over the next 5-10 years, existing stands would transition from live, dense forest to stands with open canopies and high snag densities. With the subsequent increase in dry forest fuels following mortality, the risk of stand-replacement wildfire is also projected to increase.

The impacts of the vegetative treatments associated with the Proposed Action, and to a lesser extent, Alternative 2, would be most notable for the first 5-10 years while surrounding, untreated stands maintain green or faded canopies. As untreated stands die, needles drop, and snags fall, the contrast between the alternatives and untreated stands would become less pronounced. Untreated stands would still function as habitat, but at reduced suitability and utility to species. In the short-term, treated stands would lose habitat functionality, but in the mid to long-term (beyond 10-25 years), habitat function would be accelerated; the risk of large-scale stand replacement wildfire would also be reduced. The ramifications of the proposed treatments on individual species are discussed in the MIS and sensitive species' portions of this Draft EIS (sub-sections 3.11.7 and 3.11.8, respectively).

Under the worst-case scenario, treatments under the Proposed Action would reduce amounts of existing older forest as well as existing connective habitat (Figure 3.4). Blocks of existing and managed older forest (HSS 4) in the northwestern and southwestern areas would still exist, but at a reduced size, and with increased risk of isolation. Alternative 2 would also reduce these two habitats, but at a reduced magnitude that retains most of the older forest and means of connection (Figure 3.5).

### **3.11.2 Fragmentation of Interior Forest**

Information regarding patch size and fragmentation is discussed in a general sense in the Ecology section of this Draft EIS (pp. 50 - 55). Findings specific to wildlife indicate that forest fragmentation resulting from past timber harvest and natural disturbances has:

- Reduced the amount of older forest available in the analysis area.
- Reduced the size of older forest patches.
- Created a mosaic of age classes and forest cover types with smaller patch sizes.

The level of potential impacts of forest spatial patterns seems to depend on the relative scale of a species home range and that of the new patches and remaining matrix (USDA 2003b).

1. For animals with very small home ranges compared to the size and shape of the residual forest patches, each home range is either completely altered (logged) or untouched (except those along the edges of treatment units). Therefore, the decline in numbers would be nearly proportional to the loss of habitat.
2. For animals with home ranges much larger than the residual patches, the home range of each is partially affected, and therefore, habitat quality within the home range is affected. A home range that provided adequate resources may no longer do so, and the home range must be expanded to adjust for the lower resource density.

The effects of spatial pattern and habitat for individual species are discussed in more detail in the MIS and sensitive species' portions of this Draft EIS (sub-sections 3.11.7 and 3.11.8, respectively).

### 3.11.3 Snags and Coarse Woody Debris

#### Affected Environment

Field surveys of the analysis area, including proposed treatment units, found that forested stands currently contain high numbers of snags or trees with signs of imminent mortality. Field surveys conducted in 2007 showed mortality or MPB activity in nearly 70 percent of conifers greater than 5 inches DBH. This means that approximately 70 percent of the 15,875 acres of structural stages 3B, 3C, 4B, and 4C in lodgepole pine are snags (11,113 acres); this represents a massive pulse of snag availability on the existing landscape. It also means that, in 10 to 20 years, there will be a corresponding pulse of downed wood of similar magnitude on the forest floor.

Not all conifers and snag diameters are used as potential nest sites by primary and secondary cavity nesters. For example, the American three-toed woodpecker, northern flicker, and hairy woodpecker, all of which have potential to occur in the analysis area, generally select larger diameter conifer trees (greater than 10 inches DBH) for nesting (Thomas et al. 1979). Secondary cavity nesters, such as mountain chickadee, will nest in smaller diameter trees; however, they rely heavily on cavities created by the primary cavity nesters that select larger trees (McCallum et al. 1999).

#### Environmental Consequences

##### Findings for Snags and Coarse Woody Debris:

Given the emphasis on larger trees for cavity nesting, only a portion of snags created by MPB mortality would be useful for cavity nesting. Those that would have the highest potential consist of the larger structural stages in mature and late successional forests (4A, 4B, and 4C). A total of 5,694 acres of lodgepole pine structural stages 4A, 4B, and 4C currently exist within the analysis area; 70 percent of those acres (3,986 acres) would contain snags suitable for foraging and nesting under the No Action alternative. Under the Proposed Action, approximately 2,997 acres of snags in structural stages 4A, 4B, and 4C would be available for foraging and nesting, and 3,440 acres would be available under Alternative 2.

In the short-term (less than 10 years), all alternatives would retain snag numbers and densities that far exceed those found in the analysis area prior to the MPB epidemic. As stands with high mortality begin to age and deteriorate, suitability for nesting and foraging would decline in the mid to long-term (past 10 years) under all alternatives. Deterioration and snag fall down would augment coarse wood densities under all alternatives. Downed wood within treatment units, outside of urban interface areas, would be retained to Forest Plan standards (p. 1-38).

### 3.11.4 Big Game Wildlife Species

#### Affected Environment

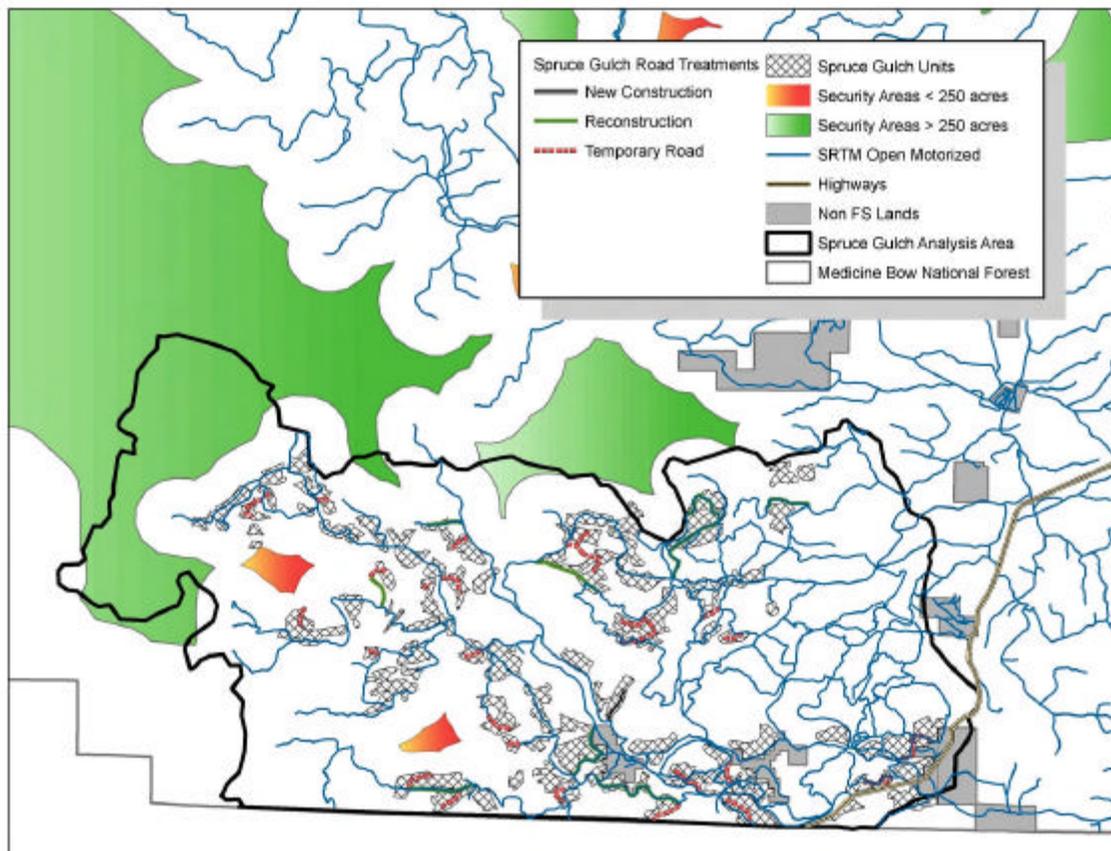
Habitat exists throughout the analysis area for mule deer, elk, and moose. The analysis area consists of summer range habitat where dense conifer forest provides hiding and thermal cover. Riparian areas, high elevation meadows, and areas disturbed by fire or timber harvest provide suitable forage. Habitat conditions in these spring/summer/fall ranges are currently adequate to support herd objectives set by the Wyoming Game and Fish Department (2004).

#### Environmental Consequences

##### Findings for Big Game Wildlife Species

No critical big game ranges are delineated within areas proposed for vegetation or road treatment under the action alternatives. Elk crucial winter/year-round range occurs about 0.15 miles west of Unit 1, but no activities are proposed within crucial elk range. Potential security areas further than ½ mile from open roads or motorized trails have been identified (Figure 3.6). Vegetative treatments are not proposed within identified security areas greater than 250 acres under either the Proposed Action or Alternative 2 nor are they proposed in identified security areas less than 250 acres.

**Figure 3.6: Security Habitat - Spruce Gulch Analysis Area**



### 3.11.5 Roads as Related to Wildlife

#### Affected Environment

The analysis area is roughly 51 square miles in size and contains approximately 164 miles of NFSRs and unauthorized routes. This equates to an average of 3.2 miles of motorized travel per square mile. Road densities within the analysis area vary, with the highest densities (over 6 miles per square mile) found in the eastern portion and lower densities found in the western portion.

Road impacts to wildlife may include avoidance by big game, increased game vulnerability, cumulative loss of habitat, fragmentation of habitat for small bodied or low-mobility species, and introduction of invasive species. Literature suggests that road densities above 1 mile per square mile may effect big game concentrations, particularly elk. Conversely, deer may avoid areas of elk concentration, and utilize areas near roads, thereby increasing deer vulnerability to poaching and harvest (Wisdom et al. 2005).

#### Environmental Consequences

##### Findings for Roads as Related to Wildlife:

Road reconstruction, temporary construction, and new road construction are proposed under both the Proposed Action and Alternative 2. Approximately 0.5 miles of system road construction, 3.7 miles of new temporary road construction, and 7.8 miles of road reconstruction could be required under the Proposed Action. All temporary roads would be decommissioned and closed following project completion. All new specified roads would be physically closed to motorized vehicle use; however, their templates would be retained for future management entries. Under the Travel Management - Eastern Snowy Range decision (June 21, 2007), roughly 3.7 miles of new motorized trail would be constructed. The plan would also close 41.7 miles of unauthorized roads and motorized trails, close 1.7 miles of system roads, and convert approximately 41.2 miles of existing, unauthorized routes to designated trails within the analysis area. Final average road density under all alternatives, when considering implementation of the travel management decision, equates to about 2.5 miles of open road/motorized trail per square mile. This represents a net reduction over the existing condition, and a reduction in the magnitude of potential impacts to wildlife resources.

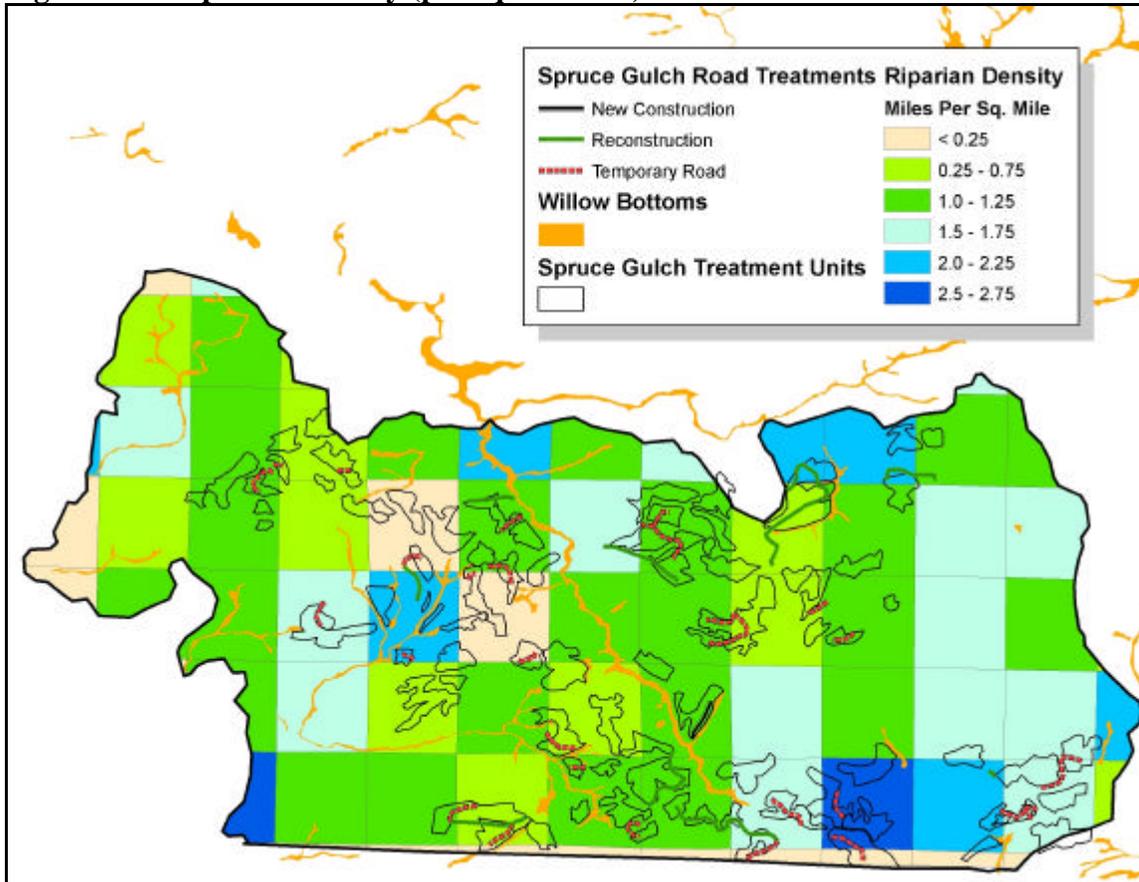
### 3.11.6 Riparian Areas

#### Affected Environment

Riparian areas provide essential wildlife habitat that is important to numerous species. Riparian areas include willow bottoms, wet meadows, and other vegetation surrounding streams, lakes, and wet areas. Some wildlife species such as the pygmy shrew and various amphibians are found directly associated with riparian areas, while other species like goshawk and elk are more loosely associated (i.e. they do not depend on them or survival) because of the rich diversity provided for foraging, dense cover along the margins, and open water. For wildlife purposes, an analysis was conducted to consider the varying density of riparian habitat across the analysis area. Management actions that alter vegetation adjacent to concentrations of wet areas are more likely to impact a larger variety of species and a larger number of animals. The following figure

displays the various densities of riparian/wet areas within one square mile blocks across the analysis area, as well as mapped willow bottoms, and proposed harvest units.

**Figure 3.7: Riparian Density (per square mile)**



## Environmental Consequences

### Findings for Riparian Areas:

Mapped riparian areas constitute approximately 2.7 percent of the analysis area. Additional areas of unmapped riparian habitat may also occur within the 4,288 acres of upland grasslands. The majority of harvest units and road treatments are located within areas where the riparian density is less than 1.5 miles per square mile (Figure 3.7). However, concentrated areas of treatments are noted in blocks of higher riparian density in the west-central, northeastern, and southeastern portions of the analysis area. A number of harvest units are also located adjacent to riparian areas and willow bottoms. To provide protection for species with habitats in and adjacent to riparian areas, buffers of 100 feet would be applied to all riparian areas. In addition, 300 foot no-treatment buffers would be applied around potential amphibian breeding sites. Potential impacts to species from proposed treatment units are further described in the MIS and sensitive species' portions of this Draft EIS (sub-sections 3.11.7 and 3.11.8, respectively).

### 3.11.7 Management Indicator Species (MIS)

#### Affected Environment

The Forest Service Manual defines MIS as "...plant and animal species, communities, or special habitats selected for emphasis in planning, and which are monitored during Forest Plan implementation in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent" (USDA Forest Service 1991). The National Forest Management Act (NFMA) requires that MIS be selected as part of the Forest Plan to estimate the effects of planning alternatives on fish and wildlife populations. Essentially, MIS are used as barometers to evaluate the effects of forest management on wildlife within the Forest. Table 3.11 lists the MIS established for the Medicine Bow National Forest.

#### Environmental Consequences

A terrestrial MIS assessment was prepared for the Spruce Gulch Bark Beetle and Fuels Reduction project. The assessment discusses distribution and status, habitat, existing conditions, direct, indirect, and cumulative effects as well as the rationale for the conclusions for each species. The MIS Assessment is on file at the Laramie Ranger District office, 2468 Jackson Street, Laramie, Wyoming.

Table 3.11 identifies primary habitat for MIS and addresses whether or not impacts from the project proposal are relevant to the Forest-wide trend for the species. Forest-wide trends were determined following an extensive review of each species' life history, habitat availability across the forest, and available population data. This table also provides a synopsis of the effects to each MIS from project implementation.

Table 3.11: Management Indicator Species

MIS	Issue or management uncertainty	Primary Habitat Components	Presence in Analysis Area	Is project proposal relevant to forest-wide trends?	Does the analysis assess the issue for the MIS?	Conclusion
<b>Northern Goshawk</b>	Old growth (late seral) lodgepole pine	Large diameter lodgepole pine or aspen for nesting. Mixed habitat structural stages for foraging	Yes	Yes	Yes	All alternatives maintain stable forest-wide population trends and comply with Forest Plan standards and guidelines for this MIS. Alternative 2 would result in fewer negative effects than the Proposed Action.
<b>American Marten</b>	Old growth, dead down wood, fragmentation, and perforation of older forest at the landscape scale.	Late successional forest, particularly spruce/fir stands. Large down logs with heart rot. Connected stands of mature forest with minimal fragmentation.	Yes	Yes	Yes	All alternatives maintain stable forest-wide population trends and comply with Forest Plan standards and guidelines for this MIS. Alternative 2 would result in fewer negative effects than the Proposed Action.
<b>Snowshoe Hare</b>	Prey for TES, Canada lynx, goshawk, and marten.	Forested habitats with dense overstories. Riparian vegetation and dense willow bottoms adjacent to spruce/fir stands provide supplemental habitat.	Yes	Yes	Yes	All alternatives maintain stable forest-wide population trends and comply with Forest Plan standards and guidelines for this MIS. Alternative 2 would result in fewer negative effects than the Proposed Action.
<b>Golden-crowned Kinglet</b>	Fragmentation within spruce/fir forested stands.	High elevation coniferous forests. Nest and forage within the interiors of dense, mature spruce-fir habitats having heavy canopy cover.	Yes	Yes	Yes	All alternatives maintain stable forest-wide population trends and comply with Forest Plan standards and guidelines for this MIS. Effects are similar in scale for both action alternatives.

