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Environmental Assessment

Devils Gate Timber Sale and Watershed Improvements

Laramie Ranger District

**MEDICINE BOW-ROUTT NATIONAL FORESTS & THUNDER BASIN NATIONAL
GRASSLAND**

Albany and Carbon Counties, Wyoming

T.13 & 14N, R.79 & 80W, 6th Principle Meridian

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INTRODUCTION

Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four sections:

- **Introduction:** The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- **Comparison of Alternatives, including the Proposed Action:** This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- **Environmental Consequences:** This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized alphabetically by resource area (e.g., botany, engineering, fisheries, etc.). Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.
- **Agencies and Persons Consulted:** This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- **Appendices:** The appendices provide more detailed information to support the analyses presented in the environmental assessment.

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

THE NEPA/EA PROCESS

The Medicine Bow National Forest is responsible for implementing the Revised Medicine Bow Land and Resource Management Plan (Forest Plan, 2003) by completing analysis and evaluation of site-specific project proposals. The Forest Plan contains direction to guide natural resource management activities and provides the Forest Service, forest users, and the public with an overall strategy for managing the National Forest. Designing and implementing projects consistent with this direction helps move the Forest toward the desired future condition as described in the Forest Plan.

A desired future condition refers to how an area would appear and function in the future under various management scenarios. A desired condition is developed based on what exists now, knowledge of how it got that way, what is ecologically possible, what is economically feasible, and what is socially desirable. A description of a desired condition provides the management goals for an area.

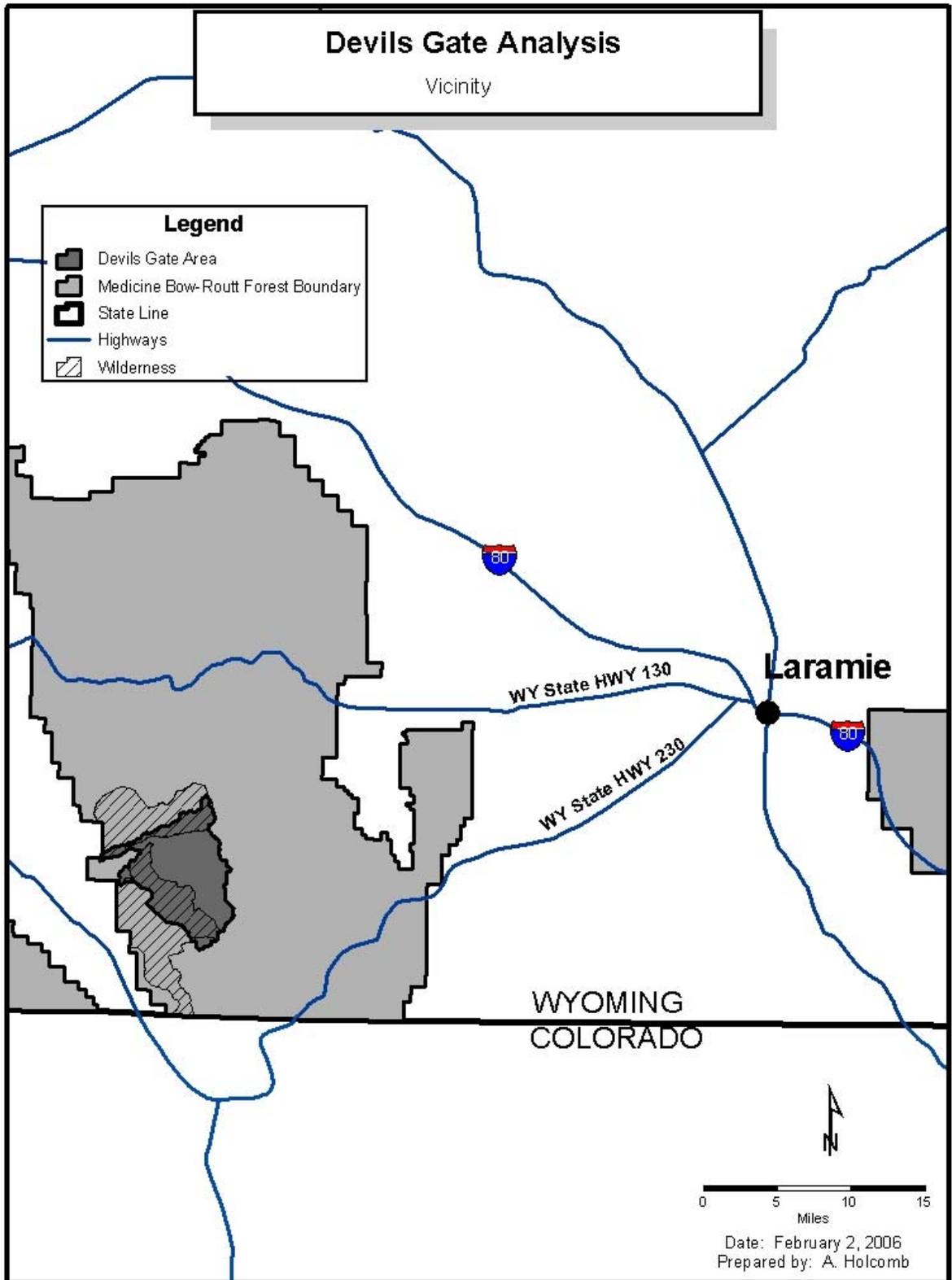
The *Devils Gate Timber Sale and Watershed Improvements Environmental Assessment (EA)* describes the potential effects of implementing a site-specific project proposal designed to: treat vegetation within the Devils Gate analysis area with a commercial timber sale, reduce the spread insect and disease infestations, improve watershed conditions within portions of the Devils Gate analysis area, and improve motorized access to the Devils Gate trailhead. The EA also describes alternative ways of implementing the proposal and the effects they could have on the environment. As part of each alternative, mitigation measures are prescribed to protect other resource uses and values, and monitoring requirements are prescribed to ensure that the mitigation measures are effective. The proposal and the alternatives are consistent with the overall management direction set forth in the Forest Plan for the Medicine Bow National Forest.

An EA is not a decision document. It is a document disclosing the environmental effects of implementing a Proposed Action and alternatives to that action. This EA will be available for public comment for 60 calendar days beginning the day after a legal notice announcing the availability of the EA is published in the Laramie Boomerang. Following public review, a decision will be documented in a separate Decision Notice (DN) signed by Laramie District Ranger, Clinton D. Kyhl. The DN will specify which alternative was selected and the rationale for the decision.

Analysis Area Description

The Devils Gate analysis area is located in Ranges 79 and 80 West in Townships 13 and 14 North in the Snowy Range portion of the Medicine Bow National Forest (see Map 1). The analysis area encompasses approximately 28,201 acres of National Forest System (NFS) lands and extends from Savage Run Creek in the north, along Platte Ridge in the west, and uses National Forest System Roads (NFSRs) 512.F, 512 and 511 going south to north to complete the eastern boundary. The analysis area elevations range from 2,255 m (7,400 ft) to 2,956 m (9,700 ft) and includes a small piece of private land on the west side. It also includes portions of the Savage Run and Platte River Wilderness Areas and portions of several inventoried roadless areas (IRAs). No projects or treatments are proposed in either the IRAs or the Wilderness Areas.

Map 1. Vicinity Map



Modified Proposed Action

During the March 2005 scoping period (40 CFR 1501.7), the Forest Service solicited public comments on a Proposed Action for the Devils Gate analysis area. Comment letters received during this period indicated that old growth forest should be retained within the Devils Gate area. The Proposed Action was modified to address this concern. Consequently, all potential old growth units previously planned for harvest under the Proposed Action were removed to create the Modified Proposed Action. In addition to old growth retention, the Modified Proposed Action also addresses issues related to forest insects and diseases and watershed restoration.

The Laramie Ranger District is proposing to harvest timber on approximately 1,144 acres within the Devils Gate analysis area. Under the proposal, roughly 24,319 hundred cubic feet (CCF) of timber would be harvested using a variety of silvicultural treatments. To obtain the timber, 3.3 miles of specified road would be constructed, 1.0 mile of specified road would be reconstructed, and 5.0 miles of temporary road would be constructed. Following project completion, all temporary roads would be decommissioned and closed. All specified roads would be physically closed to motorized vehicle use; however, their templates would be retained for future management entries. No vegetation treatments or road construction would be scheduled in any of the analysis area's inventoried roadless areas or Wilderness Areas.

In addition to timber harvest and road construction, the Modified Proposed Action also includes improving motorized access on National Forest System Road (NFSR) 506.D to the Devils Gate trailhead. To improve access, large rocks would be removed from the road bed, potholes would be filled, and the road would be graded. Finally, the proposal includes closing NFSRs 506.B (0.6 miles) and 512.G (5.5 miles) to motorized use to reduce soil erosion and sediment entering area creeks. Collectively, 6.1 miles of system roads would be closed. Closing 512.G would result in the closure of an additional 3.7 miles of unauthorized roads connected to 512.G. If approved, the Laramie District would like to implement the Modified Proposed Action in the fall of 2006. A more detailed description of the Modified Proposed Action can be found on EA pages 13 – 19.

Purpose and Need for Action

Based on Forest Plan direction and a comparison of the analysis area's existing condition versus its desired condition, the Forest Service has identified the following resource needs:

Forest Health and Resiliency

- The analysis area contains an abundance of dense, overstocked lodgepole pine stands, lodgepole infected with dwarf mistletoe and other diseases, and/or stands where annual mortality exceeds growth. These conditions provide the opportunity for insect epidemics, and they provide substantial fuel for potential wildfires in the vicinity. Much of the analysis area is within a 5.15 Management Area which prescribes that forest insects and diseases be locally restricted.

On October 14, 2004, the Lakewood Service Center Forest Health Management staff examined sites within the Devils Gate analysis area where bark beetle activity had been observed. Field evidence suggested that spruce beetles (*Dendroctonus rufipennis*) had attacked spruce trees

The abundance of spruce beetle-infested trees indicated that beetle populations are very high and increasing rapidly. The current situation at the sites visited also indicated that spruce losses are likely to increase and expand rapidly in this area in the future.

There is a need to improve the health and resiliency of area forests to reduce their susceptibility to insects and disease.

Providing a Consistent and Sustainable Flow of Timber

- Management Area 5.15 prescribes management to maintain or restore ecological health conditions while providing for a mix of ecological and human needs including commercial wood products. Local and regional sawmills depend on timber supplies from federal lands for their operation.

There is a need to contribute to the Forest Plan goal of providing for commercial timber products.

Watershed Restoration

- There are two roads within the analysis area that are eroding and contributing to sedimentation in area creeks. These roads are NFSR 506.B and NFSR 512.G.

There is a need to minimize human caused soil erosion within the analysis area.

The Modified Proposed Action responds to goals and objectives outlined in the Forest Plan (December 2003) and helps move the analysis area towards desired conditions described in that Plan. Specifically, the Modified Proposed Action responds to:

GOAL 1 – Ensure Sustainable Ecosystems

Promote ecosystem health and conservation using a collaborative approach to sustain the Nation's forests, grasslands, and watersheds.

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 (pg. 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 (pg. 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 (pg. 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.

Subgoal 2a. Improve the capability of the Nation's forests and rangelands to provide diverse, high-quality outdoor recreation opportunities (pg. 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 (pg. 1-9).

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

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 Devils Gate Timber Sale and Watershed Improvements proposal, must consider the direction provided at each scale. The following information identifies how the Modified Proposed Action responds to direction provided at the three geographic scales.

Forest-wide Standards and Guidelines

- 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. *(Standard, p. 1-28)*
- Conduct actions so that stream patterns, geometry, and habitats are maintained or improved toward robust stream health. *(Standard, 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. *(Standard, p. 1-28)*
- Manage old forest to retain or achieve at least the minimum percentages of old growth by cover type¹ 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. *(Standard, p. 1-31)*
- Limit management of stands to actions necessary to maintain or restore old growth composition and structure. *(Standard, 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. *(Guideline, p. 1-31)*
- 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. *(Guideline, p. 1-32)*
- 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. *(Guideline, p. 1-31)*
- Allow no loss or degradation of known or historic habitat for the boreal toad, wood frog or northern leopard frog. *(Standard, p. 1-44)*

¹ Spruce/fir - 25%; Lodgepole - 15%; Ponderosa pine - 25%; Aspen – 20%

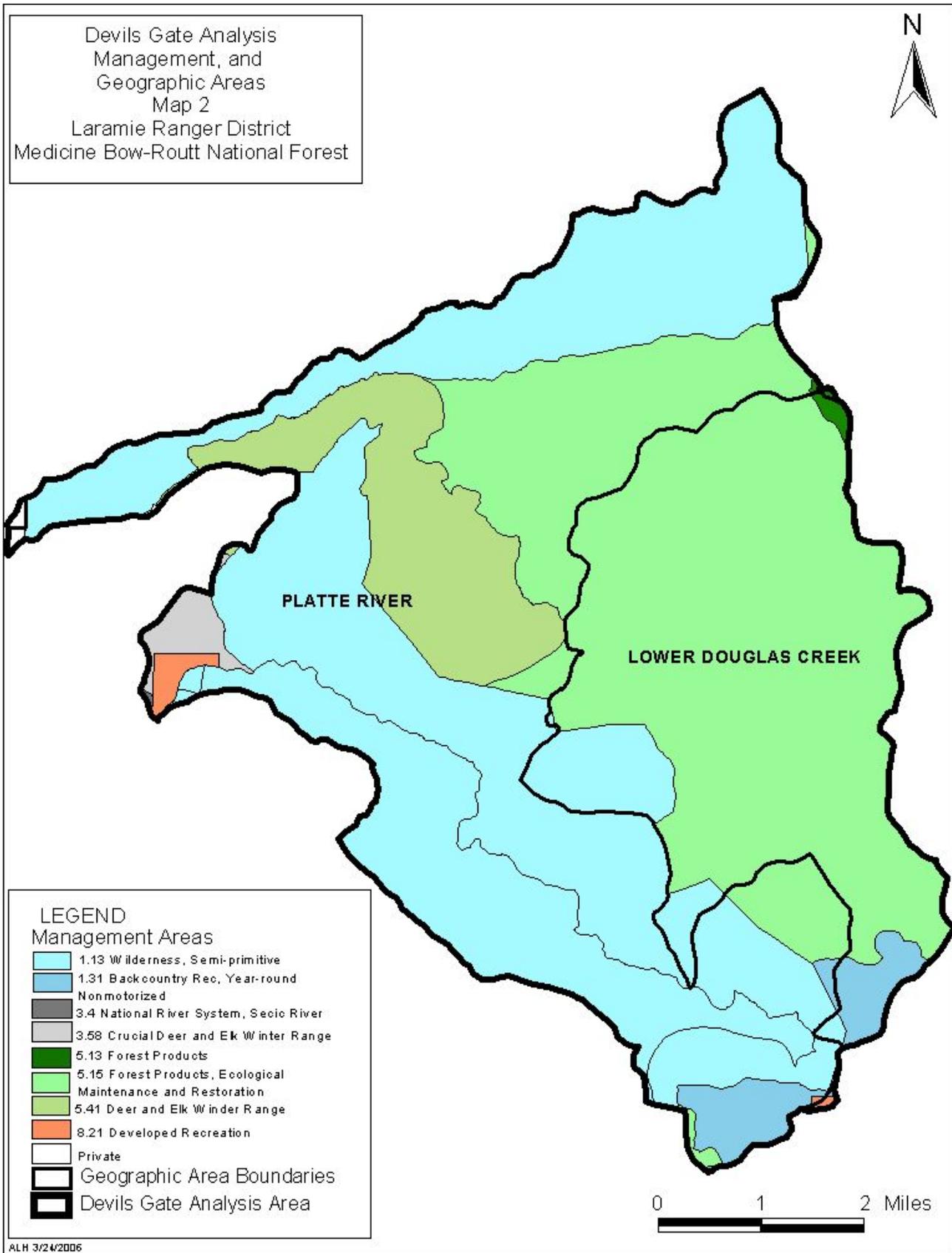
- During project planning, if potential habitat occurs in the project area, survey for threatened, endangered, proposed, and candidate species on the US Fish and Wildlife Service’s species list for the Forest. Provide mitigation of potential adverse effects for species present. *(Standard, p. 1-44)*
- 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)*

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. Application of Management Area prescriptions and associated standards and guidelines will move specific portions of each GA towards the desired condition (Forest Plan p. 3-1). The Devils Gate analysis area includes portions of three (3) Geographic Areas in the Snowy Range (see Map 2):

Table 1: Geographic Areas

Geographic Area (GA)	Total GA Acres	Analysis Area (AA) Acres	Percent of AA	Percent of GAs
Platte River	59,995	18,904	67	31.5
Upper Douglas Creek	36,307	26	0.2	.07
Lower Douglas Creek	101,910	9,271.2	32.8	9.09
TOTAL	198,212	28,201	100	40.7



Desired conditions pertinent to the Lower Douglas Creek, Platte River, and Upper Douglas Creek GAs (Forest Plan, pp. 3-71, 3-87 and 3-95, respectively) include:

- In areas allocated to Management Areas 5.13 and 5.15, a variety of successional stages will be present.

Desired conditions pertinent to the Lower Douglas Creek GA (Forest Plan, p. 3-71) include:

- 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.

Desired conditions pertinent to the Platte River GA (Forest Plan, p. 3-71) include:

- 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.

Management Area Direction

Management emphasis within the analysis area and larger geographic areas is distributed among several Forest Plan Management Area prescriptions (see Map 2). Application of Management Area prescriptions and associated standards and guidelines will move specific portions of each geographic area towards the desired condition (Forest Plan p. 3-1). The descriptions of each Management Area prescription include: theme, setting, desired condition, and standards and guidelines. This information can be found in the Forest Plan Chapter 2, pp. 2-1 through 2-80.

Table 2: Management Areas and Acres

Management Area	Description	Acres
1.13	Wilderness, Semi-primitive	12,869.84
1.31	Backcountry Recreation, Year-round Nonmotorized	833.61
3.4	National River System, Scenic Rivers Designated and Eligible	8.11
3.58	Crucial Deer and Elk Winter Range	290.23
5.13	Forest Products	66.13
5.15	Forest Products, Ecological Maintenance and Restoration Considering the Historic Range of Variability	11,473.44
5.41	Deer and Elk Winter Range	2,500.49
8.21	Developed Recreation	138.32
PVT	Private	21.06
TOTAL		28,201.23

Decision Framework

Given the purpose and need, the deciding official will review the Modified Proposed Action, the other alternative(s), and the environmental consequences in order to make the following decisions:

- Should silvicultural treatments be used to reduce the spread of insects and diseases and associated mortality in area Engelmann spruce and lodgepole pine stands?
- Should watershed improvement projects be implemented in the Devils Gate analysis area?
- Should motorized access to the Devils Gate trailhead be improved?
- Which alternative best addresses the purpose and need for the proposal and the significant issues and concerns for the Devils Gate analysis area?

Public Involvement

The Devils Gate proposal was listed in the April 2000 Medicine Bow-Routt National Forests & Thunder Basin National Grassland Schedule of Proposed Actions (SOPA) and each subsequent quarterly report through April 2006. On March 4, 2005, a scoping letter seeking public comments on the proposal was distributed to 382 potentially interested and affected parties. The scoping letter, which was also posted on the Forest website, indicated that comments on the proposal would be accepted until April 11, 2005. As part of the public involvement process, the agency also hosted an Open House meeting on March 24, 2005 wherein Forest Service personnel were available to answer questions related to the proposal. Finally, the *Laramie Boomerang* published a news article about the Devils Gate proposal on April 6, 2005. Ten comments were received in response to the public involvement process.

Using the comments received from the public and other agencies, the Interdisciplinary Team (ID Team) developed a list of issues to address during the analysis process.

Issues

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

Significant Issues

The following significant issues were identified as a result of the scoping effort. The issues were used to modify the original Proposed Action and to develop alternatives to the Modified Proposed Action.² Indicators were developed for each issue category. Indicators are measurable ways of displaying how the issues could be affected by project implementation.

² *Old Growth Retention* was originally identified as a Significant Issue in the August 23, 2005 "Devils Gate Issues and Alternatives Memo" signed by Laramie District Ranger, Clint Kyhl. However, since neither the Modified Proposed Action nor Alternative 3 proposes timber harvest in old growth forest, it was no longer considered a significant issue and was removed from the list.

Issue 1: Effects of Clearcutting, particularly in Management Area (MA) 5.41

There is concern over the use of the clearcut treatment and the cumulative effects of past clearcutting, partial cutting, logging slash, and associated roads on area resources, such as water and wildlife. There is also concern over the clearcutting of Units 1 – 6, all of which are located in MA 5.41 – Deer and Elk Winter Range. According to Vegetation Standard #2, “Vegetation management must be focused on meeting wildlife winter range habitat objectives” (p. 2-66). Consequently, timber may be harvested only to maintain or improve wildlife habitat conditions and will not contribute to the allowable sale quantity.

Public comments indicated that the Forest Service has not demonstrated that clearcutting is the optimum harvest method and that habitat conditions within MA 5.41 are inadequate or otherwise will continue to be inadequate in the long-term. Comments further indicated that it is unclear how the existing conditions have not created and/or will not lead to the creation of habitat mosaics of various types, age classes, and structural stages.

Indicators:

- Acres of past timber harvest
- Acres proposed for clearcut/percent of total acres treated
- Acres proposed for harvest in MA. 5.41
- Determination of optimal harvest method

Issue 2: Wildlife Habitat Provided by Older Forest

The spatial distribution of forest patches of different age classes within portions of the analysis area is primarily the result of past timber harvest. The pattern differs from patterns normally created by natural processes in many respects. For example, patch size is smaller and more uniform in size, the amount of high-contrast edge has been increased, and there are fewer blocks of continuous aged forest. These factors can negatively impact wildlife species dependent on large blocks of undisturbed, older forest and those who typically avoid forest edges.

Indicators:

- Acres of Identified Old Growth Forest
- Acres of Older Forest Wildlife Habitat Proposed for Timber Harvest
- Acres of Older Forest Wildlife Habitat within the Connected Blocks of Older Forest Proposed for Timber Harvest

Issue 3: Forest Insects and Diseases

The analysis area contains an abundance of mature/overmature lodgepole pine stands, many of which are infected with dwarf mistletoe and are in poor condition. Lodgepole stands with an average diameter of 8 inches and greater and averaging 80 years or more are considered most susceptible to serious beetle infestation. Many stands in the analysis area fit this size and age category.

During the summer of 2005, field reconnaissance found lodgepole pine infested with Mountain Pine and/or Lodgepole Pine beetles. In addition, spruce bark beetles (*Dendroctonus rufipennis*) have attacked numerous Engelmann spruce and nearby lodgepole pine. The abundance of spruce-beetle infested trees indicates that beetle populations are very high and increasing rapidly. The current

situation indicates that spruce losses are likely to increase and expand rapidly in the affected areas in the future.

Indicators:

- Acres proposed for treatment with bark beetle risk rating of moderate/high
- Acres proposed for treatment with Dwarf Mistletoe Ratings > 2

Issue 4: Watershed Restoration

Certain roads within the analysis area are poorly located and are allowing sediment to enter area streams.

Indicators:

- Miles of proposed road closures within 300 feet of streams or riparian areas

Issue 5: Road Construction and/or Reconstruction

The analysis area contains a fairly extensive road network. Along with contributing to the spread of noxious weeds, the disturbance from the existing road system is currently the main contributor of sediment to area streams. Consequently, road construction and/or reconstruction should be minimized or eliminated.

Indicators:

- Total road miles within the analysis area
- Miles of road proposed for construction
- Miles of NFSRs proposed for closure
- Miles of unclassified roads proposed for closure

Non-significant Issues

Non-significant issues were considered by the Interdisciplinary (ID) Team and are summarized and responded to in Appendix A. Many of the non-significant issues or concerns that were raised were addressed in the EA either as mitigation measures or they were incorporated into reports prepared for the analysis. Other issues or concerns related to non-discretionary standards or conservation measures that would be implemented as an essential part of any management action in the analysis area. These non-discretionary measures, standards, Best Management Practices (BMPs), etc. are required by law, regulation, Forest Plan direction and other mandated direction and will be implemented if any of the action alternatives are selected for implementation. Since there is no option relative to their application, they were not considered significant issues. As previously mentioned, however, each of the issues and concerns will be addressed in some manner, and effects relative to each will be disclosed within the document as required.

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the Devils Gate Timber Sale and Watershed Improvements project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public.

Alternatives

ALTERNATIVE 1: No Action

NEPA regulations require the Forest Service to identify the No Action alternative and use it as a baseline for comparing the environmental consequences of the other alternatives (40 CFR 1502.14(d) and Forest Service Handbook 1909.14.1).

Under Alternative 1, the Forest Service would continue current management of the area and natural succession would be allowed to continue during this entry in the Devils Gate vicinity. Ongoing activities, such as personal use firewood gathering, fire suppression, livestock management, and road maintenance would occur. Proposed timber harvest, road construction, watershed restoration, and motorized access improvements to the Devils Gate trailhead would not occur.

The No Action alternative would best address significant issues related to clearcutting, wildlife habitat provided by older forest, old growth retention, and specified road construction. It would not, however, reduce sedimentation in area streams thereby improving watershed conditions and it would not improve motorized access to the Devils Gate trailhead.

The No Action alternative would not help to move the area's forests towards the desired future condition as identified in the Forest Plan. In addition, it would not achieve the purpose and need for the project and would not help to prevent or suppress insect outbreaks, improve watershed conditions, or reduce the abundance of overstocked and overmature stands in the Devils Gate analysis area. No mitigation measures would be necessary.

ALTERNATIVE 2: Modified Proposed Action

Following scoping (40 CFR 1501.7), the Proposed Action was modified to address Issue 3: Old Growth Retention. Consequently, all potential old growth units previously planned for harvest under the Proposed Action were removed from the Modified Proposed Action. The Modified Proposed Action also addresses Issue 4: Forest Insects and Diseases and Issue 5: Watershed Restoration.

The Laramie Ranger District is proposing to harvest timber on approximately 1,144 acres within the Devils Gate analysis area. Under the proposal, roughly 24,319 hundred cubic feet (CCF)³ (roughly 10.9 million board feet (MMBF)) of timber would be harvested using a variety of silvicultural treatments. Silvicultural treatments include 552 acres of clearcutting; 297 acres of sanitation/salvage; 156 acres of shelterwood prep; 139 acres of commercial thinning; and 145 acres of pre-commercial thinning (see Map 3 and Tables 3 and 4). Silvicultural treatments would be

³ These are gross volumes subject to change as a result of certain design criteria, such as snag island retention.

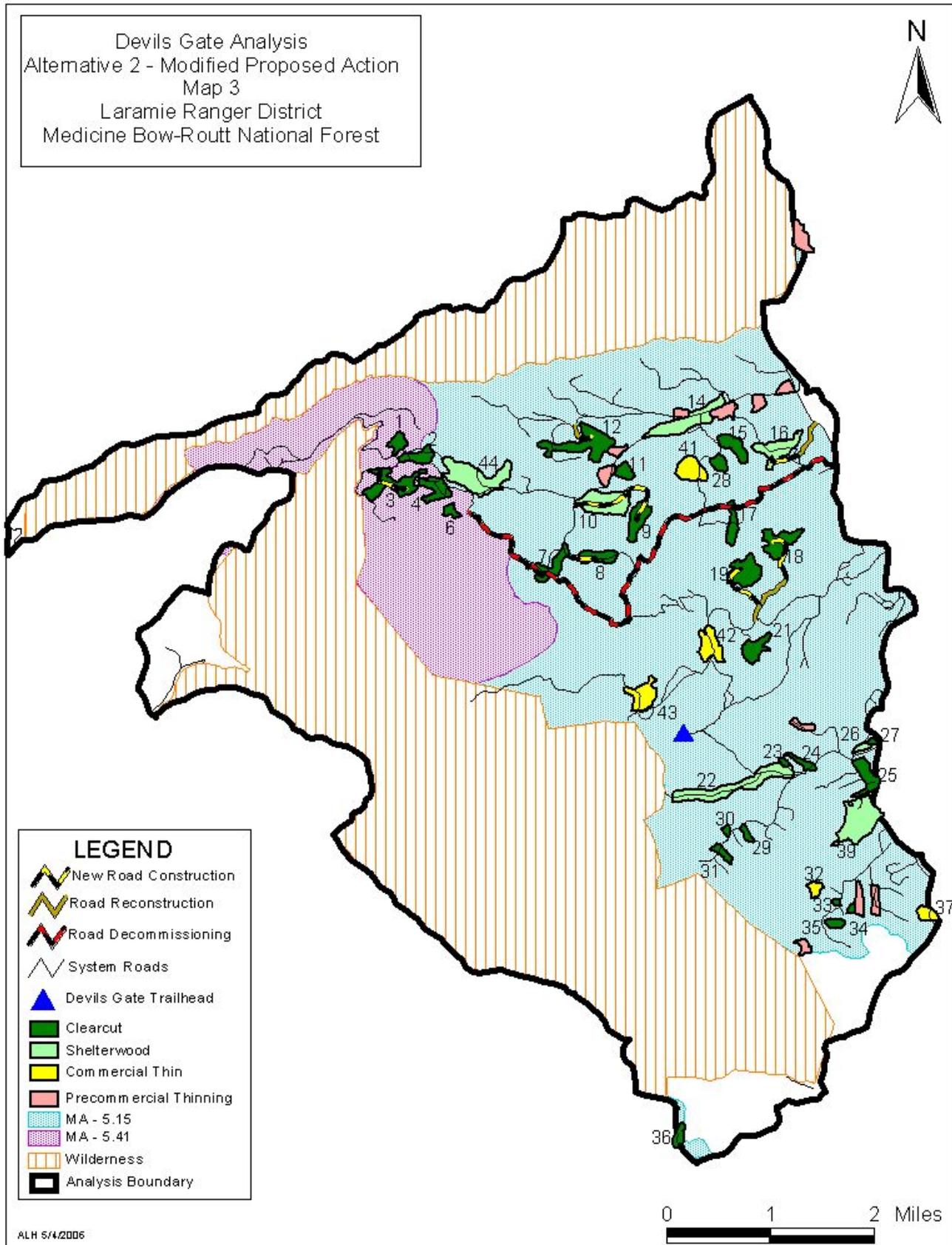


Table 3: Units, Treatments, and Insect and Disease Infestations

Unit #	Acres	Treatment	Insect Infestations	Dwarf Mistletoe Rating
CC 1	16	Clearcut	None as of 1999 ⁴	5.9 ⁵
CC 2	19	Clearcut	None as of 1999	5.9
CC 3	47	Clearcut	None as of 1999	5.9
CC 4	33	Clearcut	None as of 1999	5.9
CC 6	11	Clearcut	None as of 1999	Heavy ⁶
CC 7	30	Clearcut	None as of 1999	0.0
CC 8	24	Clearcut	None as of 1999	0.0
CC 9	30	Clearcut	None as of 1999	Light
ITM 10	66	Shelterwood	None as of 1999	Light
CC 11	14	Clearcut	None as of 1999	0.0
ITM 44	86	Sanitation/Salvage	Yes, 2005	Heavy
CC 12	63	Clearcut	None as of 1999	3.7
ITM 14	64	Sanitation/Salvage	None as of 1999	Light
CC 15	22	Clearcut	None as of 1999	0.0
ITM 16	40	Sanitation/Salvage	Yes, 2005	Light
CC 17	23	Clearcut	None as of 1999	0.0
CC 18	40	Clearcut	Yes, 2004	Heavy
CC 19	47	Clearcut	None as of 2004	Heavy
ITM 22	90	Shelterwood	None as of 1999	Moderate
CC 23	3	Clearcut	None as of 1999	3.2
CC 24	11	Clearcut	None as of 1999	3.2
CC 25	30	Clearcut	None as of 1999	2.6
ITM 26	7	Sanitation/Salvage	None as of 1999	Heavy
CC 27	4	Clearcut	None as of 1999	Heavy
CC 28	10	Clearcut	None as of 1999	0.0
CC 21*	26	Clearcut	None as of 1999	6.9
LTM 41*	29	Commercial Thin	None as of 1999	Light
LTM 42*	32	Commercial Thin	None as of 1999	3.5
LTM 43*	53	Commercial Thin	None as of 1999	2.4
CC 29	7	Clearcut	None as of 1999	Heavy
CC 30	4	Clearcut	None as of 1999	Heavy
CC 31	10	Clearcut	None as of 1999	Heavy
CC 33	3	Clearcut	None as of 1999	Light
CC 34	4	Clearcut	None as of 1999	Light
CC 35	9	Clearcut	None as of 1999	Light
ITM 39	100	Sanitation/Salvage	Yes, 2005	Heavy
LTM 32*	10	Commercial Thin	None as of 1999	Light
CC 36*	12	Clearcut	None as of 1999	Moderate
LTM 37*	15	Commercial Thin	None as of 1999	Light
Total	1,144			

* - These units are planned to be offered separately as POL sales (products other than logs).

⁴ The units described as having no bark beetle infested trees were visited in 1999. Given the fact that bark beetle infested trees have been observed nearby in inventoried roadless areas and wilderness, in riparian areas, in old growth retention sites, and in four of the units, it is reasonable to assume that infested trees may be found today in some proposed units.

⁵ The level of infection from dwarf mistletoe in a stand of trees or on an individual tree can be determined through a six class numerical rating system called dwarf mistletoe rating or DMR. A rating of one (1) indicates 50 percent of a stand is infected. A DMR of two (2) indicates that 70 percent of a stand is infected; stands or trees that have a DMR greater than 2 are considered to be seriously infected. The level of DM infection identified in Table 3 is based on the best information available including stand exam data and field observations.

⁶ Units shown without a numerical DMR are lacking formal data in the database. The description of light, moderate, and heavy DMR is based on personal observations in the field.

Table 4: Modified Proposed Action – Treatments

Prescription	# of Units	Acres	Volume (CCF)
Clearcut	27	552 ⁷	20,174 ⁸
Shelterwood	2	156	590
Sanitation/Salvage	5	297	2,582
Commercial Thin	5	139	973
TOTAL	39 Units	1,144 Acres	24,319 CCF
Pre-commercial Thin ⁹	11	145	n/a

applied to forested stands to alter the existing vegetation and move it towards the desired future condition, as directed in the Forest Plan (2003). Management areas affected by the proposed treatments include MA 5.15 (ecological maintenance and restoration similar to the historical range of variability (HRV)) and 5.41 (deer and elk winter range habitat objectives).

Sale objectives include:

- Reducing acreage of dwarf mistletoe infected stands and reduce spread dwarf mistletoe;
- Removing individual trees infected with dwarf mistletoe and other diseases;
- Removing beetle infested trees where possible to locally restrict infestation;
- Removing unhealthy trees due to characteristics other than insects/diseases;
- Improving health of stands proposed for treatment to reduce stand susceptibility to insect attack;
- Enhancing aspen clones where possible;
- Creating larger vegetation patch sizes similar to the historic range of variability so as to restore natural ecological conditions on the landscape throughout the analysis area landscape;
- Commercially thinning and reducing tree densities in overstocked, small diameter lodgepole pine stands;
- Pre-commercially thinning overstocked seedling/sapling lodgepole pine stands;
- Enhancing deer and elk winter range habitat;
- Creating similar age and size classes of trees; and
- Reducing tree densities in overstocked stands of intermediate age pine;

To obtain the timber, 3.3 miles of specified road would be constructed, 1.0 miles of specified road would be reconstructed, and 5.0 miles of temporary road would be constructed (see Table 5). Following completion of the project, all temporary roads would be decommissioned and closed. All specified roads would be physically closed to motorized vehicle use; however, their templates would be retained for future management entries. Vegetation treatments and road construction would not be scheduled in any of the analysis area's inventoried roadless areas or Wilderness Areas.

Potential sale area improvement and KV collection plan activities may include: site preparation for natural regeneration, reforestation (if necessary), regeneration surveys, release and weed (in commercial thin units), noxious weed monitoring and treatment, road decommissioning, and pre-

⁷ These are gross acres. Actual harvested acres would be 20 percent less than the number indicated. The reduction is based on MA 5.15 Guideline 6 which states, "In clearcut units, retain approximately 20% of the interior of the unit in clumps, or fingers of unharvested trees... (Forest Plan pg. 2-63)."

⁸ This is gross volume. The volume would actually be reduced by 20 percent based on the MA 5.15 Guideline 6.

⁹ Pre-commercial thin is listed separately because it does not contribute to the sale volume.

Table 5: Modified Proposed Action – Roads

Road Type	New Construction	Reconstruction	Total Miles	Closures
Specified	3.3	1.0	4.3	6.1
Temporary	5.0	0	5.0	0
TOTAL	8.3	1.0	9.3	6.1

commercial thinning. Site preparation normally involves machine treatments by roller chopping, slash piling and/or trampling based on particular site conditions or broadcast burning. Broadcast burning may be favored in stands located in MA 5.15. Broadcast burning may result in limited success of natural regeneration on some site conditions and/or lower density of regeneration. An estimate of post-harvest reforestation needs would be made for the sale area improvement and KV collection plan, and monitored for adjustments after burning.

Under the Modified Proposed Action 145 acres of seedling/sapling size stands, created by past harvest, are also proposed for pre-commercial thinning. These acres would be reviewed on the ground for thinning readiness. The purpose of pre-commercial thinning is to release the dominant trees within overstocked young stands by removing the least competitive trees, those of poor form and diseased trees. Pre-commercial thinning provides more growing space and less competition for the dominant trees.

The Modified Proposed Action further includes improving motorized access on NFSR 506.D to the Devils Gate trailhead. To improve access, large rocks would be removed from the road bed, potholes would be filled, and the road would be graded. Finally, it includes closing NFSRs 506.B (0.6 miles) and 512.G (5.5 miles) to motorized use to reduce soil erosion and sediment entering area creeks. In addition to closing 6.1 miles of system roads, roughly 3.7 miles of unauthorized roads connected to 512.G would be closed. If approved, the Laramie District would like to implement the Proposed Action in the fall of 2006.

NOTE: Currently, three clearcut units proposed for timber harvest exceed the 40 acre maximum size, as identified on Forest Plan page 1-35 (Standard #1). Proposed clearcut unit 3 (CC 3) would create a 47 acre opening in MA 5.41 (deer/elk winter range); CC 12 would create a 63 acre opening in MA 5.15 (Forest Products, Ecological Maintenance and Restoration); and CC 19 would create a 47 acre opening in MA 5.15. Size limits exceeding those established in the Forest Plan are permitted on an individual timber sale basis after a 60 day public notice period and review and approval by the Regional Forester. The Laramie Ranger District is currently in the process of receiving such approval. It should also be noted that Guideline # 2 under MA 5.15 (Forest Plan p. 2-63) indicates that sizes of openings can vary from a few acres up to 250 acres based on site-specific conditions.

Description of Silvicultural Prescriptions

Clearcut - Clearcutting would be applied to mature or overmature lodgepole pine stands that have generally met culmination of mean annual increment (CMAI) or to stands that are in imminent danger from insect or disease attack/mortality. All merchantable trees would be harvested to regenerate a lodgepole pine stand. Clearcutting can be used to setback successional stages by creating new age and size classes of pine. This, in turn, can create larger vegetation patch sizes which is the direction of MA 5.15. The 5.15 management area prescription calls for

treating existing forest vegetation to create future conditions that are more in line with historic disturbance patterns caused by fire, insect, disease, windthrow, drought, and human management activities. Thus, the design criteria for much of analysis area is to consolidate areas of past clearcutting with additional regeneration harvest to create larger patch sizes of relatively similar age and size class. Slash treatment may consist of roller chopping, machine piling, machine trampling and/or broadcast burning. Compliance with 36 CFR Part 219.27 for clearcutting is included in the project record.

Shelterwood - This prescription is generally applied to lodgepole pine stands containing minor amounts of Engelmann spruce and sub-alpine fir. Stands may exhibit little or no understory and have relatively low levels of dwarf-mistletoe. These stands do not warrant clearcutting at this time, and have generally not met CMAI. This treatment would not create larger vegetation patch sizes as desired in MA 5.15, but is used to improve health and vigor of the remaining trees, prepare stand for future regeneration, and create basal area levels that reduces risk to mountain pine-beetle. Typically, roughly 20 – 30 percent of the basal area is removed, and the prescription emphasizes removal of diseased, poor quality, bug infested and dead/dying trees. Slash treatment would consist of lopping and scattering to less than 24 inch depth.

Sanitation/Salvage - This prescription is applied to stands that are mature or overmature, where tree mortality is increasing due to insects and disease, and/or regeneration treatment is not an option at this time. Stands may exhibit little or no understory regeneration or have areas of uniform understory of younger aged regeneration. The healthiest and best quality trees are left standing which reduces tree susceptibility to insect attack and disease spread. This prescription removes roughly 20 – 40 percent of the basal area depending on stand conditions. Higher levels of removal would be applied to stands with known mountain pine beetle infestations. The prescription also emphasizes removal of diseased, poor quality, bug infested, and dead/dying trees. Slash treatment would consist of lopping and scattering to less than 24 inch depth.

Commercial Thinning - Commercial thinning is generally applied to overstocked and small diameter lodgepole pine stands with little or no spruce/fir component. This prescription removes suppressed, dead, dying and poor quality trees to release the remaining trees and provide them with more growing space and reduced competition for sunlight, water and soil nutrients. Tree removal is based on a spacing guide such as 10 x 10 or 12 x 12 feet to achieve desired stocking. Ideally, this prescription should be applied to pine stands 70 years or less that contain little or no dwarf mistletoe. Slash treatment typically consists of lopping and scattering to a 24 inch depth. Hand piling/pile burning or mulching may occur in select units to mitigate fuels or visual concerns.

Pre-commercial Thinning - Pre-commercial thinning is generally applied to young seedling/sapling lodgepole pine stands that may or may not contain scattered spruce/fir component. These stands are a result of past clearcutting and/or overstory removal treatments. Acres proposed for thinning would be reviewed on the ground for thinning readiness. The purpose of pre-commercial thinning is to release the dominant trees within overstocked young stands by removing the least competitive trees, those of poor form, and those that are diseased. This, in turn, provides more growing space and less competition for sunlight, water, and soil nutrients for the retained trees. Tree retention would be designed to emulate natural variability in tree spacing. Slash treatment consists of lopping and scattering to either an 18 inch or 24 inch

depth. Hand piling/pile burning or mulching may occur in select units to mitigate fuels or visual concerns.

Site Preparation - Site preparation would be applied to all regeneration clearcut units.

Treatment may consist of roller chopping, machine piling, machine trampling (or a combination thereof), or broadcast burning. Usually logging slash is left to lay for a 90 day drying period to allow slash to dry and lodgepole pine cones to open and release seed. Following drying, specific site preparation may include:

- 1) **Machine treatments:** roller-chopping, where a large rolling drum with blades is pulled by a dozer to chop the logging slash. Roller-chopping accomplishes both soil scarification down to mineral soil and promotes faster decomposition of logging slash. There are situations where roller chopping is not feasible such as steep ground, rocky ground, and/or large diameter slash or heavy concentrations of slash. In these cases, site preparation may be accomplished by machine piling and/or machine trampling. Machine slash piles are burned after piling.
- 2) **Broadcast burning:** burning may be used for some of the treated acres in accordance with guideline applicable to MA 5.15. Burning would be done to better emulate the conditions a natural fire would produce. Burning opportunities would be dictated by post-harvest fuels conditions and terrain that provides for successful burn control, and needs for regeneration are not unduly compromised. Under this action, broadcast burning would be designed to treat logging slash, promote new aspen regeneration, and improve forage conditions for big game and livestock. The burning would occur during the spring or fall and would require control lines to be constructed around the perimeter of selected clearcuts.

ALTERNATIVE 3: Reduced Clearcutting and Road Construction

Alternative 3 was developed to address all of the issues identified on pages 11 and 12 of this EA. Specifically, Alternative 3 addresses the issues of wildlife habitat provided by older forest, clearcutting (reduces clearcutting by 48 percent), road building (reduces road building by 30 percent), and reduces acreage of dwarf mistletoe infected stands and remove diseased or insect infested trees, but at a lesser scale than the Modified Proposed Action. Some clearcut units identified under Alternative 2 (Modified Proposed Action) were modified to a shelterwood treatment under this alternative. Finally, MA 5.41 (deer and elk winter range habitat objectives) would not be entered under this alternative. Management areas affected by the proposed treatments include MA 5.15 (ecological maintenance and restoration similar to the historical range of variability (HRV)). Sale objectives are identified on EA page 20.

Under Alternative 3, the Laramie Ranger District would harvest timber on approximately 825 acres within the Devils Gate analysis area. Roughly 12,696 CCF (roughly 6.3 MMBF) of timber would be harvested using a variety of silvicultural treatments (see Map 4 and Tables 6 and 7). Silvicultural treatments include 287 acres of clearcutting; 297 acres of sanitation/salvage; 102 acres of shelterwood prep; and 139 acres of commercial thinning. Silvicultural treatment would be applied to various stands to alter the existing vegetation and move it towards the desired future condition as directed in the Forest Plan (2003) but at a lesser scale than the Modified Proposed Action.

To obtain the timber, 2.2 miles of specified road would be constructed, 0.9 miles of specified road would be reconstructed, and 3.6 miles of temporary road would be constructed (see Table 8). Following completion of the project, all temporary roads would be decommissioned and closed. All

specified roads would be physically closed to motorized vehicle use; however, their templates would be retained for future management entries. No vegetation treatment or road construction would be scheduled in any of the inventoried roadless areas within the analysis area. All other activities proposed under the Modified Proposed Action would apply to Alternative 3.

Table 6: Units, Acres, Treatments, and Insect and Disease Infestations

Unit #	Acres	Treatment	Insect Infestations	Dwarf Mistletoe Rating
CC 7	30	Clearcut	None as of 1999 ¹⁰	0.0
CC 8	24	Clearcut	None as of 1999	0.0
ITM 10	66	Shelterwood	None as of 1999	Light ¹¹
ITM 11@	14	Shelterwood	None as of 1999	0.0
ITM 44	86	Sanitation/Salvage	Yes, 2005	Heavy
ITM 14	64	Sanitation/Salvage	None as of 1999	Light
ITM 15@	22	Shelterwood	None as of 1999	0.0
ITM 16	40	Sanitation/Salvage	Yes, 2005	Light
CC 17	23	Clearcut	None as of 1999	0.0
CC 18	40	Clearcut	Yes, 2004	Heavy
CC 19	47	Clearcut	None as of 2004	Heavy
CC 23	3	Clearcut	None as of 1999	3.2
CC 24	11	Clearcut	None as of 1999	3.2
CC 25	30	Clearcut	None as of 1999	2.6
ITM 26	7	Sanitation/Salvage	None as of 1999	Heavy
CC 27	4	Clearcut	None as of 1999	Heavy
CC 21*	26	Clearcut	None as of 1999	6.9
LTM 41*	29	Commercial Thin	None as of 1999	Light
LTM 42*	32	Commercial Thin	None as of 1999	3.5
LTM 43*	53	Commercial Thin	None as of 1999	2.4
CC 29	7	Clearcut	None as of 1999	Heavy
CC 30	4	Clearcut	None as of 1999	Heavy
CC 31	10	Clearcut	None as of 1999	Heavy
CC 33	3	Clearcut	None as of 1999	Light
CC 34	4	Clearcut	None as of 1999	Light
CC 35	9	Clearcut	None as of 1999	Light
ITM 39	100	Sanitation/Salvage	Yes, 2005	Heavy
LTM 32*	10	Commercial Thin	None as of 1999	Light
CC 36*	12	Clearcut	None as of 1999	Moderate
LTM 37*	15	Commercial Thin	None as of 1999	Light
Total	825			

* - Units planned to be offered separately as POL sales (products other than logs)

Silvicultural design changes: CCs 1, 2, 3, 4, 6, 9, 12, 28 and ITM 22 were deleted (319 acres) from Alternative 3. Roads proposed with these units were also deleted.

Amended prescriptions: CC 11 was changed to ITM 11 and CC 15 was changed to ITM 15. These prescriptions were change based on low levels of insect/disease conditions that permits partial-cut silvicultural methods while maintaining late seral stand conditions after treatment.

¹⁰ The units described as having no bark beetle infested trees were visited in 1999. Given the fact that bark beetle infested trees have been observed nearby in inventoried roadless areas and wilderness, in riparian areas, in old growth retention sites, and in four of the units, it is reasonable to assume that infested trees may be found today in some proposed units.

¹¹ Units shown without a numerical DMR are lacking formal data in the database. The description of light, moderate, and heavy DMR is based on personal observations in the field.

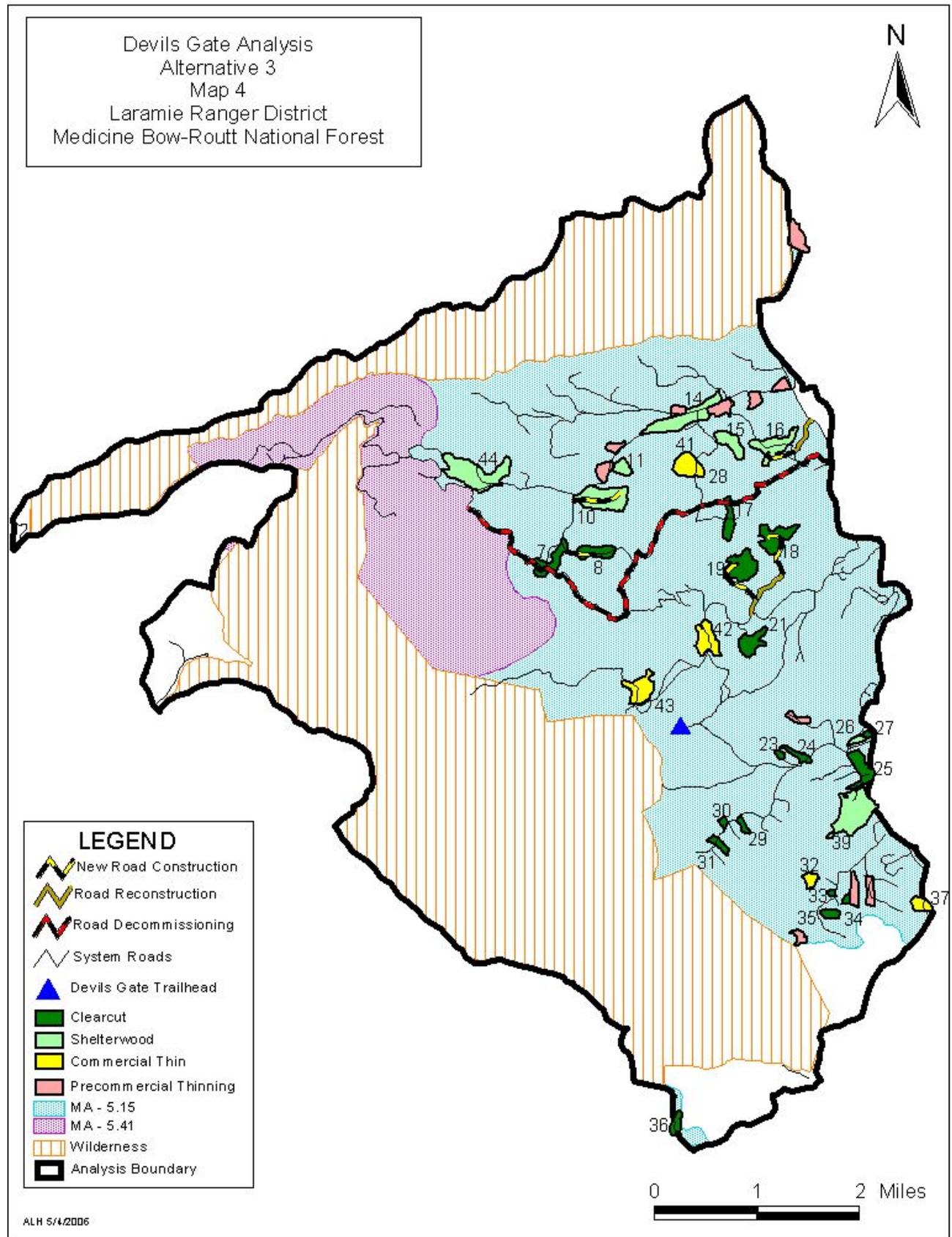


Table 7: Alternative 3 - Treatments

Prescription	# of Units	Acres	Volume (CCF)
Clearcut	17	287 ¹²	8,400 ¹³
Shelterwood	2	102	741
Sanitation/Salvage	5	297	2,582
Commercial Thin	5	139	973
TOTAL	29 Units	825 Acres	12,696 CCF
Pre-commercial Thin ¹⁴	11	145	n/a

Table 8: Alternative 3 – Roads

Road Type	New Construction	Reconstruction	Total Miles	Closures
Specified	2.2	0.9	3.1	6.1
Temporary	3.6	0	3.6	0
TOTAL	5.8	0.9	6.7	6.1

NOTE: Currently, one clearcut unit proposed for timber harvest exceeds the 40 acre limit, as identified on Forest Plan page 1-35 (Standard #1). Proposed clearcut unit 19 (CC 19) would create a 47 acre opening in MA 5.15. As previously mentioned, size limits exceeding those established in the Forest Plan are permitted on an individual timber sale basis after 60 days’ public notice and review and approval by the Regional Forester. The Laramie Ranger District is currently in the process of receiving such approval. Guideline # 2 under MA 5.15 (Forest Plan p. 2-63) indicates that sizes of openings can vary from a few acres up to 250 acres based on site-specific conditions. CC 19 is proposed in MA. 5.15.

Design Criteria Common to All Action Alternatives _____

The Interdisciplinary Team (ID Team) identified design features that will be applied to reduce or prevent undesirable effects resulting from management activities (see Appendix B). Design criteria include such measures as Best Management Practices (BMPs), Watershed Conservation Practices (WCPs), Forest Plan standards and guidelines, and other environmental protection required by laws and regulations.

Mitigation Measures Common to All Action Alternatives _____

In response to public comments on the proposal, mitigation measures were developed to ease some of the potential resource impacts the various alternatives may cause.

Recreation

- Minimize potential conflicts with snowmobile users and safety concerns with respect to winter hauling operations. Efforts may include increased outreach and signage, prohibiting

¹² These are gross acres. Actual harvested acres would be 20 percent less than the number indicated. The reduction is based on MA 5.15 Guideline 6 which states, “In clearcut units, retain approximately 20% of the interior of the unit in clumps, or fingers of unharvested trees... (Forest Plan pg. 2-63).”

¹³ This is gross volume. The volume would actually be reduced by 20 percent based on the MA 5.15 Guideline 6.

¹⁴ Pre-commercial thin is listed separately because it does not contribute to the sale volume.

hauling during weekends and holidays, and coordination with the Wyoming State Trails program.

- Place informational signage in conspicuous areas within the analysis area to alert visitors of the potential disruptions to recreation activities, especially as they pertain to the use of the Cottonwood Creek and Devils Gate trailheads.

Scenic Resources

- Retain natural features such as rock outcrops, young healthy trees, shrubs and understory plants in the immediate of NFSR 512, Savage Run Wilderness access road, trail and trailhead parking (approximately 25 ft to 100 ft from edge of road, trail and parking) for meeting Moderate SIO. Locate and screen landings and slash piles to be burned away from NFSR 512 and Savage Run Wilderness access road, trail and trailhead parking. Cut stumps as close to the ground as possible and remove heavy logging residues. Do not allow roller chopping within the immediate foreground of NFSR 512 and Savage Run Wilderness access road, trail, and trailhead parking. Allow broadcast burning on units located within the foreground of NFSR 512 and Savage Run Wilderness access road, trail and trailhead parking.

Soils

- Subsoil or scarify detrimentally compacted areas of temporary roads, landings, and main skid trails. Detrimental compaction is a 15 percent increase in soil bulk density as a result of the implementation of the proposed action. The soil scientist will identify these areas after implementation. A map of soil units having severe compaction potential is available from the forest soil scientist.
- Do not roller-chop CC11. This site has high soil productivity and is also more susceptible to compaction. Increased soil moisture in this unit increases susceptibility to compaction. Lop and scatter slash or broadcast burn in this unit.

Wildlife

- No known active goshawk nests were located in the project boundary. However, if any goshawk nests are located before or during harvest, Forest Plan standards will be applied which include the required establishment of three, thirty acre nest sites where dense vegetation suitable for nesting is retained, and timing restrictions (April through August) within ¼ mile of known nests is applied.
- Where feasible, avoid harvest in stands that make up a part of the connected older forest. For this reason harvest units 1, 2, 3, 4, 9, 12, 22, 28, which were proposed for treatment in alternative two, were removed from the harvest proposal in alternative three. Harvest units 11, 15, 16, 17, and 44 are identified as part of the late seral connection, but harvest in these units is still proposed in alternative 3 based on assumptions that treatment is important to other forest management objectives (insect and disease, forest health) and treatment other than clearcutting will retain the stands value as habitat. Based on the likely “cumulative effects” predicted to have occurred in the past for marten habitat, a conservative approach to retaining habitat in its current condition should be considered.

- Consider removing the twenty five acre portion of harvest unit 14 (north of NFSR 512) from proposed harvest. There is only a small portion of “best” rated kinglet habitat identified in the analysis area, and thus, it should be considered for retention where feasible, if it doesn’t compromise other goals of forest management.

Monitoring Common to All Action Alternatives

Monitoring is done to assure that Forest Plan standards and guidelines are being met and adhered to during project implementation. Though field surveys were conducted for R-2 sensitive wildlife and plant species, past experience has shown that yearly variations in climatic conditions greatly determine the presence or absence of fauna and flora. If these species are encountered during project implementation, the wildlife biologist/botanist will be notified. Likewise, although heritage surveys were completed for the project area, the Wyoming State Historic Preservation Office (SHPO) requests that the area be monitored for potential sites that may have been overlooked during project implementation.

The following specific items were identified by the ID Team as needing monitoring during preparation and implementation of potential projects:

Table 9: Monitoring Requirements

Monitoring Requirement	Monitoring Type	Responsibility	Frequency
Stream channel and riparian zone condition	Proper Functioning Condition (PFC)	Fisheries Biologist	Post project completion
Aquatic TES populations and habitat	Area ground surveys for amphibians	Fisheries Biologist	Annually for historic and current sites
Aquatic Management Indicator Species populations and habitat	3-pass depletion sampling for common trout	Fisheries Biologist	Randomly across Forest on Medicine Bow and Routt NF (alternate years)
Effectiveness of revegetation and erosion control on closed roads	Ocular	Hydrologist	One time within 3 years following closure
BMP and mitigation measure effectiveness	Ocular	Resource Specialists	One time within 3 years following project implementation
Reforestation	Ocular	Timber Specialist	Post harvest and site preparation

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives. Table 10 compares alternative components; Table 11 compares how the alternatives address the Purpose and Need for the Proposal; and Table 12 compares how the issues raised during scoping would be affected by the alternatives.

Table 10: Alternative Components

Treatment	Alternative 1 – No Action	Alternative 2 – Modified Proposed Action	Alternative 3 – Reduced Clearcutting and Road Construction
Clearcut	0 acres	552 acres	287 acres
Shelterwood	0 acres	156 acres	102 acres
Sanitation Salvage	0 acres	297 acres	297 acres
Commercial Thin	0 acres	139 acres	139 acres
TOTAL	0 acres	1,144	825 acres
Volume	0 CCF ¹⁵	24,319 CCF	12,696 CCF
Pre-commercial Thin	0 acres	145 acres	145 acres
Clearcut Units over 40 acres	0	3	1
Road Type			
Specified:			
New Construction	0 miles	3.3 miles	2.2 miles
Reconstruction	0 miles	1.0 mile	0.9 mile
Temporary:			
New Construction	0 miles	5.0 miles	3.6 miles
TOTAL	0 miles	9.3 miles	6.7 miles
Road Closures	0 miles	6.1 miles	6.1 miles
Improved Motorized Access to Devils Gate Trailhead	No	Yes	Yes

Table 11: Comparison of Alternatives - Purpose and Need

Purpose & Need	Alternative 1 – No Action	Alternative 2 – Modified Proposed Action	Alternative 3 – Reduced Clearcutting and Road Construction
Forest Health and Resiliency	With 0 acres of harvest treatment, the No Action Alternative would not address this need.	This alternative would reduce the spread of dwarf mistletoe by harvesting 749 acres that have a dwarf mistletoe rating (DMR) > 2. It would reduce bark beetle infestations by harvesting 266 acres that have a risk rating of moderate/high. These actions would improve overall stand health.	Alternative 3 would address this need, but to a lesser degree than Alternative 2. Roughly 482 acres that have a DMR greater than 2 would be harvested, and 266 acres with a bark beetle risk rating of moderate/high would be harvested.

¹⁵ CCF = hundred cubic feet.

Table 11: Comparison of Alternatives - Purpose and Need (Cont'd)

Purpose & Need	Alternative 1 – No Action	Alternative 2 – Modified Proposed Action	Alternative 3 – Reduced Clearcutting and Road Construction
Providing a Consistent and Sustainable Flow of Timber	With 0 acres of harvest treatment, the No Action Alternative would not address this need.	With an estimated volume of 24,319 CCF, Alternative 2 best addresses this need.	With an estimated volume of 12,696 CCF, Alternative 3 would address this need, but to a lesser degree than Alternative 2.
Watershed Restoration	With no watershed improvement projects, the No Action alternative would not address this need.	Alternative 2 would close 6.1 miles of NFSRs currently contributing sediment to area streams and 3.7 miles of unauthorized routes; 2.9 miles of the proposed road closures are within 300 feet of streams.	Alternative 3 would close 6.1 miles of NFSRs currently contributing sediment to area streams and 3.7 miles of unauthorized routes; 2.9 miles of the proposed road closures are within 300 feet of streams.

Table 12: Comparison of Alternatives - Significant Issues

Issue Indicators	Alternative 1 – No Action	Alternative 2 – Modified Proposed Action	Alternative 3 – Reduced Clearcutting and Road Construction
Issue 1 - Clearcutting, particularly in MA 5.41			
- Acres of past timber harvest	2,923	2,923	2,923
- Proposed clearcut acres/% of total acres treated	0	552 (48%)	287 (35%)
- Acres proposed for harvest in MA 5.41	0	126	0
- Determination of Optimal Harvest Method	n/a	All stands meet Forest Plan Management Area objectives. Most stands meet CMAI ¹⁶ .	All stands meet Forest Plan Management Area objectives. Most stands meet CMAI.

¹⁶ CMAI refers to Culmination of Mean Annual Increment of growth.

Table 12: Comparison of Alternatives - Significant Issues (Cont'd)

Issue Indicators	Alternative 1 – No Action	Alternative 2 – Modified Proposed Action	Alternative 3 – Reduced Clearcutting and Road Construction
Issue 2 - Wildlife Habitat Provided by Older Forest			
- Acres of Identified Old Growth Forest	1, 714 = lodgepole 791 = spruce/fir 2,505 = total acres	0 acres harvested	0 acres harvested
- Acres of Older Forest Wildlife Habitat Proposed for Harvest ¹⁷ / % of Older Forest Habitat	0	712 / 11.9	458 / 7.6
- Acres of Older Forest Wildlife Habitat within the Connected Blocks of Older Forest Proposed for Harvest	0	Total – 476 Clearcut – 288 acres Other Treatment – 188 acres	Total – 247 Clearcut – 23 acres Other Treatment – 224 acres
Issue 3 - Forest Insects and Diseases			
- Acres treated with bark beetle risk rating of moderate/high	0	266	266
- Acres treated with Dwarf Mistletoe Ratings > 2	0	749	482
Issue 4 - Watershed Restoration			
- Miles of proposed road closures within 300 feet of streams or riparian areas	0	2.89	2.89
Issue 5 - Road Construction and/or Reconstruction			
- Total miles of NFSRs within the analysis area	46.29	43.49	42.49
- Miles of proposed road construction	0	3.3	2.2
- Miles of proposed NFSR closures	0	6.1	6.1
- Miles of unclassified road closures	0	3.7	3.7

¹⁷ The analysis area contains 6,600 acres that are classified as older forest wildlife habitat (includes old growth acreage). This habitat includes large diameter lodgepole pine stands that have some old growth characteristics and that provide connectivity within a large identified block of late seral forest.

Alternatives Considered but Eliminated from Detailed Study_

Original Proposed Action

A number of potential harvest units were eliminated from the original Proposed Action to better address Forest Plan Biological Diversity Standard #1 (p. 1-31) which limits the amount of old growth that may be harvested by cover type by mountain range. The standard also directs that, "If stands meeting the old growth definition do not exist at these percentages, manage additional stands that are closest to meeting old growth criteria as recruitment old growth to meet these desired percentages." This implies that all old growth stands (and potential recruitment stands) within a particular mountain range be inventoried and mapped.

All of the forested areas within the Devils Gate analysis area have not been inventoried for their old growth potential, particularly within the Wilderness areas. Therefore, until such inventories are complete, the Forest Service has decided to remove all units that have the potential to contribute to the old growth percentages from the Proposed Action.

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 the majority of stands considered for harvest are dominated by disturbance dependent species such as lodgepole pine. Further, implementation of uneven-aged management harvest prescriptions within lodgepole pine dominated stands with dwarf mistletoe would increase the spread of the mistletoe from the overstory to the young trees in the understory.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This Chapter summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in Tables 10 - 12.

The following Table 13 provides a tabular display of past, present, and reasonably foreseeable management activity and natural processes within or adjacent to the analysis area since 1959.

Table 13: Summary of Cumulative Effects in the Devils Gate Analysis Area

Analysis Area (AA)		Acres
Includes Portions of the Cottonwood Creek, Devils Gate Creek, and Douglas Creek 6 th Level Watersheds		28,201
National Forest Land		28,180
Private Land		21
Past Harvest Activity Since 1959	Year	Acres Harvested
Unnamed sales	1959 and 1961	440
Devils Gate	1965 - 1969	1,036
Cottonwood Creek	1969 - 1972	643
Sheep Creek	1976	113
Hans Creek	1980	180
Jays Roost	1984 - 1995	511
TOTAL		2,923
Percent of AA		10.4 Percent
Past Natural Disturbances	Year	Acres Disturbed
Overlook Fire	1988	880
6-Mile Fire	2003	200
Gramm Fire	2003	720
TOTAL		1,800
Percent of AA		6.4 %
Current Projects		
Modified Proposed Action		1,144 Acres
- Percent of AA		4 Percent
Alternative 3		825 Acres
- Percent of AA		2.9 Percent
West Beaver and Platte River Allotment Management Plan		No timber removal. Includes almost all of Devils Gate AA
Foreseeable Future Projects		
Snowy Range Travel Management		Includes proposal to close user-created motorized travel routes.
Cumulative Acres Disturbed	Acres	Percent
Modified Proposed Action	5,866	20.8
Alternative 3	5,553	19.7

The information displayed in the remainder of this section includes excerpts from various resource specialist reports that were completed for the Devils Gate Timber Sale and Watershed Improvements project. The affected environment (or existing condition) for each resource is described first and establishes a baseline for comparison of the alternatives. The second part of each resource section describes the analysis of environmental effects (or consequences) of the Proposed Action and alternatives on that resource. Complete copies of these reports are available for public review and are located in the project file.