Table 3.11 (Cont'd): Management Indicator Species

MIS	Issue or management uncertainty	Primary Habitat Components	Presence in Analysis Area	Is project proposal relevant to forest-wide trends?	Does the analysis assess the issue for the MIS?	Conclusion
<b>American Three-toed Woodpecker</b>	Snags as related to spruce/fir forest and recent burns	Mature and old growth conifer forest. Also requires recently burned or beetle infested conifer forests. Snags with medium to large diameter that form suitable nesting cavities.	Yes	Yes	Yes	All alternatives maintain stable forest-wide population trends and comply with Forest Plan standards and guidelines for this MIS. Alternative 2 would result in fewer negative effects than the Proposed Action.
<b>Common Trout</b>	Water Quality	N/A	N/A	N/A	N/A	Addressed in the Fisheries section of this Draft EIS (p. 76)
<b>Lincoln's Sparrow</b>	Riparian Zone maintenance, ungulate herbivory in willow community	High elevation riparian zones with willows. Nests on the ground within a willow shrub having considerable amount of grass/sedge cover concealing the nest and entrance.	Yes	No, project is not expected to change the primary habitat components or measurably affect individuals.	No. Project would not measurably affect the condition of willows, shrubs, or grass/sedge cover in wetlands.	Stable Forest-wide population trends and habitat for this species would not be affected by the project proposal.
<b>Wilson's Warbler</b>	Riparian Zone maintenance, ungulate herbivory in willow community	High elevation riparian zones with willows. Roughly 3 acres of habitat per breeding pair. Primarily nest off the ground within the shrub canopy.	Yes	No, project is not expected to change the primary habitat components or measurably affect individuals.	No. Project would not measurably affect the condition of willows, shrubs, or grass/sedge cover in wetlands.	Stable Forest-wide population trends and habitat for this species would not be affected by the project proposal.

## MIS Conclusions

**Northern Goshawk:** Vegetative treatments under the Proposed Action would remove 384 acres, or 24 percent, of suitable nesting habitat in the analysis area. Roughly 207 acres, or 13 percent, of suitable nesting habitat would be removed under Alternative 2. Both alternatives would potentially increase disturbance to nesting and increase the risk of mortality and habitat loss. Following project implementation, sufficient habitat would be distributed across the analysis area to support goshawks.

**American Marten:** Treatments under the Proposed Action and Alternative 2 would decrease suitable marten habitat in the analysis area by 842 acres and 482 acres, respectively. Treatments would also decrease connective habitat by 18 and 9 percent, respectively. Connective habitat would be affected for an estimated 30-50 years.

Combined with additional amounts of projected loss inside and within 1.2 miles of the analysis area, these activities would reduce marten carrying capacity within the analysis area by 2-4 animals for the Proposed Action and 1-2 animals under Alternative 2. Despite these reductions, both action alternatives would retain sufficient suitable habitat within existing clusters to support marten populations and movement at the landscape level.

**Snowshoe Hare:** Alternative 2 and the Proposed Action would remove 9 and 16 percent of suitable snowshoe hare habitat within the analysis area, respectively. Post-treatment, snowshoe hare habitat would be abundant and well-distributed. At the Forest level, loss of habitat under the Proposed Action would equate to 0.4 percent of available habitat. Under Alternative 2, treatments would impact 0.2 percent of available habitat. These effects would last 30-50 years. Minor decreases in available habitat are not expected to negatively impact overall population, production, or habitat of snowshoe hare. Therefore, the current population trend would remain stable across the Forest.

**Golden-crowned Kinglet:** Alternative 2 and the Proposed Action would remove 11 and 20 percent, respectively, of the 4,125 acres of kinglet habitat in the analysis area. Over 246,000 acres of habitat currently exist across the Forest. This modification may result in a loss of between 17 and 34 breeding territories out of an estimated 9,959 territories across the Forest. This would equate to a 0.3 percent reduction under the Proposed Action and a 0.2 percent reduction under Alternative 2. This reduction in habitat and potential effects to a limited number of individuals is not expected to affect the forest-wide population trend of “stable.” Reductions in habitat are consistent with natural disturbances, but would occur on a much smaller scale. Kinglets are a mobile species that can disperse across the landscape and continue to occupy suitable habitat. Consequently, the current population trend would remain stable in the long-term.

**American Three-toed Woodpecker:** Approximately 246,824 acres of habitat occur on the Medicine Bow National Forest, roughly 4,125 acres of which occur within the analysis area. An additional 12,993 acres of foraging habitat in dense lodgepole pine stands is currently being generated by the ongoing MPB epidemic. The Proposed Action would reduce suitable reproductive habitat by 839 acres (20%). At the Forest level, reductions under the Proposed Action and Alternative 2 would equate to 0.3 percent and 0.2 percent, respectively. These minor decreases in habitat are not expected to alter current population trends on the Forest.

**Lincoln's Sparrow and Wilson's Warbler:** Project implementation would not measurably affect habitat for these species. Therefore, population trends for these species would remain stable.

### **Cumulative Effects: Wildlife MIS:**

Availability of late and old forest stands is somewhat limited in the analysis area. Frequent large fires that occurred in the southern Rocky Mountains in the late 1800s, coupled with past timber harvest activities, have impacted forest succession. As a result, the proportion of middle-aged forest (60-150 years old) is estimated to be above the historic range of variability (HRV; Dillon et al. 2005). For species related to mature and older stands such as northern goshawk, American marten, American three-toed woodpecker, and golden-crowned kinglet, this situation represents reduced availability of habitat, primarily reproductive habitat.

Road-building and subsequent increased public access to the analysis area has increased potential human-caused disturbance. The impacts of disturbance to terrestrial MIS are unknown, but are likely to be localized for breeding of northern goshawks.

Past, continued, and foreseeable livestock grazing has and is projected to have little effect on forest-dwelling species. However, for American marten, excessive livestock grazing has been shown to potentially impact availability of some prey species associated with meadows (Johnston 2006). Because marten are known to forage at the edges of openings, high-intensity cattle grazing can impact marten foraging.

Foreseeable management actions with the potential to influence MIS habitats in and adjacent to the analysis area include the Forest-wide Hazardous Tree Removal and Fuels Reduction project and pre-commercial thinning of young conifer stands. Treating hazardous trees out to a distance of 150 feet from selected roads could reduce available habitats for goshawks, marten, golden-crowned kinglet, snowshoe hare, and American three-toed woodpecker. Hazardous tree removal would also reduce snag availability and could create canopy gaps up to 300 feet wide. This is the threshold identified to impact American marten movements. Pre-commercial thinning would occur in smaller-diameter conifer stands with no projected impacts to MIS.

Small amounts of suitable habitats for northern goshawk, American three-toed woodpecker, American marten, and snowshoe hare are estimated to exist on non-Forest Service lands within and adjacent to the analysis area. Under the current insect epidemic, it is reasonable to assume that timber harvest would occur on these lands, thereby removing suitable habitats.

Given the actions and effects described above, cumulative impacts would appear extensive for MIS. However, populations of MIS pertinent to this analysis continue to be stable under existing conditions. Additional activities currently or projected to occur are present at a scale small enough to avoid altering MIS trends at the Forest level.

### **3.11.8 Region 2 Sensitive Wildlife Species**

#### **Affected Environment**

It is Forest Service policy to protect the habitat of species listed as Forest Service Region 2 Sensitive Species (Rocky Mountain Region) from adverse modification or destruction and to protect individual organisms from harm or harassment as appropriate (FSM 2670.3). Biological Evaluations (BEs) are prepared for each project authorized, funded, or conducted on National

Forest land to determine the possible effects the proposed activity may have on sensitive species (FSM 2672.43). The BE process is intended to analyze and document those activities necessary to ensure management actions will not likely jeopardize the continued existence of the species.

## Environmental Consequences

All species on the Rocky Mountain Regional Sensitive Species List were reviewed for the Spruce Gulch analysis. A number of species were eliminated from further analysis because the pre-field review determined that project implementation would have no impact on these sensitive species or their habitat (i.e. habitat for these species is either not present or would not be impacted by the project proposal). Those sensitive species that were analyzed in detail include: northern goshawk, American three-toed woodpecker, olive-sided flycatcher, boreal owl, pygmy shrew, American marten, wolverine, northern leopard frog, boreal toad, wood frog, and Hudsonian emerald dragonfly.

The BE prepared for the Spruce Gulch analysis contains a list of all species included on the Rocky Mountain Regional Species List. The BE is on file at the Laramie Ranger District office, 2468 Jackson Street, Laramie, Wyoming.

## BIOLOGICAL DETERMINATION and RATIONALE

It has been determined that the Proposed Action and Alternative 2 *may impact* individual northern goshawk, American three-toed woodpecker, olive-sided flycatcher, boreal owl, pygmy shrew, American marten, northern leopard frog, boreal toad, wood frog, and Hudsonian emerald dragonfly *but are not likely to cause a trend toward federal listing or a loss of viability*. Table 3.12 describes the potential impacts for each species. The alternatives would have “no impact” on wolverine.

**Table 3.12: Impacts to Sensitive Species**

Sensitive Species Impacted	Rationale for Determination
Northern goshawk	Habitat modeling shows that approximately 1,625 acres of suitable nesting habitat is located within the analysis area. No active nests are known to occur. <b>No Action alternative:</b> Although goshawk habitat would not be affected by management actions, continued bark beetle mortality would cause loss of green canopy, degradation of suitable habitat, and increased potential for stand replacement fires. <b>Proposed Action and Alternative 2:</b> Please refer to MIS conclusions for northern goshawk (Draft EIS p.91).
American three-toed woodpecker	Approximately 4,125 acres of core nesting habitat and 12,993 acres of foraging habitat are located within the analysis area. <b>No Action alternative:</b> In the short to mid term (10 – 50 years) increased tree mortality could benefit American three-toed woodpeckers. Past 50 – 80 years, regeneration in untreated stands would lag and delay availability of foraging habitat. <b>Proposed Action and Alternative 2:</b> Please refer to MIS conclusions for American three-toed woodpecker (Draft EIS p. 91).

**Table 3.12 (Cont'd): Impacts to Sensitive Species**

Sensitive Species Impacted	Rationale for Determination
<p><b>Olive-sided flycatcher</b></p>	<p>The analysis area currently contains about 7,476 acres of well-distributed suitable foraging habitat. No observations of this species have been reported in the analysis area.</p> <p><b>No Action alternative:</b> Current habitat conditions would be retained in the short-term (10 – 25 years). Over time, lodgepole pine mortality would reduce the amount of live trees available for nesting adjacent to natural and created openings.</p> <p><b>Proposed Action and Alternative 2:</b> Removal of snags near riparian meadows (for safety during implementation) and/or removal of overstory trees may indirectly affect olive-sided flycatchers as these sites are frequently used to defend territories and as foraging perches. Impacts are limited to individual birds making small location adjustments to nearby snags or overstory trees where specific snags that they were using have been removed. Snags and snag recruits would remain available and abundant (totaling at least 13 per acre) and thus would provide adequate perches in and around treatment areas. Nesting habitat would be fully retained in the conifer buffers 100 to 300 feet adjacent to riparian areas. Overall, this impact is presumed to have minimal consequences since nesting habitat in conifers would still be available, snags and snag recruits would be designated throughout the units, and riparian buffers would be established.</p>
<p><b>Boreal owl</b></p>	<p>The analysis area currently contains 692 acres of habitat suitable for boreal owls. Boreal owl nesting has been confirmed in two locations, both in nest boxes.</p> <p><b>No Action alternative:</b> This alternative could allow the maturing of spruce-fir habitat through succession which would increase boreal owl habitat. However, the live structure of spruce-fir stands mixed with lodgepole pine could be reduced via MPB infestations which could reduce habitat in these areas.</p> <p><b>Proposed Action:</b> Vegetative treatments would impact 79 acres of suitable habitat. Treatments would pose the risk of causing individual owl mortality or nest failures if nesting owls occupy cavities outside of the nesting boxes. Treatments would not occur within 100 feet of existing nest boxes. Residual snag and downed woody debris would be retained to Forest Plan standards.</p> <p><b>Alternative 2:</b> Vegetative treatments would impact 29 acres of suitable habitat. Effects would be similar to those described under the Proposed Action.</p>

Table 3.12 (Cont'd): Impacts to Sensitive Species

Sensitive Species Impacted	Rationale for Determination
<b>Pygmy shrew</b>	<p>The analysis area contains 1,192 acres of suitable pygmy shrew habitat. No sightings of this species have been recorded in the analysis area. The closest sighting (1969) is located 16 miles north of the analysis area.</p> <p><b>No Action alternative:</b> Continued tree mortality associated with the MPB epidemic would increase the amount of coarse woody debris, thereby improving pygmy shrew habitat.</p> <p><b>Proposed Action and Alternative 2:</b> Spruce/fir stands in the analysis area may contain small unmapped wetlands suitable for pygmy shrew. Similarly, pygmy shrews are known to venture into the lodgepole pine or spruce/fir forest surrounding occupied riparian habitat and may occasionally venture farther into the forest than the proposed 100 feet to 300 feet riparian buffers that would be retained on all harvest units. As a result, proposed units that are adjacent to wetlands (assumed pygmy shrew habitat) may reduce a small amount of foraging habitat and thereby impact individual pygmy shrews that may be present. Since wetlands would not be modified and riparian buffers would be retained as part of the project proposal, impacts to pygmy shrew are estimated to occur in marginal habitat further away from wetlands. Thus, impacts to individuals are unlikely to occur, or would occur at a very low frequency and are not expected to measurably alter the population or reproduction of pygmy shrew nor affect viability across the planning area.</p>
<b>American marten</b>	<p>The analysis area currently contains 4,773 acres of spruce-fir and lodgepole pine habitat for marten and 18,436 acres of connective habitat. Gaps in connective habitat do occur, but the area appears well-connected as a whole. Between 1995 and 1998, four marten observations were reported in the eastern portion of the analysis area.</p> <p><b>No Action alternative:</b> Existing habitat would remain in the short to mid-term (10 – 50 years). Considering the amount of fuel that would be generated from lodgepole pine mortality, the potential for a severe wildfire would be increased. Such a fire would consume and remove a large portion of suitable habitat.</p> <p><b>Proposed Action and Alternative 2:</b> Please refer to MIS conclusions for American marten (Draft EIS p. 91).</p>
<b>Wolverine</b>	<p>No occurrences of wolverine have been recorded in the Southern Rockies since the 1920s.</p> <p><b>All alternatives:</b> The analysis area contains unsuitable habitat for wolverine due to established roads, private inholdings, and winter recreation activities. The lack of confirmed sightings in the last several decades on the Medicine Bow National Forest further supports the lack of breeding populations.</p>

**Table 3.12 (Cont'd): Impacts to Sensitive Species**

Sensitive Species Impacted	Rationale for Determination
<p><b>Northern leopard frog/ Boreal toad/Wood frog</b></p>	<p>Low numbers of sightings indicate that northern leopard frogs are uncommon in the Snowy Range Mountains. Only three sightings have been recorded within 10 miles of the Spruce Gulch analysis area, and those were from the 1940s. Historic and more recent boreal toad locations have been reported for Fox Creek, Bear Creek, Heidrich Creek, and the Sixmile Gap area adjacent to the analysis area. Within the analysis area, one sighting was reported in 1961 at a tributary of Pelton Creek. Population concentrations of wood frogs have been identified near Turpin Reservoir, Stillwater Park, Ryan Park, and around Fox Park. A total of three observations have been reported within the analysis area from the 1990s.</p> <p><b>No Action alternative:</b> Existing conditions would be retained. In the short and mid-term, there would be an elevated risk of landscape-level wildfires which would alter existing upland habitats.</p> <p><b>Proposed Action and Alternative 2:</b> The Proposed Action and Alternative 2 contain 73 acres and 17 acres, respectively, of proposed harvest units within 300 feet of potential breeding sites. Treatments could alter suitability of breeding habitats as well as cause leopard frog mortality. To avoid effects at potential breeding sites, 300 foot “no treatment” buffers have been incorporated into project design.</p>
<p><b>Hudsonian emerald dragonfly</b></p>	<p>Hudsonian emerald dragonfly habitat consists of riparian areas and mature spruce/fir forest immediately adjacent to those areas. The analysis area contains 1,192 acres of potential habitat consisting of fens, slow streams, and bog-margined ponds.</p> <p><b>No Action alternative:</b> Beetles would continue to kill large spruce and lodgepole pine trees. In the short-term (3 – 15 years), these should remain standing to provide shade for temperature moderation.</p> <p><b>Proposed Action and Alternative 2:</b> While individual dragonfly larvae could be impacted by small or temporary changes in stream runoff caused by harvest treatments, the project is expected to maintain good water quality and hydrologic processes, thereby minimizing changes to stream morphology and wetland characteristics necessary to provide continued habitat for dragonfly larvae. The project would not affect adult dragonfly habitat which consists of mature spruce/fir stands immediately adjacent to wetlands since these habitats will be included in riparian buffers. Impacts limited to occasional larvae are not expected to affect the overall population or viability of the species.</p>

**3.11.9 Wildlife Species of Local Concern**

**Affected Environment**

Species of Local Concern (SLC) are documented or suspected to be at risk at a forest-wide scale but do not meet the criteria for regional Sensitive Species designation because they are reasonably secure within parts of their range within Region 2. A total of four terrestrial wildlife species were identified as SLC during the Forest Planning process (USDA Forest Service 2003b). They include: bighorn sheep, pika, brown-capped rosy finch, and brown creeper. **The analysis area does not contain suitable habitat for bighorn sheep, pika, or brown-capped rosy finch. Therefore, they were not considered in detail in this Draft EIS.**

The brown creeper is the only species of small bird that is consistently found to be affected by fragmentation of old growth at the scale created by Forest Service timber harvest in the last half of the 20th century. Trees selected for foraging are often more closely associated with size rather than species, and selection is most likely related to the bark characteristics of older trees. Nests are most often constructed behind a piece of peeling bark. Snags in the early to mid-stages of decay primarily serve as nesting substrate; however, excavated cavities, natural deformations or live trees with loose slabs of bark may also be used. Nest sites are often located in the lower portion of the tree bole.

Information pertaining to a recommended number of snags for brown creepers is primarily absent from the available literature. Although brown creepers are not technically cavity-nesters, it is suggested that similar nesting benefits could be derived by meeting the large-diameter snag requirements needed for other associated species.

## Environmental Consequences

### ALTERNATIVE 1: No Action

#### Direct and Indirect Effects:

The No Action alternative would retain existing suitable habitats in the short-term. As tree mortality increases in mature lodgepole pine stands, loss of green canopy could result in reduction of suitable habitats. Habitats within mature spruce/fir may also experience some level of mortality due to endemic insect levels, but should retain sufficient green canopy to remain suitable.

### PROPOSED ACTION: Forest Health Emphasis

#### Direct and Indirect Effects:

Proposed clearcut, overstory removal, boundary treatments, shelterwood harvests, and associated road construction would remove a total of 839 acres (20%) of brown creeper habitat by reducing forest overstory structure and snags. These actions would also increase risk of mortality and nest failure for birds nesting in treatment units. Under the worst-case scenario (i.e., clearcutting in adaptive management units), timber harvest treatments would remove approximately 79 acres of mature spruce/fir habitat, leaving 91 percent of existing habitat post-treatment. Suitable habitats in mature lodgepole pine would be reduced by 760 acres (19%). Remaining habitat would be distributed primarily in the northern portion of the analysis area, similar to the scattered distribution under existing conditions. Most of these areas would once again become suitable habitat in an estimated 80+ years.

Fuels treatments associated with clearcutting would consist of any of the following methods: prescribed burning, lop and scatter, machine pile and burn, machine trampling or roller chopping. For overstory removal and sanitation/salvage harvest, slash is typically lopped and scattered unless fuels abatement needs dictate a more substantial removal. Slash treatments would not add to effects for brown creepers because timber harvest treatments would remove habitat prior to fuels treatments.

No road treatments are proposed within spruce-fir habitat. A total of 0.7 mile of reconstruction and 1.63 miles of temporary roads would occur within mature lodgepole pine habitat.

## ALTERNATIVE 2: Fuels Management Emphasis

### Direct and Indirect Effects:

Proposed clearcut, overstory removal, boundary treatment, shelterwood harvests, and associated road construction would remove a total of 480 acres (12%) of existing brown creeper habitat by reducing forest overstory structure and snags. Under the worst-case scenario (i.e., clearcutting in adaptive management units), timber harvest treatments would remove approximately 29 acres of mature spruce/fir habitat, leaving 97 percent of existing habitat post-treatment. Suitable habitat within mature lodgepole pine would be reduced by 451 acres (11%).

Similar to the Proposed Action, slash treatments would not add to effects for brown creepers because timber harvest treatments would remove habitat prior to fuels treatments.

No road treatments are proposed within mature spruce-fir habitat. A total of 0.2 mile of reconstruction and 0.8 mile of temporary roads would occur within mature lodgepole pine habitat.

### Cumulative Effects – All Alternatives:

Past timber harvest has likely impacted brown creeper suitable habitats, primarily within mature lodgepole pine. About 3,571 acres of clearcutting and overstory removal harvest has occurred within the analysis area since 1950. The condition of these stands at time of harvest is uncertain, but they likely contained larger-diameter trees. Past road construction, coupled with the Forest-wide Hazardous Tree Removal and Fuels Reduction project, has and will impact an estimated 351 acres of habitat. Treatment of hazardous fuels near private lands at Pelton Creek, Porter Ranch, WyColo, and Mountain Home propose to remove up to 68 acres of timber harvest within 150 feet of these lands. Under the Travel Management - Eastern Snowy Range decision, 3.7 miles of new motorcycle and ATV trail construction would occur within the analysis area. This decision also authorizes the closure of 43.7 miles of unauthorized roads and motorized trails, thereby reducing potential disturbance due to motorized use. Despite past, present, and future actions, suitable habitat for this species remains relatively plentiful, and is scattered, but well-distributed across the landscape.

### 3.11.10 Threatened, Endangered, and Proposed Wildlife Species

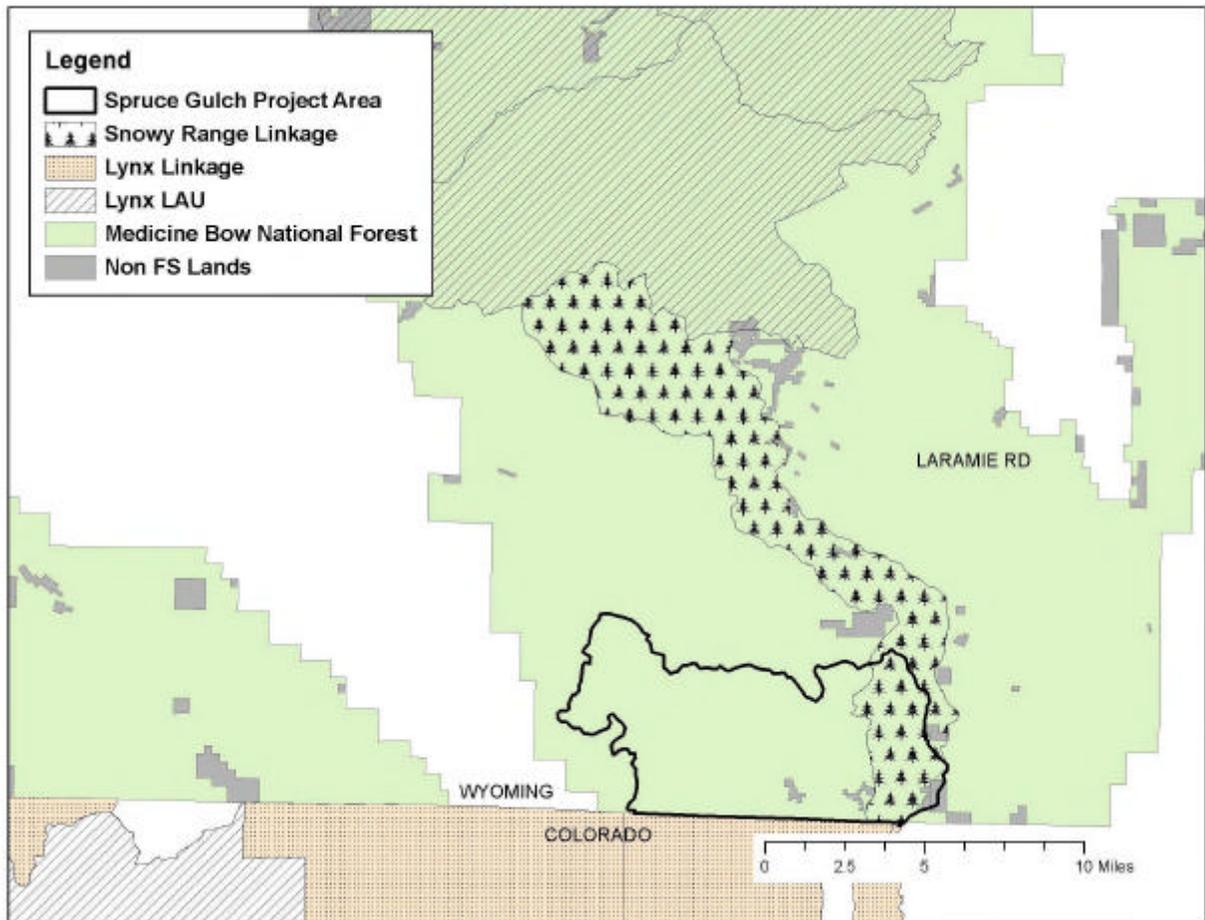
#### Affected Environment

Section 7 of the Endangered Species Act of 1973, as amended, requires federal agencies to use their authorities to carry out programs to conserve threatened, endangered, and proposed species (TEPS). Federal agencies are to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of listed or proposed species or result in the destruction or adverse modification of TEPS critical habitat.

The U.S Fish and wildlife Service (USFWS) provided the MBNF with a list of TEPS and designated critical habitats which may occur within the Laramie Ranger District (USFWS 2007). A review of these species and the effects determinations can be found in the Biological Assessment prepared for this Draft EIS. The only species on the TEPS list that has the potential to be affected by the alternatives analyzed in this Draft EIS is the *Canada lynx*.

The Spruce Gulch analysis area does not contain any Lynx Analysis Units (LAUs). An LAU is a project analysis unit upon which direct, indirect, and cumulative effects analyses are evaluated for Canada lynx. These areas provide a constant area for comparison of effects to lynx over time. The analysis area does, however, contain a portion of the Snowy Mountain Range lynx linkage corridor. Linkage corridors are defined as “habitat that provides landscape connectivity between blocks of lynx habitat” (see Figure 3.8).

**Figure 3.8: Snowy Mountain Range Lynx Linkage**



## Environmental Consequences

### ALTERNATIVE 1: No Action

#### Direct and Indirect Effects:

In many cases, No Action concerning lynx reflects the existing conditions and forest succession within the LAUs and linkage corridors. In this case, however, it is expected that the MPB epidemic would cause changes to existing lynx habitat. Observations on the Forest so far indicate that almost all lodgepole pine trees greater than 6 inches DBH within a stand are killed when the beetles hit. Surveys through 2007 indicate that roughly 15,400 acres within the Spruce Gulch analysis area have been impacted by pine beetles.

Expectations are that emerging pine beetles from the existing epicenters would continue to spread into and attack green, standing lodgepole pine. Under a worst-case scenario, 80 to 100 percent of all lodgepole pine trees within the analysis area could be killed by MPBs. This has occurred recently on other nearby Forests such as the Arapaho-Roosevelt National Forests in Colorado.

The final extent of beetle-caused changes to lynx habitat is unknown. Where pine beetle outbreaks occur, other habitat is likely to be converted to currently unsuitable habitat; winter foraging habitat would also probably convert to other habitat. There could be sufficient loss of cover above the snow (crown cover within the lower 15 feet to provide snowshoe hare habitat) such that remaining trees would be too widely spaced to provide useful habitat for snowshoe hares, red squirrels, or blue grouse.

## **PROPOSED ACTION: Forest Health Emphasis and ALTERNATIVE 2: Fuels Management Emphasis**

### **Direct and Indirect Effects:**

**Clearcutting (Unit 86), Proposed Action only:** In clearcut units, all understory trees would be impacted. Within the linkage zone, this applies specifically to Unit 86 (19 acres) under the Proposed Action. Because this unit lies at the edge of an existing opening that is currently greater than 300 feet in width, travel effectiveness is already compromised by the existing opening. While clearcutting in Unit 86 may remove travel cover within the stand, treatment would not reduce landscape travel options for lynx within the corridor because lynx are more likely to utilize more contiguous cover existing to the east of this unit.

**Adaptive Management (Units 71 and 97), both alternatives:** Adaptive management prescriptions include clearcut, salvage, sanitation/salvage, shelterwood, group selection, individual tree selection, commercial thinning, and overstory removal. For the purposes of this analysis, a clearcutting prescription was assumed. Clearcut treatments within these units would remove overstory cover for an estimated 10-25 years. Because of the units being located at the periphery of the linkage zone, treatments would reduce available travel habitat within the corridor, but are not expected to create barriers to landscape movement due to the availability of adjacent cover stands.

**Adaptive Management Units for Lynx (30 % Overstory Retention), both alternatives:** To maintain travel effectiveness within the Snowy Range Linkage Corridor, a design criterion was developed that would require 30 percent retention of overstory canopy closure in stands where treatments may create large openings and potential barriers to movement (design criterion 56). Where residual green trees are insufficient to meet 30 percent canopy closure, additional amounts of standing dead and dying trees would be retained to cover 30 percent of a treatment unit. Implementation of this design criterion would support lynx movement in the Snowy Range Linkage.

**Road Construction, both alternatives:** Proposed road treatments within the Linkage Corridor consist of about 1.4 miles of temporary construction and 0.3 mile of road reconstruction. Reconstruction would occur where access and road prisms currently exist. Treatments may entail widening the prism and improving the existing surface. Temporary roads would be closed and rehabilitated following requirements for administrative access associated with project activities.

Improvements to roads for project implementation could remove small amounts of overstory vegetation when prisms are widened and surfaces are improved. No road treatments are expected to create openings that would create barriers to travel (300 feet or wider), or increase traffic volumes to a level that is likely to increase vehicle-caused mortality or disturbance to a level that would impact lynx numbers moving through the linkage corridor.

**Fuels and Slash Treatments, both alternatives:** Fuels treatments associated with clearcutting would consist of any of the following methods: prescribed burning, lop and scatter, machine pile and burn, machine trampling or roller chopping. For overstory removal and sanitation/salvage harvest, slash is typically lopped and scattered unless fuels abatement needs dictate a more substantial removal. Slash treatments have the potential to remove structure if occurring in high levels that provide residual structure in treatment units. This analysis assumes that downed logs are retained in accordance to Forest Plan standards.

### **Cumulative Effects:**

Past timber harvest has removed overstory forest cover within the linkage corridor. Treatments have created approximately 2,380 acres in early structural stages with less than 30 percent canopy. Current and foreseeable actions on National Forest System lands include hazardous fuels treatments on 61 acres of travel habitat. Past road construction, coupled with the Forest-wide Hazardous Tree Removal and Fuels Reduction project, has and will impact up to 772 acres of overstory vegetation in the portion of the linkage zone within the analysis area. The Travel Management - Eastern Snowy Range decision authorizes about 3.7 miles of new motorized trail construction and the closure of roughly 43.7 miles of existing vehicle access routes. This represents a net decrease in potential motorized disturbance to lynx. Proposed pre-commercial thinning projects within the linkage corridor would occur on 368 acres where treated stands would retain adequate hiding cover for Canada lynx traveling through the area, retaining adequate hiding and foraging habitat for snowshoe hare which is Canada lynx primary prey.

## **BIOLOGICAL DETERMINATION for CANADA LYNX**

The project occurs outside of lynx LAUs and mapped suitable habitat; therefore, it would have no effect on lynx suitable habitat. The project does occur within a landscape linkage corridor. Proposed treatments would remove forest canopy on approximately 69 acres. Proposed road treatments within the Linkage Corridor consist of about 1.4 miles of temporary construction and 0.3 mile of road reconstruction within existing road prisms. No new road construction is proposed within the linkage corridor.

This project has been designed in association with the Canada Lynx Conservation Assessment and Strategy (LCAS) (Ruediger et al., 2000) and is consistent with the LCAS guidance. Impacts to travel habitat, including removed overstory canopy, and increased vehicle traffic, would occur as a result of implementation, but are not expected to occur at levels that would compromise overall effectiveness of the Snowy Range Linkage Zone for supporting landscape movement of lynx. Therefore, implementation of this proposed project “**may affect, but is not likely to adversely affect**” the Canada lynx. This determination was reviewed by the Southern Wyoming Level 1 Team (November 2007, February 2008) and no concerns were raised.

### **3.11.11 Forest Plan Compliance**

All alternatives would comply with Forest Plan wildlife standards and guidelines. Forest Plan standards and guidelines are located in the following sections and locations: Chapter 1,

Forestwide Standards and Guidelines (Wildlife, pp. 1-40 through 1-48); Chapter 2, Management Area Prescription 5.15 (Wildlife p. 2-64 ); Chapter 3, Geographic Areas, Lower Douglas Creek (pp. 3-69 through 3-72) and Platte River (pp. 3-85 through 3-87). Compliance in the context of the Proposed Action and Alternative 2 is contingent on implementation of project design criteria.

## 3.12 Botany

The Botany section is divided into three “sub-sections” including: 3.12.1) Threatened, Endangered, and Proposed Plant Species; 3.12.2) Region 2 Sensitive Plant Species; and 3.12.3) Plant Species of Local Concern. All sub-sections describe the affected environment first, followed by the effects associated with the alternatives.

### 3.12.1 Threatened, Endangered, and Proposed Plant Species

#### Affected Environment

Each year the USDI Fish and Wildlife Service, Wyoming Office provides a list of Threatened, Endangered, and Proposed species to consider in project-level analysis. This list was reviewed for the Spruce Gulch Bark Beetle and Fuels Reduction project (Roche 2008). The review indicated that the Spruce Gulch analysis area does not contain known occurrences of or potential habitat for federally listed threatened, endangered, or proposed plant species (Roche 2008). Therefore, **federally listed species are excluded from analysis and are not discussed further in this Draft EIS.**

#### Environmental Consequences

### BIOLOGICAL DETERMINATION – All Alternatives

“No effect” to federally listed threatened, endangered, or proposed plant species.

### 3.12.2 Region 2 Sensitive Plant Species

#### Affected Environment

The Region 2 sensitive plant species list includes 41 species that are documented or likely to occur within the Medicine Bow National Forest. Of the 41 species, 36 were dropped from further consideration because they do not have potential habitat within the Spruce Gulch analysis area. Of the original 41 sensitive plant species, five were evaluated in detail during the analysis process. They include: triangle globe moonwort (*Botrychium ascendens*), narrowleaf grapefern (*Botrychium lineare*), lesser yellow lady’s slipper (*Cypripedium parviflorum*), Scarlet gilia (*Ipomopsis aggregate, ssp. weberi*), and largeflower triteleia (*Triteleia grandiflora*).