A. AMPHIBIAN, FISHERIES, and AQUATIC HABITAT

Affected Environment

The Devils Gate analysis area is a headwaters area for tributaries to the North Platte River and includes portions of three 6th level watersheds: Cottonwood Creek, Devils Gate Creek, and the lower portion of Douglas Creek. It also includes parts of the main stems and tributaries of Savage Run, Cottonwood, Devils Gate, Douglas, Anderson, Pelton, Bert, Smith North, Sheep, Boat, Illinois and East Walbright Creeks. Much of the analysis area is scattered with seasonal and perennial wetlands associated with intermittent and perennial stream corridors. These riparian and wetland corridors and their associated streams provide habitat for fish and amphibians.

Douglas Creek and its tributaries, Savage Run Creek, and the North Platte River are highly visited sport fisheries of regional importance for brook, brown, and rainbow trout. Where they exist, they also provide habitat for native fish such as longnose dace, longnose suckers, and white suckers. Additionally, there are quite a few small to medium sized streams and jurisdictional wetlands within the analysis area. National Wetland Inventory mapping (USDI FWS, various dates) indicate most are riverine wetlands associated with the stream bottoms and side drainages of perennial streams.

Riverine and marshy wetland areas provide potential habitat for amphibians, including wood frogs, leopard frogs, and boreal toads (Forest Service sensitive species). Wyoming Natural Diversity Database (WYNND, 2004) and the NRIS Fauna database provide information on amphibian occurrences. These sources indicate that wood frogs have been reported in the analysis area from the early 1940s to the present and that boreal toads are known to exist outside the Devils Gate analysis area and across the Snowy Range Mountains as a whole. Although there is a great deal of suitable habitat for leopard frogs, there is no historic or recent occurrence documentation for them as they generally are found in lower elevation lands.

Amphibian Habitat and Populations: Wood frogs and chorus frogs are known inhabitants of ponds, wetlands, and riparian areas within the analysis area. There are also documented occurrences of wood frogs in Anderson, Hans, and the East Fork of Devils Gate Creeks. The most recent sightings were documented during the 2001/2004 field survey seasons as part of annual sensitive amphibian monitoring. The closest historic boreal toad observations were to the south of the analysis area in the Pelton Creek drainage, to the east of the analysis area below Rob Roy Reservoir, and to the north of the analysis area in the Sourdough Creek drainage.

A distribution and migration study performed during the summer of 2004 documented adult toads in the Sourdough Creek drainage north of the Savage Run Wilderness and the Barrett Creek drainage southwest of Ryan Park. These studies did not provide evidence of young of the year boreal toads.

Drought conditions and chytrid fungus are thought to be the possible reasons for the lack of viable offspring.

Resurvey of both the Sourdough and Barrett Creek drainages in 2005 documented chorus and wood frogs, but no boreal toads. Boreal toads do passively migrate downstream at night so there is the possibility that boreal toads from Douglas or Pelton Creek could end up in the analysis area.

Fish Habitat and Populations: Fish habitat exists in all streams that have sufficient water. Roughly 500 adult fish per mile is considered an established threshold for a stable reproducing population (Personal Communication, Wyoming Game and Fish Department (WGFD) 2001). The effects of current drought conditions provide limited habitat availability and population status uncertainty to individual portions of some streams. However, stream sampling completed by WGFD and Forest Service fisheries personnel between 1988 and 2003 indicate that population trends in most area streams are either stable or increasing, with only a few decreasing.

Savage Run, Devils Gate, Smith North and Douglas Creeks, along with many of their tributary streams, were extensively tie hack logged and driven during the late 1800s through the early 1900s (Young et al. 1994). Douglas Creek also experienced heavy historic mining pressure which, in some reaches, continues today. Consequently, these streams, their floodplains, and associated wetlands are still in a state of recovery (i.e., trying to reestablish natural channel morphology and complexity). A good share of the tie driven streams in the analysis area are straight stream courses, lack sufficient pools, and are lacking in large woody debris. These problems are chronic and are expected to continue for many more years. Therefore, suitable buffers for stream corridors, riparian zones, and wetlands must be utilized and protected. There are no native sensitive fish species within the analysis area.

Management Indicator Species (MIS)¹⁸: The Forest Plan (2003) lists brook, brown, and rainbow trout (“common trout species”) as potential aquatic MIS for the Devils Gate analysis area. MIS were used to assess impacts to species from changes in water quality (i.e., sediment loads, dissolved oxygen, and a macro-invertebrate prey base).

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

Region 2 Sensitive Species: Table 14 includes all Rocky Mountain Region 2 aquatic sensitive species known to exist or suspected in the Devils Gate area. These species were selected for further analysis in this EA. All other species included on the Region 2 list are either not native to the project area and/or habitat does not exist to support them; therefore, they were removed from detailed consideration.

¹⁸ MIS are selected because changes in their populations indicate the effects of management activities on the species community as a whole.

Table 14: Rocky Mountain Region 2 sensitive (S) aquatic or riparian/wetland dependent species known to exist or suspected in the Devils Gate analysis area

Species	Status	Reason for Further Analysis
Wood frog (<i>Rana sylvatica</i>)	S	Species known or have potential to occur in riparian areas, streams, wetlands and ponds.
Western boreal toad (<i>Bufo boreas boreas</i>)	C* S	Species known or have potential to occur in riparian areas, streams, wetlands and ponds.
Northern leopard frog (<i>Rana pipens</i>)	S	Species known or have potential to occur in riparian areas, streams, wetlands and ponds.

* Candidate species.

The Aquatic Biological Evaluation (BE) (Allison 2005) contains a more detailed description of each species. The description includes distribution and status, habitat, existing conditions, direct, indirect, and cumulative effects, and rationale for the biological determinations for each species carried forward in this analysis.

Federally Listed Species: There are no federally listed aquatic species within the analysis area. However, certain species native to the Platte River mainstem (downstream species) that are not normally classified as aquatic were included in the analysis because they are riparian-dependent species. These include the whooping crane, bald eagle, piping plover, pallid sturgeon, least tern, Eskimo curlew, and Western prairie fringed orchid.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects: Protected floodplains, wetlands, and riparian zones would become more densely vegetated, thereby increasing the diversity of the wetland plant community. This, in turn, would provide more secure fish and amphibian habitat and improve flood attenuation, filtering, and other floodplain processes. Riparian vegetation would continue to increase or remain in its present status. However, wetland areas and riparian zones are experiencing an increase in bark beetle and dwarf mistletoe infestation and subsequent tree mortality. These riparian/wetland tree mortalities would provide much needed sources of large woody debris for replacement habitat and floodplain and channel repair caused by historic tie-hack logging.

Streams in the analysis area would be able to maintain suitable fish and amphibian habitats and populations. Riparian character and habitat health would remain much in its same or better state. The elimination of direct and indirect impacts attributed to timber harvesting would protect fish and amphibian breeding/rearing habitats, and conifer tree loss from bark beetle and dwarf mistletoe infestation would encourage riparian vegetation recruitment. Overall, aquatic habitat conditions for fish and amphibians would remain stable or increase under this alternative.

MIS: MIS populations should remain strong and relatively unchanged.

Region 2 Sensitive Species: No direct or indirect effects on local or downstream sensitive species or their habitat are expected.

Federally Listed Species: No direct or indirect effects on local or downstream listed species are expected.

Cumulative Effects: Cumulative effects with respect to threatened, endangered and sensitive (TES) amphibian and fish habitats and populations would continue for a period of time from past timber harvests, roads, and various forms of recreation activities. Riparian and wetland areas are buffered and protected from silvicultural treatments through the use of forestry best management practices (BMPs), watershed conservation practices (WCPs), and Forest Plan standards and guidelines. However, recreation activities in the analysis area including, but not limited to, hunting, fishing, ATV, and snowmobile use could degrade amphibian and fish habitats. Bark beetle and dwarf mistletoe infestations would go unchecked and an increase in dead and dying trees could be expected. At the same time, the dead and dying trees could produce a needed source for large woody debris in streams and riparian/wetland zones.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects: Streambanks and riparian vegetation in floodplains and wetlands would remain in essentially their current condition through the use of protective buffers. Previously degraded areas would recover faster by increased protection afforded by project implementation (e.g., BMPs, mitigation measures, etc.) and Forest or project monitoring of riparian/wetland areas and associated TES species habitat.

It is likely that trout populations would continue to persist where they currently exist. Increased sediment deposition could affect the survivability of both fish and amphibian egg and larval stages, but aquatic habitat conditions for fish and amphibians should be maintained at current or better levels with the implementation of proper design criteria, administration, and proposed road closures.

MIS: Environmental effects relative to the silvicultural treatments on aquatic or riparian-dependent resources in the analysis area are expected to have a low degree of impact. The degree of impact is attributable to the protection provided by buffers mandated by use of BMPs, WCPs, and Forest Plan standards and guidelines. Given the absence of recent identifiable adverse past impacts, the low degree of impact concerning extraordinary circumstances, and the existing strong status of MIS, there is no concern for adverse impacts on the viability of these species.

Region 2 Sensitive Species: Chytrid fungus and drought are thought to be the major causes for reduced numbers of amphibians across the Forest. However amphibians, especially boreal toads, sometimes disperse relatively great distances from aquatic systems. Therefore, there is the potential for equipment, personnel activity, and harvesting to pose a risk to egg masses, larval stage, and individual amphibians.

There are many perennial streams within and around the Devils Gate analysis area, most of which contain good to excellent “common trout” fish populations. However, there are no naturally occurring Forest Service listed sensitive fish species. Therefore, it is unlikely that there would be direct impacts to fish or their habitats provided BMPs, WCPs, and Forest Plan (TES) standards and guidelines are utilized in project design.

Loss of shading, ground vegetation, cover, and stream channel damage could occur from poorly designed treatment units. There is also the possibility of catastrophic precipitation or snow melt run-

off events that exceed the protective limits of BMP and WCP buffers causing sediment loading to stream and lake aquatic systems. Sediment loading could affect dissolved oxygen utilization for egg masses of both fish and amphibians. Project and annual sensitive species monitoring by aquatics personnel should help prevent this from happening. Implementation of timber harvest standard BMPs, WCPs, and Forest Plan standards and guidelines during project design, followed by annual sensitive species monitoring, should greatly reduce the possibility of cumulative impacts from erosion and sediment deposition. Therefore, it is determined that, if implemented as designed, including specified monitoring measures, the proposed timber harvest ***may adversely impact individuals, but is not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range or Forest wide*** for the western boreal toad, wood frog, or the northern leopard frog.

Federally Listed Species: The Modified Proposed would have no direct effects on local listed species or their habitats because listed species (except bald eagles) are not known or suspected to occur in the Devils Gate timber sale analysis area. Therefore, no inadvertent taking of listed species by direct mortality, critical habitat modification or destruction is possible. Effects of the proposed timber harvest plan would be the same as those anticipated under the No Action alternative.

Cumulative Effects: Riparian ecosystems would remain in essentially the same condition with the exception of bark beetle and dwarf mistletoe infected trees. Historic impacts in most riparian areas and stream channels would continue to heal incrementally as dead trees fall in the riparian corridor or enter the stream channel. This would allow high stream flows during run-off to access the floodplain. There should also be an increase in willows and other native riparian shrubs that would help to stabilize stream channels and banks, while at the same time providing the necessary organic material to aquatic systems. Specified buffer distances for TES species around wetlands should reduce existing cumulative effect risks with respect to fish and amphibian habitat quality and quantity and assure linkage corridors between aquatic habitats.

It is likely that there will be future timber harvests for portions of forested land within and adjacent to the analysis area. The use of BMP buffers for forestry, WCPs, and new Forest Plan TES species buffers should help provide the needed protection of streams and riparian/wetland areas for aquatic life, including riparian dependent species and their associated habitats. Sediment deposition could possibly be a factor following a catastrophic rain or snow melt event that would exceed the protective limits of the buffers, but most streams in the analysis area have continued to support stable populations of common trout. Thus, it is likely that these trout populations would persist where they currently exist under this alternative.

National Forest System lands provide a large portion of good fish and amphibian populations in the Rocky Mountain West. Unlike “common trout”, however, amphibians do not exhibit the same good population presence within the analysis area, even with the amount of suitable habitat present. Wood frogs are known to occur, while boreal toads and leopard frogs are uncommon or non-existent. Possible sediment deposition is expected to be the greatest cumulative impact for fish and amphibians affecting spawning gravels, dissolved oxygen concentrations, and water quality.

The Modified Proposed Action would have no indirect or cumulative effects on local federally listed species or their habitats. All the downstream-listed species, except bald eagles, are not known or suspected to occur in the Devils Gate Timber Sale analysis area, and any effects would not be translated downstream to potential habitat. Suitable habitat is located over 100 miles downstream

from the project area. Temporary local water quality and quantity changes (e.g. sediment/water yield) would not translate to downstream habitats. Local sediment increases to streams in the analysis area would be mitigated by the use of BMPs as harvest design and mitigation criteria. These protective measures would prohibit silvicultural activities within 30.5m (100 feet) of streams or riparian/wetland areas. Forest standards and guidelines (2003) increase those distances to 91.4m (300 feet) when there are known TES species in the project area. These buffer zones would protect sediment transport or loss of suitable habitat or species under normal environmental situations. If sediment cannot reach streams or riparian/wetland habitats locally, then by inference downstream waters and habitats would be protected.

It has been suggested that increased water yield from vegetation treatment may be beneficial to Platte River main stem ecosystem species because vegetation treatment projects (timber harvest or burning of green trees) of sufficient size can lead to increases in water yield. This is primarily due to a reduction in transpiration and reductions in snow interception losses by vegetation. Even while water yield increases as a result of vegetative management are real and have been documented in watersheds less than a few square miles in size, research has not been able to detect changes in water yield on larger basins. Additionally, there are a variety of water users between the project areas and suitable downstream habitats, which could nullify any increases in water before it reached downstream habitats. Therefore, this project is not expected to change stream flows where suitable habitat for these endangered species exists.

Alternative 3 – Reduced Clearcutting and Road Construction

Direct and Indirect Effects: As with Alternative 2, streambanks and riparian vegetation in floodplains and wetlands would remain in essentially their current condition through the use of protective buffers and guidelines. Most perennial streams would continue to support stable reproducing “common trout” populations. Aquatic habitat conditions for fish and amphibians should also be maintained at current or better levels.

MIS: Environmental effects relative to the silvicultural treatments on aquatic or riparian-dependent resources in the project area are expected to have a low degree of impact with adherence to aquatic design and mitigation features. Please refer to the discussion under Alternative 2.

Region 2 Sensitive Species: This alternative reduces the potential for harm to sensitive species and their associated habitats by dropping or changing treatment prescription on prime or known habitat occurrence areas. Potential exposure harmful to sensitive amphibians would be reduced by approximately one-third from the Modified Proposed Action. There are no sensitive fish species known or expected to occur in the analysis area.

Sediment loading and soil erosion into permanent/intermittent streams and ponds affects dissolved oxygen utilization for larval stage and egg masses for both fish and amphibians. The reduction in miles of road construction or reconstruction by approximately one-third would reduce the possibility of sediment loading or soil erosion. Additionally, the amended treatments to preserve late-seral stage stands would reduce soil compaction and habitat fragmentation problems in these sensitive habitat areas.

Silvicultural activities proposed under Alternative 3 *may adversely impact individuals, but is not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range or Forest wide* for the boreal toad, wood frog or the northern leopard frog.

Federally Listed Species: Alternative 3 would produce the same type of effects as the Modified Proposed Action. However, it has the potential to quantitatively reduce the magnitude of detrimental effects towards TES species. The reduction in miles of road construction would greatly reduce the potential for adverse effects on fish and amphibians. Thus, Alternative 3 would have no direct effects on local listed species or their habitats. Therefore, no inadvertent taking of listed species by direct mortality, critical habitat modification or destruction is possible. Effects of the proposed timber harvest plan would be the same as the No Action alternative.

Cumulative Effects: Alternative 3 would result in the same effects as the Modified Proposed Action, but has the potential to quantitatively reduce the magnitude of detrimental effects of the project towards TES species by the reduction in affected acres. The reduction in miles of road building also greatly reduces the potential for adverse effects on fish and amphibians.

FOREST PLAN CONSISTENCY

Both the Modified Proposed Action and Alternative 3 incorporate Forest standards and guidelines to achieve the desired condition of lands (2003) within the analysis area. Attainment of desired condition is further improved in scope and purpose by implementing needed road and watershed restoration work. The use of BMPS, WCPs, Forest Plan standards and guidelines, mitigation and recommended monitoring should protect Forest Service lands and aquatic resources from impacts. As designed, both alternatives are consistent with the goals, guidelines and standards related to aquatic resources for the 2003 Revised Forest Plan. Alternative 1 (No Action) is not consistent with Forest Plan direction to protect at risk lands and attain landscape desired condition goals.

B. Botany

1) Proposed, Endangered, Threatened & Sensitive (PETS)

Affected Environment

The Devils Gate analysis area has no known occurrences or potential habitat for plant species formally listed or officially proposed under the Federal Endangered Species Act (USFWS 2004, Keinath *et al.* 2003, Fertig *et al.* 1994). There are, however, 87 plant species listed on the 2003 Region 2 sensitive plant species list, 38 of which are known, likely (biologically or geographically), or suspected to occur on the Medicine Bow National Forest species. Of those 38 species, 13 are unlikely to occur within or near the analysis area and were dropped from further consideration. Of the remaining 25 species, 24 were dropped from further consideration because adequate surveys were conducted to determine that they were absent from the proposed treatment units. The only species analyzed in detail for this proposal was *Botrychium lineare* (slender moonwort).

Survey Intensity

The field reconnaissance for this analysis was conducted in June, July, and August during the 2002, 2004, and 2005 field seasons. With the exception of slender moonwort, surveys were completed at the time of year and at intensity levels that would have allowed populations of all PETS to be detected had they been present in the analysis area. Slender moonwort is a small ephemeral species which may not appear above the ground every year; therefore, it is possible that populations of slender moonwort could go undetected during surveys.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects: No direct effects are expected to occur as a result of the No Action alternative. Assuming presence, occupied sites of slender moonwort would, at least for the short term, continue to experience current levels of disturbance from ongoing activities (e.g., firewood gathering, livestock management, fire suppression, and road maintenance). Where populations of slender moonworts are found, current levels of disturbance should be maintained (Popovitch 2003).

Cumulative Effects: The Devils Gate analysis area has been affected by past timber harvest, wildfires, road construction, motorized recreation use, grazing, mining, and water diversions. These activities have all contributed to changes in the hydrologic regime and TES habitat effectiveness. Historic disturbances (clearing and ground disturbances) ranging from 30 to 50 years ago have potentially created habitat for slender moonwort within the analysis area.

Habitat succession (in the absence of fire and/or harvest) and fire suppression could threaten slender moonwort (Vizgridas 2001). However, the relationship between habitat succession and fire suppression to its persistence is not clear. No other cumulative effects are expected as a result of the No Action alternative.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects: Under Alternative 2, approximately 1,144 acres of canopy reduction treatments are proposed. An estimated 5 percent (~57 acres) of these acres are potential habitat for slender moonwort. Potash (1998) states that potential threats to occupied sites could include activities that change the canopy cover, soil temperature, or soil moisture of moonwort habitat. However, because only one observance to date has documented the species in a habitat with a closed canopy, canopy cover changes are not likely to be a major effect to occupied locations (Potash 1998).

Alternative 2 would result in the greatest amount of ground disturbance from new road construction (3.3 miles) and reconstruction (1 mile). Of these miles, an estimated 5 percent are potential habitat for slender moonwort. Operational activities (mechanized equipment) associated with the canopy reduction treatments and road building would generally cause light to moderate ground disturbances and high intensity ground disturbances in select areas. Beatty *et al.* (2003) states that disturbances and land management activities may create and maintain suitable habitat for slender moonwort or may negatively impact existing populations, depending on the disturbance intensity and frequency.

Moderate to intense ground disturbing activities occurring within occupied locations could negatively affect individuals and habitat, including the mycorrhizal relationships of early gametophytes which occur below the ground. Ground disturbing activities could also negatively affect the roots, stems, leaf primordia, and fern-like structures which occur above the surface (Virgirdas 2001). Assuming presence, disturbance at moderate to high intensities within occupied sites could compact soils. This would reduce pore space which could affect both soil microorganisms and plants themselves and could effectively eliminate any existing moonwort. Ground disturbing activities within occupied sites would most likely threaten slender moonwort habitat and their developing gametophytes when the ground is most wet during spring and early summer. Although moonworts seem to be associated with human disturbances, it is unknown how soil compaction in occupied sites affects this plant or its associated mycorrhizae. Farrar (2003) states that, because slender moonwort appears to be at least somewhat tolerant of disturbance, activities that cause light to moderate ground disturbance are not likely to significantly impact populations (Popovich 2003). Where populations of slender moonworts are found, current levels of disturbance should be maintained (Popovitch 2003).

Because moonworts, in general, are mostly found in previously disturbed areas, actions that clear or burn acres could create habitat for this species (Popovich 2003). If any habitat is improved or created for slender moonwort as part of this project and the habitat becomes occupied, this would result in an increase in the known populations for this species.

Canopy reduction treatments and road construction are proposed under the Modified Proposed Action. Noxious weed invasions often occur where habitats are disturbed. If a noxious weed invasion occurred within occupied habitat, individuals or whole populations of slender moonwort could be lost as a result of the change in plant community and resulting competition.

Cumulative Effects: The extreme rarity of slender moonwort makes it vulnerable to destruction due to random events. Its habitat requirements are not well understood; therefore, habitat trend cannot be established (Beatty *et al.* 2003). Not enough data are available to conclude if moonwort populations are increasing, decreasing, or remaining stable throughout Region 2. Establishing population trends through monitoring efforts are further complicated because the plant is ephemeral (not up every year). However, since being listed as a candidate for listing as threatened, additional moonwort populations have been located which represent an increase in known total populations.

Because this species appears to be at least somewhat tolerant of disturbance, activities which (have caused, or would cause in the predicted future) light to moderate ground disturbance are not likely to significantly impact populations (Farrar 2003).

It is likely that grazing impacts occurred in the past at intensities and frequencies greater than current or future levels. Impacts to TES plants were recently analyzed for the West Beaver and Platte River Allotments. Portions of these allotments occur within the Devils analysis area. Through allotment management plans, any future impacts to this species and other sensitive plants by the trampling or grazing by livestock can be reduced.

Invasive species are often spread by forest management activities. All the action alternatives would present some risk of noxious weed invasion. The Modified Proposed Action would present a greater risk than Alternative 3. If exotic species invasion occurred within occupied habitat, individuals or whole populations of slender moonwort could be lost.

The terrain within the analysis area is moderate, and recreation use in this area is currently light to moderate. Portions of the Devils Gate analysis area occur within the Snowy Range Travel Management (SRTM) analysis area. That effort would direct any potential negative impacts to TES plant species from off highway vehicle use away from likely habitat. In addition, that effort would result in new trail construction in select areas and decommission select roads and trails in other areas. It is possible, but unlikely, that the new trail construction or decommissioning of roads and trails associated with SRTM would result in negative impacts to individuals of slender moonwort. It is also expected that the decommissioning of roads and trails would result in decreased use and subsequent ground disturbance within select locations in the future.

Insect and mistletoe epidemics and natural disturbances have occurred in the past and have resulted in the death of trees and habitat succession (including the encroachment of aspen and the opening up of meadows). Because only one observance to date has documented the species in a habitat with a closed canopy, canopy cover changes have not been, and are not likely to be, a major effect to occupied locations.

Habitat succession (in the absence of fire and/or harvest) and fire suppression could threaten slender moonwort (Vizgridas 2001). However, the relationship between habitat succession and fire suppression to its persistence is not clear. Fire is a natural disturbance in the ecosystem. In some areas, fire could possibly benefit moonwort habitat by reducing the litter accumulation and competition from other plants. In other areas, wildfires or controlled fires would create high ground temperatures that could sterilize the soil and eliminate fungal species that are necessary for moonwort survival.

A large wildfire (extreme event) ignited on the Medicine Bow-Routt NF could threaten populations and habitat for this species in Colorado and/or Wyoming. The impacts of wildfires are controllable through suppression actions which are generally successful but at times, incidents can exceed suppression capabilities. In some cases, wildfires or controlled fires create high ground temperatures that may sterilize the soil and eliminate fungal species that are necessary for moonwort survival.

Alternative 3 – Reduced Clearcutting and Road Construction

Direct and Indirect Effects: Under Alternative 3, approximately 825 acres of canopy reduction treatments are proposed. An estimated 5 percent of these acres are potential habitat for slender moonwort. Assuming presence, Alternative 3 would result in less risk to slender moonwort than Alternative 2.

Alternative 3 would also result in less ground disturbance than Alternative 2. Under Alternative 2, approximately 2.2 miles of new road construction and 0.9 miles of reconstruction are proposed. Of these miles an estimated 5 percent are potential habitat for slender moonwort. Because Alternative 3 proposes to treat fewer acres than Alternative 2, Alternative 3 would result in less risk to slender moonwort than Alternative 2. Finally, because fewer acres would be disturbed, Alternative 3 provides less risk that a noxious weed invasion would occur within habitat occupied by slender moonwort.

Cumulative Effects: Please refer to the discussion under Alternative 2.

BIOLOGICAL DETERMINATIONS, RISK ASSESSMENTS and RATIONALE for PETS

Because it is uncertain whether slender moonwort is present on the Medicine Bow-Routt National Forest, and because there is very limited information available about this species, it is difficult to assess whether the activities associated with the proposed actions for this project would have a no effect, a potential adverse effect, or a potential beneficial effect on slender moonwort. The most likely effects determinations are provided below for each alternative (Table 15).

Table 15: Biological Determinations for Slender Moonwort

Common Name	Scientific Name	Status	Determination		
			Alt 1	Alt 2	Alt 3
Slender Moonwort	<i>Botrychium linare</i>	R2 Sensitive	No Effect	MAII*	MAII*

* May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend toward federal listing or a loss of species viability range wide

The rationale for the above determinations is based upon the following:

- Survey efforts were put forth to detect slender moonwort. No populations were found as result of that field reconnaissance, minimizing the risk that populations could become negatively effected by the proposed activities (Proctor 2005).
- This finding is based upon the assumption that light to moderate disturbances resulting from activities both create and maintain suitable habitat for this species depending on the disturbance intensity and frequency (Beatty *et al.* 2003). Because slender moonwort appears to be at least somewhat tolerant of disturbance, activities that cause light to moderate ground disturbance are not likely to significantly impact populations (Farrar 2003).
- Slender moonwort has demonstrated its ability to colonize past disturbance areas, and the species is known to persist with limited but continuing levels of disturbance, (Farrar 2003, Wooten 1993). Where populations of slender moonworts are found, Dr. Farrar (North American Moonwort Expert) recommends maintaining any current levels of disturbance.
- Any populations of slender moonwort that occurred in this area would be new populations (previously unknown, unrecorded and not used in the determination of FWS candidate status or R2 sensitive species status).
- The management requirements included in this project and for other management actions that might result in cumulative effects populations (assuming presence) would provide for adjustments to retain populations.

FOREST PLAN CONSISTENCY

Assuming mitigation, all action alternatives would be consistent with standards and guidelines in the Medicine Bow Forest Plan Direction for Botany.

2) Species of Local Concern (SLC)

Affected Environment

SLC are species that 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. Species at the edge of their range may not merit regional Sensitive Species status but may be important elements of biological diversity for the Forest/Grassland unit (from R2 Planning Desk Guide Chapter 27: Selection of Sensitive Species, Species of Local Concern, and MIS in R2). SLC are identified during revision of individual Land and Resource Management Plans.

The Medicine Bow-Routt National Forests and Thunder Basin National Grassland has identified 50 SLC; the Devils Gate analysis area contains potential habitat for 44 of these species. Of the 44 species, 42 were dropped from further consideration because adequate surveys were conducted to determine that they were absent from the proposed treatment units. The two SLC analyzed in detail in this EA include *Cypripedium fasciculatum* (clustered lady's slipper) and *Listera cordata* (heartleaf twayblade). Clustered lady's slipper occurs in two proposed harvest units, ITM 14 and ITM 44, and heartleaf twayblade occurs in ITM 14.

Survey Intensity

The field reconnaissance for this analysis was conducted in June, July, and August during the 2002, 2004, and 2005 field seasons. Peatland/fen areas within the proposed treatment units and areas within the area of influence of the proposed alternatives were surveyed for SLC. With the exception of moonwort species, surveys were completed at the time of year and at intensity levels that would have allowed populations of all SLC to be detected had they been present in the analysis area.

Analysis of slender moonwort is presented above. Assuming other moonworts are present but went undetected during surveys, the likely effects would be similar to those presented for slender moonwort.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects: Insect epidemics and dwarf mistletoe and natural disturbance elements have occurred in the past and will continue to occur in the future. These can result in the death of lodgepole pine and spruce trees, changes in canopy cover, and habitat changes to earlier seral stages. Tree mortality would occur more slowly overtime than with timber harvest, and dead trees would continue to stand for a few to many years (2 – 50 years) after dying (Lowry 1882, Mielke 1950, Hinds et al. 1965, Lyon 1977).

Plants currently growing under the canopy would experience some changes in light, humidity, and thermal regimes (warmer in the summer and colder in the winter) (Aussenac 2000). Woody material, duff, and litter would be exposed to higher solar insolation (light and heat) and would experience a generally drier microclimate in the summer, but may also experience greater snow

depth and longer snow cover (Fahey and Knight 1986, Leaf 1975). Fuel moistures would generally decrease after the canopy is removed (Pook and Gill 1993). Existing regeneration in the understory would contribute to shading where it is larger and/or taller than the herbaceous plants. The changes expected would generally be less than under the action alternatives.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects: Changes in canopy cover and amounts and distribution of dead and down woody debris would generally be detrimental to clustered lady's slipper and heartleaf twayblade occurrences (Vance in press, Seevers and Lange 2002, Hoy 2002). Although flowering stems of clustered lady's slipper are occasionally found in clearcuts and areas with fuel treatments, it is unlikely that these situations provide conditions suitable for symbiotic germination and sustenance for mycorrhizae necessary for symbiotic germination. It is also unlikely that the situations provide habitat for pollinators, fungal gnats, and decomposing wood fungi (North et al. 1997, Seevers and Lange 1998).

Design features (included in Appendix B) that apply a 100-foot radius no-treatment or minimal treatment buffer around documented occurrences would minimize effects to the species of local concern. The design features would maintain canopy cover, down woody material, and ecological processes that sustain orchids, pollinators and parasitic prey in and around areas where the species occur.

The project would bring additional traffic and road use within the project area. Noxious weed occurrences are expected to increase. Silvicultural treatments that favor early seral conditions and disturb solids within forested areas would create conditions suitable for noxious weeds and invasive species to reproduce (With 2001, Gelbard and Belnap 2003). Control of noxious weeds and invasive species along roadsides would continue at current or increased levels in response to occurrences. The FS has cooperative agreements with the counties for the control of these species. Requiring machinery to be cleaned before use on NFS lands would help to reduce the transport of noxious weed/invasive species seeds from off-site.

Road use activities would increase. There would be implementation of both silvicultural and prescribed fire activities. Risks would increase during project implementation as machinery use increases. In areas where the overstory is removed or where clearcutting is applied, and where slash treatment is lop and scatter, there would be an increase in both fine and large ground fuels. These fuels would eventually dry out thereby increasing the risk of a wildfire that could produce severe soil heating.

Alternative 3 – Reduced Clearcutting and Road Construction

Direct and Indirect Effects: Please refer to the discussion under Alternative 2.

CUMULATIVE EFFECTS – All Alternatives

It is likely that grazing impacts occurred in the past at intensities and frequencies greater than current or future levels. Future impacts to this species and other sensitive plants by the trampling or grazing

by livestock can be reduced through allotment management plans. None of the alternatives proposes any changes in grazing levels; however, the action alternatives may create more forage in forest stands in the vicinity of SLC occurrences. This may increase grazing in the vicinity of the occurrences.

Invasive species can be spread by road use and forest management activities. Invasive species presence can be additive to other disturbances and can change mycorrhizal communities (With 2002). The No-Action alternative has the lowest level of road use. Alternative 2 has the highest level of road use, and Alternative 3 has an intermediate level of road use.

Mountain pine beetle epidemics are natural disturbances which have occurred in the past, resulting in the death of trees and habitat succession (Dillon et al. 2005). Natural disturbances can change canopy cover and have effects similar to forest harvest. The No Action alternative would allow natural disturbances to proceed un-altered. Alternatives 2 and 3 would capture most of the mortality from mountain pine beetle as forest products.

Habitat succession (in the absence of fire and/or harvest) and fire suppression is likely to maintain favorable conditions for all SLC.

Wildfires or controlled fires would create high ground temperatures that could sterilize the soil and eliminate fungal species that are necessary for SLC survival. A large wildfire (extreme event) ignited elsewhere on the Snowy Range could threaten populations and habitat for this species. The impacts of wildfires are controllable through suppression actions which are generally successful; however, at times, incidents can exceed suppression capabilities. The action alternatives would have the greatest risk of ignition of a wildfire as part of machinery operations off of roads.

The actions and effects described above can be both additive and interactive to each other and to the direct and indirect effects described above. The cumulative effects are not expected contribute to any change in status or viability; however they may result in effects to individuals and/or extirpation of clones and/or occurrences which have not been identified in botanical surveys. The cumulative effects of the action alternatives are expected contribute very slightly to the existing and predicted downward trend in population numbers and distribution in the short term.