## Environmental Consequences

### ALTERNATIVE 1: No Action

#### Direct and Indirect Effects:

Forest succession would proceed without direct management intervention. Insect and disease outbreaks are natural events that occur periodically; however, current levels are more intense than in recent history. Such outbreaks lead to tree mortality, creation of forest-gap habitats, opening of meadow habitats, and potentially to stand-replacing fires. The vast majority of these beetle-killed trees would eventually fall and be incorporated into forested stands as coarse woody debris. The No Action alternative would not result in any direct or indirect effects to Region 2 sensitive plant species except those that would occur naturally from the on-going MPB epidemic or from on-going forest succession.

#### Cumulative Effects:

In the absence of severe wildfire, there are no past or reasonably foreseeable actions that would cumulatively add to measurable effects for botanical resources within the analysis area.

### PROPOSED ACTION: Forest Health Emphasis and ALTERNATIVE 2: Fuels Management Emphasis

#### Direct and Indirect Effects:

Direct impacts to sensitive plant species could include trampling, smothering, or being burned under slash piles. Impacted individuals may experience reduced growth and development as well as reduced or eliminated seed-set and reproduction. Such impacts may cause mortality of individuals or populations. The timing of impacts can be critical for sensitive plant species. Impacts occurring in spring, prior to the release of spores or seeds, could reduce population size and change meta-population structure and species viability on the planning unit or range-wide.

Indirect impacts to sensitive plant species could occur as a result of changes to vegetation cover and structure. By felling and removing overstory trees, treatment areas would receive more sunlight and may become warmer, drier, and have lower humidity. By contrast, if trees are dropped, lopped, and scattered, the impact is less clear. Depending on the amount of slash left on the ground, sites may become warmer and drier; if slash loads are heavy, the ground may be shaded with an increase in moisture and humidity.

Sensitive plant species could also be impacted by competitive invasive plant species. Design criterion 2 was developed to reduce this risk. Therefore, effects are expected to be minimal.

Implementation of the Proposed Action would present a greater risk to sensitive plant species than Alternative 2 because vegetative and fuels abatement treatments would occur over more acres and because more road work would be implemented.

#### Cumulative Effects:

Past and current activities have altered sensitive plant species occurrences and their habitats. These activities include: livestock grazing, timber harvest and thinning, motorized and non-

motorized recreational use, road/trail construction and maintenance, insect and disease outbreaks, fire suppression, fire (prescribed and wildfire), mining, urban development (subdividing and development of private land), and noxious weed infestation. Other ongoing impacts include those associated with wildlife and climate changes.

Cumulative effects under the Proposed Action would be greater than under Alternative 2 because of the additive effects of increased vegetative and fuels abatement treatments and more road work added to the past and on-going management actions. Negative effects from other past, ongoing and reasonably foreseeable actions to these species would continue to contribute to negative effects to these species analyzed, their habitat, and their pollinators. However, policies and standards and guidelines that limit cumulative effects to sensitive plant species' habitat are in place; therefore, implementation of the action alternatives is not expected to contribute to an increase in any current or predicted downward trend in population numbers or density. It is also not expected to contribute to current or predicted downward trends in habitat capability that would reduce the existing distribution of any of the R2 sensitive plant species carried forward into this analysis.

## BIOLOGICAL DETERMINATIONS

All alternatives *“may adversely affect individuals, but are not likely to result in a loss of viability on the planning area, not cause a trend towards Federal Listing or a loss of species viability.”* Assuming presence, the No Action alternative would have the least impact, followed by Alternative 2. The Proposed Action would result in the greatest impacts to sensitive species.

## FOREST PLAN CONSISTENCY

The No Action alternative is consistent with the Forest Plan direction and standards and guidelines for sensitive species (p. 1-44). The Proposed Action and Alternative 2 will comply with this direction with effective implementation of recommended BMPs. None of the alternatives analyzed in this Draft EIS would result in irreversible or irretrievable effects to sensitive plant species.

### 3.12.3 Plant Species of Local Concern

#### Affected Environment

Species of Local Concern (SLC) are documented or suspected to be at risk at a forest-wide scale but do not meet the criteria for regional Sensitive Species designation because they are reasonably secure within parts of their range within Region 2. There are 69 plant SLC that could either have potential habitat or known occurrences within the analysis area. Of the 69 species, 14 were not analyzed because they do not have potential habitat within the project area. The remaining 55 species were grouped into five groupings based on habitat factors and similarity of consequences. Groupings include:

**Group 1 – Streamside Habitat:** American alpine lady fern; dissected bahia; streambank wild hollyhock genotypes; and ice grass (4 species)

**Group 2 – Forest and Forest Edge:** Common moonwort; pale moonwort; northern moonwort; clustered lady slipper; showy draba; spruce-fir fleabane; western rattlesnake plantain; oak fern; fairy slipper; pine sap; surefoot buttercup; fir clubmoss; Crandall's wild hollyhock genotypes; largeflower wild hollyhock genotypes; wild lily; broad-leaved twayblade; bluntleaved orchid; slender bog orchid; whiteveined wintergreen; western goldenweed; western trillium, white

violet; and squashberry (23 species)

**Group 3 – Wetland and Wet Meadows:** Lanceleaf grapefern; leathery grapefern; low northern sedge; woolyfruit sedge; bristle-stalk sedge; mud sedge; boreal bog sedge; Sartwell's sedge; three stamen waterwort; tall cottongrass; Dane's dwarf gentian; thread rush; northern white rush; Bigelow's groundsel; streambank groundsel; saffron groundsel; arrow-leaf sweet coltsfoot; and Rolland bullrush (18 species)

**Group 4 – Rock Outcrops:** Beavertip draba; fewseed draba; narrowleaved bladderpod; and larchleaf penstemon (4 species)

**Group 5 – Aquatic:** Ribbonleaf pondweed; white-stem pondweed; flatleaf pondweed; small bur-reed; fineleaf pondweed; and Sago pondweed (6species)

## Environmental Consequences

### ALTERNATIVE 1: No Action

#### Direct and Indirect Effects:

**Groups 1- 5:** Existing and potential habitat for Group 1 - 5 species would not be affected by timber harvest or road construction and reconstruction activities. Existing and undiscovered occurrences of these species would also not be affected by the project proposal. Occurrences of Group 1 - 5 species would be subject to natural processes (mountain pine beetle epidemic and associated tree death) producing changes in canopy structure and variation and dead and down woody accumulations.

#### Cumulative Effects:

In the absence of severe wildfire, there are no past or reasonably foreseeable actions that would cumulatively add to measurable effects for species of local concern within the analysis area.

### PROPOSED ACTION: Forest Health Emphasis

#### Direct and Indirect Effects:

**Groups 1, 3, and 5:** Roughly 1 to 5 percent of the proposed treatments would occur in or near the habitats where Group 1, 3, and 5 species are most likely to occur. Direct effects to streamside, wetland, wet meadow, and aquatic habitats would be limited for the following reasons: use of existing roads would not directly impact any new riparian areas; the majority of temporary roads would be located on upland sites to avoid disturbance to riparian areas; any temporary road disturbance in riparian areas would be short term; and riparian area function would return to current conditions in the long-term after the temporary roads are rehabilitated. BMPs, which limit use of heavy equipment and harvest in and near riparian ecosystems, have also been recommended for implementation and would further reduce potential direct impacts to riparian ecosystems. Implementation of design criteria 18, 20, 23, 43, and 46 would further limit management activities in these habitats. Depending on the species, changes in canopy cover could either have beneficial or detrimental effects to Group 1, 3, and 5 species.

Indirect effects from implementing the Proposed Action could occur in the form of hydrologic changes in habitat, effects to pollinators, and introduction of noxious weeds. Design criterion 2 would reduce the potential for noxious weed infestations.

**Group 2:** An estimated 10-100 percent of the vegetative treatments under the Proposed Action would occur in habitats where Group 2 species are most likely to occur (forest and forest edge). Similar habitat for Group 2 species exists outside of the immediate treatment areas with the exception of habitat for the white violet. Unit 87 contains the first known occurrence of this species on the Medicine Bow National Forest. However, Kurulok and Macdonald (2004) indicate that the white violet did not disappear after salvage logging.

Changes in canopy cover and amounts of dead and down woody material and distribution would generally be detrimental to Group 2 species occurrences. Group 2 species plants that occur in the area of road construction would be eliminated as part of road construction actions.

Implementation of the Proposed Action could reduce the number of pollinators in the area which could reduce populations of certain plant SLC. It could also increase introductions of noxious weeds. However, design criterion 2 would reduce the potential for noxious weed infestations.

**Group 4:** An estimated 5 percent of vegetative treatments proposed would occur in the habitats where Group 4 species are most likely to occur (rock outcrops). Although skid trails are not generally located and timber is not purposefully felled in these areas, the removal of surrounding canopy would change the area's growing environment. Depending on the species, changes in canopy cover could either have beneficial or detrimental effects to Group 4 species.

Indirect effects would be similar to those described for Group 2 species.

## **ALTERNATIVE 2: Fuels Management Emphasis**

### **Direct and Indirect Effects:**

**Groups 1, 3, and 5:** An estimated 1-2 percent of vegetative treatments would occur in or near the habitats where Group 1, 3 and 5 species are most likely to occur. The effects of Alternative 2 would be similar to the Proposed Action, but to a lesser extent due to fewer treatment areas and reduced road work.

**Group 2:** The effects of Alternative 2 would be similar to the Proposed Action, but to a lesser extent due to fewer treatment areas and reduced road work.

**Group 4:** An estimated 1 percent of vegetative treatments would occur in the habitats where Group 4 species are most likely to occur. The effects of Alternative 2 would be similar to the Proposed Action, but to a lesser extent due to fewer treatment areas and reduced road work.

### **Cumulative Effects: Proposed Action and Alternative 2**

Ongoing and reasonably foreseeable road and trail maintenance operations could negatively affect individuals and habitat for Group 1 - 5 species. Ground disturbing activities within occupied sites would be most likely to threaten habitat when the ground is the wettest during spring and early summer.

Group 1 - 5 species are not known to need anthropogenic (human created) disturbance to establish or grow; therefore, ongoing, proposed and reasonably foreseeable actions may, but are not likely to, provide conditions that allow for these species to establish and grow.

Cumulative effects under the Proposed Action would be greater than under Alternative 2 because of the additive effects of increased vegetative and fuels abatement treatments and more road

work added to the past and on-going management actions. Negative effects from other past, ongoing and reasonably foreseeable actions to these species would continue to contribute to negative effects to these species analyzed, their habitat, and their pollinators. However, policies and standards and guidelines that limit cumulative effects to habitat for plant SLC are in place; therefore, implementation of the action alternatives is not expected to contribute to an increase in any current or predicted downward trend in population numbers or density. It is also not expected to contribute to current or predicted downward trends in habitat capability that would reduce the existing distribution of any of SLC carried forward into this analysis.

## VIABILITY DETERMINATION

A “no loss of viability” determination was made for all alternatives analyzed in this Draft EIS. Assuming presence, the No Action alternative would have the least impact to SLC, followed by Alternative 2. The Proposed Action would result in the greatest impacts to SLC.

## FOREST PLAN COMPLIANCE

All alternatives would comply with Threatened, Endangered, and Sensitive Species Standard 15 in the Medicine Bow Forest Plan (p. 1 - 44). This standard also pertains to SLC. Compliance in the context of the Proposed Action – Modified is based on implementation of pertinent project design criteria. None of the alternatives analyzed in this Draft EIS would result in irreversible or irretrievable effects to species of local concern.

## 3.12 Recreation

### Affected Environment

#### Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum (ROS) is a planning system used by land managers to classify areas according to the types of recreation opportunities available therein. These classifications enable managers to provide a variety of settings in which to recreate, each with their own characteristics and opportunities. ROS classifications may range from *Primitive* inside a designated Wilderness to *Urban* in recreation areas adjacent to metropolitan areas.

The Spruce Gulch analysis area includes four of the seven possible ROS classification settings: Rural (1,462 acres), Roded Modified (17,138 acres), Roded Natural (7,702 acres) and Semi-Primitive Non-Motorized (5,480 acres). The frequency of contact between users is expected to be moderate to high on roads and developed sites within the Rural (RL), Roded Modified (RM), and Roded Natural (RN) ROS classifications. Within the Semi-Primitive Non-motorized (SPNM) ROS settings, frequency of contact between visitors is expected to be much lower (6 – 15 encounters per day). All of the proposed treatment units identified in the Proposed Action and Alternative 2 lie within ROS classes RL, RM, and RN. No treatment units are proposed in the SPNM ROS area.

#### Developed Recreation

The Spruce Gulch analysis area does not contain any developed campgrounds; it does, however, contain one developed trailhead along NFSR 898 (the Pelton Creek trailhead). This trailhead was developed in conjunction with the Medicine Bow Rail Trail (MBRT) and offers toilet facilities, picnic facilities, and parking and interpretive/informational signs to the recreating public. The

Pelton Creek Trailhead is surrounded by lodgepole stands that are dead and dying from MPB activity. The small lodgepole stand within the trailhead area itself, however, has remained mostly beetle free up to this point due to the small diameter of most of the trees (3 to 6 inches DBH); small diameter trees are not typically attacked by the MPB. However, it may just be a matter of time before these trees are infested as land managers in other areas of the forest are recording cases where the beetles are attacking and killing small diameter “pole stands.” There are no other developed recreation sites with the analysis area.

### **Dispersed Recreation**

Dispersed recreation activities in the analysis area include camping, hunting, horseback riding, and fishing. Many users seeking to camp on the Forest opt for more secluded experiences than what developed campgrounds afford. With as many roads, meadows, creeks, and ponds as are found in the analysis area, opportunities for dispersed car and trailer camping are numerous. This is also the case with fishing and hunting opportunities; access is easy via the road system to abundant fishing holes and hunting grounds.

While much of the analysis area is roaded, it does contain 5,480 acres that are designated and managed for year-round non-motorized uses (SPNM ROS classification). These areas are more remote and provide even greater solitude to those seeking such experiences.

### **Summer Motorized Recreation**

Passenger vehicles, 4 x 4 vehicles, and various Off-Road Vehicles/ATVs and motorbikes are all popular for motorized recreation in the area. Historically, motorized recreationists have used NFSRs, unauthorized motorized trails (not formally designated as part of the transportation system), and local/county roads for their recreation pursuits. The Travel Management: Eastern Snowy Range - Decision 1 (June 21, 2007) designated 44.9 miles of unauthorized motorized trails in the analysis area as part of the forest transportation system. These trails will be open to public use once they comply with Forest Service Trails Management Handbook (FSH 2309.18) direction, Watershed Conservation Practices (FSH 2509.25) direction, and Best Management Practices. The June 21, 2007 decision also authorized the closure of approximately 43.7 miles of unauthorized routes within the analysis area. Route designations and closures will be deferred in the analysis area until the environmental analysis and potential project implementation is complete.

### **Winter Motorized Recreation**

Although snowmobiling is a common winter recreation activity in the analysis area, it is not as popular as in other areas on the District. Designated trails “R”, “A”, “AA” and “T”, as shown on the Wyoming State-Southeast Snowmobile Trails Map, are regularly groomed for snowmobiling. Non-motorized recreation pursuits such as snowshoeing, cross-country skiing, and dog-sledding are also allowed on these groomed trails. The most popular access points to the trails are via the Wold/Ticks parking area, the Mountain Home parking area, and the privately held WyoColo Lodge.

### **Summer Non-motorized Recreation**

Recreational activities such as hiking, horseback riding, mountain biking, backpacking, etc, can be pursued in any general forest area (GFA) of the Spruce Gulch analysis area that is not closed to the public. Closures can occur in the event of forest fires, natural disasters, or if other safety concerns arise.

Over the last several years work has been completed converting an old railroad bed in the analysis area into a non-motorized “Rail-Trail”, the Medicine-Bow Rail Trail (MBRT). The MBRT begins near the town of Albany at its northern end and runs 21 miles generally south toward the Colorado border, terminating at Pelton Creek Trailhead where the trail intersects NSFR 898. Facilities, signs, and rest stop/trailheads are scheduled for completion on the trail within the next two years. Bicycling, hiking, and horseback riding are the predominant uses of the MBRT. Approximately four miles of the MBRT lie within the analysis area

### **Winter Non-motorized Recreation**

Cross-country skiing, snowshoeing, and dog sledding are all popular pursuits within the analysis area. Chimney Park cross-country ski trail lies to the northeast of the analysis area on state Hwy 230 near the Chimney Park Boy Scout Camp. As with summer non-motorized recreation, winter non-motorized recreation is allowed in any GFA.

### **Recreation Special Uses**

A few snowmobile guides are permitted to operate within the analysis area using the “A”, “AA”, “R” and “T” trails. Although these guides are based outside of the analysis area, they use the trails to access adjacent terrain. Annual special use permits have historically been issued for summer group events held at Horatio Rock.

### **Lands and Minerals**

Land easements have been granted around the private in-holdings of Porter Ranch, Pelton Creek, and Mountain Home. Each year a few gold panning permits are issued for recreationists to pan for gold in Pelton and Lincoln Creeks.

## **Environmental Consequences**

Current quantitative baseline data on the recreation usage patterns within the analysis area are sparse. Trailhead counts, winter use surveys, snowmobile trail counts, and recreation fee collection receipts constitute the extent of the data available at this time. However, these figures are not sufficient to establish reliable trend forecasts, statistically viable and preference-based visitor profiles, or utilizable demographic data. Nonetheless, existing data and repeated field-observations, professional judgments, ROS classifications, Forest Plan direction, and technical reports do allow for the consequences of the alternatives on recreation opportunities and experiences to be predicted with a fair degree of certainty.

### **ALTERNATIVE 1: No Action**

#### **Direct and Indirect Effects:**

Recreating visitors who utilize recreation facilities, trails, and the GFAs would continue to witness the effects of an unchecked expanding MPB epidemic as more trees succumb to beetle attack. With no actions taken to mitigate the spread of the epidemic, and no actions taken to remove diseased or dead trees, the negative effects on the recreating public and the natural resources on which they rely would grow more widespread over time.

**Developed Recreation:** Given that small diameter lodgepole pine trees in other areas of the forest are being impacted by MPBs, it is likely that the existing stand of healthy, small diameter lodgepole pine trees around the Pelton Creek trailhead would be impacted sometime in the near future. This situation would result in unsafe conditions at the trailhead. As required by Forest

Service Manual (FSM) 2332.11 (Public Safety, Hazard Trees), hazardous trees would need to be removed from the trailhead prior to it being open for public use. If trees could not be removed in a timely fashion, the trailhead would have to be closed until the hazardous situation is remedied. Closure of the trailhead would have a negative impact on people who use it.

**Dispersed Recreation:** The specific effects the No Action alternative on Dispersed Recreation are difficult to ascertain. In areas where the MPB is most active, dead and dying trees would impact and displace some dispersed campers as falling trees accumulate in and/or around favorite camping spots. In the long term, as increasing amounts dead snags fall, dispersed campers may have difficulties finding desirable locations. In worst case scenarios, dispersed campers may unknowingly expose themselves to areas of concentrated snag trees. Since National Forests do not provide for or guarantee public safety in dispersed camping areas, the public would likely experience increased exposure to hazardous trees as the unchecked epidemic progresses.

**Summer Motorized Recreation:** The effects of the No Action alternative on motorized trails and roads would be similar to the negative impacts expected near developed and dispersed recreation areas. Because of the large scale and intensity of the current beetle epidemic, the No Action alternative would likely result in maximum tree mortality throughout the GFA where most motorized roads and trails are located. In the short-term (2 to 3 years), most dead and dying trees would remain standing. In the long-term (10 to 15 years), however, increasing numbers of dead snags would fall across roads, trails, and throughout the GFA. Overtime, the large numbers of fallen snags would likely overwhelm District resources capable of removing them. This would have a direct impact on both the District trail crew's ability to maintain existing motorized trails and the crew's ability to construct new motorized trails that are planned and approved in the Travel Management: Eastern Snowy Range decision. As these negative effects from the No Action alternative accumulate over the long-term, motorized recreationists would experience a decline in the quality and quantity of motorized recreation trails in the analysis area.

**Winter Motorized Recreation:** The effects of the No Action alternative on winter motorized recreation would be similar to those described above for summer motorized recreation, but with less direct impacts on trails due to seasonal snow cover. The historical amount of snowfall in the analysis area would typically bury most fallen snags well below the surface of most groomed snowmobile trails. Recreationists who enjoy riding snowmobiles in areas open to cross-country travel would, however, find more stands of fallen trees in certain areas after the beetle epidemic runs its course. Typically, in a lodgepole timber type, snags start falling 3 to 15 years after they are killed; it would be during this time frame that large amounts of dead trees would be expected to start falling across snowmobile trails. Large wind events common to the analysis area would likely be the catalyst that causes the standing dead trees to fail and fall on the groomed trails. If large areas of beetle-killed trees are left next to major trail routes, which would likely be the case in the No Action alternative, snowmobilers and snowmobile guides would encounter barriers of fallen trees across their chosen route. However, the impact to winter motorized recreationists would probably be less severe than to summer motorized recreationists because it would be easier to get around the downed trees without causing resource damage to the trail. The impact to cooperators, like the Wyoming State Trails grooming program, could, however, be significant if trees fail suddenly and in concentrated numbers. The difficulty of cutting and removing downed trees in deep snow conditions, and the scaled-down size of winter recreation crews, could further complicate trail grooming and maintenance efforts.

**Summer Non-motorized Recreation:** Effects of the No Action alternative on summer non-motorized recreation in the analysis area would be widely varied over time. Since activities such as hiking, walking, horseback riding, etc. can be enjoyed throughout the analysis area, direct impacts from falling snags, accumulations of deadfall, and downed trees could easily be avoided. However, visitors who have favorite places that they like to visit by non-motorized means may find their experience negatively affected by sudden and/or widespread tree mortality. Such negative experiences should be sporadic in nature, and visitors would likely find alternative places within the analysis area or adjacent areas on the Laramie Ranger District.

Visitors who use specific non-motorized trails within the analysis area would find the long-term effects of the No Action alternative harder to avoid. Specifically, recreationists who utilize the portion of the MBRT that runs through the analysis area would likely find that increasing numbers of fallen snags from adjacent stands of dead trees would impede or block their use of the trail. In worst-case scenarios, dead fall from beetle killed trees may create such a public hazard that portions of the MBRT would have to be closed.

**Winter Non-motorized Recreation:** The effects of the No Action alternative on winter non-motorized recreation are not likely to be as significant as those expected for summer non-motorized recreation. Since there are no designated non-motorized winter trails within the analysis area, and the numbers of non-motorized recreationists decrease dramatically during winter months, significant impacts from the No Action alternative on this recreating group are not expected. Further, most winter non-motorized recreationists prefer to use nearby trail systems, such as the Chimney Park Cross-Country Ski Trails, which are outside of the analysis area. One non-motorized group (dogsledders) that uses the groomed snowmobile trails during the winter would likely encounter the same effects described above for winter motorized recreationists.

**Recreation Special Uses:** The effects of the No Action alternative on Special Use Permits are difficult to ascertain and will vary according to the type of permit issued and the location of the proposed event. Since many special use events are held in dispersed recreation type settings, some permit holders would experience more direct impacts than others. Over time, applicants for recreation events such as group camping, weddings, and family reunions, etc. may have to consider alternative locations if favorite sites are located next to large concentrations of beetle-killed hazardous trees. The increase in dead and dying trees across the analysis area may eventually render some areas unsuitable and unsafe for issuing Special Use Permits/events.

**Lands and Minerals:** Forest Service easements in the analysis area—NFSR 898 which passes through a corner of the privately held Porter Ranch property; NFSR 898.C which passes through Pelton Creek private in-holdings; and NFSRs 501 and 230 which pass through private land pieces in the Mountain Home—would experience varying degrees of impacts from the No Action Alternative, depending on the surrounding forest type and tree stand densities. Again, for those locations/roads that pass through dense stands of beetle-killed trees, falling dead and dying trees may directly impact the easement as they fall across NFSRs. Depending on the language agreed to in the easement, Forest Managers and private land owners would have to coordinate responsibility for opening and maintaining affected roads. In the long-term, land easements that include dense stands of beetle-killed trees may suffer more complex direct and indirect impacts, such as: increased threat of wild-fire, increased fuel loadings next to private in-holdings, and reduced visual quality of the surrounding forest canopies.

Gold panning permittees within the analysis area may experience some direct impacts such as fallen trees, causing some parties to relocate. On the whole, however, most gold panners would experience the same effects from the No Action alternative as the general public—reduced visual qualities, road blocks from fallen trees, and increased exposure to hazard trees over time.

### **Cumulative Effects:**

As recreation crews become overwhelmed with accumulating numbers of fallen trees on Forest System Trails, managing motorized trails systems to standard in the analysis area would grow increasingly difficult overtime. Eventually, the cumulative effects of the No Action alternative would overwhelm available trail crews to the point that the District would not be able to maintain trails to National, Regional or Forest standards. Recreationists would realize the direct impacts of the No Action alternative first-hand as they encounter increasing numbers of fallen trees inhibiting and blocking their chosen motorized routes. In worst-case scenarios, routes and trails would have to be closed to public use; in best-case scenarios, motorized recreationists would experience a decrease in the quality of motorized recreation in the analysis area as a result of the fallen trees.

## **PROPOSED ACTION: Forest Health Emphasis**

### **Direct and Indirect Effects:**

**Developed Recreation:** Treatment units 53, 54, 92, and 108 surround the Pelton Creek trailhead while units 38, 39, 40, 55, and 93 are within a few miles of the trailhead. Since these units either surround the trailhead or lie directly next to the two main NFSRs (898.C and 898.D) that provide access to it, logging activities would have a direct impact on recreationists who use the Pelton Creek trailhead. In the short-term (during project implementation), recreationists visiting the trailhead would encounter periodic heavy truck traffic, noise from nearby logging equipment, and dust from mechanical operations. In the long-term, mechanically created openings, slash piles, and corresponding changes in the forested landscape would negatively affect the scenic quality around the trailhead. On the other hand, beneficial long-term effects would also be derived: trees located within the trailhead boundary would be preserved and vegetation treatments would stimulate new tree growth in forested stands adjacent to the trailhead, thereby improving forest ecological health.

**Dispersed Recreation:** The direct effects of vegetation treatments on dispersed recreationists would depend a great deal on their campsite choice and its proximity to logging operations. Since the Proposed Action includes 1,859 acres of predetermined clearcutting distributed over approximately 64 different treatment units, it is quite likely that some dispersed campers would be directly affected and/or displaced. Research studies have shown that clearcutting has the greatest negative effect on the recreating public, but that these negative effects vary greatly according to people's expectations and perceptions. (Gan and Miller 2001). In the long-term, after vegetation treatments have been completed, visitors may or may not notice that their favorite dispersed campsite appears quite different. They may or may not notice that it is void of dangerous snags and/or made more diverse with different aged tree stands. Whether or not these changes are noticed, the long-term mosaic of different aged forest stands would improve forest ecological health. Varying tree mosaics would also indirectly and positively affect dispersed camping areas by minimizing the risk of catastrophic wildfire and the sudden loss of preferred dispersed recreation sites.

**Summer Motorized Recreation:** Many of the treatment units associated with the Proposed Action would directly impact NFSRs and trails that motorized recreationists typically use. Planned treatments in units 63 thru 70 and 106 would impact a series of planned and existing motorized trails that branch off of NFSR 530; clearcut units along NFSR 521 would impact motorized roads and trails as well. In these areas, system roads popular for motorized recreation would be the main haul routes for logging trucks over the next 2 to 4 years (depending on when the sales are sold and when contractors plan to harvest).

With many of the proposed units planned as clearcuts, motorized recreationists would be riding or driving through mechanically created openings for a relatively long period of time (10 to 20 years). The accumulation of activity fuels, such as stumps and slash, could prevent some ORV enthusiasts from riding illegally in open areas created by clearcuts; however, experience has shown that newly created openings often become motorized “play grounds.” Motorized recreationists often view the open areas (particularly on hills) as an invitation to leave designated routes in search of more variety or a more challenging experience. Creation of unauthorized motorized routes would be contrary to Forest Plan direction which states “motorized travel is allowed on designated roads and trails forest wide” (p 1-16). They would also be counterproductive to the Forest’s implementation of the National Travel Management Rule and enforcement of the District’s Motor Vehicle Use Map.

**Winter Motorized Recreation:** Winter logging and timber hauling operations would significantly impact winter motorized recreation in the analysis area, particularly since contractors would most likely use the same NFSRs that are groomed by the Wyoming State Trails cooperators. It is anticipated that contractors who purchase timber sales associated with the Proposed Action would conduct winter-time logging operations for about 4 years, utilizing NFSR 898 as the main haul/access route. This would effectively displace snowmobile enthusiasts for significant periods during the winter season. Winter motorized recreationists are expected to relocate to the groomed trails at the Albany trailhead outside of the analysis area. From the week before Christmas to the week after New Year’s Day, however, planned timber hauling or machinery operation on established snowmobile trails should cease. This would provide access to popular trails and draw tourists into the area.

The mechanical creation of openings would produce secondary effects on winter motorized recreation. Snowmobilers would most likely be unable to distinguish created openings from naturally occurring meadows or “parks”; thus, they would use them for legal off-trail riding. Snowmobilers would likely consider these winter-time “play areas” to be beneficial to their recreation experience.

**Summer Non-Motorized Recreation:** Recreationists seeking a more primitive non-motorized setting in adjacent Roadless and Wilderness Areas may experience short-term indirect effects such as distant machinery noise, increased truck traffic on NFSRs that access these areas, and the after effects of logging operations. Long-term visual impacts from slash piles, created openings, and changes in the forest landscape may or may not be significant depending on visitors’ personal expectations.

Recreationists who use the MBRT would experience significant direct and indirect effects from treatment units that are located immediately adjacent to the trail (Units 53, 54, 92, and 108). Both short-term and long-term effects would be unavoidable as these units would be viewed by all persons using the trail. During logging operations, recreationists riding or walking on this

section of trail would be exposed to machinery noise, sounds of falling trees, dust from machinery, and various sights, sounds and smells of typical logging operations. Visitors would frequently encounter log truck traffic on NFSR 898 as they access the MBRT via the Pelton Creek trailhead. Visitors would experience similar effects as they ride/walk the trail and pass by proposed units 88, 89, and through Unit 104. The degree of effects on this section of trail could, however, be less due to the adaptive management prescriptions associated with these units.

Clearcutting, if chosen as the adaptive management tool, would have the most significant long-term effect on MBRT users as the created openings would be visible for decades. Again, the effect of these activities on non-motorized recreationists would vary according to visitors' expectations and perceptions. Design criteria outlined on p. 28 of this Draft EIS would reduce some of the social impacts and would help to create a more natural appearing landscape.

**Winter Non-Motorized Recreation:** Since there are no designated non-motorized winter trails in the analysis area, impacts from proposed vegetation management activities should be negligible. Non-motorized recreationists can always utilize the GFA for winter recreation activities and these visitors may occasionally experience direct and indirect effects from proposed actions. But, these encounters will likely be sporadic and insignificant to the non-motorized winter recreating public.

**Recreation Special Uses:** Special use permittees could experience minor disruptions if they are not adequately kept abreast of logging, log hauling, and construction routines and schedules. Implementation of design criterion 6 would reduce these impacts.

**Lands and Minerals:** The Forest Service easement for NFSR 898 passes through a corner of the privately held Porter Ranch property. Increased truck traffic, noise, and dust are anticipated as NFSR 898 would be used as a major haul route for the Proposed Action. Logging activities in Unit 55 would also impact the Porter Ranch easement due to the close proximity of the unit to the road. Planned treatments in unit 93 would expose the Pelton Creek easement (NFSR 898.C) to noise, dust, and the after effects of logging. The easement for NFSRs 501 and 230 in the Mountain Home area would also experience similar direct effects.

Gold-panners would likely encounter logging trucks along major NFSRs in the analysis area. Increased logging traffic should not be a great impact to this recreation group. Occasional displacement of gold-panning enthusiasts may be possible, but is not likely.

## **ALTERNATIVE 2: Fuels Management Emphasis**

### **Direct and Indirect Effects:**

**Developed Recreation:** Please refer to the effects described under the Proposed Action.

**Dispersed Recreation:** Acres of clearcutting proposed under Alternative 2 are significantly less than under the Proposed Action (772 acres vs. 1,859 acres). Consequently, the effects to dispersed recreation, as described under the Proposed Action, would be reduced as well.

**Summer Motorized Recreation:** Due to the considerable reduction in treatment acres proposed under Alternative 2, impacts to summer motorized recreation would be significantly less than those described under the Proposed Action. However, tree mortality and the numbers of subsequent dead and falling snags would be significant, particularly on those designated routes

that run through large stands of dead and dying trees. This may create a long-term challenge for recreation crews as dead and dying trees fail at an increasing rate, especially in the aforementioned 10 to 15 year period after the trees die.

**Winter Motorized Recreation:** Due to the considerable reduction in treatment acres proposed under Alternative 2, impacts to winter motorized recreation would be significantly less than those described for the Proposed Action. The mechanical creation of open “parks” would be significantly reduced; however, this effect would most likely go unnoticed by snowmobile riders. The need for winter logging operations and timber hauling would be reduced as well, thereby minimizing potential conflicts with trail users. In the long-term, high tree mortality may result in sporadic numbers of fallen trees across certain trails, but not to the extent anticipated under the No Action alternative.

**Summer Non-Motorized Recreation:** Due to the reduced treatment acres proposed under Alternative 2, indirect impacts to Wilderness and Roadless area recreationists would be significantly less than those described for the Proposed Action. Noise, dust, and truck traffic would still impact non-motorized recreationists as they travel through the analysis area, but the duration of these indirect impacts should be less noticeable.

**Winter Non-Motorized Recreation/Recreation Special Uses/Lands and Minerals:** Please refer to the effects described under the Proposed Action.

### **Cumulative Effects - Proposed Action and Alternative 2:**

Human impacts and land use emphasis in the analysis area have changed greatly since European settlers first utilized what is now the Medicine Bow National Forest. From the turn of the 20<sup>th</sup> century, when tie-hack and railroading were the primary uses, to the modern era where trail-based recreation is the dominant use, the cumulative effects of human impacts in the analysis area have grown more complex and varied.

Recreation impacts in the analysis area have grown from primarily hunting and fishing to the motorized, trail-based recreation so prevalent in the area today. Roads created to access timber stands over the past century have become the main arteries for the recreating public to access other areas of the forest and to use as summer and winter trails. The railroad bed first created to access timber to construct the nation’s main railroad lines is now more valued as a “Rail-Trail” for bicyclists, hikers, and other non-motorized recreationists. When past logging activities, forest fires, mining activity and other uses are viewed collectively with recreation activities over the last century, there are very few places within the analysis area that do not show evidence of human activity or use.

Recreation surveys, professional observations, and encounters with the recreating public point to growing impacts on the recreation resource within the analysis area; as the recreating public grows in size and in diversity the cumulative effects—both positive and negative—on the recreating public and the recreation resource would continue to grow as well.

## **FOREST PLAN COMPLIANCE**

All alternatives would comply with Forest-wide standards and guidelines pertinent to the recreation resource (pp. 1-52 to 1-56). Vegetative treatments, as described in the Proposed Action and Alternative 2, would be consistent with applicable direction in MA 5.15 (p. 2-62) and with direction for the Lower Douglas Creek and Platte River Geographic Areas for (pp. 3-72 and

3-87, respectively). Compliance in the context of the Proposed Action and Alternative 2 is contingent on implementation of project design criteria. None of the alternatives analyzed in this Draft EIS would result in irreversible or irretrievable effects to the recreation resource.