Insects and diseases are currently killing trees in vicinity of the occurrences. Therefore, the No Action alternative is expected to have similar cumulative effects to the action alternatives, but slightly less in extent and intensity because there will not be machinery operating off of roads. Because the action alternatives include design features that limit machinery operations and canopy changes in the vicinity of the occurrences, similar cumulative effects are expected to occur in the vicinity of the occurrences.

BIOLOGICAL DETERMINATIONS and RISK ASSESSMENT for SLC

The following table (Table 16) displays the biological determination by alternative.

Table 16: Biological Determination for Species of Local Concern

Common Name	Scientific Name	Determination		
		Alt. 1	Alt. 2	Alt. 3
Clustered lady's slipper	<i>Cypripedium fasciculatum</i>	No impact	Some impact to individuals, no loss of viability to species	Some impact to individuals, no loss of viability to species
Heartleaf twayblade	<i>Listera cordata</i>	No impact	Some impact to individuals, no loss of viability to species	Some impact to individuals, no loss of viability to species

Based on the best available information, no loss of viability for any species of local concern is expected from the proposed action as modified by the design features specified.

The risk of affecting individuals of clustered lady's slipper and heartleaf twayblade is relatively certain because these species occur in areas proposed for canopy reduction and ground disturbance. Design features may reduce the impact but would not completely eliminate the impact. They may also may prove difficult to implement because these orchids appear to move about as the above ground stems arise from different parts of the below ground rhizome in different years. The habitat capability outside of the limited operations area would be reduced.

FOREST PLAN CONSISTENCY

There are no identified inconsistencies with the Forest Plan or other direction if the design features specified are incorporated into the project proposal.

C. Economics

Affected Environment

The Devils Gate Analysis Area is located on the Laramie Ranger District of the Medicine Bow-Routt National Forests in Albany and Carbon Counties, Wyoming. Located in both counties, the communities of Keystone, Albany, Foxpark, Woods Landing, and Laramie have the greatest potential to be directly affected by the project activities because of their proximity to the analysis area. Therefore, they are the focus of the following social and economic analysis.

Some residents of these communities depend upon a variety of forest resource-related activities, and access to resources, for their economic livelihood. These forest resource-related activities include: water diversions, wood products, mining, hunting, fishing, outfitter guiding, grazing, tourism, and other recreation activities. Some residents who live around the project area may also consider the forest resources and access as important part of their quality of life.

Environmental Consequences

The following three-part analysis highlights both social and economic issues, and potential impacts, to the greatest degree possible. In some cases, quantitative measures have been used, but in most cases, the discussion is qualitative.

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 (e.g., timber, grazing, and recreation) to which a monetary value is assigned. The monetary values include both market and non-market values. A financial efficiency analysis is also completed to determine the financial returns of each alternative. A financial efficiency analysis is the PNV of Federal revenues and costs.

PNV 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 Devils Gate analysis, the output level of non-market goods (e.g., recreation, hunting, water production) is not expected to change under any alternative. Further, 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.

A benefit/cost ratio and PNV were calculated for both action alternatives using two scenarios: a short term period of 10 years and a long term period of 43 years. Table 17 displays the PNV and benefit/cost ratio for each Devils Gate alternative for a short term period of 10 years. All monetary values are expressed in constant dollars with no allowance for inflation. A 4 percent discount rate was used over a 10-year period (2006-2016) because this is the timeframe for the activities and outputs proposed by the alternatives. The reduction of PNV in any alternative, as compared to the most efficient solution, is the economic trade-off, or opportunity cost, of achieving that alternative.

Table 17: Short-term Economic Efficiency by Alternative (in Thousands of Dollars)

10-Year Period	Alternative 1 No Action	Alternative 2	Alternative 3
Present Net Value	N/A	\$8,802	-\$43,555
Benefit/Cost Ratio	N/A	1.01	0.91

Source: *Quicksilver Economic Analysis*

Table 18 displays the PNV and benefit/cost ratio for each Devils Gate alternative for a long term period of 43 years. Again, all monetary values are expressed in constant dollars with no allowance for inflation. A 4 percent discount rate was used over a 43-year period (2006-2049) because this is the timeframe for the activities and outputs proposed by the alternatives. The reduction of PNV in any alternative, as compared to the most efficient solution, is the economic trade-off, or opportunity cost, of achieving that alternative.

Table 18: Long-term Economic Efficiency by Alternative (in Thousands of Dollars)

43-Year Period	Alternative 1 No Action	Alternative 2	Alternative 3
Present Net Value	N/A	-\$85,370	-\$112,256
Benefit/Cost Ratio	N/A	0.92	0.84

Source: *Quicksilver Economic Analysis*

Economic Efficiency

Economic efficiency compares costs and benefits of resources, quantifiable or not. This measure considers positive and negative resource externalities, passive uses, non-consumptive use, and opportunity costs at various scales. An economic efficiency analysis includes national, as well as local issues and concerns. Many of these benefits and costs are not valued through the market or exchange of money and can, therefore, be difficult to quantify or summarize. Often, the same impact may be considered a cost to some and a benefit to others, depending on individual values. Economic efficiency is another tool used in the decision making process to gain full information about a project, both quantitatively and qualitatively, and to discern differences between alternatives.

Alternative 1 – No Action

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

Alternatives 2 and 3 (Action Alternatives)

Table 17 (short-term economic efficiency) indicates that Alternative 2 has a positive PNV and benefit/cost ratio greater than one while Alternative 3 has a negative PNV and benefit/cost ratio less than one. Alternative 2 has lower costs and higher revenues in the short term while Alternative 3 is

the reverse. The Modified Proposed Action (Alt. 2) has a higher PNV and benefit/cost ratio than Alternative 3 because it treats more acres and generates more revenue.

Table 18 (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. However, the Modified Proposed Action (Alt. 2) has a higher PNV and benefit/cost ratio than Alternative 3 because it treats more acres and generates more revenue.

When evaluating trade-offs, the use of economic efficiency measures is one tool used by the decision maker. Many things cannot be easily quantified with a monetary value, such as effects towards public safety, wildlife, forest health, plant diversity, etc. The decision maker takes these and many other factors into account in making the decision.

CUMULATIVE EFFECTS

There are many elements that influence and affect local economies including population growth, economic growth, and economic diversity and dependency of individual counties and communities. Due to the relatively small scope of this project, it is not expected to add any existing cumulative effect to the economy.

Distribution Analysis

Distribution analysis is not concerned with costs and benefits directly or with direct values of resources. Instead, it is concerned 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. In this project area analysis, the distribution impact is considered from several perspectives, impacts of employment and income by alternative, and environmental justice.

Employment and Income

In general, Alternative 2 would have little impact, positive or negative, to the local economies of Albany and Carbon Counties. There would be little overall change in terms of economic activity. Under Alternative 3, the situation is similar; total impact to the local economy would be minimal. 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 a Proposed

Action 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.

D. Engineering

Affected Environment

All National Forest System Roads (NFSR) within the analysis area are classified by functional class. A definition of the functional classes as well as the road numbers and names, and length of each road are listed below.

Arterial Roads

The analysis area contains portions of two arterial roads: NFSR 512 (Platte Access Road, 8.64 miles) and NFSR 898 (Pelton Creek Road, 0.54 miles). 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. Since these roads receive the highest vehicle use, they require more maintenance than other forest roads.

The Platte Access Road (NFSR 512) is a single lane, aggregate surfaced road with turnouts and provides the primary access to the Platte River on the Laramie Ranger District. Along with fishing and other water related activities, the road accesses the Pike Pole Campground and Pickaroon Picnic Grounds as well as hiking opportunities on the Douglas Creek Trail into the Platte Ridge Wilderness area via the Douglas Creek Trailhead. The road also accesses the Savage Run Wilderness Area via trailheads at the end of NFSR 512.V (Savage Run Trailhead) and at the beginning of NFSR 512.Z (Cottonwood Trailhead).

The Pelton Creek Road (NFSR 898) is a single lane, aggregate surfaced road with turnouts. While only a short section of this road lies within the analysis area, a 5 mile section of the road from State Highway 230 to the intersection of NFSR 516 would be used to haul timber from Unit 36 (Alternative 2 only).

Collector Roads

Forest collector roads serve as connectors between major (arterial) roads and lower class (local) roads that access small 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. There are no collector roads in the Devils Gate Analysis Area.

Local Roads

There are approximately 37.11 miles of local roads in the analysis area. Local generally terminate in smaller resource areas and are usually constructed for a single resource activity, such as timber harvest. Following implementation of resource management activities, many local roads are closed (gated) to motorized traffic to reduce impacts on other resources, such as wildlife. However, other local roads provide access to popular recreation areas and remain open to motorized traffic. Local roads are the lowest class of National Forest System Roads and are typically located and designed to

follow existing land contours. They are characterized by narrow widths, moderate to steep grades, and primitive or native surfaces. Local roads remaining open for recreational use may have improvements such as aggregate surfacing and improved alignments and grades.

Note: Between Arterial and Local Roads, there are 46.29 miles of NFSRs within the analysis area. This figure includes roads open to motorized travel and those that are gated and closed.

Unauthorized Roads

The analysis area currently contains an estimated 16.02 miles of unauthorized roads. Unauthorized roads are not managed as part of the forest transportation system and include such things as unplanned roads, abandoned travelways, off-road vehicle tracks that have not been designated and managed as a trail, and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization (36 CFR 212.1, FSM 7705 - Transportation System). Unauthorized roads also include roads that are “user created,” having been established by a user or groups of users for recreation, mining, etc. Temporary roads and user created roads can have a significant impact on soil, water, wildlife, etc resources.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects: Needed road maintenance would continue to be deferred under the No Action alternative until funding becomes available. As a result of low funding levels, annual maintenance would not keep up with normal deterioration, and roads would not be maintained to original design and maintenance standards.

Improvements to the Devils Gate Trailhead Road (NFSR 506.D) would not occur. Gullying and displacement of sediment would continue to occur and access to the trailhead would continue to be difficult.

Roads identified for closure under the action alternatives (NFSR 506.B, NFSR 512.G, and unauthorized roads 512.G.01, 512.G.02, 512.G.03, 512.G.04, and 512.G.05) would remain accessible and would continue to deteriorate due to use by motor vehicles and inadequate surface drainage. Between arterial and local roads, the analysis area would continue to contain 46.29 miles of NFSRs.

Cumulative Effects: Soil disturbance and additional connected disturbed areas common to new road construction and reconstruction would not occur under the No Action alternative.

Due to a lack of pre and post haul maintenance, many of the existing area roads would not move towards the desired condition for the transportation system in the analysis area. Further, annual maintenance would not keep pace with normal deterioration, and roads would not be maintained to original design and maintenance standards.

No system or unauthorized roads would be closed under this alternative. If implemented, the Snowy Range Travel Management Project (SRTM), which is currently in the planning phase, would result in the closure of many spur roads and unauthorized roads in the area and would convert some existing system roads to ATV trails. This project also proposes to build sections of new single track motorcycle trail to tie into already established user created routes to create a motorized trail system

running through the analysis area; therefore, motorized recreation opportunities may increase in the analysis area in the future.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects: Implementation of Alternative 2 would require 3.3 miles of new road construction, 1.0 mile of road reconstruction, and 5.0 miles of temporary road construction. Newly constructed roads would be located and designed to minimize excavation and exposed soils. Road designs would include allowances for grades and soil types when selecting the appropriate drainage spacing. Following project completion, all newly constructed and reconstructed roads would be scarified, seeded, and closed (by gates) to public motorized travel. All temporary roads would be decommissioned following project completion.

During project implementation, NFSR 506.B would be reconstructed and two spurs would be built off of this road to access Units 18 and 19. NFSR 506.B is adjacent to a tributary of Devils Gate Creek and is currently causing erosion problems at its intersection with NFSR 506. The old drainage structures (rolling dips) would be improved and new dips would be constructed where necessary to correct the problem.

The remaining construction and reconstruction activities associated with Alternative 2 would occur away from creeks in the Devils Gate watershed and from the headwaters of a tributary of Douglas Creek. There are no proposed stream crossings for any of the road construction or reconstruction.

Roughly 6.1 miles of system road and 3.67 miles of unauthorized road would be closed under this alternative. Road closures include NFSR 512.G (5.5 miles), NFSR 506.B (0.6 miles), and several short unauthorized roads. All of these roads have areas with poor surface drainage and erosions problems and may be contributing sediment into the Devils Gate watershed. Proper decommissioning of these roads would reduce the sedimentation within the watershed. NFSR 506.B, although identified for closure, would not be decommissioned. This road would be scarified, seeded, and closed by a gate so that it may be used for future entry into the area.

The analysis are would contain approximately 43.4 miles of NFSRs following implementation of Alternative 2. This figure was calculated by adding 3.3 miles to the existing 46.29 NFSR miles and subtracting 6.1 miles of NFSR closures.

Alternative 2 also includes improvements to the Devils Gate Trailhead Road (NFSR 506.D). This road is 1.17 miles long and is one of the steeper roads in the analysis area. Improvements would include: maintenance of existing drainage structures (cross drains), installation of additional cross drains to improve drainage, surface blading, and roadside brushing.

A number of the local roads in the analysis area would be used as haul routes if this alternative is selected. They include:

Table 19: Road Numbers and Mileages for Alternative 2 (Modified Proposed Action)

Road Number	Miles		Road Number	Miles
506 East Fork Devils Gate	5.76		563 Cottonwood Road	1.96
506.A Devils Crossing	0.49		565 Jays Roost Road	1.39
506.B Beaver Pond Road	0.61		567 Lost Line Road	1.13
512.R Sheep Creek Road	1.20		581 Stuck Truck Road	0.19
514 Hans Creek Crossover	1.51		584.A Anderson Creek Road	0.79
521.E Scobee Road	0.51		585.A Hot Road	0.80

Pre and post use maintenance would be required on all haul routes; some roads may require little or no work while others may require more extensive maintenance to make them suitable for hauling. Pre-haul and post haul maintenance can include minor drainage maintenance, surface blading, roadside brushing, and minor earthwork. Only those sections of the roads used for hauling timber would be eligible for pre and post haul maintenance.

Cumulative Effects: Alternatives 2 and 3 would require reconstruction and pre and post haul maintenance on roads used during the timber sale activities. This activity would reduce or eliminate impacts related to poor location, inadequate drainage, steep grades, and traffic. It would also move the road system in the analysis area towards a more desired condition.

Improvements to the Devils Gate Trailhead Road (NFSR 506.D) would reduce erosion and sediment delivery into stream channel. Surface blading and roadside brushing would also improve the access to the trailhead.

This alternative proposes to close NFSR 512.G, NFSR 506.B, and unauthorized roads 512.G.01, 512.G.02, 512.G.03, 512.G.04, and 512.G.05 for an estimated 9.8 miles of road closures. Some users may react negatively to these closures. NFSR 512.G and its spurs (authorized and unauthorized) have been used for motorized access for hunting, trail riding, and exploring the historical mines and cabins located in the northern portion of the analysis area. These roads are viewed as challenging to offroad enthusiasts. NFSR 512.G, at 5.5 miles in length, is one of the longer 4-wheel drive challenges on the Laramie Ranger District. Closing newly constructed and reconstructed roads to the public following the timber sale may also be viewed negatively by some users.

If implemented, the SRTM could close many unauthorized roads in the Devils Gate analysis area, convert some of the existing roads to ATV trails, and result in the construction of new single track motorcycle trails. Alternatives 2 and 3 would align well with the proposed SRTM objective of converting selected existing roads to ATV and single track motorcycle trails.

Alternative 3 – Reduced Clearcutting and Road Construction

Direct and Indirect Effects: Alternative 3 would require 2.2 miles of new road construction, 1.0 mile of road reconstruction, and 3.6 miles of temporary road construction. The effects of this road construction would be similar to, but less than, that described under Alternative 2. Following construction, all newly constructed and reconstructed roads would be scarified, seeded, and closed (by gates) to public motorized travel. All temporary roads would also be closed and reclaimed following project completion.

Like Alternative 2, Alternative 3 would result in the closure of an estimated 6.1 miles of system road and 3.67 miles of unauthorized roads. The effects associated with the closures would be identical to those described under Alternative 2.

The analysis are would contain approximately 42.4 miles of NFSRs following implementation of Alternative 3. This figure was calculated by adding 2.2 miles to the existing 46.29 NFSR miles and subtracting 6.1 miles of NFSR closures.

A number of the Local roads in the analysis area would be used as haul routes if this alternative is selected. They include:

Table 20: Road Numbers and Mileages for Alternative 3

Road Number	Miles	Road Number	Miles
506 East Fork Devils Gate	5.76	565 Jays Roost Road	1.39
506.A Devils Crossing	0.49	567 Lost Line Road	1.13
506.B Beaver Pond Road	0.61	581 Stuck Truck Road	0.19
514 Hans Creek Crossover	1.51	584.A Anderson Creek Road	0.79
521.E Scobee Road	0.51	585.A Hot Road	0.80

The effects of pre and post use maintenance would be the same as those described under Alternative 2.

Cumulative Effects: See the effects discussion for Alternative 2.

FOREST PLAN CONSISTENCY

All alternatives are consistent with the transportation standards and guidelines contained in the Revised Forest Plan (2003).

E. Forested Vegetation/Insects and Diseases

Affected Environment

Forested Vegetation

Lodgepole pine is the dominant tree species on 79 percent of the forested acres in the analysis area. In general, this species is found on drier sites with stand conditions varying from even-aged to multi-aged and single-storied to multi-storied. Lodgepole pine often exists in pure pine stands; however, there are cases where it is mixed with Engelmann spruce, Subalpine fir and aspen. Lodgepole pine may be observed in separate size classes such as seedlings and saplings, poletimber, sawtimber or a mixture of size classes.

Stands proposed for management vary in age from 15 years on up to over 319 years with the average stand age around 183 years. Many of the lodgepole pine stands within the analysis area are either mature or overmature in age and are in poor health due to age and disease. Recognizing unhealthy stand conditions, along with stand ages rising well beyond physical maturity, planning emphasis was directed toward treating the oldest and unhealthiest stands of lodgepole pine.

Other commercial tree species found in the watershed include Engelmann spruce and Subalpine fir; these species comprise roughly 5 percent of the forested acres. These two species occupy similar

sites such as moist sites, north-facing slopes and drainages. In most cases, these stands are healthy and relatively disease free and are not proposed for treatment at this time. However, due to a recent outbreak of Spruce Bark Beetles (SBB) populations in some spruce/fir areas, it is recommended that specific stands containing infested Engelmann spruce be entered immediately to reduce SBB populations and reduce spread to nearby trees.

Forest-wide Direction for Physical - Water and Aquatic, Standard 15 (Forest Plan pg. 1-29) states, "In watersheds containing aquatic, wetland or riparian dependent TES [Threatened, Endangered & Sensitive] species, allow activities and uses within 300 feet of 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 [R2 Desk Guide]." In other words, buffers of 300 feet must be maintained next to riparian areas with TES species. This buffering would seriously impact treatment of bug-infested spruce or pine located along riparian areas. Riparian areas without TES species will be buffered for a 100 feet minimum from water in accordance with the revised Forest Plan (RFP) and the allowable sale quantity (ASQ) computation.

Other trees species within the analysis area include aspen, ponderosa pine, Douglas-Fir and limber pine. These tree species account for 1,129 acres or less than 6 percent of the analysis area acres. Many of these acres are found in two designated Wilderness Areas that are excluded from treatment. A minor amount of aspen can be found in small patches on lodgepole pine sites. Wherever possible, aspen stands are enhanced by cutting adjacent lodgepole pine.

Structural Stage Information

- Approximately 17 percent of the analysis is made up of natural and made-made openings (habitat structural stages 1 and 2) including grasslands, seedlings/shrublands, and riparian areas.
- Forested areas dominate the landscape with lodgepole pine (79 percent), spruce/fir (5 percent), aspen (2 percent) and Douglas fir/Ponderosa pine (less than 2 percent).
- 54 percent of the analysis area is made up of forest with tree diameters between 5 and 9 inches (Pole size timber, habitat structural stage 3).
- Approximately 29 percent of the analysis area is made up of forest with trees greater than 9" diameter (mature size timber, habitat structural stage 4 or 5).

Table 21: Existing Habitat Structural Stages for the Devils Gate Analysis Area

Vegetation Type	Stage 1	Stage 2	Stage 3A	Stage 3B	Stage 3C	Stage 4A	Stage 4B	Stage 4C	Stage 5	Total Acres	Percent
Aspen			162	378	26	29	22	24		641	2.28%
Douglas-fir			9		101	7	129	170		416	1.48%
High Elevation Riparian		881								881	3.13%
Lodgepole Pine		1,236	2,079	7,604	4,724	1,223	5,009	419		22,294	79.30%
Mountain Grassland	1,785									1,785	6.35%
Mountain Shrub										0	0.00%
Pinyon-Juniper										0	0.00%
Ponderosa Pine							47			47	0.17%
Sage brush		755								755	2.69%
Spruce-fir		14	90	15	4	245	729	194		1,291	4.59%
Wet Meadow	2									2	0.01%
Total Acres	1,787	2,886	2,340	7,997	4,855	1,504	5,936	807	0	28,112	
Percent	6.36%	10.27%	8.32%	28.45%	17.27%	5.35%	21.12%	2.87%	0		100.00%

Forest Insects and Disease

Foresters have long recognized dwarf mistletoe (DM) as a serious parasite of lodgepole pine. In the Rocky Mountains, it is considered the most damaging disease affecting lodgepole pine (Hawksworth 1965). Dwarf mistletoe is a parasitic plant that attaches itself to tree bark where it grows and reproduces by feeding on food and nutrients produced by its host tree. DM can be found in various stages of infection in most of the lodgepole pine stands within the analysis area. It is estimated that at least 58 to 65 percent of the timber stands proposed for silvicultural treatment within Devils Gate analysis area have serious DM infections (see Table 22). Other diseases impacting many of these same stands include comandra rust and Western Gall Rust. All three diseases cause problems for lodgepole pine including reduced tree growth and vigor, reduced tree volumes, increased tree mortality, reduced stand volumes, and increased susceptibility to insect attacks. Moreover, these diseases contribute to poor cone and seed production and cause abnormal wood growth which affects wood quality and stumpage values. In short, these diseases, especially dwarf mistletoe, contribute heavily to the poor health observed in many of the lodgepole pine stands in the Devils Gate analysis area.

Table 22: Level of Dwarf Mistletoe Infection

	# Acres with DMR < 2	# Acres with DMR > 2
Alternative 2	395 (35 % of total)	749 (65% of total)
Alternative 3	355 (42% of total)	482 (58% of total)

In addition to diseases, the analysis area is also displaying signs of unusual bark beetle activity within the lodgepole pine and Engelmann spruce species. Based only on field reconnaissance, the number of infested trees observed during the summer of 2004 was dramatically higher than numbers first seen in 1999. Lodgepole pine infested with Mountain Pine Beetle (MPB) (*Dendroctonus ponderosae*), Engelmann spruce infested with Spruce Bark Beetle (SBB) (*Dendroctonus rufipennis*), and lodgepole pine infested with lodgepole pine beetle (*Dendroctonus murrayanae*) were all observed. It appears that stand conditions are favorable to area bark beetle populations. Table 23 displays information collected during aerial survey of the forest in 2005 for insects and diseases.

Table 23: 2005 Aerial Insects/Disease Survey Data

	Spruce Bark Beetles (SBB)	Mountain Pine Beetles (MPB)
# Patches of Faders	11	44
# of Trees/ac Dying in Patches	Range of ¼ tree per ac to 100 trees per acre	Range of ¼ tree per ac to 100 per acre

Patches or concentrations of dying trees (faders) observed are the result of successful bark beetle attacks. Eleven patches of SBB were identified within the watershed along with 44 patches of MPB. Estimated numbers of faders per acre ranged from ¼ tree per acre (very light infection) to 100 trees per acre (heavy infection) for both SBB and MPB. In addition, there are numerous patches of faders located within 3 miles of the analysis area boundary. These numbers are as follows: 15 patches of SBB and 44 patches of MPB. Estimated number of faders per acre varied from a ¼ tree per acre to 50 trees per acre for SBB and from a ¼ tree per acre to 100 trees per acre for MPB.

A review of annual aerial insects/disease surveys done for the same area from 2000 through 2005 has been completed. The survey maps show a definite increase in the number of patches or concentrations of trees and the number of trees per patch being killed by MPB and SBB both within the analysis area and outside (mainly Savage Run and Platter River Wildernesses). The insects appear to be spreading from wilderness into roadless and nonroadless areas with the greatest number of patches of faders and number of trees per patch of faders located within wilderness. This scenario is not surprising given the fact that there are an abundance of stands considered very susceptible to bark beetle attack within the analysis area and beyond.

The most active bark beetle observed in the Devils Gate analysis area is the SBB. This beetle has been found infesting Engelmann spruce and lodgepole pine along the perimeters of moist drainages. The abundance of spruce beetle-infested spruce observed is indicative of very high beetle populations and are on the increase in this area (Witcosky 2005). According to research, all known major outbreaks of this insect have originated from stand disturbances such as blowdown or cull material left from logging operations (Wygant and Lejeune 1967). Widely scattered blowdown is especially conducive to increases in beetle populations (Wygant and Lejeune 1967) and is a prime source of outbreaks. The unusual SBB activity observed in this watershed probably originated from either the Routt Divide Blowdown of 1997, the Gramm Fire of 2003, the beetle infestation east of Gramm, or some of each.

SBB are known to fly great distances in search of food. Under field conditions, flight distances may exceed 15 miles. In one known case, beetles flew 30 miles south from the Flat Tops in Colorado to establish new infestations south of the Colorado River (Nelson 1954, Wygant 1956, Wygant 1959). Whatever the origin, SBB are attacking large diameter Engelmann spruce in parts of the analysis area and have been observed in a stand about 2 miles northwest of Foxpark. The probable life cycle for SBB in this area is 2 years.

According to research, unmanaged stands of Engelmann spruce (ES) can be rated for their susceptibility to potential outbreaks of BB by using average diameter at breast height (dbh), basal area, species composition (% of ES) and location. Potentially high risk stands usually have an average dbh of 16 inches, basal area greater than 150 sq. ft., contain more than 65 percent spruce in the canopy, and are located in well-drained creek bottoms. Low risk stands usually have an average dbh less than 12 inches, basal area less than 100 sq. ft., less than 50 percent spruce in the canopy, and a site index of 40 to 80 (Schmid and Frye 1976). Only 5 percent of the acres within Devils Gate analysis area are listed as ES/TF (true fir) cover type. In addition, polygons typed as riparian or lodgepole pine cover type may contain small areas of ES/TF. Even though the analysis area contains a limited amount of ES, proper silviculture encourages the reduction of SBB populations when found and where possible to minimize the spread to healthy ES both within and outside the analysis area. A guideline for MA 5.15 states manage forested area such that insect infestations and disease outbreaks remain locally restricted, except where compatible with site-specific management objectives and conditions.

ES stands in the Devils Gate analysis area have been rated for SBB susceptibility. Only one area, which is located along several drainages, was rated high risk. Other spruce stands were rated moderate risk. Focusing solely on risk ratings, it would appear as though there is no real problem with SBB in the analysis area. Field inspections of some stands, however, reveal otherwise. On October 14, 2004, a field trip to the Devils Gate analysis area was taken to investigate known areas of bark beetle infestations. Attendees on the trip included Region 2 Entomologists. Numerous Engelmann spruce were found to be infested, dead, or dying from spruce beetles. Most of the larger diameter spruce trees were dead or were infested with developing beetle larvae and were located along and nearby open parks and drainages. These stands also contain some pole sized spruce infested with developing broods of spruce beetle. In addition, bark beetles have attacked a number of lodgepole pine trees adjacent to infested spruce trees. Bark beetle attack on a non-host tree such as lodgepole pine is an uncommon observation in bark beetle biology. It is suggested that these are all signs that spruce beetle populations are very high and are increasing rapidly in this general area of the Snowy Range Mountains. Spruce beetle infestations in Colorado and Wyoming have killed vast expanses of spruce during the last five years. The current situation at these three sites indicates that spruce losses are likely to increase and expand rapidly in this area in the future (Witcosky 2005).

The other known insect observed in the watershed and of significant importance concerning lodgepole pine is the Mountain Pine Beetle (MPB) (*Dendroctonus ponderosae*). MPB has had a tremendous impact on lodgepole pine ecosystems throughout recorded history. Research has concluded that lodgepole pine stands averaging 8 inches and larger at (dbh) and more than 80 years of age are most susceptible to serious beetle infestation. In addition, research has found that both elevation and latitude play important roles in whether beetle infestations are sustainable. With increased elevation, tree losses to MPB decline. Normally, higher elevations and cooler

temperatures would not be conducive to beetle development. However, recent beetle outbreaks have shown that higher elevations are not inhibiting the buildup of large beetle populations.

In summary, susceptibility of lodgepole pine stands to serious MPB infestations is most dependent on stand age, dbh, and phloem thickness. Using these criteria, a review of lodgepole pine stands in this watershed and their susceptibility to MPB infestation has been completed. The results show that the majority of the pine stands are rated low or moderate susceptibility with few stands rated high risk. Based upon this information, it would appear that the stands in the Devils Gate analysis area are not that susceptible to BB infestation. However, Region 2 Entomologists have observed bark beetle activity in the analysis area and acknowledged similar beetle activity elsewhere in Region 2. They concluded that lodge pole stands rated moderate and high risk to BB attack are equally susceptible to an infestation. Or to say it another way, lodge pole stands rated moderate risk are equally susceptible to serious beetle attack as lodge pole stands rated high risk. A map of the analysis area displaying risk rating to bark beetles shows that 36 percent of the area is rated high risk to MPB. Another 5,945 acres or 21 percent of the watershed were not risk rated because information is unavailable. Probably half or more of this acreage would be rated high risk to beetles. In conclusion, at least one half or more of the watershed contains timber stands that are highly susceptible to bark beetle attack. It is highly probable that a number of these high risk stands will be lost during the next 10 to 20 years to MPB infestations unless harsh winter weather occurs. This scenario could be further expanded by natural wildfire occurring in the area.

Historic Range of Variability

Forest Plan MA 5.15 directs that forested stands be managed for wood fiber in such a way to mimic natural disturbances similar to the historic range of variability (HRV). Both action alternatives are proposed to do this but at different rates of time and disturbance. The assumption is made that the current conditions of the forest are out of line with the ecosystem existing during the HRV or before the influence of European-Americans in the MBNF.

USDA General Technical Report RMRS-GTR-139, "Historic Range of Variability for Upland Vegetation in the Medicine Bow National Forest, Wyoming" was released in September 2005. This report discusses an HRV analysis of the upland vegetation of the MBNF using the HRV reference period as approximately 1600 - 1850. In addition, the HRV analysis compared MBNF ecosystems to comparable ecosystems in natural areas. Ecosystem variables included live tree density, snag density, canopy cover, abundance of coarse woody debris, species diversity, fire return intervals, abundance of various diseases, the proportion of the landscape in different land cover types, and the degree of patchiness in the landscape. Variables were examined at the stand and landscape scales. Using this information, conclusions were drawn about the above listed variables relative to the HRV from about 1600 to 1850. Ecosystem variables were evaluated to be either within or outside the HRV and assigned a confidence level of low, moderate, or high.

Ecosystem variables and their relation to HRV were compared to the disturbances proposed in each action alternative. For example, insect outbreaks at high elevations and disease outbreaks, except for DM in some areas, are judged to be within HRV. Both insects and disease (i/d) are considered important players in ecosystems. Where i/d outbreaks conflict with management objectives, decisions are made based on Forest Plan direction to suppress and/or restrict outbreaks. MA 5.15, vegetation Standard 1, directs vegetation to be managed to maintain or

restore healthy ecological conditions through a variety of management activities. MA 5.15, integrated pest management, Guideline 1, says manage forested areas such that insect infestations and disease outbreaks remain locally restricted except where compatible with site-specific management objectives and conditions. The proposed project would affect the i/d variables to a small degree and keep these variables within the HRV. This conclusion is based on the fact of the small scale of the project in relation to the large scale of the MBNF.

An example of an ecosystem variable determined to be outside of HRV within the analysis area is tree cover and the density and size of canopy gaps. Harvesting additional trees as proposed by the project would probably continue to keep these variables outside the HRV.

Without discussing all ecosystem variables that are affected by the proposed project, it is reasonable to say that each variable would be affected to a different degree whether the variable is within or outside of the HRV as determined by the report. How much the variables are affected is open to much discussion and difficult to determine.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects: Implementation of the No Action alternative would allow forested vegetation to continue to change through natural processes or succession. Individual tree mortality would increase with the heavy presence of DM, Western gall rust, comandra rust, insects, and other natural processes. In turn, tree susceptibility to insect attack would increase and any insect outbreaks would increase stand risk to wildfire. Stand health can be expected to continue to decline. Dense pole stands would become stagnated and basically stop growing unless thinned as would young seedling/sapling stands. Mature and overmature stands would continue to age and decline in health causing additional mortality. Entire stands or portions of stands may be replaced over time by fires and/or insect epidemics.

Taking no action at this time 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, the No Action alternative would not allow management to: pre-commercially thin young seedling/sapling stands; reduce the presence and spread of insects and disease; and reduce fuels buildup and fire risks to forest resources. No action would conflict with the goals, objectives, strategy, direction, and standards and guidelines as written in the Forest Plan (2003) by not allowing the creation of greater vegetation patch sizes similar to the historic range of variability (HRV) nor more diverse age and size classes. Working towards the desired future conditions described in the Forest Plan would not occur at the present time.

Discussion Pertinent to MA 5.15 and MA 5.41/Cumulative Effects: Silvicultural treatments identified in Alternatives 2 and 3 are located solely in Management Areas (MAs) 5.15 (Forest Products, Ecological Maintenance and Restoration Considering the HRV) and 5.41 (Elk and Deer Winter Range). The following discussion addresses the consequences of **not** treating these stands at this time.