One change to existing ROS classifications would result from implementation of the Proposed Action: areas along NFSR 898, currently classified as *Roaded Natural*, would move toward *Roaded Modified* following project implementation. Roaded Natural and Roaded Modified classifications provide the same social setting under the ROS. It should be noted that such a change is acceptable within the affected Management Areas and is typical for a timber harvest operation. ROS classifications within Management Area prescriptions are identified as guidelines in the Forest Plan. Guidelines are recommended courses of action and are not mandatory. Consequently, a Forest Plan amendment would not be required.

## 3.14 Heritage Resources

### Affected Environment

#### Heritage Resources Surveys

Previous heritage resources surveys in the Spruce Gulch analysis area focused on those stands and areas in which activities have been proposed that have the potential to affect heritage properties. Based on the most current available data, just over 4,600 acres in the analysis area have been surveyed for heritage resources. These surveys have been conducted for many reasons not associated with the project; examples include surveys for vegetation management, range use, recreation projects, and prescribed burning.

#### Heritage Resources

Based on the Forest's most current information, 32 heritage properties have been identified in the analysis area. Of these properties, none are currently listed on the National Register of Historic Places; three (3) are considered eligible for listing; 26 are currently considered Not Eligible for listing; and three (3) have not been fully evaluated for listing and are considered unevaluated.

Prehistoric heritage properties are typical in the low wide drainages and on the higher ridges. Historic heritage properties are found in a variety of topographic regions and include sites associated with early exploration and the fur trade, Euro-American-Native American contact and conflict, precious metal mining, early transportation, commercial timber operations, high country ranching and agriculture, recreation and tourism and early administration of the area by the Forest Service. For the mountain regions in the analysis area, the historic period begins in the early to mid-1800s, when Euro-American explorers first began to venture into the area. Unfortunately, most of the earliest Euro-Americans in the area were explorers and trappers, and left little trace of their visits. The most visible historic activities relate to the early mining, ranching, and timber industries as well as the Forest Service administration of the area.

## Environmental Consequences

### ALTERNATIVE 1: No Action

#### Direct and Indirect Effects:

This alternative would not result in a federal action; consequently, there would be 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, the No Action alternative could result in adverse effects to heritage resources due to dead trees falling naturally on the above ground features or by the accumulation of heavy fuels around them. Heavy fuel loading could result in catastrophic fires which are known to affect both historic and prehistoric resources through direct and indirect methods. Fire can and does consume wood and other organic materials that are on the ground surface. It can also alter the condition of stone tools, organic materials, and historic artifacts. Direct effects would include rendering many dating methods inaccurate, visual alteration and the physical destruction of materials. In addition, rain and snow after a fire can cause severe erosion on heritage properties.

#### Cumulative Effects:

The loss of archaeological resources has happened in the past and would continue to happen without any protection. The cumulative effect is that over time fewer archaeological resources will be available for study and interpretation.

### PROPOSED ACTION: Forest Health Emphasis and ALTERNATIVE 2: Fuels Management Emphasis

#### Direct and Indirect Effects:

Direct effects on heritage resources are expected to be as follows:

- (1) No effect to heritage properties in project areas where no historic properties are present.
- (2) No effect to heritage properties in project areas where historic and/or unevaluated properties are present, but where site avoidance is feasible and implemented.
- (3) Design criterion 1 would be applied where heritage resources occur and site avoidance is not feasible. Accordingly, activities that may affect the resource would be halted immediately, and the resource would be evaluated by a professional archaeologist. Consultation would be initiated with the Wyoming State Historic Preservation Officer (SHPO), as well as with the Advisory Council on Historic Preservation, if necessary. Project activities would not be resumed until the resource is adequately protected and agreed-upon mitigation measures are implemented with SHPO approval. Application of this design criterion would ensure that historic properties are protected and would, in fact, be beneficial to the resource. Without treatment, the risk of adverse effects would be increased due to damage by unrestricted falling trees and catastrophic fire.

Based on the above information, no adverse effects to heritage resources are expected. The proposed activities are not expected to have indirect effects on heritage resources.

### **Cumulative Effects:**

As mentioned above, implementation of the Proposed Action and Alternative 2 would not adversely affect heritage resources. Therefore, cumulative adverse effects to heritage resources are not expected.

## **FOREST PLAN CONSISTENCY**

All alternatives would be consistent with Heritage direction found in the Medicine Bow National Forest Plan (pg. 1-51). Consistency in the context of the Proposed Action and Alternative 2 is based on implementation of project design criteria. None of the alternatives analyzed in this Draft EIS would result in irreversible or irretrievable effects to heritage resources.

## **3.15 Scenery**

### **Affected Environment**

#### **Scenic Integrity Objectives**

Adopted Scenic Integrity Objectives (SIOs) provide Forest Plan objectives for achieving the desired scenic condition and landscape character of the Forest. Adopted SIOs within the Spruce Gulch analysis area are displayed in Table 3.13. SIO categories are as follows:

- **Very High SIO** allows only minor, if any, deviations from the natural landscape.
- **High SIO** requires the landscape character to appear intact.
- **Moderate SIO** allows the valued landscape character to appear slightly altered.
- **Low SIO** allows the valued landscape character to appear moderately altered.

**Table 3.13: Forest Plan SIOs by Management Area**

<b>SIOs</b>	<b>Mgmt Area</b>	<b>Acres</b>
Very High	1.13 - Wilderness	4,185
High	1.31 - Backcountry Rec., YR Nonmotorized	1,725
Moderate in the foreground of roads/trails. Low in all other areas.	5.13 - Forest Products	214
Moderate in the foreground of roads/trails. Low in all other areas.	5.15 - Forest Products, Ecological Restoration	25,658
Subordinate to more restrict management areas.	7.1 - Residential/Forest Interface	No acreage estimates

Chapter 2 of the Forest Plan (2003) identifies SIOs as guidelines. Guidelines are advisable courses of action that should be followed to achieve forest goals; however, they are optional. Deviations from guidelines must be analyzed during project level analyses and documented in project decisions; they do not require a Forest Plan amendment. A grace period of one year is provided to meet the SIOs of High and Moderate after project completion. A grace period of three years is provided to meet Low SIOs after project completion.

#### **Distance Zones**

Foreground and middleground zones are identified and mapped for the analysis area. At foreground distance (0 – ½ mile from the observer position), visitors can view details of trees,

shrubs, forbs and grasses and small and medium sized animals. At middleground distance (1/2 to 4 miles from the observer position), visitors can view large forest stands, natural openings, lakes and, medium and large management activities such as timber harvest and roads.

## Environmental Consequences

### ALTERNATIVE 1: No Action

#### Direct and Indirect Effects:

Many lodgepole pine areas within the analysis area boundary have already been heavily infested with MBPs and appear red or brown in color. In some areas, where trees were infested up to two to three years ago, trees have already lost their needles. As the beetle epidemic continues, needles on newly infested trees would change color from green to yellowish green, then red and finally brown in several months to one year. Color change typically begins from the lower crown to the top. After two years, needles of dead trees would fall to the ground. As the epidemic continues, more and more of the lodgepole pine forest landscape would have the appearance of dead standing trees with downed trees and natural litter on the ground. In 10 - 15 years, most of the dead trees would litter the forest floor.

In some areas, strong winds would likely blow dead and dying trees down across roads, trails, trailhead parking areas, and dispersed campsites. This situation would present hazards to forest users and travelers within the analysis area. As time and funding allows, the routes would be cleared by Forest Service workers to open access. However, woody material from the cleared trees would not be removed and would likely degrade scenic quality due to the evidence of cut ends of logs when viewed from the immediate foreground of travelways. If trees are not cleared as they fall, forest visitors may also create new paths around the blocked road or trail corridor. These new paths would cause visible resource damage to the landscape.

In some areas, visitors would notice heavy jackstraw of downed timber which, too, would degrade scenery. In these areas, it would take a longer period of time for new trees to regenerate, thus reducing scenic quality for longer periods of time.

Some areas would not be noticed due to camouflaging and screening by surrounding landform and vegetative patterns. In the middleground area where lodgepole pine stands are completely defoliated, scenic impacts would be less apparent than in areas where trees still have discolored needles. Adjacent stands of spruce-fir and non-insect killed lodgepole pine, where they occur, could also soften the scenic impact of defoliated dead standing trees.

Over time, new lodgepole pine seedlings/saplings would be established and, in some areas, small spruce-fir would be established. There may be some invasion of new openings by aspen trees. After several decades, the landscape would have the appearance of pure stand of lodgepole pine trees or mixed stands of lodgepole pine and spruce/fir. Forest visitors may also find scattered aspen groves established within the lodgepole pine forest landscape. Over time, as new forests are established, scenic quality would improve.

The amount of dead and dying trees and fallen trees resulting from the beetle epidemic has the potential to create more severe fire conditions. If large-scale wildfires are ignited, scenic quality would be substantially altered until new vegetation is reestablished. Depending on the severity of the fire, it could take many decades before scenic quality is improved.

## **PROPOSED ACTION: Forest Health Emphasis**

### **Direct and Indirect Effects:**

Under the Proposed Action, vegetation and fuels reduction treatments would be implemented on approximately 4,372 acres within the Spruce Gulch analysis area. Forest visitors would notice landscape changes due to the removal of mature trees that once dominated the landscape. When traveling along roads and trails and when camping in dispersed sites, visitors would observe created openings in various sizes and shapes. They would also observe dead standing trees (snags) left to provide wildlife denning, nesting, and feeding habitat as well as trees left on the ground to protect sensitive plant and wildlife habitats. Larger units would have a higher scenic impact than the smaller units.

Numerous units located in the foreground zones of State Highway 230 and NFSRs 898 (Pelton Creek Road), 530 (Spruce Gulch Road), 516 (Six Mile Gap Road), and 521 (Platte Ridge Road) would appear as Low SIO or Very Low SIO instead of Moderate SIO due to the removal of most beetle-killed trees. However, removal of the dead and dying trees in the foreground zone would allow remaining younger trees to grow faster with less competition for light and moisture. Units larger than 40 acres would appear as Very Low SIO instead of Moderate SIO or Low SIO in the foreground and middleground zones. This would occur because there would be no available vegetative screening in the immediate foreground to mitigate the scenic impact. After 10 to 20 years, scenic integrity would improve once young green healthy trees begin to dominate the forest landscape again and provide a more pleasing visual experience for future generations.

Indirect effects could result in some larger treated units if residual trees not adapted to created opening are naturally blow down by wind. This would result in down trees with exposed roots dominating the opening which would lower the scenic integrity when viewed from travel routes.

## **ALTERNATIVE 2: Fuels Management Emphasis**

### **Direct and Indirect Effects:**

Direct and indirect effects on scenic resources would be similar to the Proposed Action but to a lesser extent since vegetation and fuels reduction treatments would be implemented only around WUIs and adjacent to forest road corridors that provide escape routes.

### **Cumulative Effects - All Alternatives:**

Existing landscapes within the Spruce Gulch analysis area have primarily been shaped by natural and human events. The landscape characteristics remain in place with some changes resulting from human activities such as timber cutting, roads, trails, and dispersed and developed recreation. Currently there is evidence of beetle-killed stands scattered throughout the analysis area, and it is estimated that the majority of mature lodgepole pine trees will be infested by MPBs within 3 to 5 years.

In the recent past (3 - 5 years), two wildfires occurred near or within the analysis area boundary. Several of the burned sites were replanted with new seedlings. Past harvested units on FS lands located within and adjacent to the analysis area have new young trees established in various stages of ages and heights. It is likely that these areas would not be infested by MPBs. New young trees are also growing on the Wyoming State forest land located across State Highway 230; this area was harvested about a decade ago. These young green trees would help to

compensate for scenic impacts that would occur through vegetation and fuels reduction treatments within the analysis area.

Future projects in and adjacent to the analysis area include a hazardous tree removal project and a road/trail decommissioning project. The Forest-wide Hazardous Tree Removal and Fuels Reduction Project (2008) proposes to remove dead and dying trees within developed recreation areas, trailhead parking areas, and along roads and trails. Hazardous tree removal in these areas would appear as Low or Very Low SIO instead of High or Moderate SIO. It is anticipated that this project would remove 2,500 acres of hazardous trees in the analysis area over the next 10 years. Some of these acres overlap with the Spruce Gulch project. The Travel Management - Eastern Snowy Range project (June 2007) will result in the decommissioning of roughly 43.7 miles of unauthorized roads and trails. Decommissioning of unneeded roads would improve scenic integrity of the analysis area.

The No Action alternative would affect scenic quality when viewed from travel corridors, developed and dispersed recreation sites, and adjacent to private home development. Many dead and dying trees would fall down in a decade or so and would litter the forest floor. Forest visitors would likely find this situation undesirable when viewed from travel corridors and private home development. However, these situations would be the result of natural disturbance rather than human-caused disturbance.

The Proposed Action would result in large, visible landscape changes in the foreground and middleground zones because thousands of acres of beetle killed trees would be harvested. This situation would be similar under Alternative 2, but to a lesser degree, due to fewer acres proposed for harvest in the middleground zone.

## FOREST PLAN COMPLIANCE

The No Action alternative would comply with Forest Plan adopted SIOs except for along NFSRs and Forest trails where naturally felled trees would be cut to open access but would not be removed. Areas where large amounts of cut trees would be left on the forest floor alongside road and trail corridors would appear as Low or Very Low SIO instead of Moderate SIO. Most treatment units associated with the Proposed Action and Alternative 2 would be consistent with adopted SIOs with effective implementation of design criteria. Numerous units located in the foreground zone of State Highway 230 and NFSRs 898, 530, 516, and 521 would appear as Low SIO instead of Moderate SIO due removal of most beetle-killed. Units larger than 40 acres would appear as Very Low SIO instead of Moderate SIO or Low SIO when viewed in the foreground and middleground zones if there is no available vegetative screening in the immediate foreground to mitigate the scenic impact. None of the alternatives analyzed in this Draft EIS would result in irreversible or irretrievable effects to scenic resources.

## 3.16 Range

### Affected Environment

The West Beaver livestock grazing allotment and the Somber Hill pasture of the Boswell livestock grazing allotment are located within the Spruce Gulch analysis area. Grazing permit information, including class of livestock and season of use, is listed in Table 3.14.

**Table 3.14: Permit Information by Allotment**

Allotment/ Pasture	Livestock Type	Number & Class	Season Of Use	Acres	Suitable Grazing Acres	AUMs
West Beaver	Cattle	300 cow/calf	7/1-9/30	21,842	5,023	1,170
Somber Hill	Cattle	526 cow/calf	6/25-9/30	6,080	1,824	2,201

The majority of suitable rangelands in the allotments exist along Pelton Creek, North Fork Creek, Elkhorn Creek, and Walbright Creek. Plant communities in these areas generally consist of a sedge/rush/agrostis/ deschampsia mixture with fescue and brome present along the less moist edges. Most of the bottom areas also have a dense willow overstory. Other suitable, drier rangelands exist in small parks of sagebrush/grass, isolated stands of aspen, and past timber harvest areas that were logged between 1970 and 1990. Aspen sites generally have a mixed herbaceous understory of forbs and grasses. Suitable rangelands in conifer stands consist mostly of sedges with some bluegrass and pinegrass.

Natural barriers, such as steep terrain, high elevation, and dense stands of conifers comprise the majority of the boundary line for the West Beaver allotment and Somber Hill pasture of the Boswell Allotment. However, a boundary fence does exist along the southern boundary of the West Beaver allotment and along the southeastern side of the Somber Hill Pasture. Intermittent segments of boundary fence also exist between the North Pelton pasture and the South Pelton pasture; between the South Pelton pasture and the Porter Creek pasture; Between the North Pelton pasture and the Douglas Creek pasture; and between the South Pelton pasture and the Somber Hill pasture.

**Environmental Consequences**

**ALTERNATIVE 1: No Action**

**Direct and Indirect Effects:**

No management actions would be taken to reduce fuel loads or to improve forest health in the West Beaver Allotment and the Somber Hill pasture. Consequently, transitory range would not be created from timber removal and no additional forage would be created by removal of the aspen understory and sagebrush canopy. This would have no immediate impact to the range resource.

As tree mortality from the bark beetle epidemic continues, some transitory range may still be created as trees fall and open up the canopy. A more open canopy would allow the vegetation on the forest floor to utilize the subsequent sunlight and available nutrients thereby improving the overall vigor of the herbaceous understory. Depending on site conditions, other tree species (e.g. aspen) may increase as well. Forage conditions, in terms of species composition and overall vigor of the herbaceous layer, would improve more under an aspen canopy than under a conifer canopy.

**PROPOSED ACTION: Forest Health Emphasis**

**Direct and Indirect Effects:**

Treatment units associated with the Spruce Gulch Bark Beetle and Fuels Reduction project are not expected to impact rangeland to the extent that a full season of rest from livestock grazing

would be required. Most of the treatment units are located in areas not traditionally occupied by livestock or they are at the west end of the allotment where livestock use occurs toward the end of the grazing season. Any livestock grazing that does occur on the treatment areas would take place later in the growing season after most of the vegetation has reached maturity.

Clearcut, overstory removal, and salvage treatments would remove tree basal area and conifer canopy over a large area. The newly opened canopy from the harvest treatments would allow the herbaceous and woody understory to utilize the increased light and the available nutrients, thereby increasing the overall vigor of the herbaceous understory. This would expand and enhance forage for wildlife habitat and, depending on access, topography, and proximity to water, create transitory rangeland for domestic livestock.

While the slash treatments should not have any comprehensive, long-term effects, the areas disturbed by pile burning may take longer to regenerate and would provide potential sites for noxious and undesirable weeds to invade. The burned sites would be small and relatively isolated and should not have a significant impact on the size or condition of the range resource, as long as noxious and undesirable weeds are controlled. Elimination (burning) of slash would greatly increase herbaceous undergrowth due to increased light and nutrient availability. Removal would also allow greater mobility across the landscape for livestock and wild ungulates.

In most cases, existing fences on the southern boundary and across creek bottoms should prevent cattle from leaving the allotment. There is one area (T.12N., R78W., sections 7, and 18), however, where a dense conifer stand serves as a natural boundary that may be adversely affected by timber removal. This area (unit 105) may necessitate 0.25 miles of new fence construction to prevent livestock movement between allotments. Approximately 0.6 miles of an existing fence that runs thru units 21 and 37 may also need to be reconstructed after forest treatments have been applied; the fence may need to be moved north of the units.