Aerial surveys for insects/disease on the forest have been completed annually to track changes in insects/disease agents. Data collected during the last three years has identified a steady growth pattern of bark beetle attacked trees in the Devils Gate analysis area, particularly within the Platter River and Savage Run Wilderness Areas, inventoried roadless areas, and suitable timber stands. Many of these outbreaks are located in close proximity to MA 5.41. Stands proposed for treatment in MA 5.41 are considered highly susceptible to beetle attack because of their desirable diameter, age, and condition. Considering the current beetle activity and stand characteristics, the probability of beetle attack in moderate and high risk stands in MA 5.41 and the potential for losing entire stands and severely reducing hiding/or thermal cover is very high. Beetle killed stands would increase fire risk and fire potential in the area. Lightning occurrence in dry bug killed lodgepole stands could result in a major fire which could consume live and dead trees over a large portion of MA 5.41.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects: Implementation of the Modified Proposed Action would move vegetation in Devils Gate Watershed towards the desired conditions identified in the Forest Plan more rapidly than any other alternative. This alternative is designed to directly address the purpose and need of the proposal by improving the health and resiliency of area forests. Improved forest health and resiliency would be accomplished by reducing susceptibility to insect/disease, by contributing to the Forest Plan goal of providing for timber harvest, and by minimizing human caused soil erosion within the watershed. These benefits would be realized by implementing a variety of silvicultural prescriptions.

Clearcutting would be applied to stands that have generally reached culmination of mean annual increment (CMAI) and to some stands that have not quite reached CMAI but have visible signs of insect and disease infestations. Clearcutting has been determined to be the optimum harvest method for treating lodgepole pine and to meet the goals and objectives of the Revised Forest Plan. The stands scheduled for clearcut treatment are mature and overmature lodgepole pine and are infected with either DM, comandra blister rust, Western gall rust, or a combination of these diseases. As a result of age and disease, these stands contain a multitude of dead and dying trees with fading crowns.

Effects from clearcutting include: a) the creation of larger vegetation patch sizes similar to the conditions of the HRV or the desired future condition described in the Forest Plan; b) removal of stands infected with diseases; c) reduced stand susceptibility to bark beetle outbreaks; and d) utilization of timber resources that provide saw log and round wood products for local timber industry. Other effects include: a) reduction in fuel loading and the creation of short-term fuelbreaks; b) a temporary increase in forage for livestock and wildlife; c) enhancement of aspen clones; and d) an increase in stand age and size class distribution.

Shelterwood treatments would be applied to lodgepole pine stands containing minor or limited amounts of Engelmann spruce and subalpine fir. Harvesting would be accomplished in multiple entries and would occur in stands that have generally have not met CMAI. Shelterwood treatments do not create larger vegetation patch sizes, but are used to improve the health and vigor of the remaining trees, prepare stands for future regeneration, and to create basal area levels that reduce risk to mountain pine beetle. Roughly 20 – 30 percent of the basal area would be removed from the proposed stands.

Sanitation/salvage would be applied to pure and mixed species lodgepole pine stands that are mature or overmature, where tree mortality is increasing due to insects and disease, and/or where clearcutting is not an option at this time. This treatment would remove 30 – 40 percent of the basal area. This treatment would emphasize the removal of diseased, poor quality, bug infested, and dead/dying trees.

Effects of partial cutting (shelterwood and sanitation/salvage) include: a) improving forest health and resiliency; b) reducing susceptibility to insect attack by removing diseased, dead, dying and poor quality trees; c) reducing insect/disease spread through the removal of bug infested and diseased trees; d) creating additional growing space and less site competition for retained trees by reducing stand density; e) improving wind firmness of remaining trees; and f) increasing snow accumulation and subsequent water yield.

Commercial thinning would be done in small diameter, overstocked lodgepole pine stands that have not met CMAI, and pre-commercial thinning would be accomplished on 145 acres of 15-25 year old lodgepole pine regeneration. Effects from these treatments would be similar to those listed for partial cutting.

Discussion Pertinent to MA 5.15 and MA 5.41: One of the vegetation guidelines for MA 5.15 addresses the retention of clumps or islands of wildlife snags. This guideline states, “In clearcut units, retain approximately 20 percent 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.

Forest-wide Direction and Silviculture Standards (Table 1-11, Forest Plan pg. 1-37) identifies the minimum forest requirements for snags and snag recruits on forested sites following timber harvest. Table 1-11 indicates that snag components and snag recruits are to be well distributed across harvested units. If high-quality snags occur scattered across a stand, they should be left in this pattern. However, Table 1-11 also indicates that snags or snag recruits may be left in clumps if this distribution occurs naturally, if mistletoe in remaining lodgepole trees threatens regeneration success or long-term stand development, or if retention in an island of live trees will help prevent blowdown.

As discussed previously under Forest Insects and Disease, the level of dwarf mistletoe infection in proposed treatment stands is quite high. In fact, roughly 65 percent of the proposed treatment acres of alternative 2 have a DMR of 2 or higher. Alternative 3 has a DMR of 2 or higher on 58 percent of proposed treatment acres. A DMR of 2 or greater is considered a serious level of infection.

There is a concern with applying the snag island retention (SIR) guideline under MA 5.15 and the minimum forest-wide direction for snag retention and not addressing the impact of DM spread from SIRs and scattered snags/recruits across harvest units to healthy regeneration. Retaining clumps or islands of DM infected trees and scattered snags/recruits would result in the spread of DM to healthy regeneration while affecting regeneration success and/or long-term development. In addition, scattered snags/recruits would be more prone to windthrow.

According to the Forest Plan, guidelines are advisable courses of action that should be followed to achieve forest goals. Deviations from guidelines must be analyzed during project level analysis. Based on concerns for DM spread and windthrow, it seems reasonable to deviate from the SIR guideline. To reduce DM spread from SIRs and scattered snags/recruits to healthy regeneration and to improve the retention of snags/recruits over time, it is recommended that 20 percent of the interior of each clearcut be retained in one or more clumps to meet both the SIR guideline for MA 5.15 and the forest-wide minimum snag requirement for MAs 5.15 and 5.41. All clumps or islands would be burned and/or all trees on the perimeters would be girdled to reduce DM spread to future generation in each clearcut.

The majority of silvicultural treatments are planned within MA 5.15 which is 41 percent of the analysis area acreage. The remainder of the treatments involves portions of five units that are located in MA 5.41 Elk and Deer Winter Range (9 percent of the watershed acreage). The purpose of treating stands in MA 5.41 is to create additional early successional stages to improve hiding/or thermal cover. The environmental consequences of treating these stands and others have been described above.

Cumulative Effects: Implementation of Alternative 2 would result in 319 more treated acres than Alternative 3 and would result in 48 percent more clearcut acres. Increased timber harvest would advance vegetation more quickly towards the Forest Plan desired future conditions. It is reasonable to predict that the additional clearcutting produced by Alternative 2 would do more to improve overall health and resiliency of area stands and reduce their susceptibility to insect/disease problems than the treatment acres proposed for Alternative 3. In addition, the clearcut acres proposed under Alternative 2 would create a larger range of vegetation patch sizes more similar in size and age class distribution found in the HRV. Combining acreage of past known harvest since 1959 with the Modified Proposed Action, an estimated 17 percent of the forested acreage would be cumulatively affected. The 2,923 acres of past harvest (see Table 13) have become new forests.

Cumulative effects of past treatments and the proposed treatments have and would enhance aspen suckering where found and reduce the amount and spread of DM and other diseases on approximately 18 percent of the lodgepole pine cover type or 17 percent of the forested acres. Similarly, past and proposed treatments have and would improve stand health and reduce susceptibility of trees against bark beetle attack on 18 percent of the lodgepole pine cover type or 17 percent of the forested acres.

In addition, cumulative effects of past harvests and future harvests have created and would create additional acres of early habitat structural stages. Timber harvesting creates larger vegetation patch sizes similar in size and age class distribution found in the HRV.

Alternative 3 – Reduced Clearcutting and Road Construction

Direct and Indirect Effects: The effects of implementing Alternative 3 would be similar to those described under Alternative 2, but to a lesser degree, due to the reduction in proposed timber harvest. Please refer to the discussion under Alternative 2.

Cumulative Effects: A total of 825 acres would be treated under Alternative 3 which is a 28 percent reduction from Alternative 2. Timber harvesting under Alternative 3 would move

vegetation towards the desired future conditions identified in the Forest Plan more slowly. Cumulatively, past harvest of 2,923 acres combined with the proposed acres of 825 would affect 15 percent of the forested acres.

Past treatments and those proposed under Alternative 3 would continue to enhance aspen suckering where found and reduce the amount and spread of DM and other diseases on approximately 17 percent of the lodgepole pine cover type or 15 percent of the forested acres. Similarly, past and proposed treatments have and would improve stand health and reduce susceptibility of trees against bark beetle attack on 17 percent of the lodgepole pine cover type or 15 percent of the forested acres. In addition, past harvests and future harvests would result in 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.

FOREST PLAN CONSISTENCY

Alternative 1 – No Action

Alternative 1 is not consistent with standards and guidelines for the timber resource under the Medicine Bow National Forest 2003 Revised Forest Plan. The No Action alternative may result in deviation from these important standards and guidelines from the Forest Plan and the impacted management areas, including:

- 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 ...recreation sites, suitable timberlands, or areas of concentrated public use. (*Forest-wide 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. (*Forest-wide Guideline, p. 1-50*)
- In project plans, consider existing infestations of insects or disease in the project area. Design activities to minimize risk of spreading infestation and meet multiple use and ecological objectives. (*Forest-wide Guideline, p. 1-50*)

Alternatives 2 and 3

The Modified Proposed Action (Alternative 2) and Alternative 3 are consistent with standards and guidelines for the timber resource under the Medicine Bow National Forest 2003 Revised Forest Plan (Forest Plan pgs. 1-35 through 1-40, 2-63, and 2-66).

F. Geology and Soils

Affected Environment

Geology

Bedrock geology in the analysis area is dominated by Precambrian mafic intrusive rocks. These rocks comprise 57 percent (16,120 acres) of the analysis area. Precambrian metasedimentary and

metavolcanic rocks comprise 24 percent (6,746 acres) and Precambrian granitic rocks comprise 19 percent (5,248 acres) of the analysis area. The remainder of the area is comprised of Upper Miocene rocks and scattered bodies of alluvium. Most soils developed in residual surfaces of these parent materials.

Soils

The upland forested communities within the analysis area are dominated by coarse textured soils. These soils typically have sandy loam or loamy sand surface horizon textures with high percentages (by volume) of rock fragments in the soil profile. Most soils in the riparian areas are made up of reworked alluvium, have poor drainage, and are frequently saturated, especially during the spring.

Soil management interpretations that are important to vegetation management are mass wasting potential, erosion hazard, compaction hazard, reforestation potential, and limitations for unsurfaced roads. Descriptions of each are provided below:

Mass Wasting Potential: Landscape stability is a product of several factors, including geology, geomorphology, soil, and environmental factors. Stability can be viewed as a particular landform’s resistance to slope failure or mass wasting. Mass movement hazard ratings for the action alternatives are summarized in Table 24.

Table 24: Mass Movement Hazard Potential – Acres by Alternative

Rating	Alternative 2	Alternative 3
Low	303.6	2
Moderate	839	587
High	2.4	236
TOTAL	1,145	825

“Low” ratings indicate few mass movement problems; “moderate” and “high” ratings indicate that design considerations, mitigation actions, and additional costs may likely be needed to overcome potential hazards.

Erosion Hazard: Erosion is the detachment and removal of soil material while erosion hazard is the susceptibility of a soil to erosive forces, such as raindrop impacts or overland flow. Erosion hazard is dependent on particle size distribution, organic matter content, soil structure, permeability, rock fragment content, slope gradient, and rainfall characteristics. Erosion hazard ratings for the action alternatives are summarized in Table 25.

Table 25: Erosion Hazard Potential – Acres by Alternative

Rating	Alternative 2	Alternative 3
Slight	2.4	174
Moderate	199.3	21
Severe	943.3	630
TOTAL	1,145	825

“Slight” ratings indicate little to no erosion is likely; “moderate” ratings indicate some erosion is likely and that simple erosion control measures may be needed; and “severe” ratings indicate that significant erosion can be expected. Despite the number of acres depicting severe ratings,

observations within previously harvested stands throughout the analysis area showed little evidence for increased rates of erosion resulting from timber harvest activities (Milner 2005). Consequently, erosion should not be a limiting factor for proposed management activities.

Compaction Hazard: Compaction hazard is the risk of inducing soil compaction through timber harvest, livestock grazing, or other management activities. Compaction is dependent on particle size distribution, amount of rock fragments in the soil, organic matter content, soil moisture levels, percent bulk density, amount of soil protective cover, and the characteristics of weight forces acting on the soil surface. Compaction hazard ratings for the action alternatives are summarized in Table 26.

Table 26: Compaction Hazard Potential – Acres by Alternative

Rating	Alternative 2	Alternative 3
Slight	613	455
Moderate	530	367
Severe	2	3
TOTAL	1145	825

“Slight” ratings indicate that little to no compaction is likely; “moderate” ratings indicate that some compaction is likely; and “severe” ratings indicate that significant compaction can be expected. Designated skid trails should be required as part of project design to protect the soil resource and to reduce compaction. Use of skid trails is a proven design feature for the prevention of excessive soil compaction and keeps compaction impacts within acceptable limits.

Reforestation Potential: Reforestation potential is the expected response of disturbed soil to revegetation efforts. It is primarily dependent on available water holding capacity, infiltration capacity, depth to bedrock, fertility, and erosion hazard. Table 27 summarizes reforestation potential for the action alternatives.

Table 27: Reforestation Potential – Acres by Alternative

Rating	Alternative 2	Alternative 3
Low	125	124
Moderate	1003	682
High	15	17
Non-forested	2	2
TOTAL	1145	825

“High” ratings indicate that management restrictions (i.e., mitigation) are not necessary; “moderate” ratings indicate that one or more management restrictions may be necessary for the stand to regenerate within 5 years; and “low” ratings require implementation of management restrictions. Although most of the acres proposed for harvest fall within the low to moderate ratings, reforestation should not be a limiting factor. This assumption is based on observations of regeneration rates of past harvest units on the same soil types within the analysis area (Milner 2005). Leaving large woody debris on the affected sites to provide shade should help disturbed areas regenerate (Alexander 1987).

Limitations for Unsurfaced Roads: Slope, flooding, texture, rock fragments, soil depth, and depth of high water tables create limitations for unsurfaced roads. Table 28 summarizes limitations for unsurfaced roads for each action alternative.

Table 28: Limitations for Unsurfaced Roads – Acres by Alternative

Rating	Alternative 2	Alternative 3
Slight	257	190
Moderate	792	537
Severe	96	98
TOTAL	1145	825

“Slight” ratings indicate that limitations are minor and can be easily overcome; “moderate” ratings indicate that limitations can be overcome or modified by special planning, design, or maintenance; and “severe” ratings indicate that the degree of limitation generally requires major soil reclamation, special design, or intensive maintenance.

During field surveys (2005), past harvest units and roads adjacent to proposed units were observed to compare the potential effects of proposed activities on landform and soil morphology. None of the observed past harvest units had damaging soil impacts in exceedance of Forest Plan standards. Isolated areas of increased soil bulk density on skid trails were observed, but soil recovery appeared substantial. Evidence for recovery included absence of soil resistance to penetration and successful revegetation.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects: Implementation of the No Action alternative would not change the soil resource or soil productivity beyond what is currently occurring. There would be no increased rate of disturbance, whether from compaction, displacement, or erosion, due to timber harvest activities.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects: Direct and indirect effects of the Modified Proposed Action include increased rates of soil displacement, erosion, compaction (see Tables 24 - 26), and soil heating. 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 and erosion rates and may also result in soil displacement and rutting.

Mechanized timber harvest methods increase soil bulk density and may lead to soil compaction within an activity area. Landings may also create soil compaction. Minor increases in bulk density would decrease over time. Soil compaction may require mechanical treatments to reduce bulk density and increase infiltration. Forest Plan standards and guidelines call for minimizing soil compaction by reducing vehicle passes and skidding on dry or frozen soil conditions.

Ground based skidding results in 20 to 40 percent soil exposures. The use of designated skid trails can reduce this exposure rate to 7 to 15 percent. Designating landings and spacing skid trails approximately 100 feet apart would result in 11 percent of each proposed unit being in skid trails and landings (Garland 1997). Childs et al. (1989) found increased compaction from timber harvest largely confined to skid trails. Limiting skid trail-related impacts would help prevent exceedance of the 15 percent Regional and Forest Plan soil quality standard.

Broadcast burning of harvest generated slash would have similar soil heating effects as a prescribed fire. This form of slash treatment results in an increased number of smaller, less intensely burned areas than machine pile burning. Robichaud and Hungerford (2000) stated that water repellency after prescribed fire was minimal. Absence of hydrophobicity would allow for the continuation of established infiltration rates. Thus, soils in the analysis area would not be adversely affected by increased runoff or soil erosion beyond normal rates. These burns would occur during the fall and would require control lines to be constructed around the perimeter of clearcut units.

Burning of harvest-generated slash in machine piles would decrease the direct impacts of slash disposal. The negative impacts of slash pile burning include soil heating and increased potential for introduction of hydrophobicity. There would also be some localized soil displacement where slash is machine piled.

Roller-chopping for site preparation can impact soils by introducing compaction and displacing organic and/or surface horizon material. To reduce these impacts, roller-chopping should be limited to areas of high slash concentration within the stands and units should be treated only during times of low soil moisture content.

Effects from the 145 acres of proposed pre-commercial thinning include increased ground cover and increased soil organic matter contributions.

Effects from road construction proposed under the Modified Proposed Action include reduced soil productivity on the disturbed areas until the roads are decommissioned and rehabilitated. Many road-related impacts occur during the first year following construction or reconstruction. When the closures are implemented and revegetation occurs, soil productivity would be restored to near pre-harvest levels. New road construction segments would be maintained to Forest Plan standards as a part of the permanent transportation system.

When and if roads intercept or otherwise affects streams, proper Watershed Conservation Practices (WCP) standards and design criteria would need to be implemented. These may include frozen soil (winter) operations, buffer strips, avoidance, stabilized fill slopes, and culvert crossings.

Indirect effects include probable short-term decreases in soil productivity within the treated areas, most specifically in association with skid trails and landings.

Alternative 3 – Reduced Clearcutting and Road Construction

Direct and Indirect Effects: The effects of Alternative 3 would be similar to the Modified Proposed Action; however, the area of impact would be reduced. Effects from skidding would be significantly reduced due to the decrease in proposed clearcut area from 552 acres to 287 acres.

CUMULATIVE EFFECTS

Introduction

Existing, past, and present disturbance activities within the analysis area include road construction, timber harvest, livestock grazing, fires, mining, and ATV/OHV trail use. The time frame for consideration of cumulative effects includes the existing conditions, actions that have occurred in the past 10-15 years, and reasonably foreseeable future actions expected within the next 10 years.

New road construction, both temporary and permanent, can be considered cumulative in nature, particularly if roads are not properly drained or are placed in unstable locations. Use of Forest Plan standards, WCPs, and BMPs during design and construction would minimize any cumulative impacts of road construction on soil productivity. These measures help ensure that erosion from harvest units or roads is not excessive.

Repeated timber harvest activity within the same area can lead to loss of topsoil or excessive compaction and displacement. Forest Plan standards and guidelines call for minimizing soil compaction by reducing vehicle passes and skidding on dry or frozen soil or snow. Soils are considered to be compacted if there is a 15 percent increase in bulk density. Harvested stands would not be re-entered for 20 years or more; therefore, any cumulative compaction or displacement would be minimized.

Observations of domestic livestock grazing in the proposed units were minimal. Evidence within the units was limited to a few trails apparently created by domestic animals. Due to the heavily timbered nature of the units, forage availability was minimal to nonexistent. Livestock utilization in non-timbered lands in and around the project area did not contain any evidence of detrimental soil impacts. 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 brief in nature and should not negatively impact the soil resource in the area.

Currently, ATV/OHV use within the analysis area is restricted to designated routes (i.e., no cross-country motorized travel is allowed). These restrictions are expected to continue in the future. Observed ATV/OHV impacts were minimal and were not exceeding Forest Plan standards for the soil resource. These impacts did not overlap with proposed harvest units.

Alternative 1 - No Action

The No Action alternative would not result in adverse cumulative effects for the soil resource. However, forested units, wherein where yearly mortality exceeds growth, greatly increase the potential for an insect epidemic and subsequent wildfires in the vicinity. Increased insect activity and subsequent tree mortality could increase soil erosion rates as a result of increased water yield. Increased tree mortality would also increase small-scale, high-intensity wildlife potential. High-intensity wildfire effects include the detrimental burning of soils, introduction of soil hydrophobicity, and increased rates of soil erosion and mass movement. A wildfire of significant intensity and duration could result in irreversible effects to the soil resource.

Alternatives 2 and 3 (Action Alternatives)

Implementation of the Modified Proposed Action and Alternative 3, with application of Forest Plan standards and guidelines, WCPs, and BMPs, would reduce potential adverse effects to well within the level of acceptable impacts. Effects would also be well within the Forest Plan 15 percent threshold for activity areas. There would likely be scattered localized effects to soils from the cumulative effects of interacting activities, but these areas represent a very small percentage of the total project area. There are no past, present, or foreseeable actions described above that would contribute impacts cumulatively to exceed acceptable levels permitted by the Forest Plan or other applicable standards within the analysis area.

FOREST PLAN CONSISTENCY

The No Action alternative would maintain consistency with Forest Plan direction for the soil resource. With careful implementation of Forest Plan standards and guidelines, WCPs, and BMPs, both the Modified Proposed Action and Alternative 3 would maintain consistency. None of the alternatives would result in any irreversible or irretrievable impacts to the soil resource.

G. Heritage Resources

Affected Environment

Approximately 192 acres were inventoried for heritage resources. The acres selected for survey were those which were determined to have a high probability of containing heritage resources. A file search with the Wyoming State Historic Preservation Office, Office of Cultural Records, demonstrated that both historic and prehistoric cultural resources are located within the study area.

During the inventory 17 new sites were recorded. The sites are associated with mining, timber harvesting, historic trash dumps, and fire prevention. Of the 17 new sites, 14 were determined by the Forest Service to not be eligible to the National Register of Historic Places and three were determined to be eligible for listing on the National Register.

In addition to the 17 new sites, three previously recorded sites were also visited. All three sites were previously determined to be eligible to the National Register. At the time of the revisit, it was determined that one of these sites had been so damaged as to change its eligibility from eligible to not eligible.

Environmental Consequences

All Alternatives

All of the eligible properties are located outside of the planned impact zone and would not be affected by project implementation. On February 17, 2006, the Forest Service requested a concurrence determination from the Wyoming State Historic Preservation Office (SHPO) of no historic properties affected (36 CFR 800.4(d)(1)). The Forest Service received SHPO concurrence on March 8, 2006.

CUMULATIVE EFFECTS

This project, in combination with other Forest activities such as recreation, travel management, and range activities, may have a cumulative effect on cultural resources in the form of increased soil erosion, increased visitor traffic, vandalism, and alteration of historic landscapes.

FOREST PLAN CONSISTENCY

Since none of the heritage resource sites would be affected by project implementation, all alternatives would comply with the Forest Plan for heritage resources (Forest Plan, pg. 1-51).

H. Hydrology

Affected Environment

The project area is located in the Upper North Platte River basin which is tributary to the Platte River. Table 29 gives the names, sizes of, and past disturbance information for the watersheds in the analysis area. The Hydrologic Unit Code (HUC) is also given. The HUC is the interagency watershed code for these watersheds.

Water Quality Standards

The perennial streams and adjacent wetlands in the analysis area, outside of Wilderness, are designated as Class 2AB - Fisheries and Drinking Waters. Class 2AB are considered to be high quality waters that support the beneficial uses of aquatic life, fisheries, drinking water, recreation, wildlife, agriculture and scenic value (WYDEQ, 2001). Intermittent streams in this 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).

In Wyoming, the surface waters within Wilderness areas and the mainstem of the North Platte River above Sage Creek (south of Saratoga) to the Colorado Border are designated as Class 1 Outstanding Waters. The State of Wyoming requires that the water quality existing at the time of designation will be maintained and protected (WYDEQ, 2001). In this analysis area, much of Cottonwood Creek lies within the Savage Run Wilderness. The Platte River Wilderness includes lower Douglas creek and several tributaries including Sheep Creek, most of Devils Gate Creek, and the lower portions of Hans and Anderson Creeks. The State of Wyoming 303(d) list of "Waterbodies with Water Quality Impairments" (WYDEQ 2004a) does not identify any impaired water bodies within the project area.

Upland Watershed Conditions

The Equivalent Clearcut Area (ECA) method was developed to estimate the effects of vegetation removal on streamflow. Experiments in the Coon Creek watershed (west of the analysis area) measured statistically significant increases in streamflow when 24 percent of the watershed was harvested. Experiments of the Fraser Experimental Forest in Colorado indicate that water yield from timber harvest declines to zero over approximately 80 years (Troendle and King 1985).

Calculation of ECA for this analysis used the methodology developed for the Medicine Bow N.F. Forest Plan Revision and includes harvest activities, fire, blowdown and roads (Tolbert, 2000). Partial harvest was pro-rated to a clearcut based on the percent of vegetation removed (e.g. 100 acres of shelterwood, with 30 percent basal area removed, is equated to 30 ECA). A relationship was included to estimate the hydrologic recovery (due to vegetative regrowth) over time (e.g. 100 acres of clearcut that occurred 40 years ago is estimated to be 50 ECA). Table 29 summarizes ECA for each watershed within the analysis area.

Table 29: Watersheds and Past Disturbance

Watershed Name HUC Code	Watershed Area (acres)	Harvested / Disturbed Acres*	Percent ECA	Miles of Road	Road Density (mi/sq. mi)
Anderson Creek 1018000201070201	1,061	264	15.2	4.0	2.4
Cottonwood Creek 10180002020102	6,814	770	7.8	15.5	1.4
Devil's Gate Creek 10180002010701	7,193	1,287	11.7	30.0	2.7
Hans Creek 1018000201070203	1,245	247	12.3	5.4	2.8
Douglas Creek 1018000201	95,443	18,732	11.3	471	3.2

*Harvested / Disturbed acres from the Medicine Bow – Routt GIS database. ECA calculations from C. Tolbert, 2000 and includes both timber harvest and roads, in addition to other land clearing such as campgrounds.

Road densities vary from 1.4 to 2.8 miles per square mile in the analysis area watersheds. The entire Douglas Creek Watershed has a road density of 3.2 miles / sq. mile. Most of the roads in the Douglas Creek Watershed are above the analysis area. Roads within the analysis area tend to be narrow with a native surface. Most roads were not constructed with ditches, thus reducing the risk of roads increasing peak flows through extending the stream drainage network. However, many roads have rills or road surface erosion and are contributing sediment to the area creeks.

Stream Channel Conditions

Stream channel conditions were determined primarily by field information. Stream surveys were completed during the 1999 (Snook, 1999) and the 2002 and 2003 field seasons (Purchase, 2003). Pfankuch Stream Channel Stability method was used, and the stream condition ratings were modified by Rosgen channel type (Rosgen, 1996). The majority of streams in area appear to be in good condition with some increase in fine sediments due to a variety of causes, primarily roads and cattle grazing.

Cottonwood Creek: Cottonwood Creek and its tributaries were generally rated in ‘good condition’ with mostly stable banks. There were, however, signs of sediment deposition. This is likely related to the rills and erosion from several roads in the area. One tributary was rated in ‘fair condition’ due to both sediment and bank erosion. Minor bank trampling from cattle was also observed along the streams in this area.

Devils Gate Creek: The mainstems of Devils Gate and West Fork Devils Gate are generally in ‘good condition’ with signs of increased sediment from roads and localized areas of moderate cattle bank trampling. The West Fork of Devils Gate Creek has an extensive mining history. The stream

channel near the Sunset Mine has been impacted by mine spoils and possible mine tailings being deposited in and near the stream channel.

Hans Creek: Hans Creek is in ‘good condition’ with stable banks and little sign of increased sediment. Road surveys indicate minor sediment delivery to streams from road surface erosion.

Anderson Creek: No stream surveys were completed on this creek; however, it is likely that this stream is in a similar condition to the other creeks in this analysis area. Road surveys indicate minor sediment delivery from roads in this watershed.

Douglas Creek: Stream surveys on several tributaries of Douglas Creek indicate that the streams in this watershed are in ‘good condition.’ There are, however, some localized areas of bank trampling and slightly elevated sediment levels due to roads.

Lakes and Reservoirs: There are no stock ponds or reservoirs in the analysis area, including lakes, small ponds and reservoirs. There are numerous smaller beaver ponds in the project area, most of which are less than 2 acres in size.

Wetlands, Riparian Areas, Floodplains: Wetlands, riparian areas, and floodplains exist throughout the project area and are summarized by type in Table 30. Palustrine (isolated, or lacking flowing water) wetlands are most common and are found in the analysis area’s parks, wet meadows, and beaver ponds. Riparian vegetation is found along all of the creeks in this area; however, Douglas Creek has some riparian areas broad enough to have been mapped as riverine wetlands by the National Wetlands Inventory. Floodplains tend to be quite narrow along the steep tributary streams, and broader along the mainstems of creeks and in areas of beaver activity and meadows.

Table 30: Wetlands and Riparian Areas in Analysis Area

Wetland System and Class ¹	Acres
Palustrine Wetlands	186
Emergent Vegetation	645
Scrub Shrub Vegetation	11
Aquatic Bottom	3
Forested	53
Riparian Areas - Riverine Wetlands	147
Total:	992

¹Source: National Wetland Inventory (NWI, 1991), summarized using the Medicine Bow – Routt NF GIS coverage.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects: Current management plans would continue to guide management of the analysis area. Treatments or actions to promote wood fiber production/utilization, set back seral configurations, reduce tree density, and treat dwarf mistletoe or mountain pine beetle infestations

would not occur. Road conditions would remain essentially the same and annual road maintenance would continue to occur. Past timber harvest in the area would gradually recover as trees mature.

Flow Regime: Since vegetation would not be removed, there would be no direct or indirect effects on streamflow.

Sediment: There would be no direct or indirect effects on sediment as ground disturbing activities would not occur.

Riparian Areas and Wetlands: There would be no direct or indirect effects on riparian areas and wetlands.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects: Only the effects of commercial timber harvest and road construction/reconstruction activities are described below. Pre-commercial thinning is generally accomplished using hand crews and existing roads are used for access. Therefore, this activity has negligible effects on watersheds, streams, and/or wetlands.

Flow Regime: ECA percentage increases from the proposed timber harvest and commercial thinning activities were estimated for all watersheds within the analysis area. The estimated ECA increase for this alternative ranges from < 1 percent for the entire Douglas Creek watershed to a 7.1 percent increase for the Hans Creek watershed (see Table 31).

Table 31: Estimated ECA Increases for the Modified Proposed Action and Alternative 3

Watershed	Alternative 2 Modified Proposed Action		Alternative 3 Reduced Clearcutting and Road Construction	
	ECA acres / % increase	Watershed Cumulative ECA (%)	ECA acres / % increase	Watershed Cumulative ECA (%)
Anderson Creek	16 / 2.5%	17.7%	16 / 2.5%	17.7
Cottonwood Creek	113 / 1.7%	9.5%	41 / 0.6%	8.4
Devils Gate Creek	344 / 5.2%	16.9%	232 / 3.6%	15.3
Hans Creek	76 / 7.1%	19.4%	72 / 5.8%	18.1
Entire Douglas Creek Watershed	655 / 0.7%	12.0%	722 / 0.5%	11.8

Sediment: The proposed timber harvest would not increase sediment delivery to area streams as all stream channels, riparian areas, and wetlands would be buffered by a minimum 100 foot buffer. These buffers have been shown to be effective in filtering sediment (Welsch 1991).

Reconstruction of a section of NFSR 506.B (adjacent to a tributary of Devils Gate Creek) would result in a minor short-term increase in sediment delivery to the tributary of Devils Gate Creek. Currently 506.B is supplying minor amounts of sediment to the creek. Following project completion, however, this road would be closed and re-vegetated. The road closure would have the long-term effect of reducing sediment.

Other road construction and reconstruction occurs away from creeks in the Devils Gate watershed and in the headwaters of a tributary to Douglas Creek. There are no proposed stream crossings for any of the road construction or reconstruction.

Temporary roads would be built with adequate drainage and would be located away from creeks and riparian areas. These roads would also be closed and re-vegetated after use.

In addition to closing 506.B, the Modified Proposed Action would also result in the closure of 512.G. Currently 512.G has several areas where erosion and sediment are being delivered to stream channels in the Devils Gate watershed and in the headwaters of several tributaries of Douglas Creek. Closure of both roads would reduce sediment to these waterways, particularly since roughly 3 miles of the proposed road closures are within 300 feet of the waterways. The surface would be re-vegetated and road crossings would be stabilized as part of the closure action.

Riparian Areas and Wetlands: There would no direct or indirect effects from proposed timber harvest as a result of the 100 foot buffer.

Closing 512.G would gradually restore riparian areas at several stream crossings. It is anticipated that willows or other riparian vegetation would eventually grow on the old road. Increased vegetation would connect the riparian areas up and downstream of the road.

Alternative 3 – Reduced Clearcutting and Road Construction

Flow Regime: The estimated ECA for this alternative ranges from <1 percent (entire Douglas Creek and Cottonwood Creek watersheds) to a 5.8 percent increase for the Hans Creek watershed (see Table 28).

Sediment: The effects on sediment from Alternative 3 would be similar to the Modified Proposed Action. However, short-term sediment increases would be slightly less in Devils Gate, Cottonwood, and Sheep (a small tributary of Douglas Creek) creeks due to less road construction in those watersheds.

Riparian Areas and Wetlands: Direct and indirect effects would be similar to the Modified Proposed Action.

CUMULATIVE EFFECTS

Alternative 1 – No Action

Flow Regime: Streamflows would slowly decrease over time in the streams in the analysis area. No other activities are planned which would affect streamflows in this area.

Sediment and Riparian Areas and Wetlands: Implementation of the West Beaver and Platte River Allotment Management Plan (AMP) decision would either maintain or slightly reduce the amount of bank trampling by cattle within the analysis area. This potential improvement would likely result in slowly decreasing fine sediment levels and increasing stream bank stability in localized areas.

The Snowy Range Travel Management (SRTM) project, currently in the analysis phase, could result in the closure of several user-created roads, in the conversion of existing roads to ATV trails, and in the construction of new single-track motorcycle trails. The road closures would reduce the amount of sediment delivered from roads in localized areas and would likely improve riparian and wetland conditions in localized areas. The conversion of existing roads to ATV trails would have very little effect on sediment delivery from those roads/trails. The newly constructed single-track trails would be located in the uplands; however, trails would cross several small headwater streams. Sediment delivery from these crossings would be minimal as the streams are small and tend to have well-armored stream channels. The overall cumulative effect would be a slight reduction of fine sediments in the long-term (5 to 10 years) as roads are closed and re-vegetated and a slight increase in the amount of functioning riparian areas and wetlands.

Alternatives 2 and 3 (Action Alternatives)

Flow Regime: Past timber harvest, fire, and road construction in all watersheds within the analysis area have resulted in ECAs of between 7-15 percent for both alternatives. The additional harvest proposed under the Modified Proposed Action and Alternative 3 would increase ECA to between 9.5 to 19.4 percent and 8.4 to 18.1 percent, respectively. Water yield research has found that 15 to 30 percent of a forested basin must be treated within a short time period to detect changes in runoff (MacDonald and Stednick 2003). Proposed timber harvest under both alternatives would increase the ECA in Devils Gate, Hans, and Anderson creeks to just above the lowest level at which the water yield increase may potentially be detected. For these small watersheds, this level of water yield increase would be well within the potential increase resulting from a naturally occurring wildfire. The beaver ponds and wetlands in these drainages would reduce peak flows and the stable channels would reduce the potential for increased stream channel erosion or reduced streambed or bank stability.

Sediment: As described under the No Action alternative, both the AMP and the SRTM decisions would slightly decrease fine sediments in this area. The cumulative effect would be a slight overall reduction of fine sediments in the long-term (5 to 15 years).

Riparian Areas and Wetlands: As described under the No Action alternative, both the AMP and the SRTM decisions would slightly improve riparian areas within the analysis area. The cumulative effect would be a slight overall increase in the amount of functioning riparian areas and wetlands.

Effects on the North Platte River: The North Platte River meets the eligibility requirements for a Wild and Scenic River. Neither of the action alternatives proposed in this EA would have measurable effects on the river due to the use of buffers and BMPs to reduce potential sediment increases. Over the long-term, this project, in addition to the SRTM project, would slightly decrease sediment flowing into the North Platte. However, the change would be minor in comparison to the normal sediment load of the North Platte as to have virtually no effect on the river.

Effects on the Platte River Canyon Research Natural Area (RNA): The analysis area is adjacent to the Platte River Canyon RNA. This area is located on the western boundary of Douglas Creek to the North Platte River within the Platte River Wilderness Area. This project would have negligible effects on Douglas Creek and no effects on the remainder of the RNA. With the use of BMPs and riparian buffers, sediment delivered to the tributaries of Douglas Creek would be minor, with short-term increases due to road construction and road closing. There would also be minor long-term

decreases in sediment from road closures and revegetation from both this proposal and the SRTM project. This project would not alter the characteristics of the RNA.

FOREST PLAN CONSISTENCY

The No Action alternative would be consistent with Forest Plan water resource standards and guidelines (pp. 1-28 to 1-30). Both the Modified Proposed Action and Alternative 3 include recommended BMPs and mitigation measures. If effectively implemented, these alternatives would be consistent with Forest Plan water resource standards and guidelines.

CONSISTENCY WITH OTHER LAWS AND REGULATIONS

Consistency with Wetlands/Floodplains Executive Orders: This project is consistent with these executive orders. The project will maintain wetland and floodplain function through avoiding harvest and road related impacts to wetlands and floodplains. Secondly, the project will use the best available 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. While there may be some minor effects to water quality as described above, the designated uses of water bodies in the project area will be maintained.

State of Wyoming Turbidity Waiver: Road reconstruction and temporary road construction proposed in the project would not require a short-term exemption from turbidity standards as no stream crossing would be constructed or reconstructed.

Stream crossing removal during road decommissioning may require a short-term exemption from turbidity standards. These projects should be evaluated and a waiver secured 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 construction / reconstruction and temporary road construction proposed in the project is for the purposes of silvicultural activities. WYDEQ provided guidance that 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). Therefore, road reconstruction and temporary road construction associated with this project is a silvicultural activity and believed to be exempt from storm water discharge permit requirements per 40 CFR 122.3(e) and 40 CFR Section 122.27.

The road decommissioning may require a Stormwater Discharge Permit. The determination of whether a permit is needed and the category of permit will depend upon the amount of road decommissioning occurring the same season. BMPs to reduce sediment during road decommissioning will be implemented regardless of the need for a permit. When road decommissioning is scheduled to occur, it will be evaluated to determine the need for this permit and a permit would be secured prior to project implementation.

I. Recreation

Affected Environment

The Devils Gate analysis area represents one of the lesser visited sections of the Laramie Ranger District. Access is gained primarily via NFSRs 512, 511, and 500 from the communities of Fox Park and Albany, and State Highway 230. Developed recreation sites are located on the southern and easternmost boundaries of the analysis area and include the Pike Pole, Pickeroon, and Pelton Creek Campgrounds. Unimproved non-motorized trailheads include Douglas Creek South, Douglas Creek North, Devils Gate, Cottonwood Creek, and Cottonwood Extension. The analysis area bisects portions of the Savage Run and Platte River Wilderness Areas.

The area is used primarily for dispersed recreation activities during the summer and fall months. Such activities include camping, hiking, horseback riding, big game hunting, wildlife viewing, fishing, and Off-Highway Vehicle (ATV, 4x4, and motorbike) travel. The trailheads located in the analysis area all serve to provide access to one of the two Wilderness Areas and the river ecosystems for which they are named. The major summer system trails within the area are Douglas Creek, Devils Gate, Savage Run, and Cottonwood Creek. All summer trails maintained by the Forest Service are designated as non-motorized; however, several non-system trails—both motorized and non-motorized—can also be found. Use of both system and non-system trails is low in comparison to other trails located on the District.

In addition to summer season use, the analysis area provides opportunities for motorized winter recreation activities, including two groomed snowmobile trails maintained by the Wyoming State Trails Program—the “S” and “Q” trails. Use of these trails and cross-country terrain is relatively small compared to other areas in the District due to the proximity of the Wilderness areas, thick timber, and the lack of open, park-like “play areas” that are plentiful several miles north along the Snowy Range.

With the exception of the Platte and Savage Run Wilderness Areas, most of the analysis area has been modified by various activities, including timber harvest, road construction, grazing, water developments, mining, and dispersed recreation. Timber harvest, mining, and grazing have created the majority of access and routes of travel for recreation as well as destination sites. Historic and cultural features are common throughout the area, including evidence of old mining and tie-hack activities.

Recreation Special Uses: Currently, several permitted snowmobile guides operate within the analysis area, utilizing the “S” and “Q” trails primarily for the purpose of accessing other adjacent terrain. These guides are based outside of the analysis area, either in the town of Albany or along the Highway 230 corridor. Additionally, there are currently two hunting outfitter guides permitted to operate within the analysis area.

Lands and Minerals: There are no lands and minerals activities currently under permit within the analysis area.

The Recreation Opportunity Spectrum: The Recreation Opportunity Spectrum (ROS) is a planning system utilized by land managers to classify areas according to the types of recreation

opportunities available therein. ROS classifications may range from *Primitive* inside a pristine Wilderness to *Urban* in forests adjacent to metropolitan areas. ROS classifications enable managers to provide a variety of settings in which to recreate, each with their own characteristics and opportunities. The Forest-wide standard concerning the ROS, as specified in the Forest Plan, is to “conduct management activities to comply with the requirements of the adopted ROS class and the scenic integrity objective in the management area prescription.” Four recreation settings may be found within the analysis area: *Roaded Modified*, *Roaded Natural*, *Semi-primitive Motorized (SPM)*, and *Semi-primitive Non-Motorized (SPNM)*.

Over half of the analysis area is classified as *Semi-primitive Non-Motorized*, with the majority of this designation resulting from the presence of the two Wilderness Areas. *SPNM* settings have a natural-appearing environment and there is a high probability of experiencing solitude, closeness to nature, self-reliance, challenge, and risk. Interactions between users are occasional and motorized travel is not permitted. Access is via non-motorized trails, non-motorized primitive roads, or cross-country (USDA FS 1990; USDA FS 2001). There are no vegetative treatments proposed in these areas as part of this project.

The NFSR 512 corridor within the analysis area is classified as *Roaded Natural*. This setting is generally a naturally-appearing environment as viewed from sensitive roads and trails with moderate evidence of the sights and sounds of people. Contact between visitors is low to moderate on trails and moderate to high on roads. Conventional motorized uses are provided for in the design of facilities, and moderate site modification is common for facilities (USDA FS 1990; USDA FS 2001). Treatment Units 1-6, 10-12, and 44 are located completely within *Roaded Natural* areas; Units 9, 15, 16, 28, and 41 lie partially within *Roaded Natural* areas and partially within *Roaded Modified* areas.

The remaining treatment units are in areas classified as *Roaded Modified* (Units 7, 8, 17-27, 29-37, 39, 42, and 43). *Roaded Modified* areas are characterized by a substantially modified environment, often the result of prior harvest activities. Slash and debris may be present except within developed sites or popular dispersed camping areas. There is moderate evidence of other users on roads and trails, and conventional motorized uses are provided for in the design of facilities (USDA FS 1990; USDA FS 2001).

A small portion of the analysis area is classified as *SPM*. *SPM* areas resemble *SPNM* areas with the exception that motorized travel is permitted under certain controls. There are no treatments proposed within or immediately adjacent to this area.

Environmental Consequences

Currently there is little existing baseline data on the recreation usage patterns within the analysis area. 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 attitudinal and preference-based visitor profiles, or utilizable demographic data. Nonetheless, through what data have been collected and repeated field-observation, professional judgment, ROS management prescriptions, Forest Plan direction, and technical reports, the consequences of the alternatives on recreation opportunities and experiences may be predicted with a fair degree of certainty, but without quantitative analysis.

Alternative 1 – No Action

Direct and Indirect Effects: Recreation opportunities and experiences in the analysis area would remain consistent with their present characteristics and anticipated future trends.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects: During actual project implementation, some disruptions and impacts to dispersed recreation uses and experiences would result from the sights, sounds, and activities associated with timber harvesting, road construction, log truck hauling, etc. However, due to the area's overall low level of visitation and use, the general lack of recreation development within the vicinity of the units, and the utilization of mitigation measures (see EA p. 22), any immediate negative effects resulting from this action should be minimal in quantity and short in duration with respect to recreation opportunities and experiences.

Several recreation groups would likely be directly impacted by this alternative during project implementation (e.g., users of the Devils Gate and Cottonwood Creek trailheads and big game hunters). Under this alternative, logging operations and/or road construction would occur in the immediate vicinity of the Devils Gate and Cottonwood Creek trailheads. These activities could either displace users of the sites or diminish the quality of their experience. Displacement and/or experience degradation may also be the case for hunters recreating in the vicinity of treatment units if operations occur during big game hunting seasons. Snowmobilers would likely be impacted as well if log-hauling occurs during the winter, as the only access routes that could be utilized for hauling are maintained (i.e., groomed) as snowmobile trails from December 15 through April 1. Other groups, including ATV enthusiasts and dispersed campers, could be similarly affected if their desired recreation destinations and/or access routes overlap with treatment units and/or road construction sites.

It may be reasonably anticipated that many of the recreationists directly affected by this alternative would seek alternative locations of the Forest in which to recreate during actual logging operations. However, it is unlikely that any off-Forest displacement of recreationists would occur. Other locations within the analysis area unaffected by logging operations could see an increase in users as displaced hunters and other dispersed recreationists seek out more favorable conditions in which to recreate. The potential for crowding in these areas as a result of this displacement is expected to be minimal. Wilderness users should not be negatively impacted by this project, with the exception of the temporary problems associated with trailhead access referenced above.

Special use permittees (snowmobile and hunting guides) could experience minor disruptions to their operations if they are not adequately kept abreast of logging, log hauling, and construction routines and schedules.

Existing scientific literature on the indirect and long-term effects of past timber harvest on recreation resources generally offers five conclusions with respect to these issues (Gan & Miller 2001, Tarrant et al 1999, McDonald & Stokes 1997, English & Home 1996, Herrick & Rudis 1994, Jaakko Poyry Consulting 1994, Schroeder et al 1993, Palmer et al 1993, Cordell et al 1990, Palmer 1990, Schweitzer et al 1976).

- 1) Forest recreationists typically prefer—when offered a choice—environs in which to recreate that are largely undisturbed by human activities.
- 2) Negative impacts on the experiences of recreationists increase proportionate to the extent of human-induced disturbances, with the clearcutting method of timber harvest being the most negatively impacting.
- 3) Over time, negative impacts from past timber harvest on the experiences of recreationists typically diminishes, dissolves, or in many cases, becomes a positive influence on recreation opportunities and experiences.
- 4) Recreationists are not affected uniformly by timber harvesting—long-term undesirable impacts, including those from clearcutting, range from none at all to considerable, depending on a variety of user characteristics.
- 5) Mitigation measures intelligently employed to offset the visual effects of timber harvesting generally reduce negative impacts to recreation users and occasionally improve both recreation opportunities and experiences.

In light of these and other findings, it is impossible to determine the exact nature and extent of the long-term impacts of the Modified Proposed Action on recreation; however, several general effects may be reasonably anticipated.

- 1) Activities proposed in dispersed recreation locations would alter the appearance of the landscape to an extent sufficient to negatively affect the experiences of some visitors who currently enjoy recreating in these areas for some time into the future. Exactly what percentage of visitors would be affected in this manner is subject to considerable debate and speculation, and exactly how long these visitors would remain affected would vary from one user to another (Gan & Miller 2001, Herrick & Rudis 1994, Palmer 1990).
- 2) A small percentage of negatively impacted individuals would find these changes to be very offensive and may choose not to recreate in these areas.
- 3) Some users would not react negatively to the changes brought on by the Modified Proposed Action and would not have their recreation experiences negatively impacted.
- 4) Some users would likely find the changes beneficial to their recreation opportunities and experiences over the long term, particularly where viewsheds, openings in otherwise dense forest stands, landscape diversities, and opportunities for cross-country travel (especially for winter motorized recreationists) are newly created (Palmer 1995, Jaakko Povry Consulting 1994).
- 5) Potential long-term impacts to recreationists under this alternative would be the greatest in the vicinities of treatment units located along NFSR 512 due to the nature of the treatments (i.e., clearcutting in Units 1-4 and 6), the relatively high use of NFSR 512, and the presence of the Cottonwood Creek trailhead.
- 6) Following project implementation, the number of recreationists displaced and/or negatively impacted by the Modified Proposed Action in the years to come would likely constitute a very small percentage of the total number of users typically found recreating within the analysis area. Again, exactly what percentage is difficult to determine. However, given the relatively small size of the treated acres as compared to the size of the analysis area and the availability of similar dispersed recreation opportunities outside of and unaffected by the proposed treatment units, it is reasonable to assume that the relative number of recreationists that could potentially experience lasting negative effects from this action should be minimal.
- 7) Logging has occurred in the past within and/or adjacent to the proposed treatment units as well as elsewhere within the analysis area. Consequently, much of the landscape that is currently enjoyed

by recreationists has been altered and generally does not constitute environs undisturbed by human activities.

8) Improvements being proposed to the Devils Gate trailhead and the roads accessing it would benefit users of this area and trail.

9) The proposed closure of 6.1 miles of road in the analysis area would be viewed as either positive or negative by different recreationists depending on whether they prefer roaded recreation or not. This action would reduce motorized access to sites within the analysis area.

One change to the existing ROS designations would result from the Modified Proposed Action: areas along NFSR 512 currently classified as *Roaded Natural* where clearcutting is planned would move toward *Roaded Modified* following project implementation. (It should be noted that such a change is acceptable within the prescribed Management Areas and is typical for a timber harvest operation.)

Alternative 3 – Reduced Clearcutting and Road Construction

Direct and Indirect Effects: Much of the discussion above on the effects of timber harvest on recreation resources pertains to this alternative as well. There are, however, some expected differences as noted below:

- 1) With clearcutting having been reduced by 265 acres in this alternative, the extent and duration of any long-term negative effects on recreation experiences would be lessened.
- 2) With Clearcut Units 1-4 and 6 having been removed completely in this alternative, any negative impacts to recreationists—both direct and indirect—would also be considerably lessened. These units have the greatest potential to impact the largest number of users of the analysis area (see effect #5 in the Modified Proposed Action).
- 3) There would be no change to the ROS classes in the analysis area under this alternative.
- 4) With 319 fewer overall treated acres and 2.6 fewer miles of road construction/reconstruction than the Modified Proposed Action, negative impacts—both immediate and long term—to visitors recreating in the analysis area would be reduced.
- 5) New opportunities for recreation and positive changes in recreation experiences that would have potentially resulted from the Modified Proposed Action (see effect item #4) would not be realized through this alternative, with the exception of the benefits associated with the improvements to the Devils Gate trailhead (see effect #8).

CUMULATIVE EFFECTS – All Alternatives

The analysis area and surrounding areas have been modified in the past by timber harvest, roads construction, grazing, water developments, dispersed recreation uses, and concentrated recreation uses at developed sites. Current trends indicate that recreation use in the Medicine Bow National Forest (and the analysis area) will continue to increase well into future, likely becoming an even greater focus of forest management. The cumulative effect that this phenomenon may have, when viewed in light of the alternative proposals presented in this EA, could involve the intensification of many, if not all, of the impacts of these actions on recreation opportunities and experiences in the manners discussed above. Greater numbers of recreationists affecting and being affected by the current proposed and any potential future timber harvest areas would almost certainly increase the effects—both positive and negative—of these activities on recreation resources.

A portion of a proposed trail system being analyzed in the Snowy Range Travel Management Analysis lies within the analysis area. While the existing proposed motorized routes avoid most treatment units, there is some overlap. Consequently the potential exists for conflict between logging operations and construction and/or trail use should the trail proposal be adopted and implemented. In this event, additional mitigation measures would likely be needed to ensure worker/user safety and to minimize any negative impacts of logging operations to user experiences.

FOREST PLAN CONSISTENCY

The No Action alternative and the action alternatives would comply with Forest Plan standards and guidelines, as they relate to the recreation resource (Forest plan pgs. 1-52 through 1-55).

J. Scenic Resources

Affected Environment

The analysis area consists mainly of lodgepole pine forests (90 percent) with scattered stands of spruce/fir, Douglas fir, aspen, ponderosa pine, and limber pine. Other area vegetation, found primarily in meadows and riparian areas, includes grasses, forbs, and shrubs. The analysis area can be viewed from the main travel route of NFSR 512 – Platte Access Road and from numerous local forest roads scattered throughout the analysis area. Savage Run Wilderness trailhead parking is located north of NFSR 512. The analysis area includes portions of the Savage Run and Platte River Wilderness Areas on the north and west sides of its boundary.

The landscape character within the analysis area has primarily been shaped by natural events such as fires, winds, insects and disease. However, human activities, including timber harvest and associated road building, mining, dispersed recreation, and livestock grazing, have also played a role in landscape changes. For example, tie hacking began in the area in the late 1800's and early 1900's, and commercial timber harvest started in the early 1930's. Several commercial sales occurred throughout the later 1900's, with the last timber harvest occurring in 1995 in the Jays Roast area. Today, major recreational activities in the analysis area include hiking and OHV riding. The landscapes within the Platte River and Savage Run Wilderness Area and inventoried roadless areas remain intact with little changes by humans.

Existing Scenic Integrity (ESI)

The Existing Scenic Integrity is a baseline inventory on the state of naturalness or the degree to which a landscape is visually perceived to be "complete." The highest scenic integrity ratings are given to those landscapes that have little or no deviation from the landscape character, and lower ratings are given to landscapes that have been moderately to severely altered by such things as roads, recent harvest units, and old harvest units partially grown in. Within the Devils Gate analysis area, six Existing Scenic Integrity levels were identified and inventoried. They are as follows:

Existing Scenic Integrity Rating	Percent of Analysis Area
Very High	65
High	4
Moderate	18
Low	9
Very Low	3
Unacceptable Low	<1

Scenic Integrity Objectives

The Medicine Bow National Forest Plan’s adopted Scenic Integrity Objectives (SIO) provide objectives to achieve the desired scenic condition and landscape character of the Forest. Each SIO prescribes a different degree of acceptable alteration of the landscape based on the importance of aesthetics.

SIOs are Forest Plan guidelines (Forest Plan, Chapter 2). Guidelines are advisable courses of action that should be followed to achieve forest goals, but are optional. Deviation from guidelines must be analyzed during project level analysis and documented in a project decision but do not require a forest plan amendment. A grace period of one year to meet the Scenic Integrity Objectives of High and Moderate and three years to meet Low SIO are allowed after the completion of a project. Table 32 displays the assigned SIO(s) for each Management Area Prescription established within the Devils Gate analysis area.

Table 32: Adopted Scenic Integrity Objectives

Management Areas	Adopted Scenic Integrity Objectives
1.13	Very High
1.31	High
3.4	Moderate
3.58	Moderate
5.13	Moderate – foreground of arterial/collector roads and trails; Low in all other areas
5.15	Moderate – foreground of arterial/collector roads and trails; Low in all other areas
5.41	Moderate
8.21	Low

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects: There would be no direct effects to scenery resources, as there would be no management activities. Only the forces of natural events, such as wildfires, winds, insects and disease, would change the visual appearance of existing landscapes. Beetle killed trees located within travel ways and recreation sites could create lower scenic quality for a time until new green trees are established. Within the analysis area, large-scale wildfire caused by humans or lightning could reduce scenic quality and leave some visible scars of the landscape until new vegetation is established.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects: The Modified Proposed Action would allow silvicultural treatments of forested stands throughout the analysis area to reduce the spread of insect and disease infestations and to improve forest health, resiliency, and growth. Silvicultural treatments would also be used in past harvest areas to ecologically restore the areas into a more natural forest landscape pattern.

Other proposed management projects would be planned, including road decommissioning to reduce soil and water impacts to existing riparian areas and developing improved trailhead access to Devils Gate area. These projects would improve, enhance, and protect the scenic quality of the analysis area.

Following project implementation, scenic resources could be affected when visitors travel on existing roads or trails within and adjacent to the analysis area and notice disturbed ground surface within vegetation treatment sites. For example, there are several proposed units located within the NFSR 512 corridor. This corridor accesses the Platte River and the Savage Run and Platte River Wilderness Area trailheads. It also accesses several other dispersed and developed recreation sites. The scenic quality within the corridor would be maintained, however, as mitigation measures for scenery would be followed to comply with the revised Forest Plan adopted scenic integrity objectives and meet the desired landscape character of the analysis area. Initially, vegetation treatments on some portions of units on the foreground of NFSR 512, the Savage Run Wilderness access road (NFSR 500), and trailhead parking would be visible and appear as Low SIO (moderately altered). Overtime, however, when new vegetation is established, they would appear as Moderate SIO (slightly altered).

Scenic resources could be indirectly affected if OHV users drive off of improved access roads or trails and create new illegal trails. This could cause visible resource damage of the landscape. OHV use is one of the increasing recreational activities on the Forest.

Alternative 3 – Reduced Clearcutting and Road Construction

Direct and Indirect Effects: Alternative 3 is similar to Alternative 2 except that several clearcut units were dropped and fewer miles of road would be constructed or reconstructed. Several clearcut units proposed under Alternative 2 would become shelterwood units in Alternative 3. Consequently, Alternative 3 would have less visible visual change through vegetation treatments, particularly along the NFSR 512 corridor.

CUMULATIVE EFFECTS – All Alternatives

Past, present and future management activities were reviewed for cumulative effects on scenic resources. As previously mentioned, the characteristic landscape of the analysis area has been shaped by natural and human events. A number of commercial timber harvest areas implemented within the analysis area in 1930's have become reestablished with mosaics of green healthy tree stands with different ages and sizes. A more recent timber project was completed in 1995 in the Jays Roost area. This sale attempted to eliminate the strip cut pattern left from past commercial sales and to restore into a more natural appearing pattern that better blend with the surrounding forest landscape.

Overall, the landscape character of the analysis area remains in place with some minor changes resulting from past and present human activities such as timber cutting, roads, trails, dispersed recreation, mining, and livestock grazing. The landscape character of Savage Run and Platte River Wilderness Areas remains largely intact with little deviations such as the trail development.

The Modified Proposed Action would not cause any adverse cumulative effects on scenic resources as it would maintain and meet the desired condition of landscape character. Young healthy trees created by past management actions would mitigate and minimize the overall impact by vegetation

treatments on scenery within the three geographic areas. Road decommissioning and watershed improvements would restore the landscape to the desired natural appearing condition. There would be a short-term impact on scenery after the completion of management actions; however, area scenery would be improved in the long-term. Managing the vegetation and maintaining the scenic quality within the analysis area would allow present and future visitors to continue to enjoy and experience the forested landscape setting.

FOREST PLAN CONSISTENCY

The No Action and the action alternatives would be consistent with the Medicine Bow National Forest Plan (2003) adopted scenic integrity objectives providing that the proposed mitigation measures for scenery are implemented.

K. Wildlife

Due to the number of species types and resource concerns that must be analyzed, the wildlife section is formatted slightly differently than the other resource sections. It contains 10 “sub-sections” including: 1) Old Growth Forest; 2) Wildlife Habitat Provided by Older Forest; 3) Snags and Coarse Woody Debris; 4) Big Game Wildlife Species; 5) Roads and Wildlife; 6) Threatened, Endangered, and Proposed Species; 7) Forest Service Sensitive Species; 8) Management Indicator Species; 9) Cumulative Effects to Wildlife; and 10) Forest Plan Consistency. All sub-sections describe the affected environment first followed by the effects associated with the alternatives.

1) Old Growth Forest

Affected Environment

The Medicine Bow National Forest Plan recognizes the importance of retaining old growth forest to improve biodiversity and to provide key habitat conditions for maintaining viable populations of flora and fauna species across the Forest. Old growth forests are defined as “...ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics that may include tree size, accumulations of large dead woody material, number of tree top layers, species composition, and ecosystem function” (USDA 2003, p. G-26).

The Forest Plan contains two standards that are pertinent to old growth retention and/or management:

1) Manage old forest to retain or achieve at least the minimum percentages of old growth by cover type by mountain range shown in the following table...” (*Biological Diversity Standard, pg. 1-31*)

Table 33: Minimum Percentage of Old Growth by Cover Type by Mountain Range

Cover Type	Percent of Cover Type by Mountain Range
Spruce/fir	25%
Lodgepole	15%
Ponderosa Pine	25%
Aspen	20%

Table 34 depicts the amount of old growth that currently exists on the Snowy Mountain Range and Table 35 depicts the amount of old growth within the Devils Gate analysis area. Although there is no Forest Plan standard for old growth at the analysis area scale, a review of identified old growth at this scale was deemed pertinent to assess the potential effects of the project on wildlife species associated with late seral forest.

Table 34: Old Growth Conditions on the Snowy Mountain Range

Cover Type	Acres of OG 4 or 5 ¹⁹	Total Forest Cover	Percent of Cover
Lodgepole pine	43,985	274,250	16.04
Spruce-fir	58,217	115,881	50.24
TOTAL	105,670	410,229	25.76

This information was extracted from the Forest Plan Final Environmental Impact Statement (pg. 3-133).

Table 34 shows that old growth spruce-fir is abundant across the Snowy Range and that Forest Plan standards are being met. It also shows that identified old growth lodgepole pine is approaching minimum required levels across the Snowy Range. For this reason, all forested stands identified as old growth were avoided during project design.

Table 35: Old Growth Conditions in the Devils Gate Analysis Area

Cover Type	Acres of OG 4 or 5	Total Forest Cover	Percent of Cover
Lodgepole pine	1,714	22,294	7.69
Spruce-fir	791	1,291	61.27
TOTAL	2,505	23,585	11

Table 35 shows that spruce-fir old growth is also abundant within the analysis area; however, the area contains only minimal amounts of old growth lodgepole pine. Table 35 also shows that the total amount of identified growth in the analysis area makes up approximately 11 percent of all forested habitat, thus suggesting that wildlife habitat made up by inventoried late seral forest is fairly unique within the analysis area. Further review of the distribution and connectivity of older forest, as well as its value as late seral habitat in comparison to other areas on the forest is an important consideration and is addressed in the next section (Wildlife Habitat Provided by Older Forest).

2) Prohibit vegetation treatment in inventoried and mapped spruce-fir or lodgepole pine old growth stands. (5.15 Forest Products, Ecological Maintenance and Restoration Standard, pg. 2-63)

¹⁹ This is an “available indicator” code where a code of 4 or 5 represents those forested stands having a high or very high probability of being old growth.

Under Forest Goals, Objectives, and Strategies, the Forest Plan directed that within three years, the Forest is to identify and map old growth stands to be used in project planning and to meet the Forest-wide and 5.15 old growth standards. The Forest is currently in the process of completing this exercise with an anticipated completion date at the end of 2006.

Environmental Consequences

All Alternatives (No Action and Action)

Direct and Indirect Effects: Old growth, as identified with old growth indicator code 4 or 5, would be retained in its current condition and would not be treated.

2) Wildlife Habitat Provided by Older Forest

Affected Environment

A Historic Range of Variability for Upland Vegetation on the Medicine Bow National Forest (Dillon et al. 2005) indicates that forests of the Medicine Bow National Forest (MBNF) are more fragmented now than prior to the introduction of large scale timber harvesting and road building. Forested stands currently have smaller patch sizes, perforation of interior forest by roads and harvest, and more edges between old and young forest. This information is consistent with the fragmentation analysis presented in the Forest Plan Final EIS (USDA Forest Service 2003b).

To determine fragmentation of older forest habitat within the Devils Gate analysis area, four criteria were analyzed. The criteria are described in "Landscape Structure Measurements for Watersheds on the Medicine Bow National Forest Using GIS Analysis" (Baker 1994) and are as follows:

- The amount of forest stands originating after 1950 (55 years or older)
- The amount of forest stands originating before 1859 (155 years or older)
- The interior size of older forest stands (155 years or older)
- The interior size of lodgepole pine forest stands (155 years or older)

The date was compared between the Devils Gate analysis area, the reference areas described by Baker, and the averages across the MBNF in similar forest types.

Findings

- The Devils Gate analysis area has approximately 6,600 acres of forest (28%) providing older forest wildlife habitat. This includes all identified old growth and vegetation within the wilderness areas. Approximately 52 percent of this habitat (3,460 acres) resides in a connected block.
- The northern portion of the analysis area has similar amounts of old forest vegetation (155 years or older) as the undisturbed reference areas on the forest and significantly more than what is found in most areas of the MBNF with similar vegetation.
- The remainder of the analysis area has fewer older forest stands than the reference areas and slightly fewer than are found on average across the MBNF.
- Young stands (55 years or younger) are similar in abundance to the rest of the MBNF, but significantly more common (15 times or more) than found in the undisturbed reference areas.

- Few older forest stands have similar amounts of interior habitat as is present in the reference areas.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects: Older forest wildlife habitat would be retained in its current condition over the short and mid-term. Wildlife species such as marten, boreal owl, and goshawk would continue to occupy habitat in similar densities as are currently present. Over the next 100 years, a larger number of stands in the mid-seral stages would begin to take on characteristics of older forest wildlife habitat as tree diameters increase and insects, disease, mistletoe, and other natural disturbances cause heart-rot, tree mortality, and form large diameter snags and coarse woody debris. Barring catastrophic wildfire, some of the mid-seral lodgepole pine stands would develop multiple canopy layers and trend toward mature mixed spruce/fir/lodgepole stands. As younger, previously harvested stands begin to mature; the overall tree diameter and connectivity of mature forest would begin to resemble a large connected block of older forest habitat.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects: This alternative proposes to harvest mature forest that is located adjacent to or between recently harvested areas. This management action would increase the patch size of early forest while continuing to decrease the amount and connectivity of older forest in the analysis area. Wildlife species that favor older forest would see a reduction in useable habitat and/or a decrease in quality of habitat. Consequently, the analysis area would be able to support a fewer number of these species. However, adequate habitat and populations would be retained to support a continuing forest-wide population trend. For effects to individual species, refer to the “Management Indicator Species” sub-section.

Alternative 3 – Reduced Clearcutting and Road Construction

Direct and Indirect Effects: Alternative 3 was designed specifically to reduce clearcutting and road construction. It was also designed to minimize fragmentation (or connectedness) of older forest wildlife habitat while still providing opportunities to meet timber production and forest health goals. Decreases in overall amount of older forest wildlife habitat would still occur, but they would generally be located in stands that are not connected to larger blocks of connected habitat; thus, the effects would be less than those described under Alternative 2. Timber harvest would be more concentrated in areas that currently provide minimal or poor quality habitat for species dependent on older forest. The analysis area would be able to support fewer numbers of these species than what currently exists, but adequate habitat and population would be retained to support a continuing forest-wide population trend. The few stands that are harvested within the connected block of late seral forest would generally be thinned, thereby retaining a portion of their value as older forest habitat and retaining connectivity between adjacent older forest wildlife habitats. For effects to individual species, refer to the “Management Indicator Species” sub-section.