Livestock use in the Spruce Gulch analysis area should not negatively affect tree regeneration. Cattle are grazers and select herbaceous species as their primary forage (Hanley, 1982). This does not preclude them, however, from browsing on shrubs. When cattle do browse on shrubs, it is usually in the winter or late spring, or when herbaceous forage is not available (Holechek 1984). Cattle would not generally be in the allotments at this time. Therefore, shrub use would be incidental, if at all.

The greatest harm to young trees from cattle grazing could occur when the terminal buds are removed. This would preclude growth on the main stem and stimulate lateral growth of the branches (Doescher et al., 1987). While this may prevent the tree from growing into a symmetrical tree, it does not necessarily delay the successful regeneration of the tree component. Further, cattle do not normally select conifer tree terminal buds and shrub species unless they are forced by a lack of herbaceous forage or intense competition (Holechek and Vavra 1982, Vavra et al., 1989).

Canada thistle is fairly common along area of disturbance such as new road construction, log decks, and skid trails. Surface disturbing activities and associated traffic may create an environment for biennial thistles and other noxious weeds, including Canada thistle, leafy spurge, several knapweeds, Dalmatian and yellow toadflax.

## **ALTERNATIVE 2: Fuels Management Emphasis**

### **Direct and Indirect Effects:**

Direct and indirect effects on the range resource would be similar to the Proposed Action but to a lesser extent since vegetation and fuels reduction treatments would be implemented only around WUIs and adjacent to forest road corridors that provide escape routes.

### **Cumulative Effects - All Alternatives**

Any 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 native rangeland vegetation, as invasive species have the ability to out-compete desired native plants. Both the Proposed Action and Alternative 2 have the potential to introduce and increase noxious weeds and other exotic plants as a result mechanized equipment associated with the vegetative and fuels abatement treatments. However, project design (design criterion 2) would minimize the potential for noxious weed and exotic plant dispersal.

Removal of hazardous trees along NFSRs, as proposed in the Forest-wide Hazardous Tree Removal and Fuels Reduction project (2008), would have little to no effect on livestock operations. The inevitable ground disturbance, however, could affect noxious weed populations. Noxious weeds thrive in areas where soil disturbance has occurred and roads are a vector for spread of noxious weeds to other areas. Increased treatment of weeds is likely to be required for a number of years (depends on site characteristics) following soil disturbance.

Road construction associated with the Proposed Action and Alternative 2 may make formerly inaccessible areas available to both humans and grazing animals. Opening a new area to grazing can have a positive impact by helping to distribute grazing animals. However, it can also have a negative impact by allowing access to areas that may contain sensitive species habitat. The likelihood of gates being left open (which increases the chance livestock being in unauthorized areas) increases as the number of roads increase.

In the Spruce Gulch analysis area, the primary impacts from recreational use to the rangeland resource are the negative impacts to vegetation (i.e. removal of vegetation, soil compaction, introduction of invasive species) that result from off-road travel. Off-road travel also indirectly impacts the rangeland vegetation resource by increasing the likelihood of gates being left open by the public. Leaving gates open makes livestock management difficult and often results in livestock being in unauthorized areas. Although off-road travel is not allowed in the analysis area, this activity does still occur.

Road closures associated with the Travel Management: Eastern Snowy Range decision (June 21, 2007) would have both positive and negative effects on livestock management operations. Disturbance or harassment of livestock by recreational users would be reduced in areas where roads would be closed. Reduction or relocation of fence gates due to road closures would reduce the incidence of livestock leaving designated pastures via gates left open by recreational users. Access to some areas would become more difficult for livestock managers due to road closures. Livestock may continue to trail on closed roads that they have used in the past.

## **FOREST PLAN COMPLIANCE**

All alternatives would comply with Forest Plan direction and standards and guidelines for rangelands (pp. 1-32 to 1-35). The Forest Plan emphasizes removal of livestock from the allotments when further utilization on key areas would exceed allowable-use criteria identified in the forest plan or allotment management plans. Proper grazing management would ensure that livestock would be removed from the West Beaver and Boswell allotments before damage to shrubs and trees can occur. None of the alternatives analyzed in this Draft EIS would result in irreversible or irretrievable effects to the range resource.

### **Short-term Uses and Long-term Productivity**

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NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

Short-term uses are those expected to occur on the Forest during the next ten years. These include, but are not limited to; recreation use, grazing, mineral development, timber harvest, and prescribed burning. Long-term productivity refers to the capability of the land to provide resource outputs beyond the ten-year period. For the purposes of this analysis, short-term uses include harvesting timber and disturbance of the land surface for the associated equipment and travelways. These areas would be returned to vegetative cover and would not reduce the long-term productivity of the land.

The ecological, social, and economic sustainability requirement established by 36 CFR 219.19 provide for long-term productivity of the land. Minimum management requirements prescribed by Forest Plan standards and guidelines help to assure that long-term productivity of the land will not be impaired by any of the short-term uses that are proposed by any of the activities of this project. Forest Plan standards would be met under both the Proposed Action: Forest Health Emphasis and Alternative 2: Fuels Management Emphasis.

### **Unavoidable Adverse Effects**

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The application of the Forest Plan standards and guidelines and the listed design criteria would limit the extent and duration of any adverse environmental effects associated with this project. However, it is impossible to avoid all potential impacts completely. Refer to the discussion of Environmental Consequences for each resource area in the preceding sections of this document for the disclosure of environmental effects.

### **Irreversible and Irretrievable Commitments of Resources**

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Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

None of the alternatives analyzed in this Draft EIS have any identifiable irretrievable or irreversible commitment of resources, as determined by the Interdisciplinary Team. See Draft EIS pp. 50 – 125.

## CHAPTER 4: CONSULTATION AND COORDINATION

### Preparers and Contributors

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:

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## Distribution of the Environmental Impact Statement \_\_\_\_\_

This environmental impact statement has been distributed to individuals who specifically requested a copy of the document. In addition, copies have been sent to the following Federal agencies, federally recognized tribes, State and local governments, and organizations representing a wide range of views regarding resources in the Spruce Gulch analysis area.

### **FEDERAL AGENCIES:**

Advisory Council on Historic Preservation  
 USDA APHIS PPD/EAD  
 Natural Resources Conservation Service  
 USDA, National Agricultural Library  
 U.S. Army Engineer, Northwestern Division  
 Environmental Protection Agency, Region 8  
 Federal Aviation Administration  
 U.S. Department of Energy  
 U.S. Fish and Wildlife Service

Wyoming Game and Fish Department  
 State Historic Preservation Office  
 State Trails Program  
 State Forestry  
 Wyoming Department of Transportation  
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## APPENDIX A

### Standards and Guidelines

#### **Forest-wide Standards and Guidelines:**

- Limit roads and other disturbed sites to the minimum feasible number, width, and total length consistent with purpose of specific operation, local topography, and climate. (*Soil Standard 1, p. 1-28*)
- Construct roads and other disturbed sites to minimize sediment discharge into streams, lakes, and wetlands. (*Soil Standard 2, p. 1-28*)
- Stabilize and maintain roads and other disturbed sites during and after construction to control erosion. (*Soil Standard 3, p. 1-28*)
- Reclaim roads and other disturbed sites when use ends, as needed, to prevent resource damage. (*Soil Standard 4, p. 1-28*)
- Manage land treatments to limit the sum of severely burned and detrimentally compacted, eroded, and displaced land to no more than 15% of any activity area (FSH 2509.18). (*Soil Standard 5, p. 1-28*)
- Maintain or improve long-term levels of organic matter and nutrients on all lands. (*Soil Standard 6, p. 1-28*)
- Prohibit soil-disturbing activities (e.g., road construction, wellpad construction) on slopes greater than 60% and on soils susceptible to high erosion and geologic hazard. (*Soil Guideline 1, p. 1-28*)
- Perform an on-site slope stability examination on slopes over 40% prior to designing roads or activities that remove most or all of the timber canopy. Limit intensive ground-disturbing activities on unstable slopes identified during the examinations. (*Soil Guideline 2, p. 1-28*)
- Manage land treatments to conserve site moisture and to protect long-term stream health from damage by increased runoff. (*Water and Aquatic Standard 2, p.1-28*)
- In the water influence zone (WIZ) next to perennial and intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term stream health and riparian condition. (*Water and Aquatic Standard 4, p. 1-28*)
- Design and construct all stream crossings and other instream structures to allow passage of water and sediment, to withstand expected flood flows, and allow free movement of resident aquatic life. (*Water and Aquatic Standard 5, p. 1-29*)
- Design activities to protect and manage the riparian ecosystem. Maintain the integrity of the ecosystem including quantity and quality of water. (*Water and Aquatic Standard 14, p. 1-29*)
- In watersheds containing aquatic, wetland or riparian dependent TES species, allow activities and uses within 300 feet or the top of the inner gorge, (whichever is greater), of perennial and intermittent streams, wetlands and lakes (over ¼ acre) only if onsite analysis shows that long-term hydrologic and riparian function, channel stability, riparian and stream habitat will be maintained or improved. (*Water and Aquatic Standard 15, p. 1-29*)
- Manage old forest to retain or achieve at least the minimum percentages of old growth by cover type<sup>6</sup> by mountain range. If stands meeting the old growth definition do not exist at these percentages, manage additional stands that acre closest to meeting old growth criteria as recruitment old growth to meet these desired percentages. (*Biological Diversity Standard 1, p. 1-31*)

<sup>6</sup> Spruce/fir - 25%; Lodgepole - 15%; Ponderosa pine - 25%; Aspen – 20%

- Limit management of stands to actions necessary to maintain or restore old growth composition and structure. (*Biological Diversity Standard 2, p. 1-31*)
- Identify and map old growth blocks that mimic natural patch size and distribution. Include non-linear, unfragmented blocks (over 300 acres) where available. Old growth in small, scattered stands, larger patches, and streamside stretches shall be maintained to produce a pattern that is well distributed across the landscape by making sure that some old growth is maintained in every Geographic Area. Consider connectivity when identifying scattered stands. (*Biological Diversity Guideline 1, p. 1-31*)
- Operations (such as timber harvest and other vegetative treatments) and road and motorized trail construction and management should be conducted to create patch sizes of sufficient area or appropriate spatial pattern to serve the habitat needs of species or communities at risk. (*Biological Diversity Guideline 4, p. 1-32*)
- When managing vegetation, maintain existing, or move towards desired patch size, distribution abundance and/or edge-to-interior ratios, which are characteristic of natural disturbances (fire, insects, and diseases) representative of the cover types, measured at the Geographic Area scale. (*Biological Diversity Guideline 5, p. 1-32*)
- Allow no loss or degradation of known or historic habitat for the boreal toad, wood frog or northern leopard frog. (*Standard, p. 1-44*)
- During project planning, if potential habitat occurs in the project area, survey for threatened, endangered, proposed, and candidate species on the US Fish and Wildlife Service's species list for the Forest. Provide mitigation of potential adverse effects for species present. (*Standard, p. 1-44*)
- Activities will be managed to avoid disturbance to sensitive species and species of local concern, which would result in a trend toward Federal listing or loss of population viability. The protection will vary depending on the species, potential for disturbance, topography, location of important habitat components and other pertinent factors. Special attention will be given during breeding, young rearing, and other times which are critical to survival of both flora and fauna (*Standard, p. 1-44*)
- Use integrated pest management techniques, including silviculture treatments, to meet management area objectives. Base treatments activities on achieving multiple use and ecosystem management objectives and reducing risks to adjacent private and public lands. Give priority to areas in which values to be protected exceed cost of protection; for example, areas adjacent to subdivisions, recreation sites, suitable timberlands, or areas of concentrated public use. (*Guideline, p. 1-50*)
- Use vegetation management practices to meet objectives and reduce risk of insects and disease. Give priority to cover types identified as moderate to high risk. (*Guideline, p. 1-50*)
- In project plans, consider existing infestations of insects or disease within the project area. Design activities to minimize risk of spreading infestation and meet multiple use and ecological objectives. (*Guideline, p. 1-50*)

### **Management Area (MA) Standards and Guidelines:**

#### **MA 5.15 - Forest Products, Ecological Maintenance and Restoration Considering the Historic Range of Variability**

- Manage forested areas such that insect infestations and disease outbreaks remain locally restricted. (*Integrated Pest Management, Guideline 1, p. 2-62*)

- Use coordinated landscape scale treatments to limit the need for frequent reentries and continued need for additional classified roads. Maximize use of temporary roads. (*Transportation Guideline 2, p. 2-62*)
- Manage vegetation to maintain or restore healthy ecological conditions through a variety of management activities. Timber harvest is scheduled and does contribute to the allowable sale quantity. There are opportunities to collect firewood. (*Vegetation Standard 1, p. 2-63*)
- Prohibit vegetation treatment in inventoried and mapped spruce-fir or lodgepole pine old growth stands (*Vegetation Standard 2, p. 2-63*)
- Mimic the size, shape, juxtaposition, and position on the landscape of past fires. Sizes of openings can vary from a few acres up to 250 acres based on site-specific conditions. Inclusion of past harvest units will be evaluated for opportunities to restore natural patterns on the landscape. (*Vegetation Guideline 2, p. 2-63*)
- Design boundaries of harvest units to mimic natural landscape patterns. (*Vegetation Guideline 3, p. 2-63*)
- In clearcut units, retain approximately 20% of the interior of the unit in clumps, or fingers of unharvested trees. These areas contribute to forest-wide standards for snag retention and distribution of future downed wood. These interior units are designed to emulate unburned areas that occur in natural fire disturbances. (*Vegetation Guideline 6, p. 2-63*)
- Special emphasis is given to treating lodgepole pine in the 80 to 120 age class where these ages exceed the HRV. This may require harvesting some stands prior to achievement of 95% CMAI as described in 36 CFR 219.16(a)(3)(iii). (*Vegetation Guideline 7, p. 2-63*)
- Design and implement silvicultural treatments to meet wildlife objectives for vertical structure, stand density, age class distribution, spatial pattern, or other habitat goals. (*Vegetation Guideline 8, p. 2-63*)
- Use a full range of biologically appropriate silvicultural practices to produce sawtimber and other forest products. (*Vegetation Guideline 10, p. 2-64*)
- Identify and manage areas greater than 250 acres in size as needed to provide adequate wildlife security areas. (*Wildlife Guideline 1, p. 2-64*)

#### **MA 7.1 – Residential/Forest Interface**

- Coordinate management activities with adjacent landowners, county fire wardens, local volunteer fire departments, and the State Forester. (*General Guideline 1, p. 2-69*)
- To allow direct attack, treat management activity fuels to reduce fire intensity levels within 3 years after vegetation management activities are completed. (*Fire and Fuels Standard 1, p. 2-70*)
- Minimize potential for insect infestations and disease outbreaks through vegetation treatments to maintain stands at moderate or lower risk. (*Integrated Pest Management Guideline 1, p. 2-70*)

## **APPENDIX B**

### ***Adaptive Management, Silvicultural Prescriptions, and Logging Design***

#### **Adaptive Management - Spruce Gulch Analysis**

Under Adaptive Management vegetation treatments are identified at the time of implementation rather than during project planning. Treatment units identified during the NEPA process need to be evaluated on the ground before an adaptive management option is selected because of rapidly changing conditions (i.e., bark beetle infestation). Reforestation of future stands is the primary goal of adaptive management. It is important to emphasize that bark beetle activity is always part of this ecosystem and outbreaks of varying size and intensity may continue to occur in treated stands and the adjacent untreated stands. These outbreaks could require continued control operations.

The Proposed Action identifies 2,329 acres for adaptive management treatments; these acres are highly susceptible to bark beetle infestation. During project implementation, all infested trees would be targeted for removal; dead trees not retained for wildlife purposes would also be targeted. In addition, live, poor form, defective, diseased, or overstocked trees would be considered for removal depending on the selected silvicultural treatment method. Although fewer acres are proposed for treatment under Alternative 2, the mix of treatments would be different as determined by the extent of bark beetle infestation at the future date of implementation. The advantage of deferring this decision is the ability to more appropriately address level of salvage needs and reforestation needs and opportunities.

Despite the latitude of an adaptive management approach, many stands have a predetermined treatment due to stand conditions. This is mostly true regarding the application of the clearcut treatments prescribed, given existing CMAI, insect/disease infestation levels, and lack of existing regeneration. Table A-1 provides a summary of the silvicultural treatments for both action alternatives. It also depicts predetermined treatments and adaptive management treatments. Design criteria for some adaptive management units have specific criteria for tree retention within the mapped lynx corridor. These are shown as separate adaptive management acres in the table.

**Table A-1: Comparison of Treatments – Predetermined and Adaptive Prescriptions**

Treatments	Proposed Action	No Action	Alternative 2
Clearcut	2,005* acres	0 acres	772 acres
Overstory Removal	38 acres	0 acres	0 acres
Adaptive Management	1,896 acres	0 acres	1,147 acres
Adaptive Management – Lynx (30% Retention)	433 acres	0 acres	433 acres
<b>TOTAL</b>	<b>4,372 acres</b>	<b>0 acres</b>	<b>2,352 acres</b>

\* This includes the clearcut POL prescriptions.

## General Silvicultural Prescriptions – Spruce Gulch Analysis

**Clearcut** – A silvicultural regeneration system under which the existing stand, with the exception of designated wildlife trees, is removed in a single harvest entry. This creates open, full sunlight ground conditions for new regeneration and favors the establishment of early successional species such as lodgepole pine and aspen. Natural regeneration is anticipated but occasionally (less than 5%), some areas may need to be seeded or planted. The primary objective of clearcutting is the regeneration of a healthy new stand.