3) *Snags and Coarse Woody Debris*

Affected Environment

Field surveys of the area, including proposed units, found that older forested stands have high numbers of snags within them. Over 8,000 acres (28%) of the analysis area are classified as habitat structural stage 4 (mature) and likely meet or exceed Forest Plan guidelines for snag retention. Additional stands may be present in the Savage Run Wilderness Area.

Many stands dominated by mid-seral lodgepole pine lack quality snags (large diameter, wildlife cavities) and associated large down woody debris. This condition exists for several reasons: 1) mid-seral lodgepole pine does not typically produce quality snags; 2) stands impacted by forest fires were salvage harvested after the fire; and 3) fire suppression activities have put out naturally occurring fires that create snags.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects: Snags would remain in their current density and gradually increase over time.

Alternatives 2 and 3 (Action Alternatives)

Direct and Indirect Effects: Timber harvest units were designed to retain suitable numbers of snags; thus, Forest Plan snag standards (see Appendix B) would be met.

4) *Big Game Wildlife Species*

Affected Environment

Habitat exists throughout the analysis area for mule deer, elk, moose, and bighorn sheep. In non-winter range habitat, dense conifer forest dominates the vegetation, and big game foraging occurs during spring/summer/fall months most commonly in riparian areas, high elevation meadows, and areas disturbed by fire or timber harvest. Deer and elk occupy forested areas with dense vegetation and minimal roads for security from motorized vehicles and human disturbance. Habitat conditions in these spring/summer/fall ranges are adequate to support herd objectives set by the Wyoming Game and Fish Department (2004).

Populations of mule deer, elk, and moose are at or approaching Wyoming herd objectives. Bighorn sheep populations are below herd objectives because of a lack of non-forested migration corridors connecting lower elevation wintering areas on the North Platter River to summer foraging areas in high elevation meadows of the Snowy Range, as well as the decadent condition of sagebrush and ground forbs in some areas.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects: Big game habitat and populations would remain in their current condition and locations. However, benefits to big game by closing NFSRs 512.G and 506.B would not occur.

Alternative 2 - Modified Proposed Action

Direct and Indirect Effects: Proposed clearcutting in units 1, 3, 6, and portions of units 2 (5 acres) and 4 (21 acres) would remove hiding/security cover and thermal protection for approximately 15 years. These units are located in Management Area 5.41 - Big game winter range. Some foraging benefits would be provided in the short-term (during spring, summer, and fall months); however, winter habitat would not be improved. Contact with the WGFD (Haley and Straw, Personal Communication) confirm that these forested stands are more valuable for the hiding cover and the forested connections they provide among older forest.

Limiting habitat for bighorn sheep and moose would not be affected by the project proposal. Additional benefits to deer and elk would be realized by closing over 6 miles of roads (NFSR 512.G and NFSR 506.B). These closures would provide a fairly important security area for deer and elk where motorized travel would not be permitted.

Alternative 3 - Reduced Clearcutting and Road Construction

Direct and Indirect Effects: This alternative does not propose harvest treatment within big game winter range. Consequently, hiding/security cover in winter range would be retained in its current condition. Additional benefits to deer and elk would be realized by closing over 6 miles of roads (NFSRs 512.G and 506.B). These closures would provide a fairly important security area for deer and elk where motorized travel would not be permitted.

Harvest units would occur in spring/summer/fall ranges where animals are less sensitive to disturbance. A small amount of hiding cover would be compromised in treatment areas, but remaining forests surrounding the treatments would continue to provide ample hiding cover. There would also be added benefits of increased forage in clearcuts. Habitat for bighorn sheep and moose would not be altered by the project proposal.

5) Roads and Wildlife

Affected Environment

The analysis area is roughly 44 square miles in size and contains over 60 miles of motorized roads and trails. Of these, approximately 5 miles of road are gated closed and 16 miles are unauthorized roads/trails. This equates to an approximate average of 1.3 miles of motorized travel per square mile. Road impacts may include avoidance by big game, hydrologic and erosion effects, alteration of natural landscape patterns, alteration of flow of biological resources, and introduction of invasive species. While there are no wildlife species in the analysis area known to require “interior” habitat, it is thought that habitat without roads and associated disturbances may benefit species such as pine

marten, elk, snowshoe hare, and Canada lynx. Literature suggests that road densities above 1 mile per square mile may effect big game concentrations, particularly elk, where they tend to avoid areas frequented by road noises and regular human presence.

Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects: The effects of roads on wildlife would remain unchanged. The wildlife related benefits of decommissioning NFSR 512.G (over 5 miles) and its spurs and closing 506.B (after reconstruction) would not occur. Wilderness and unroaded areas would continue to provide a refuge for wildlife away from motorized use.

Alternative 2 - Modified Proposed Action

Direct and Indirect Effects: An important wildlife habitat feature is the unroaded area between the two forks of Devils Gate creek where units 18 and 19 are proposed. This area provides a natural security area for big game because of the current lack of roads and its position between two riparian areas. To access these two units, up to ½ mile of road (506.B) would be reconstructed along a riparian area, and an additional 1 mile of road (two ½ mile segments) would be newly constructed in some of the less-roaded portions of the analysis area (excluding roadless areas or wilderness areas). If the roads are effectively closed to motorized vehicles, as is proposed, the reconstruction and construction would have only temporary effects to big game security during construction and timber harvest. Year-round closure of these roads would offset these temporary effects. Remaining road construction/reconstruction proposals do not pose a risk to wildlife resources since they are located away from riparian areas and occur in areas already having moderate to high road densities.

Decommissioning over 5 miles of NFSR 512.G and its spurs would provide considerable benefit to big game security and would reduce ongoing motorized impacts to approximately 3 miles of riparian habitat.

Alternative 3 - Reduced Clearcutting and Road Construction

Direct and Indirect Effects: The effects of Alternative 3 are essentially the same as Alternative 2 because the decommissioning and closures in both alternatives are the dominant road construction activity affecting wildlife. Road construction and reconstruction proposed in Alternative 3 are small segments located outside of riparian areas and in areas with moderate to high road density.

6) *Threatened, Endangered, and Proposed 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 2006). A review of these species and the effects determinations can be found in the Biological Assessment prepared for this EA. The only species on the TEPS list that has the potential to be affected by the alternatives analyzed in this EA is the *Canada lynx*.

Environmental Consequences

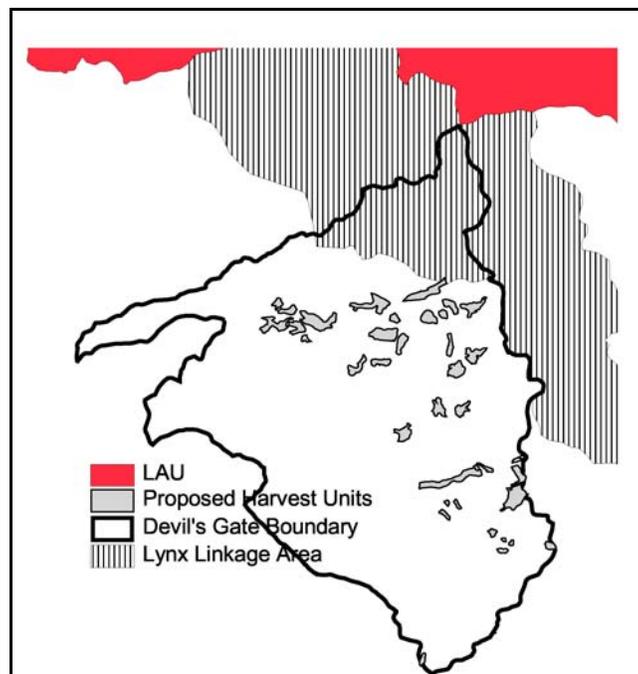
Alternative 1 – No Action

Habitat and populations for TEPS would remain in their current condition. This alternative would have “No Effect” on federally threatened or endangered wildlife species, “No Effect” on any designated critical habitat, and is not likely to jeopardize the continued existence of any wildlife species proposed for federal listing.

Alternatives 2 and 3 (Action Alternatives)

As mentioned above, Canada Lynx is the only TEPS that has the potential to be affected by project implementation. The following figure displays the proposed harvest units in relation to Lynx Analysis Units (LAUs) and Lynx Linkage Corridors.

Figure 1 - Canada Lynx LAU and Linkage Corridor



BIOLOGICAL DETERMINATION and RATIONALE

A determination of “*May affect but is not likely to adversely affect*” has been made for both action alternatives. The rationale for this determination is as follows:

- The project occurs outside of established LAUs. LAUs designate the primary habitat where lynx reside.
- Continuous vegetative cover within the Lynx Linkage Corridor exists and would not be compromised by the project proposal. Only 40 acres within this corridor are proposed for treatment (pre-commercial thinning). This treatment type would retain forested cover suitable for lynx foraging and travel.
- Some harvest units are located in potential lynx travel areas or temporary foraging habitat outside of LAUs. Forest openings created by clearcut harvest treatments are temporary (would regenerate within several years after treatment) and are small enough in size (40 acres plus or minus) that they **would not** create barriers to lynx movement and **would not** limit temporary foraging that may occur.
- Areas adjacent to proposed treatments provide abundant forested cover that is connected from stand to stand. Foraging habitat (snowshoe hare presence) would remain intact in surrounding stands because these stands remain forested with a variety of structural stages ranging from early seral forest (regeneration from previous harvest) to mature forest.
- Impacts to lynx prey are expected to be minimal for the following reasons: treatments would affect only a small amount of available habitat for snowshoe hare; existing habitat is of limited value because it is dominated by single story lodgepole pine forests; forested conditions would be retained across the analysis area; and suitable habitat for prey species adjacent to the treatment areas is widespread.

The USFS is in the process of requesting concurrence from the USFWS regarding this determination for Canada lynx.

7) *Forest Service Sensitive 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.

All species on the Rocky Mountain Regional Sensitive Species List were reviewed for the Devils Gate 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). The BE prepared for the Devils Gate analysis contains an analysis 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.

Environmental Consequences

BIOLOGICAL DETERMINATION and RATIONALE

It has been determined that both action alternatives *may impact* individual northern goshawk, American three-toed woodpecker, olive-sided flycatcher, boreal owl, pygmy shrew, American marten, boreal toad, wood frog, and Hudsonian emerald dragonfly *but is not likely to cause a trend toward federal listing or a loss of viability*. Table 36 describes the potential impacts for each species.

Table 36: Impacts to Sensitive Species

Sensitive Species Impacted	Rationale for Determination
northern goshawk	Goshawk surveys were completed in July of 2004 and 2005. Multiple surveys were completed in areas where potential nesting was most probable. No nests were located. The project has the potential to affect four post-fledging areas (PFA) and associated nests (if present). Alternative 2 has a higher probability of impacts while Alternative 3 reduces many of the proposed treatments that would impact PFAs. Many of the proposed treatment areas occur in vegetation conditions which are poor for goshawk nesting due to their stand density and location away from riparian areas. The most likely area to find goshawk nesting is in the vicinity of proposed harvest units 8, 9, 10, 11, 15, 16, 18, and 28. Since nests were not found, impacts are unlikely. Most probable impacts are that mechanical harvest activities and human presence during harvest would temporarily displace individual goshawk that might otherwise forage on a given site. Absence of nests and limited temporary impacts to individuals indicate that the project would not alter stable Forest-wide trend or affect viability.
American three-toed woodpecker	The northern portion of the analysis area represents some of the better habitat in the snowy range for three-toed woodpeckers. This species prefers larger blocks of mature spruce/fir forest with heavy insect activity. Pockets of bark beetle and wood borer activity in later seral lodgepole pine and spruce/fir stands within the project area likely attract these woodpeckers. Elements of project design that promote thinning and snag retention, recruitment snags, and trees with cavities would minimize project impacts to three-toed woodpeckers.
Olive-sided flycatcher	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.

Table 36: Impacts to Sensitive Species (Cont'd)

Sensitive Species Impacted	Rationale for Determination
boreal owl	<p>Much of the habitat proposed for treatment may be occupied by boreal owls as they are known to nest and forage in larger blocks of mature spruce/fir (preferably) or secondarily, in older lodgepole pine forest. However, the species is uncommon on the forest and naturally is found at very low densities. Nesting habitat is dependent upon cavities, while preferred foraging habitat occurs in spruce/fir forests where red-backed voles are abundant and hunting perches are available fairly close to the ground. In particular, older forests in the northern portion of the analysis area are more likely to be occupied based on previous sightings and the continuous (connected) nature of older forest in that area. Previously, 16 boreal owl nest boxes were placed in this area to provide presence/absence data and genetic study. Harvest unit 14 contains one owl nest box that has been inactive during past surveys. Of the two action alternatives, Alternative 3 is preferred for boreal owls because it emphasizes thinning in areas where boreal owls are more likely to be present. Thinning treatments would have a smaller impact on habitat than clearcutting because thinning impacts are small and short term, such as temporarily reducing the quality of vole habitat, boreal owl's major prey species, through mechanical disturbances and disruption of vegetation on the forest floor. Over the medium and longer term, thinning treatments may release spruce/fir understory thereby improving vole and boreal owl habitat. Clearcutting would create an early successional stage in treatment areas thereby leaving habitat in a condition that is less favorable to red-backed voles, with few perches for boreal owl to hunt from, and with fewer available cavities for nesting. Where clearcut treatments occur in large blocks of connected older forest, a temporary loss of suitable habitat would occur for approximately 100 years until the treated stands have regenerated and begin to mature. These effects may or may not translate to impacts to one or two individual owls because of their low density of occurrence. Retention of snags with cavities, retention of large trees in the overstory and/or surrounding forests, retention of woody debris piles, and avoiding harvest of trees with actual nest boxes is adequate to protect existing boreal owl habitat in a way which preserves its value for boreal owls that may be in the area. (Personal Communication with Greg Hayward, October 2005).</p>
Pygmy shrew	<p>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. Where small unmapped wetlands exist within proposed treatment units, additional wetland buffers should be established during project layout.</p>

Table 36: Impacts to Sensitive Species (Cont'd)

Sensitive Species Impacted	Rationale for Determination
American marten	<p>The analysis area contains some quality marten habitat consisting of connected late seral forest, large snags, coarse woody debris piles, thick understory, and available prey including voles, snowshoe hare, and pine (red) squirrels. Connected patches of older forest represent the higher quality marten habitat which exists predominately on the northern portion of the analysis area. Many of the forested stands in the central and western portions of the analysis area are lower quality habitat with moderate to low stand complexity, minimal coarse woody debris, early to mid-seral forest development, and disconnected patches of older forest. Approximately 5% to 10% of current marten habitat would be affected by the project proposal. Likely impacts to the species include a loss of habitat for between 2 and 6 adult marten or the need for those adults to expand their homerange size to meet biological needs. Of the action alternatives, Alternative 3 is preferable for marten because of significantly fewer impacts in connected older forest. Retention of snags and snag recruits at the rate of 13 per acre, retention of coarse woody debris, and commercial thinning treatments would retain useable habitat and help limit impacts. Overall reduction of habitat and individuals within the marten population is minimal compared to that which remains available across the MBNF.</p>
Boreal toad	<p>There are minimal known boreal toad locations within the vicinity of the analysis area. Treatments are designed with riparian buffers which would minimize the impacts to breeding habitat and immediately adjacent uplands. Project implementation within Forest Plan standards and guidelines should not result in any changes of population numbers, habitat quality, or distribution of this species.</p>
wood frog	<p>Treatments are designed with riparian buffers which would minimize impacts to breeding habitat and immediately adjacent uplands. Project implementation within Forest Plan standards and guidelines should not result in any changes of population numbers, habitat quality, or distribution of this species</p>
Hudsonian emerald dragonfly	<p>Hudsonian emerald dragonfly habitat consists of riparian areas and mature spruce/fir forest immediately adjacent to those areas. 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>
All Remaining Wildlife Sensitive Species	No Impacts

Alternative 1 – No Action

Direct and Indirect Effects: The No Action alternative would retain habitat and populations for sensitive species in their current condition. Boreal toad and wood frog would continue to have small impacts to habitat and to individual amphibians where NFSR 512.G and NFSR 506.B are adjacent to and/or crossing riparian areas.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects: Alternative 2 would result in more impacts to individual species dependent on older forest (goshawk, boreal owl, three-toed woodpecker, and marten) than Alternative 3 because many of the harvest units are proposed as clearcuts and exist in an identified block of connected older forest. Clearcuts are assumed to remove the stands value as habitat for these species in the short to mid-term because important nesting habitat and/or foraging features are gone until the stand can regenerate and develop adequate tree size and canopy cover to provide quality habitat. The time it takes for these clearcut stands to return as quality habitat for species preferring later seral habitat may be well over 100 years.

Alternative 3 – Reduced Clearcutting and Road Construction

Direct and Indirect Effects: Alternative 3 would result in fewer impacts to species dependent on older forest than Alternative 2 because most of the harvest units that were originally proposed within connected older forest would be retained without treatment or the silvicultural prescription has been changed to thinning (rather than clearcut). Proposed harvest units 1, 2, 3, 4, 6, 12, 22, and 28 would not be harvested under this alternative, and harvest units 11 and 15 were changed from clearcut to shelterwood.

8) *Management Indicator Species*

Affected Environment

The Forest Service Manual defines Management Indicator Species (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.

The terrestrial MIS Assessment prepared for the Devils Gate analysis 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.

Environmental Consequences

Table 37 lists the MIS established for the MBNF, addresses whether or not impacts from the project proposal are relevant to the Forest-wide trend for the species and, if so, summarizes how project implementation would affect population trends 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.

Table 37: Management Indicator Species Summary

MIS	Issue or management uncertainty	Primary Habitat	Presence in Analysis area	Is proposal relevant to forest-wide trends?	Does analysis assess the issue for the MIS?	Conclusion
Northern Goshawk	Old growth (later 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 trend. Complies with the Forest Plan.
American Marten	Fragmentation and perforation of older forest and coarse woody debris.	Late successional forest, particularly spruce/fir stands.	Yes	Yes	Yes	All alternatives maintain stable forest-wide population trend. Complies with the Forest Plan.
Snowshoe Hare	Prey for T&E or Sensitive forest carnivores Canada lynx, goshawk, and marten.	Habitats with dense understory	Yes	Yes	Yes	All alternatives maintain stable forest-wide population trend. Complies with the Forest Plan.
Golden-crowned Kinglet	Fragmentation within a forested stand	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 trend. Complies with the Forest Plan.
Three-toed woodpecker	Snags as related to spruce/fir forest and recent burns	Mature and old growth conifer forest.	Yes	Yes	Yes	All alternatives maintain stable forest-wide population trend and comply with the Forest Plan.
Lincoln's Sparrow	Riparian Zone maintenance, ungulate herbivory in willow community	High elevation riparian zones with willows.	Yes	No, project is not expected to change the primary habitat components or measurably affect individuals.	No. Project will not measurably affect the condition of willows, shrubs, or grass/sedge cover in wetlands.	Stable Forest-wide population trend and habitat for this species will not be affected by the project proposal.
Wilson's Warbler	Riparian zone herbivory in willow community	High elevation riparian zones with willows. 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 will not measurably affect the condition of willows, shrubs, or grass/sedge cover in wetlands.	Stable Forest-wide population trend and habitat for this species will not be affected by the project proposal.

MIS Conclusions

Northern Goshawk: Impacts to individuals are possible but would likely be minimal. Only a small proportion of proposed harvest units provide nesting habitat. Since surveys did not detect nests in harvest units, the probability of nest disturbance is unlikely. Contract measures would include avoidance of nests if they are found during project layout. In the unlikely event that a number of individuals are affected, effects to overall population would be minimized because adequate habitat for alternate nest sites is present within each post-fledging area. Therefore, effects would be limited to temporary disturbance of individuals, but disturbance would not result in a long term decrease in production. Project implementation would not alter the stable Forest-wide trend.

American Marten: The analysis area includes some quality marten habitat consisting of connected late seral forest, large snags, coarse woody debris piles, thick understory, and available prey including voles, snowshoe hare, and pine (red) squirrels. Across the MBNF, approximately 246,800 acres of marten habitat exist, and quality habitat is predominately in mature or older spruce/fir forests which are located mostly outside of the analysis area. These areas of contiguous habitat also correspond approximately with the Canada lynx LAUs. The proposal would impact between 336 and 754 acres of marten habitat, affecting between 2 and 6 adult marten (Alternatives 2 and 3, respectively). Of the action alternatives, Alternative 3 is preferable for marten because of significantly fewer impacts in connected older forest. Retention of snags and snag recruits at the rate of 13 per acre, retention of coarse woody debris, and commercial thinning treatments would retain useable habitat in treated areas and help limit impacts. Across the MBNF (planning area), the project can be expected to reduce less than 1% of current marten habitat and a potential loss of several individual marten within the Forest-wide population. These changes are small in scale in comparison to habitat and marten abundance across the planning area and, thus, are expected to maintain a stable population trend.

Snowshoe hare: Between 2 - 3 percent of snowshoe hare habitat would be affected by the project proposal out of over 15,684 acres of habitat in the analysis area (over 685,000 acres of habitat on the MBNF). This reduction in habitat may result in a maximum temporary loss of approximately 400 to 500 individual snowshoe hare, particularly in clearcut areas where winter forage is eliminated until tree regeneration is established. This reduction in habitat and individuals is small in comparison to Forest-wide habitat and population estimates and is well within the natural and frequent variation found in studies of snowshoe hare ecology. Thus, these effects would have no lasting effect on overall population, production, or habitat of snowshoe hare, and would maintain the stable population trend across the MBNF.

Golden-crowned Kinglet: The project would modify 7 – 10 percent of the 6,650 acres of kinglet habitat in the analysis area (Alternatives 2 and 3, respectively). Over 246,000 acres of habitat exist across the MBNF. This modification may result in a loss of between 18 and 27 breeding territories out of an existing 269 in the analysis area and 34,000 across the MBNF. Alternative 3 would have fewer impacts than Alternative 2 because the amount of habitat treated would be reduced and there is a stronger emphasis on thinning. This reduction in habitat and potential effects to a limited number of individuals is not expected to affect the Forest-wide stable population trend because reductions in habitat are consistent with natural disturbances; however, they would occur on a much smaller scale.

Kinglets are a mobile species that can disperse across the landscape and continue to occupy suitable habitat.

Three-toed Woodpecker: The MBNF contains approximately 246,000 acres of habitat, of which over 7,500 acres are located within the analysis area. Alternative 2 would decrease habitat in the analysis area by a maximum of 9 percent while Alternative 3 would decrease habitat by 6 percent. These changes would result in a decrease of two or three woodpecker territories (approximately 32 territories currently exist in the analysis area). Based on abundant habitat and the species ability to disperse to new disturbance areas created by active beetle populations, this small level of impact to a few individuals is not expected to affect overall populations. Elements of project design that further reduce impacts include commercial thinning (which retains numerous standing mature trees) and snag retention standards.

Lincoln's Sparrow and Wilson's Warbler: Neither alternative would measurably affect the condition of willows, shrubs, or grass/sedge cover in wetlands. Therefore, Forest-wide population trends and habitat for these species would not be affected.

9) Cumulative Effects to Wildlife

Affected Environment

Cumulative effects to wildlife and their habitat are a result of past timber harvest, road construction, fire suppression in sagebrush/aspen communities, salvage logging after forest wildfires, livestock grazing, and motorized recreational use, particularly Off-Highway-Vehicles and snowmobiles. A general discussion of cumulative effects related to wildlife and wildlife habitat can be found by reviewing the existing conditions for older forest wildlife habitat and road density. The results of these two analyses discussed earlier show that:

- The northern portion of the analysis area contains significantly more older forest than is found in most areas of the MBNF and thus, provides a unique opportunity for vegetative and biological diversity in its current condition. Most of this older forest is found in the Savage Run Wilderness area and the area on its southern border. The Platte River Wilderness area provides very little older forest habitat because of fire activity within the last 100 years.
- The band of older forest on the northern portion of the analysis area remains fairly well connected to adjacent older forest stands; however, it has been largely perforated from harvest in the last 50 years. Further harvest, particularly clearcutting, could lead towards a trend of fragmenting this large patch of older forest, thereby reducing its value as late-seral wildlife habitat.
- There are over 60 miles of road present in the analysis area which equates to an approximate average of 1.3 miles of road per square mile. Road impacts may include avoidance by big game, hydrologic and erosion effects, alteration of natural landscape patterns, alteration of flow of biological resources, and introduction of invasive species. Habitat without roads and associated disturbances benefit species such as pine marten, elk, snowshoe hare, and Canada lynx.

- The presence of two designated Wilderness areas over approximately 50 percent of the analysis area limits cumulative impacts associated with timber harvest and motorized vehicles.

Environmental Consequences

Alternative 1 – No Action

Cumulative effects from timber harvest and fire disturbances would gradually dissipate over the next 50 to 100 years as early and mid-seral forest stands mature. Wildlife habitat provided by older forest would improve to eventually form large connected blocks with interior habitat. Smaller openings would remain in riparian areas where natural disturbances occur and in exceptionally dry or wet site conditions. These changes would slowly and gradually improve the overall quality and quantity of habitat for marten, Canada lynx, goshawk, three-toed woodpecker, golden crowned kinglet, and other species.

Over 6 miles of proposed road closure and decommissioning would not occur. As a result, motorized use in riparian areas of NFSR 512.G and NFSR 506.B would continue to increase with predicted increases in OHV and four-wheel-drive recreation. Fairly large areas of elk and moose habitat adjacent to these riparian areas would continue to be regularly influenced by motorized travel, thereby pushing elk herds to reside more commonly in the Wilderness areas. Amphibian habitat affected by numerous road crossings would continue to have small localized impacts.

Alternative 2 – Modified Proposed Action

This alternative trends toward harvesting mature forest that is located adjacent to or between recent harvest areas. The result is to increase the patch size of early forest while continuing to decrease the amount and connectivity of older forest in the analysis area. The predicted responses by wildlife species that favor older forest, such as American marten, are a reduction in useable habitat or a decrease in quality of habitat. As a result, the analysis area would be able to support of fewer numbers of these species. This trend is not believed to have effects or impacts that would eliminate populations; however, such a trend would not take advantage of the unique habitat opportunity the analysis area provides. The large and connected block of older forest wildlife habitat would trend toward early/mid seral forest conditions that already predominate over much of the remaining Medicine Bow National Forest.

Over 6 miles of proposed road closure and decommissioning would improve elk security areas, moose, and amphibian habitat.

Alternative 3 – Reduce Clearcutting and Road Construction

This alternative was a modification of Alternative 2, specifically to reduce clearcutting, reduce road construction, and to minimize fragmentation (or connectedness) of older forest wildlife habitat while still providing opportunities to meet timber production and forest health goals. Decreases in older forest wildlife habitat would still occur, but they would generally be located in stands that are not connected to the larger identified block of connected habitat. The result is that timber harvest would be more concentrated in areas that provide minimal or poor quality habitat for species dependant on

older forest. The few stands that would be harvested within the connected block of late seral forest would generally be thinned, thereby retaining a portion of their value as older forest habitat and retaining connectivity between adjacent older forest wildlife habitats. Thus, the proposed project would contribute minimal additional cumulative effects.

Over 6 miles of proposed road closure and decommissioning would improve elk security areas, moose, and amphibian habitat.

10) Forest Plan Compliance

Affected Environment

Standards and guidelines from the Medicine Bow National Forest Land and Resource Management Plan were reviewed. The project proposal is expected to affect the standards and guidelines specific to the wildlife resources in the following way:

Management Area (MA) 5.15 is an important consideration in this project proposal because the theme described in the Forest Plan (page 2-61) is that “these areas are managed 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.” In the action alternatives, the following activities contribute to restoring ecological health in the 5.15.

- Old growth was identified and would not be included in any harvest proposal.
- Road 512.G and its spurs are proposed for closure and decommissioning to improve wildlife security habitat
- Treatments units are proposed to increase stand patch size
- Treatments units are proposed to address insect and disease issues related to tree health.
- A connected block of older forest wildlife habitat was identified. Recognizing its unique value compared to other areas on the forest, Alternative 3 was developed to retain that habitat type.

Environmental Consequences

Alternative 1 – No Action

Implementation of the No Action alternative would meet all wildlife related standards and guidelines in the Forest-wide direction and Management Area Prescriptions.

Alternative 2 – Modified Proposed Action

Implementation of Alternative 2 would meet all wildlife related standards and guidelines in the Forest-wide direction. However, proposed clearcut treatments in connected blocks of older forest would result in a decreasing patch-size of older forest wildlife habitat, particularly in MA 5.15. Similarly, proposed treatments in MA 5.41 would not improve big game winter range habitat.

Alternative 3 – Reduced Clearcutting and Road Construction

Implementation of Alternative 3 would meet all wildlife related standards and guidelines in the Forest-wide direction. Harvest treatments would not occur in MA 5.41 - Big game winter range. Connected older forest would either not be harvested or a thinning prescription would be applied in order to retain these stands value as connected older forest wildlife habitat.

L. UNAVOIDABLE ADVERSE EFFECTS

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

M. SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). 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 and guidelines will be met under both action alternatives.

N. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The irreversible commitment of resources means that non-renewable resources are consumed or eliminated. Examples include coal extraction which consumes a non-renewable resource, or the potential elimination of an historical site due to some management activity on the ground.

The irretrievable commitment of a resource is an opportunity that is foregone as a result of implementing some activity. They often represent a trade-off in the use and management of forest

resources. An example of this would be the expenditure of funds, loss of wood production, or a permanent restriction on the use of a resource.

None of the alternatives analyzed in this EA have any identifiable irretrievable or irreversible commitment of resources, as determined by the Interdisciplinary Team.

CONSULTATION AND COORDINATION

In accordance with 40 CFR 1501.2a, the Laramie District Ranger selected a team of resource specialists to utilize a systematic, interdisciplinary approach in planning and analyzing projects that may have an impact on the human environment. The following ID Team members participated in the analysis process:

ID TEAM MEMBERS:

Melissa Martin	Project Leader
Ted Dietrich	Economics/Forestry
Kathy Roche	Zone Botanist
Dean Lebeda	Engineering
Gary DeMarcay	Heritage Resources
Carol Purchase	Hydrology
Todd Allison	Fisheries
Paul Blackman	Recreation
Steve Kozlowski	Wildlife
Jeff Tupala	Visuals
Derek Milner	Soils/Geology

The Forest Service consulted 382 individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment. Only those entities that provided comments on the proposal are listed below.

FEDERAL, STATE, AND LOCAL AGENCIES:

Wyoming Game and Fish Department
Wyoming State Forestry Division
Department of Environmental Quality

OTHERS:

Biodiversity Conservation Alliance
Mike Higgins
Sigrid Mayer
Phil Pucel
David Nelson
Joshua Tatman
James Rinehart

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APPENDIX A: NON-SIGNIFICANT ISSUES AND RESPONSES

Comment Code	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
1a	1	If logging has already occurred, why is forest health a concern? How will additional logging make the forest “more healthy”?		<p>The Medicine Bow National Forest (MBNF) is a complicated ecosystem that constantly undergoes changes; every day new trees germinate and other trees die. Insects and disease both play important parts in the forest ecosystem as do humans. Much of the MBNF is an aging forest with diseases like dwarf mistletoe, comandra rust, and Western gall rust that all contribute to its declining health. The ongoing drought in Wyoming is also affecting the overall health. Insects like mountain pine beetle, spruce bark beetle, and slash beetle are present in our local forests and, under normal conditions, attack and kill incidental numbers of trees. Considering the aging forest, coupled with diseases and drought, it is not surprising that insect problems are becoming noticeable.</p> <p>In many cases, past timber harvest has improved forest health concerns. However, forest health issues are not solved with one entry. Logging will improve forest health in stands that are entered, but it is not a one time fix. Managing a forest is a long term, complicated job and is a process that is ongoing. The National Forests were set up and laws were passed that direct the Forest Service to manage the Forests for multiple use (Multiple Use-Sustained Yield Act of 1960). One of the uses is timber. The 2003 MBNF Revised Land and Resource Management Plan (RFP) guides natural resource management activities and provides the Forest Service, forest users, and the public with an overall strategy for managing the Forest. The RFP directs the Forest Service to restore or maintain forest stands in a healthy condition with reduced risk and damage from insects and disease through vegetation management. In addition, the RFP directs that the Forest provide multiple benefits to people including wood products and to implement a consistent timber program each year.</p>

Issue	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
1b	1	There is no indication that current insect and/or dwarf mistletoe infestations are unnatural or otherwise outside the range of natural variability. There is no indication that these processes are threatening any natural value...If current conditions are any indication, logging will not create conditions that truly halt the spread of forest insects or conditions that inhibit dm infestation, but rather will create conditions that are more favorable to forest insects and dm and that significantly impact forest wildlife and other important values.		Insects and dwarf mistletoe (DM) are natural processes within a forest ecosystem. However, these processes can negatively affect forest health. We are not purporting that the proposed sale will halt the spread of insects and/or DM nor prevent future occurrences of the same. The proposed sale provides the opportunity to reduce the spread of insects/diseases and create conditions where trees are less susceptible to insects/diseases. Other resource concerns listed in the RFP under management area standards and guidelines can limit treatment options for both insects/diseases and thus limit effectiveness of treatments. However, the Forest Service's mission is to manage the national forests for multiple uses that are sustainable and meet the diverse needs of people. The RFP guides the management of the MBNF for multiple-use and not for any single purpose. There is ample evidence that the local forest is declining in health due to aging, diseases, and drought and that it is becoming more susceptible to insect outbreaks. Past timber harvesting has not created these conditions. The RFP directs the Forest Service to restore or maintain forest stands in a healthy condition with reduced risk and damage from insects and disease through vegetation management.
1b	1	If the main reason of forest health is to prevent the spread of dwarf mistletoe and spruce bark beetle, couldn't this be accomplished with a combination of thinning, sanitation/salvage, and/or individual tree marking?		Thinning and sanitation/salvage are both intermediate cutting methods applied to commercial timber stands for different reasons. Individual tree marking is a method of designating trees to be removed in a number of silvicultural prescriptions. These treatment methods may or may not reduce the spread of spruce bark beetles (SBB). Thinning bug free stands ahead of a SBB outbreak reduces tree susceptibility to insect attack and should minimize insect attacks. A stand already infested with SBB may need to be treated with a group selection, clearcut, or partial cut depending on the amount of infestation. In a full blown insect epidemic, most treatment options are not successful. Concerning DM, it depends on the level of DM infection in a stand as to whether the stand should be clearcut or partial cut. Depending on management area standards and guidelines and other resource concerns, treatment options can be limited and can reduce effectiveness of treatments.

Issue	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
1b1	1	Efforts by the FS to eliminate beetle outbreaks are counterproductive. Samman et al. concluded that past timber harvest practices have made forests more susceptible to outbreaks, and that forest managers could render their forests less vulnerable to irruptions by allowing outbreaks to run their course. The FS should educate the public and the forest products industry about the role of beetle outbreaks in preserving the health of forest ecosystems.		Our goal is to reduce risk and losses to insects/diseases through silvicultural treatments where determined necessary and not to eliminate beetle outbreaks, as mentioned in the comment. It is recognized that insects/diseases are a natural part of the forest ecosystem. The reference is made to General Technical Report RMRS-GTR-62, Assessment and Response to Bark Beetle Outbreaks in the Rocky Mountain Area. The conclusion, as written, is that timber harvest practices have made forests more susceptible to outbreaks and that forest managers could render their forests less vulnerable to infestations by allowing outbreaks to run their course. It is much more probable that the lack of forest management in the sort/long term past has contributed more to insect/disease problems being observed today. In addition, weather related events, stand ages, and size classes desirable to insects have contributed to insect/disease problems. Considering the values placed on the national forests and increasing developments in/and around national forests, allowing insect outbreaks to run their course is neither desirable nor practical.
1b2	1, 5	Scientific studies strongly indicate that dm provides innumerable benefits to wildlife and that its threat to forest health is exaggerated. Studies have found that tree mortality only occurs in areas heavily infested with dm and that in these areas, mortality rates are near or at natural background mortality rates. There is no indication that clearcutting is an effective agent of dm control.		For more than 90 years, foresters have recognized dwarf mistletoe (DM) as a serious parasite of lodgepole pine. In the Rocky Mountains, it is considered the most damaging disease affecting lodgepole pine (Hawksworth 1965). DM can be found in various levels of infection in most of the lodgepole pine stands. It is estimated that more than 65 percent of the timber stands proposed for silvicultural treatment within the Devils Gate analysis area have serious DM problems. Overall, the action alternatives for Devils Gate would not greatly reduce the amount of DM within the watershed. Neither of the action alternatives constitutes an effort to “eradicate” DM. Management of DM infected pine stands for health needs is often tempered with other multiple use objectives. Often, discussions of appropriate management of these stands focus on the amount of infection to be tolerated given management area objectives. Clearcutting is the most effective and efficient method use to regenerate overmature and/or diseased lodgepole pine stands.
1b2	1	Explain to what extent dm is of concern. According to the 2003 Plan EIS, incidences of dm have steadily decreased from 2,000 acres in 1998 to only 78 acres in 2001.		See response above. The table being referred to is on page 3-217 of the FP FEIS. This table displays aerial observations of incidence of insects/diseases from 1996 through 2001. The information is not clear, but the acres listed are new acres observed each year excluding existing known acres. In other words, the acres shown are accumulating acres. Forest-wide surveys indicate that DM infects 60 percent of all lodgepole stands on the MBNF (Johnson, Hawksworth et al. 1978).

Issue	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
1c	1	The FS must explain what it means for “forest health” and provide information and analysis showing that, on the whole, forest health will improve as a result of the sale. The FS must address scientific studies that clearly document the ecological benefits of insect and dm infestations and that clearly document the negative impacts of clearcutting, road building, and logging in general.		<p>Forest health, also referred to as ecosystem health, is described in the glossary of the Forest Plan as follows: an ecosystem in which the structure, composition, and function ensure the maintenance of biological diversity, biotic integrity, and ecological processes over time. Ecosystem health is the first goal identified in the Forest Plan. Goal 1 is to ensure sustainable ecosystems by promoting health and conservation using a collaborative approach to sustain the Nation’s forests, grasslands, and watersheds. For more information on forest health, see the silviculture report of the Devils Gate EA.</p> <p>Both positive and negative impacts of clearcutting, road building, and logging have been studied, discussed, and recognized for many decades. These impacts were taken into account during revision of the Forest Plan; the Forest Plan provides direction and guidance for this project. Please refer to the Forest Plan and the Forest Plan FEIS which discusses the effects of timber harvesting and road construction.</p>
2a	1	The timber sale is significant in both context and intensity. In terms of context, the sale will impact a very large area. The area may be impacted directly, indirectly, and cumulatively by proposed activities. Further, the sale proposes 500 acres of clearcutting, more than has been proposed in several years. If the FS does not believe that the proposed activities are significant, we request an explanation. Such a discussion should include an explanation as to what thresholds the FS based its assessment on.		<p>The analysis area contains 24,550 acres of forested land which includes 12,870 acres of designated wilderness and 5,790 acres of inventoried roadless areas that cannot be entered at this time. These areas comprise more than 66 percent of the entire watershed. The action alternatives contain 1,144 and 837 acres of treatment, respectively. Percentage of treatment vs. total watershed acreage is 4 and 3 percent, respectively. The 500 acres (actually 552 acres – alt 2) of clearcut is only 2 percent of the area. The reason for prescribing clearcutting is that it is the most effective and efficient way of regenerating mature and overmature lodgepole pine stands that have generally met culmination of mean annual increment or stands that are in danger from insect or disease attack/mortality.</p> <p>Clearcutting can be used to setback successional stages by creating new age and size classes of pine. This, in turn, can create larger vegetation patch sizes which is the direction of Management Area (MA) 5.15. MA 5.15 is designated for 41 percent of the watershed. The 5.15 management area prescription calls for treating existing forest vegetation to create future conditions that are more in line with historic disturbance patterns caused by fire, insect, disease, windthrow, drought and human management activities. Thus, the design criteria for much of analysis area is to consolidate areas of past clearcutting with additional regeneration harvest to create larger patch sizes of relatively similar age and size class in the future. The significance of the proposed project and activities will be explained and determined by the responsible official at a future date.</p>

Issue	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
2a	1	The proposed activities are significant in the context of the potential impacts to native species and their habitats. The analysis area covers a large landscape that includes several habitat types that support a wide array of native species, many of which are rare and imperiled.		If implemented, it has been determined that the action alternatives would have “no effect” on TES with the exception of Canada lynx, which has a determination of “Not likely to adversely affect.” For sensitive species, a determination of “No Impact” has been made for most species, with a “May adversely impact individuals” determination for: American marten, northern goshawk, boreal owl, American three-toed woodpecker, olive-sided flycatcher, pygmy shrew, boreal toad, northern leopard frog, wood frog, and Hudsonian emerald dragonfly. Finally, there would be no measurable effect to MIS.
2b1	1	In terms of intensity, there are many unique characteristics of the GA that may be impacted by the proposed activities. In particular are the impacts to the Platte River and Savage Run Wilderness areas. While the FS claims that these areas will not be directly impacted, the areas will be indirectly impacted. In addition, there is no indication that the proposed clearcutting will meet any habitat objectives for MA 5.41 and/or is necessary to meet any specific resource objectives. Other ecologically critical areas include riparian areas and wetlands that are vital to the survival of aquatic sensitive species and habitat that is vital to the survival of lynx.		Timber harvest activities are not proposed in the Wilderness areas; therefore, Wilderness users should not be negatively impacted by either action alternative. Wilderness areas do not require buffers from management activities; thus, activities may occur up to Wilderness boundaries. Clearcutting in MA 5.41 has been omitted from Alternative 3. The Forest Plan includes Standards and Guidelines for resource protection. Both action alternatives comply with the Forest Plan.
2b2	1	The effects of the proposed activities on the human environment are likely to be highly controversial. Given that the FS acknowledges clearcutting as a preliminary issue, and yet proposes 500 acres of it, an EIS is warranted to address the controversy that would arise if the FS proceeds with such a proposal.		Controversy over an issue does not by itself require that an EIS be completed. The direct, indirect, and cumulative effects of the proposed activities for the Devils Gate Analysis Area will be addressed in an Environmental Assessment. This information, in combination with the test for significance, will be reviewed by the responsible official and a determination will be made about the preparation of an EIS.
2b2	1	The proposal to treat insects and diseases is controversial. Treatments reduce snags, nesting habitat, and foraging habitat for cavity nesting species; reduces down woody debris; etc.		Please see responses to 1b1 and 2b2.

Issue	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
2b3	1	The proposed activities may adversely impact TES species and critical habitat. This possibility is significant.		If implemented, it has been determined that the proposed activities would have “no effect” on TES with the exception of Canada lynx, which has a determination of “Not likely to adversely affect.”
2b4	1	The proposed activities threaten to violate Federal and State laws imposed for the protection of the environment, particularly water quality. Thus, an EIS is necessary.		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. While there may be some minor effects to water quality, the designated uses of water bodies in the project area will be maintained.
3a	1	The FS claims that there is a general decline/loss of aspen dominated stands along with a corresponding loss in associated wildlife habitat in the vicinity. However, there is no information to support this claim. We request the FS explain how any loss in “aspen dominated stands” affects “associated wildlife habitat” in the context of specific wildlife species that may rely on and/or be dependent upon such habitat.		The Wildlife Specialist Report, dated May 3, 2006, addresses the decline/loss of aspen dominated stands and its effects on associated wildlife (e.g. snowshoe hare, northern goshawk, big game species, etc.). The report is filed in the project record and is located at the Laramie Ranger District.
4a	1	It is unclear how and why the FS is justifying clearcutting within MA 5.41. According to the FP, vegetation management must focus on meeting wildlife winter range habitat objectives. Yet no clear objectives are identified or even cited to justify the clearcutting.	X	
4a	1	There is no indication that the existing habitat conditions within MA 5.41 are inadequate or otherwise will continue to be inadequate in the long-term. This must be explained. Tree mortality from insects and diseases in this area would be a good thing. It is unclear how the existing conditions have not created and/or will not lead to the creation of habitat mosaics of various types, age classes, and structural stages.	X	

Issue	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
5a	1	Logging and road building will exacerbate the impacts of fragmentation and detrimentally impact many native species of wildlife.	X	
5b	1	Disclose methodology in assessing the impacts of fragmentation. We are concerned by FS assumptions that the current fragmentation level does not already pose significant and potential detrimental impacts to native wildlife species and their habitats.	X	
5c	1	The FS has failed to provide information regarding natural patch sizes, just asserts that natural patch size will be restored. There is no context as to what actually constitutes a natural patch size and the validity of the information.	X	
5d	1	The FS must address the impacts of roads to fragmentation. Studies have found roads contribute heavily to the adverse impacts of fragmentation.		The Wildlife Specialist Report addresses roads and fragmentation (beginning on page 24).
5e	1	The FS must fully address the impacts of the sale to connectivity habitat between roadless and wilderness areas and between forest and big game winter range.		Please refer to the Wildlife section of the EA and the Wildlife Specialist Report (pg. 16).

Issue	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
6a	1, 5	It is unclear how wilderness values will be protected. There is not indication that treatments proposed adjacent to the wilderness areas will ensure protection of solitude and/or otherwise ensure that the wilderness values will not be indirectly and negatively impacted.		<p>Forest Service Manual 2320.3 (Policy) #5 states, "Because wilderness does not exist in a vacuum, consider activities on both sides of wilderness boundaries during planning....Do not maintain buffer strips of undeveloped wildland to provide an informal extension of wilderness. Use the Recreation Opportunity Spectrum as a tool to plan adjacent land management.</p> <p>Over half of the analysis area has an ROS classification of <i>Semi-primitive Non-Motorized</i>, with the majority of this designation resulting from the presence of the two Wilderness areas.). There are no proposed vegetative treatments in these areas. Treatment unit numbers 1-6, 10-12, and 44 are located completely within <i>Roaded Natural</i> areas; unit numbers 9, 15, 16, 28, and 41 lie partially within <i>Roaded Natural</i> areas and partially within <i>Roaded Modified</i> areas. The remaining treatment units are in areas classified as <i>Roaded Modified</i> (unit numbers 7, 8, 17-27, 29-37, 39, 42, and 43). <i>Roaded Modified</i> areas are characterized by a substantially modified environment, often the result of prior harvesting activities. Slash and debris may be present, except within developed sites or popular dispersed camping areas. <i>Roaded Natural</i> are characterized by a predominantly natural-appearing environment as viewed from sensitive roads and trails, with moderate evidence of the sights and sounds of people.</p>
6b	2	Consider treatments that create firebreaks adjacent to wilderness so natural and prescribed fires may burn at more natural fire frequencies.		<p>The idea of creating fire breaks around wilderness areas does have merit and in fact the treatments within the project area will become fire breaks if a wildfire were to ignite within the wilderness and cross over into the project area. There have been many wildfires that were stopped when they reached timber harvest units because of the change in fuel characteristics and easier access for hand crews and mechanized equipment.</p> <p>Under the current Fire Management Plan for the Medicine Bow National Forest there is no option to let naturally ignited lightning fires burn anywhere on the Medicine Bow National Forest. All fires even in designated wilderness areas such as the Savage Run or Platte River Wilderness areas are suppressed as soon as possible after detection.</p> <p>The Medicine Bow National Forest will update the current Fire Management Plan in the next two years to allow for Wildland Fire Use. This type of fire management can be described as the application of the appropriate management response to naturally ignited wildland fires to accomplish specific resource management objectives in predefined designated areas such as wilderness areas.</p>

Issue	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
7a	1	It is unclear if the FS has conducted and/or will conduct baseline stream surveys. There is no indication that: T-WALK or a method as rigorous has been used to assess stream health and ensure compliance with the WCPH and Forest Plan.		Stream surveys were completed during the 1999 (Snook, 1999) and the 2002 and 2003 field seasons (Purchase, 2003). Pfankuch Stream Channel Stability method was used, and the stream condition ratings were modified by Rosgen channel type (Rosgen, 1996). The majority of streams in area appear to be in good condition with some increase in fine sediments due to a variety of causes, primarily roads and cattle grazing.
7b	1, 8	The need to assess stream health in accordance with the WCPH and the Forest Plan is further required to ensure compliance with Section 404 of the CWA. The CWA requires that construction projects disturbing more than five acres of land must get a storm water permit.		See response above. As stated in the EA, 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. While there may be some minor effects to water quality, the designated uses of water bodies in the project area will be maintained. The EA further indicates that road reconstruction and temporary road construction associated with the project is a silvicultural activity and believed to be exempt from storm water discharge permit requirements per 40 CFR 122.3(e) and 40 CFR Section 122.27
7c	1, 8	The FS is proposing drainage structures, such as culverts or channels that facilitate the unnatural transport of sediment, etc.. Therefore, a NPDES permit is required.		The determination of whether a permit is needed and the category of permit depends upon the amount of road decommissioning occurring the same season. BMPs to reduce sediment during road decommissioning will be implemented regardless of the need for a permit. When road decommissioning is scheduled to occur, it will be evaluated to determine the need for this permit and a permit would be secured prior to project implementation.
7d	1, 8	It is unclear what standard the FS will rely upon to ensure adequate protection of soil resources. According to the FP, detrimental soil impacts are limited to no more than 15% of any activity area.		Ground based skidding results in 20 to 40 percent soil exposures. The use of designated skid trails reduces this exposure rate to 7 to 15 percent. Designating landings and spacing skid trails approximately 100 feet apart would result in 11 percent of each proposed unit being in skid trails and landings (Garland 1997). Childs et al. (1989) found increased compaction from timber harvest largely confined to skid trails. Limiting skid trail-related impacts would help prevent exceedences of the 15% Regional and Forest Plan soil quality standard.
7d	2	Any road construction or reconstruction completed as part of this project should be designed and completed in a manner that minimizes soil erosion.		As stated on EA page 52, new road construction segments would be maintained to Forest Plan standards as a part of the permanent transportation system. Further, design criteria have been incorporated into the action alternatives to further reduce soil erosion (EA, Appendix B).

Issue	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
8a	1	The agency must show that harvest impacts will not reduce old growth levels below FP standards. Before the FS can make an accurate assessment of the impacts of the sale, it must first assess how much old growth exists on the Snowy Range.	X	
8b	1	The FS must ensure compliance with Standards related to northern goshawk habitat protection.		Goshawk surveys were completed in harvest units and adjacent areas where nests were predicted to occur. Observations occurred in or near harvest units 2, 4, and 14. Suitable nesting habitat near the observations was more thoroughly searched and no nests were located. The analysis completed for goshawk concluded that impacts to individuals are possible, but likely minimal.
8c	1	The FS must ensure protection of known and historic boreal toad, wood frog, and n. leopard frog habitat.		EA Appendix B contains a design criterion that states: Provide a 91-meter (300 feet) buffer setback for specified streams and ponds that have associated wetlands (Forest Plan aquatic standards #11 and #15). This includes all wetlands and riparian zones that have the opportunity to provide suitable habitat for TES species or are known current or historic sites for Forest TES species. Specified Treatment Units that are appropriate for this buffer include: <u>22, 24, 25, 29, 30, 31 39 and 43</u> . This criterion will ensure amphibian habitat protection.
8d	1	Surveys must be conducted for all TES species. For lynx conservation, the FS must formally consult with the USFWS.		The Biological Assessment prepared for the EA includes a determination of "Not likely to adversely affect" for Canada lynx. The FS is in the process of requesting concurrence from the USFWS regarding this determination.
8e	2	Enhance suitable sites for bighorn sheep since this is a species of local concern.		While this project would not enhance habitat for bighorn sheep, existing habitat would not be adversely impacted (EA, pg. 89).
8f	1	For MIS, the FS must present and utilize population trend data to properly analyze and assess impacts to these species.		Table 37 (EA, pg. 97) lists the MIS established for the Medicine Bow National Forest, addresses whether or not effects from the project proposal are relevant to the forest wide trend for the species and, if so, summarizes how the project will affect population trends for that species. The current forest-wide trend for each species (found in the narrative section for each MIS) was arrived at by a group of USFS wildlife biologists after completing an extensive review of each species life history, habitat availability across the forest, available population data, and additional pertinent information.

Issue	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
9a	1, 7	The FS has not explained whether or not clearcutting is the optimum method. There is no discussion as to whether clearcutting will be carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources.		<p>Clearcutting silviculture is the most appropriate system for effectively regenerating those species of trees which naturally grow in even-aged stands and which cannot regenerate in the stands of other trees. Aspen and lodgepole are those kinds of trees (USDA Forest Service 1992). Clearcutting has a very important environmental implication for forests in the Rocky Mountain Region. Clearcutting is done in such a way that trees are logged in an area and then left to grow for a relatively long period of time... because clearcutting requires only... infrequent operation of mechanical equipment, streams and soils can recover from the impacts of clearcutting through natural processes (USDA Forest Service 1992). Clearcutting...most nearly matches the role formerly played by forest fires...is often considered the optimum method for regenerating aspen, lodgepole pine with serotinous cones, ... is also the most effective method for treating stands heavily infected with dwarfmistletoe, ... and if often the only practical method to use in stands of late successional species that have deteriorated to the point where there is an insufficient number of good trees for selection or shelterwood methods to be effective (Burns 1989).</p> <p>Lodgepole pine is the dominant tree species on 90% of the forested acres on this watershed. Stand ages vary from 15 years on up to over 319 years with the average stand age around 183 years. Many of the lodgepole pine stands within Devils Gate Watershed are either mature or overmature in age and are in poor health due to age and disease. Recognizing this commonality of unhealthy stand conditions along with stand ages rising well beyond physical maturity, planning emphasis was directed toward treating the oldest and unhealthiest stands of lodgepole pine.</p> <p>All harvest treatments including clearcutting and road construction are analyzed as to their effects on soils, water, fish, wildlife, recreation, visuals and other resources and are addressed in the Devils Gate EA.</p>
9b	5	I do not find any explanation in this proposal, how or why a timber harvest of such magnitude can be termed sustainable. When Objective 1 from the FP is cited as "a consistent timber program each year" it is evident that the fragile MBNF cannot sustain 11.7 MBF on a consistent basis.		One of the objectives in the FP is to implement a consistent timber program each year. The timber resources on the MBNF are certainly available but only time will tell whether they are obtainable in following the Forest Plan along with probable appeals and litigation. The FP determined that the allowable sale quantity on the Medicine Bow NF is 22.8 million board feet per year. This ASQ will be shared between the Med Bow's 3 Ranger Districts.

Issue	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
9c	6	Overstock lodgepole stands are the result of past clearcutting. The FS needs to introduce other tree species for diversity.		Some overstocked young lodgepole stands are the result of past clearcutting while others are the result of past forest fires and/or insect epidemics. Proper clearcutting and site preparation provide more than adequate natural regeneration. Pre-commercial thinning such stands is a normal practice that produces large diameter trees over a shorter rotation. The FS works with the trees that nature provides. In our case, lodgepole pine is the dominant species and has been around much longer than the FS has been harvesting timber.
9d	2	Provisions for appropriate snag retention and recruitment should be made, including large diameter trees and coarse woody debris retention.		<p>Timber harvest units in the action alternatives will be designed to retain suitable numbers of snags to meet minimum forest plan standards (see EA, Appendix B)</p> <p>In clearcut units within the 5.15 Management Area Prescription, approximately 20% of the interior of the harvest unit will remain in clumps, or fingers of unharvested trees in order to 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. The harvest units that this guideline will be applied to include:</p> <p>2, 4, 7 through 12, 14 through 19, 21 through 37, 39, and 41 through 44.</p>
10a	1, 2	The FS must fully analyze and assess the cumulative impacts of past and present clearcutting. This must include a discussion of acreage impacted, how wildlife has been impacted, etc.		EA Table 13 lists past, present, and reasonably foreseeable management activity and natural processes within or adjacent to the analysis area since 1959. The information in this table was used by the resource specialists when conducting their analyses.
10a	5	The proposal does not take into account the high elevation levels of the forest, nor does it consider past experience and lessons with timber harvests and clearcutting methods.		Past harvest, cutting methods, and known elevations are accounted for in the analysis. Successful natural regeneration of clearcuts is found all over the forest. Some mistakes have been made but are the exceptions when considering all the harvesting that has taken place during the past 144 years. Large old Engelmann Spruce can still be found on the forest and in most cases are still in pretty good condition except where spruce beetle populations are growing. The Medicine Bow National Forest consists of mainly three species; lodgepole pine, Engelmann Spruce and subalpine fire. Douglas Fir, limber pine, ponderosa pine and aspen are other species but exist in small numbers and are mostly noncommercial. Lodgepole pine is the dominant species on ninety percent of the forested acres on this watershed. Planning emphasis was directed toward treating the oldest and unhealthiest stands of lodgepole pine that are in greater need of management than nearby Engelmann Spruce stands.

Issue	Letter #	Comment	Significant/Alt. Dev.	Explanation of Non-Significance
10b	1	Cumulative impacts must address the impacts of the SRTM project.		Please see response to 10a, letter #'s 1 and 2.
10c	1	The impacts of past, present, and reasonably domestic livestock grazing must also be analyzed and assessed, especially in the context of ensuring adequate watershed protection.		Cumulative effects related to livestock grazing are discussed in the "Hydrology" section of the EA.
10d	1	The FS must analyze how past, present, and reasonably foreseeable timber sales have impacted or will impact old growth in the context of ensuring proper amounts of old growth are maintained.	X	
10e	1	The FS must address the fact that dozens of projects have impacted individual sensitive species in the last decade. The FS has never explained at which point a population may become unviable, nor has the agency explained how many individuals can be impacted before viability begins to suffer.		EA pages 99 - 101 contain a discussion related to cumulative impacts to wildlife.
11a	1, 5, 6, 7, 9	The FS must analyze a no clearcutting alternative.	X	
11b	1	The FS must consider a no new construction or reconstruction alternative, whether temporary or permanent, particularly in light of the fact that roads pose potentially significant impacts to watersheds and soils.	X	
11c	1	To adequately mitigate the cumulative and potentially significant impacts of past fragmentation, the FS should analyze a restoration alternative that provides for no timber harvesting or road construction.	X	
12a	2	Buffer zones of undisturbed vegetation should be left along each side of standing waters and water courses to minimize the sedimentation and direct fish habitat impacts.		Please see response to comment 8c above.

Issue	Letter #	Comment	Significant/ Alt. Dev.	Explanation of Non-Significance
12b	2	Slash control and disposal should be completed in a manner that minimizes the occurrence of debris entering stream courses.		Slash treatment and site preparation will be completed in accordance with the direction provided in the Medicine Bow National Forest Revised Land and Resource Management Plan and follow the Wyoming Best Management Practices for Silviculture.
12c	2	Cutting units should be designed and situated so that snow melt discharges are spread over a period of time to reduce bank and channel damage.		The "Hydrology" section of the EA discusses estimated clearcut areas and flow regimes.
12d	2	All stream crossings by roads should be designed to allow fish passage at all flows.		Road/stream crossings are not proposed under either action alternative.
13a	2	Disturbed areas other than those associated with road construction or reconstruction should be reseeded with appropriate plant varieties as soon as possible after disturbance.		Seeding of disturbed areas will be completed in accordance with the direction provided in the Medicine Bow National Forest Revised Land and Resource Management Plan and follow the Wyoming Best Management Practices for Silviculture.
13b	2	To prevent ditch erosion, grade dips or culverts should be used to drain water from roads.		Please see EA Appendix B, Design Criteria.
14a	4	In the proposal, closed road 506.b and 512.d result in a ratio of 1.0 miles of open road to 8.7 miles of closed road. These roads should not be closed.		Please refer to the Purpose and Need statement in the EA (pg.). These roads are proposed for closure to reduce sedimentation and erosion and to improve watershed conditions.
14b	5	The proposed road construction eliminates the chance for wildlife to cross between the wilderness areas.		No road construction is proposed in the vicinity of the wilderness areas.
15a	7	Clearcutting in units 1-4 conflict with the statement about scenic quality within corridors should be maintained or enhanced. Clearcut 2 borders on the road (512), 4 crosses the road, and 1 and 3 can be seen from the road.		Implementation of the alternatives would be consistent with the Forest Plan's adopted scenic integrity objectives provided that the proposed mitigation measures are implemented (see EA pg. 84).

Coding System

1 – Forest Health

- a – Effects of logging
- b – Insect/Disease (general)
 - 1b1 – Beetles
 - 1b2 – Dwarf mistletoe
- c – Scientific studies

2 – EIS Needed

- a – Context
- b – Intensity
 - 2b1 – Unique characteristics
 - 2b2 – Highly controversial
 - 2b3 – TES species
 - 2b4 – Violation of laws

3 – Aspen

- a – Loss of

4 – Management Areas

- a – 5.41: deer/elk winter range

5 – Fragmentation

- a – Impacts to wildlife
- b – Aggregating clearcuts
- c – Natural patch size
- d – Roads
- e – Connectivity habitat

6 – Wilderness

- a – Values
- b – Firebreaks

7 – Watershed/Soil Impacts

- a – Stream health
- b – Storm water permit
- c – NPDES permit
- d – Soil impacts/erosion

8 – Wildlife/Plant Habitat Impacts

- a – Old growth

- b – Goshawk/raptors
- c – Toads/frogs
- d – TES
- e – Sensitive sp.
- f – MIS

9 – Timber Harvest

- a – Optimum Method
- b – Sustainability
- c – Diversify tree sp.
- d – Snag retention

10 – Cumulative Impacts

- a – cc/timber harvest
- b – SRTM
- c – Grazing
- d – Old growth
- e – Species viability

11 – Alternatives

- a – No Clearcutting
- b – No road construction
- c – Restoration

12 – Aquatics

- a – Buffer zones
- b – Slash control
- c – Snow melt discharges
- d – Stream crossings

13 – Mitigation

- a – Reseeding
- b – Cross drainage

14 – Roads

- a – Closures
- b – Construction

15 – Scenery

- a – Scenic quality

Commentors

- 1- Biodiversity Conservation Alliance
- 2 – WGFD
- 3 – WY State Forestry Division
- 4 – Mike Higgins
- 5 – Sigrid Mayer

- 6- Phil Pucel
- 7 – David Nelson
- 8 – DEQ
- 9 – Josh Tatman
- 10 – James Rinehart

APPENDIX B: DESIGN CRITERIA

Botany

Code	Scientific Name	Common Name	Status	Design Feature
CYFA	<i>Cypripedium fasciculatum</i>	Clustered lady's slipper	Local concern	100 foot no action/limited action buffer around 2 locations: 1 location in unit 44 (alternative 2,3), 1 location in unit 14 (alternatives 2,3)
LICO6	<i>Listera cordata</i>	Heartleaf twayblade	Local concern	100 foot no action/limited action buffer around 1 location Unit 14 (alternatives 2,3)

Fisheries

- Provide a 91-meter (300 feet) buffer setback for specified streams and ponds that have associated wetlands (Forest Plan aquatic standards #11 and #15). This includes all wetlands and riparian zones that have the opportunity to provide suitable habitat for TES species or are known current or historic sites for Forest TES species. Specified Treatment Units that are appropriate for this buffer include: 22, 24, 25, 29, 30, 31 39 and 43.
- Provide a 30.5 m (100 feet) buffer for all streams and ponds, riparian areas, and associated wetlands that do not have known occurrences of sensitive amphibians.

Hydrology

- Ground cover will be established or maintained on disturbed areas (closed and temporary roads, landings, skid trails, etc.). These actions will be current with the purchaser's operations and will be completed immediately preceding seasonal periods of precipitation or runoff to reduce erosion and the spread of noxious weeds.
- Rip main skid trails and landings. Periodically lift ripper teeth so as not to have a continuous furrow. 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. Close all skid trails in the same season of use.
- Rip temporary roads, periodically lifting the ripper teeth so as not to have continuous furrows. Construct water bars where necessary. Do not drain water bars directly into perennial or intermittent streams or into swales that lead to stream channels.

Scenic Resources

- When using rocks as barrier, rocks should be buried as least 1/3 in the ground as to look natural. Use different size and shape of rocks. Do not use tank trap for road closure within the immediate foreground of NFSR 512 and Savage Run Wilderness access road, trail and trailhead parking.

- Design the shape and pattern of vegetation treatment units to complement and maintain the landscape character of the analysis area.
- Follow natural contour lines and avoid straight lines when laying units.
- Allow vegetation treatment edges to be irregular to create natural appearing edges when feasible.

Soils

- Control the use of equipment. Restrict skidding to designated skid trails to the best degree possible.
- 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. Close all skid trails in the same season of use.
- When disposing slash through piling and burning, piles should be placed on landings to concentrate and minimize the extent of detrimental soil impacts.
- Where roller-chopping is prescribed in the clearcut areas not subject to broadcast burning, only areas of high slash concentrations should be treated and only during times of low soil moisture content.
- Establish or maintain ground cover on disturbed areas (i.e., native surface roads, landings, skid trails). These actions will be current with purchaser's operations and will be completed immediately preceding seasonal periods of precipitation or runoff to reduce erosion and the spread of noxious weeds.
- Skid trails water bars should have the following spacing:

<u>Slope</u>	<u>Average water bar spacing</u>
0-10%	300 feet
10-20%	200 feet
20-30%	100 feet
> 30%	50 feet

These are average spacing criteria only. The actual location for each water bar is dependant on the site-specific topography. In some instances the water bar spacing may actually be closer or farther apart, but overall the average spacing between water bars should meet the above guidelines.

Wildlife

- Harvest in units 8, 9, 10, 11, 15, 16, 18, and 28 will not occur between April 1st and July 15th to protect goshawk which could establish new nest sites in the areas adjacent to harvest units. These harvest units listed above are adjacent to some of the better goshawk nesting habitat in the analysis area. This restriction is more liberal than the dates in the Forest Plan standard which applies to known nests. Recognizing that there is often a lag time of several years between goshawk surveys, a signed decision, and project implementation, this restriction ensures that reasonable effort is made to protect any new nests adjacent to harvest units that were established after surveys were completed and remain undetected during project layout and implementation.

- All pre-commercial thinning (PCT) units for this project are planned within 5.15 Management Prescription. During contract preparation, PCT treatments will be designed to emulate natural variability in tree spacing through a contract specification that requires 25% variation in the suggested spacing. This variation could be applied based on tree sizes within a given treatment unit (example: larger diameter trees get 12 foot spacing, medium trees get 10 foot spacing, smaller trees get 8 foot spacing), or by leaving 25% of a PCT unit in an un-thinned condition.
- Timber harvest units in the action alternatives will be designed to retain suitable numbers of snags to meet minimum forest plan standards which are:

Cover Type	Snags/acre within harvest units	Size	Snag recruits/acre Within harvest units
Spruce/Fir	6-10	At least 3/acre over 25", or largest available	8-12, at least 3/acre over 15" if available
Lodgepole pine	1-2	Over 10" if available	8-12
Lodgepole pine pole stands		Retain 3-4 small clumps of trees per acre	