There are several operational phases to clearcutting: 1) the overstory is typically removed during a commercial harvest. Overstory is generally lodgepole pine 5.0” dbh and larger and other conifer species over 7.0” dbh. 2) Site preparation and slash treatment are generally completed concurrently following the commercial harvest. Site preparation is critical to ensure preparation of a seedbed for the new regeneration. Site preparation/slash treatment can be done using a variety of methods including mechanical scarification, roller chopping, piling and burning piles, or broadcast burning. The specific method would be chosen after commercial harvest and will depend on unit specific conditions and objectives. 3) Regeneration surveys are done to ensure the stand is fully stocked and certify the stand or to prescribe reforestation treatments if it is not (see Table A-2).

Clearcutting has been proposed for units with existing MPB infestations, high mortality levels, and/or moderate to high levels of dwarf mistletoe infection.

**Adaptive Management** proposed units can be considered for clearcutting if:

- a) Stands have generally culminated in mean annual increment (CMAI).
- b) Dwarf mistletoe infestation is moderate to high
- c) A significant number of trees (50% or more of the stand) is infested with mountain pine beetles and /or spruce beetles. Infested trees may be live, fading, or dead.
- d) Little to no understory or natural regeneration is currently on site with in the unit.

**Shelterwood – Removal Cut (overstory removal)** – This system is often referred to as an overstory removal; it is a silvicultural regeneration system used to free an existing understory from competition. Designation by species (DxSPP) or designation by diameter (OR) can be considered.

Operational phases completed in an overstory removal treatment are similar to those completed under a clearcut system. There is one primary difference – in an overstory removal, a healthy well-stocked understory exists and great care is taken to preserve that understory. 1) Trees removed in a commercial harvest are generally lodgepole pine 5.0” dbh and larger and other conifer species over 7.0” dbh. Wildlife trees are marked for retention and remain on site. 2) Slash treatment generally involves lopping and scattering to a 2 foot slash depth; slash treatment is generally a contract requirement to be done by the timber purchaser during commercial harvest. Lopping is usually done with a chainsaw and scattering is done by hand. 3) Site preparation is not generally needed except in occasional lightly or un-stocked patches. In these cases a small dozer can be used to mechanically scarify the patches. Specific needs for site preparation and method would be chosen after commercial harvest and would depend on unit specific conditions and objectives. 4) Release and weeding may be done in the remaining regeneration as a separate operation after the commercial harvest for stocking control and to remove defective and/or diseased young trees.

**Adaptive Management** proposed units can be considered for overstory removal if:

- a) A basal area of 60 square feet per acre or greater of healthy understory exists and is well distributed over at least 60% of the stand.
- b) Mistletoe infection in the understory is low or non-existent.
- c) 20% or more of the stand is infested with MPBs and /or spruce beetles. Infested trees may be live, fading, or dead.

**Table A-2: Summary of Adaptive Management Treatment Considerations:**

Adaptive Mgmt. Treatment Options	Regeneration Is Objective	Site Prep	Beetle Infestation Percent	Slash Treatment	Regen Survey and Cert	% of Cut Overstory (Not WL Trees)	Wind Throw Concerns	*TSI Need
Clearcut	Yes (Even-aged)	Yes	Up to 100%	Mechanical	Yes	100%	No	No
Overstory Removal	Yes (Even-aged)	Not Usually	Up to 100%	Lop and Scatter	Yes	100%	No	Yes
Shelterwood Prep/Seed	Yes (Even-aged)	Not Usually	10% or less	Lop and Scatter	Yes	About 1/3 per step	Yes	No
Commercial Thinning	No-Intermediate Treatment	Not Usually	10% or less	Lop and Scatter	No	Varies 20–60%	Not usually	No
Sanitation/Salvage	No- usually an Intermediate Treatment. Yes- if heavy removal results in non-stocked areas resulting in reforestation need.	Not usually but may occur in patches.	20 % or less	Lop and Scatter, Mechanical as needed	No, but add reforest need if non-stocked areas exist	**Varies sanitation usually 10-40%, Salvage can be up to 100%	Depends on % removal	No or yes
Group Selection	Yes (uneven-age)	Not usually but may occur in patches	Very low levels 5% or less	Lop and Scatter, Mechanical as needed	Yes	Usually not more than 25%	Not usually	Not usually

\*TSI Need - Stand improvement treatments for the culturing of new stands such as release and weeding and thinning are will be done following harvest as they are a component of implementing the regeneration systems. A shelterwood removal system, and perhaps sanitation/salvage systems, would be followed by a release and weed operation within several years of harvest. Regeneration as a result of clearcutting would generally be pre-commercially thinned at age 20-25. Not usually, but a thinning or release and weed could be done subsequent to group selection harvest outside of the current harvest groups as a separate operation.

**Shelterwood Systems – Shelterwood Seed and Shelterwood Prep Harvest -**

The objective of shelterwood silvicultural systems is to regenerate a stand. A shelterwood system creates a more protected and shaded environment for the new regeneration and is especially helpful in regenerating later seral species such as Engelmann spruce and sub-alpine fir although it is often used in lodgepole pine.

Conditions for use: Apply to units with fairly open wind firm overstory and pockets of existing conifer understory that are not heavily infected with mistletoe or infested with beetles (15% or less of overstory trees). Either lodgepole pine or Engelmann spruce may be favored as seed trees.

Usually a 3-step shelterwood is employed in this area rather than a 2-step shelterwood due to wind throw risks. The shelterwood prep step is the first step of the 3-step shelterwood system and typically calls for removal of about 1/3 of the basal area (BA). A 2-step shelterwood does not have a "Prep Cut." The Seed Cut is the 2<sup>nd</sup> step of a 3-step shelterwood or 1<sup>st</sup> step of a 2-step shelterwood. The shelterwood seed step typically calls for removal of 50% of the remaining BA (for a 3 step system this is approximately 1/3 of the original volume). The objective is to leave the best trees for seed and create sheltered ground conditions for the new seedlings. Generally portions of these units are ready for an overstory removal and that can be accommodated in the same unit as variations of the shelterwood seed prescription where adequate regeneration exists. Operationally, trees are often marked with paint for designating commercial removal. Trees can be marked to leave (LTM) or marked to take (ITM) depending on stand conditions.

Conditions for use: apply to units that have a relatively even-aged stand structure and a low incidence of mistletoe and beetle infestation (15% or less of the overstory trees).

Operational phases of shelterwood implementation include:

- A) Shelterwood Prep Step – Remove approximately 1/3 of the BA via a commercial timber sale. Intent is to test/develop wind firmness in the remaining trees. Trees are usually marked for removal with paint. Usually beetle infested, dead, defective and or diseased trees over 7.0" DBH are marked. Slash treatment is usually lop and scatter to a 2 foot depth.
- B) Shelterwood Seed Step – Done about 10 – 30 years after the prep entry to open up the stand enough to obtain regeneration. Remove approximately 1/2 of the remaining BA (about 1/3 of the original stand BA) via a commercial timber sale. Trees are usually marked for removal with paint. Usually beetle infested, dead, defective and or diseased trees over 7.0" DBH are marked. Slash treatment is usually lop and scatter to a 2 foot depth.
- C) Regeneration survey is conducted by the Forest Service to ensure there is adequate regeneration before scheduling the Shelterwood removal step.
- D) Shelterwood Removal Step - Done about 10 – 20 years after the seed entry to release the new regeneration from competition with the remaining overstory (see overstory removal system description). Remove the remaining BA (about 1/3 of the original stand BA) via a commercial timber sale. Trees can be marked for removal with paint or an OR or DxSPP designation can be used. Usually beetle infested, dead, defective and or diseased trees over 7.0" DBH are marked. Slash treatment is usually lop and scatter to a 2 foot depth.
- E) Regeneration survey is done to ensure the stand is fully stocked and certify the stand or to prescribe reforestation treatments if it is not.

**Adaptive Management** proposed units can be considered for Shelterwood systems if:

- a) The existing stand structure is fairly even-aged and wind throw risk is not high.
- b) There is beetle infestation in 15% or fewer of the overstory trees in the stand.

c) Mistletoe infestation in lodgepole pine is low or non-existent or another species such as Engelmann spruce (which is not susceptible to mistletoe infection) is the target species for the new stand.

**Commercial Thinning** - Commercial thinning is an intermediate treatment. The intent is to reduce stocking and reallocate growing space to the more superior crop trees. Commercial thinning is generally done in younger lodgepole pine stands where release and further growth can be expected. This treatment may be applied to stands with predominately pole-size class trees. Stocking goals are usually described in terms of average spacing between remaining trees or residual basal area (BA) per acre. The intent is not to regenerate a stand.

Operationally, lodgepole pine 5.0 inches DBH and greater can be removed in a commercial operation. Other conifer species 7.0" and larger can also be removed.

**Designation methods**: Trees can be marked to leave (LTM), marked to take (ITM), or a designation by spacing can be used. Slash treatment is generally lopping and scattering to a 2 foot slash depth and is done by a timber purchaser during harvest. Site preparation is not generally needed except in occasional lightly or un-stocked patches. Specific needs for site preparation and method will be chosen after commercial harvest and will depend on unit specific conditions and objectives.

**Adaptive Management** proposed units can be considered for Commercial Thinning if:

- a) There is beetle infestation in 10% or fewer of the trees in the stand. Consider retaining mid-sized or smaller trees for the retained crop trees in the stand instead of the larger trees because the larger trees are more likely to be infested by beetles.
- b) There will generally be at least 60 square feet of BA remaining per acre following harvest well distributed over at least 80% of the stand. This BA should be reasonably expected to survive beetle infestation.
- c) If minimal stocking following harvest and beetle infestation cannot be reasonably expected consider a regeneration method which will ensure the unit receives site preparation and regeneration treatments.

**Sanitation/Salvage** – Sanitation/salvage is an intermediate treatment. The intent is to remove beetle infested, diseased, dead, and or defective trees to create a healthier stand. The intent is not to obtain regeneration. Sanitation and salvage can be separate operations, but they are usually combined so not only dead or imminently dying trees are removed but those that are diseased and/or defective also but perhaps not in imminent danger of dying. A strictly sanitation operation would not be expected to remove so many trees that reforestation would be needed. In general, sanitation removals would range between 10% and 40% of the BA and leave a fully stocked stand with either a uniform or patchy arrangement. Release and weeding may be done in the remaining regeneration as a separate operation after the commercial harvest for stocking control and to remove defective and/or diseased young trees.

Salvage removals could range up to 100% BA removal of the overstory depending on mortality levels caused by fire, insect infestation, and/or wind-throw. If the removal needed to treat the problems in a unit is heavy (i.e., harvest would leave a stand with significant non-stocked areas), a regeneration method to ensure a stocked stand remains may be more appropriate to ensure automatic tracking of reforestation needs.

Operationally, trees are often marked with paint for designating commercial removal. Alternatively a DxSPP (designation by Species) or overstory removal (OR) designation could be used to accomplish designation for harvest dependent on conditions.

Slash treatment is generally lopping and scattering to a 2 foot slash depth and is done by a timber purchaser during harvest. Site preparation is not generally needed except in occasional lightly or un-stocked patches. Specific needs for site preparation and method will be chosen after commercial harvest and will depend on unit specific conditions and objectives.

**Adaptive Management** proposed units can be considered for Sanitation/Salvage if:

a) There is beetle infestation of 15-50% of the overstory trees in the stand

**AND**

b) There will generally be at least 60 square feet of BA remaining per acre following harvest well distributed over at least 60% of the stand. This BA should be reasonably expected to survive beetle infestation.

**OR**

c) If minimal stocking following harvest and beetle infestation cannot be reasonably expected consider a regeneration method which will ensure the unit receives site preparation and regeneration treatments or schedule reforestation treatments and regeneration surveys.

**Group Selection** - Group Selection is an uneven-aged regeneration method. The intent is to remove a high forest appearance in perpetuity with all age classes present. Trees in small groups, 1-2 tree lengths in diameter over a total of 20% of the stand acres, would be harvested on a 30 year cutting cycle. During the first entry, groups containing beetle infested, diseased, dead, and or defective trees would be targeted to create healthier stand conditions. In addition, sanitation salvage would be implemented between groups to salvage imminent mortality, those trees not expected to survive to the next entry. The intention is to obtain regeneration of approximately 20% of the stand during each cutting cycle (Cutting cycle = 30,  $Q = 1.2$ ).

Operationally, individual trees are marked for take (ITM) with paint for commercial removal. Designation by species (DxSPP) is not appropriate for designation of trees to remove.

Slash treatment is generally lopping and scattering to a 2 foot slash depth and is done by a timber purchaser during harvest. Site preparation is not generally needed except in occasional lightly or un-stocked patches. Specific needs for site preparation and method will be identified after commercial harvest and will depend on unit specific conditions and objectives.

**Adaptive Management** proposed units can be considered for Group Selection if:

a) Unit is predominantly spruce, spruce-fir, or mixed conifer.

**AND**

b) Bark beetle infestation is very light with 5% or fewer infested trees in the overstory. And there is not a strong expectation that bark beetle infestation levels will dramatically increase in the near future based on local conditions and trends.

c) The stand structure is currently not even-aged and generally has a somewhat all-aged structure (variety of diameter classes and somewhat "J" shaped distribution). Stand may be patchy in appearance.

**Release/Weeding** - This treatment may be applied to shelterwood-removal and sanitation/salvage units as a post-harvest treatment in the Spruce Gulch analysis area. Determination of need would occur after the commercial entry. The objective of this treatment is to release the desired crop trees from competition with other vegetation. Weeding usually means felling or killing of undesirable tree species while release often means felling or killing of desirable tree species to release crop trees.

### **General Silvicultural Considerations for Spruce Gulch:**

In the long term, the prescribed harvest treatments would create more outbreak resistant stand structures by modifying future bark beetle risk factors. Among the benefits of managing these stands is the removal of dead trees and treatment of slash both of which contribute to fuel loading and regeneration of healthy new stands. Reforestation treatments may be needed in both Engelmann spruce and lodgepole pine stands and will be determined based on post harvest conditions. However, Engelmann spruce regeneration is an especially critical concern because adequate regeneration can be difficult to obtain without aggressive reforestation treatments. Engelmann spruce seed does not persist once trees have been killed by beetles because the cones are non-serotinous. If sufficient seed producing trees do not remain on site following a disturbance such as fire, wind event, or beetle epidemic artificial regeneration can ensure that a new forest will quickly restock the site. Engelmann spruce and lodgepole pine seed collection is included under this project so seed in the needed elevational zones will be available to meet future needs for planting or seeding the sites. Mechanical site preparation will be a critical component of reforestation to create good seedbeds. Of the 2,329 acres proposed for adaptive management only a very small portion are typed as spruce-fir where clearcutting is not an appropriate regeneration method and would not be considered. However post epidemic beetle conditions could leave a spruce site looking open and clearcut-like following the salvage of dead trees and reforestation would become the critical need. Although natural processes would most likely return the site to forested conditions this could take a very long time, well over 100 years and composition would probably be quite different. It is expected that subalpine fir would be much more prevalent in a natural post bark beetle disturbance regime.

### **Logging Design – Spruce Gulch Analysis**

It is difficult to predict exactly how the proposed stands would be logged, but here are some things that may reasonably occur.

The majority of the logging companies that operate in our area utilize what is called a “mechanized operation.” This means that they typically have a tracked felling machine with a cutting head attached to a boom to cut the trees and bunch them either along the skid trails or actually in the skid trails. After the trees are cut a tracked delimeter goes up the skid trail and delimits the trees and cuts the tops off. Then a rubber tire grapple skidder goes up the trail and drags the logs out to the landing. The trees may also be hand felled and delimited where they lay. A grapple or cable skidder will then come and remove the logs to the landing.

Designated skid trails and landings will be required in all cutting units. Skid trails usually are 75’ – 100’ apart except where trails converge. Skidding patterns may be approved on a unit-wide basis in clearcuts and salvage treatments where lack of residual and other considerations permit. Spacing depends on the number of trees marked and spacing of the trees. In the seed cut step and removal cut step the existing regeneration will be protected to the best extent possible with the objective being to have a residual stand of 300 – 400 seedlings or saplings of the acceptable species.

In partial cut treatment units (typically other than clearcuts or open patches in sanitation/salvage or group selection units) the slash will be lopped and scattered to a specified depth. The exception would be in partial cut units adjacent to the wildland-residential interface (WUI) treatments where whole tree skidding to a landing for machine piling. Clearcuts and group openings in partial cuts may receive mechanical piling, trampling or roller chopping, or clearcuts may be broadcast burned to manage activity slash. Slash treatment in the clearcuts may occur anytime between June and October. Slash pile burning typically occurs in November or December when there is at least 4 inches of continuous snow cover. Burning can occur between January and May if necessary to meet other resource needs.

In all units wildlife trees will be retained to meet the minimum standards and guidelines stated in the Forest Plan. Additional wildlife trees above the minimum required may be retained should other resources request it. In cases where retention areas are needed, evaluations need to be made for not only wildlife but for harvesting functionality and safety of the people in the field for harvesting and other processes occurring after the harvest. The designation of areas to be retained will include areas that could remain viable, such as wind firm, located away from skidding areas, wet areas, riparian zones and possible areas of regeneration already occurring on the site. These evaluations will be made during the layout phase, and will be identified on sale area maps for use during the contract administration.

Landings would be created to stage harvested trees before loading and hauling. Landings are generally about a quarter acre in size. Slash disposal and site preparation method would be chosen following harvest based on after-harvest conditions. If piling slash followed by burning or chipping the slash piles is chosen the piles could be evident for up to several years. In areas with high activity fuels near private land, boundary treatments are designed to reduce slash even further within 100-150 feet through whole tree skidding (which will generate piles).

In areas where advanced regeneration exists or a partial removal such as a shelterwood or commercial thinning is done the slash treatment of choice would most likely be lopping and scattering to a 2 foot slash depth. This slash would be visually evident for several years before needles dry, turn red and drop to the ground and compaction by winter snows and eventually decomposition occurs.

### **Summary**

Among the purpose and need for this project is regenerating a healthy forest, salvage of mortality, and, where possible, reducing the spread of bark beetles. The natural processes which influence these factors would continue under all alternatives. Populations of bark beetles will be present in stands even following implementation of the action alternatives. The extent to which factors such as bark beetles would influence the composition and structure of future forest stands would be influenced by the chosen alternative.