# United States Department of the Interior
# Bureau of Land Management

**Environmental Assessment (DOI-BLM-MT-B070-2011-55-EA)**

## Upper Big Hole East Landscape Restoration Project Environmental Assessment

**May 23, 2012**

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# Upper Big Hole East Landscape Restoration Project
# Environmental Assessment
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# Chapter 1 – Purpose and Need

## 1.1 **Introduction**

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of the Upper Big Hole East (UBHE) landscape restoration project as proposed by Butte Field Office on Bureau of Land Management lands (Appendix A, Map 1). The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record may be signed for the EA approving the selected alternative, whether the proposed action or another alternative. A Decision Record (DR), including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in environmental documentation for the Butte Resource Management Plan (April, 2009).

The Upper Big Hole East Landscape Restoration (UBHE) analysis area totals roughly 160,000 acres, including all BLM managed lands (23,000 acres), Forest Service lands (FS) (113,930 acres), State lands (2,540 acres) and private lands (20,410 acres). The proposed project is located approximately 25 miles southwest of Butte in the Big Hole Watershed, T1S, R10W, Sections 1-15, T1N, R10W Sections 30-32, T1N R11W Sections 13-15, 17-19, 20-29 and 31, T1N R12W Sections 2-3, 10-15, and 23-24, T1S, R11W Sections 5-8 and 18 (Figure 2). Map 2 in Appendix A displays the 6 major locations in the UBHE project area referenced in this document; Charcoal Gulch, Jimmie New, Dickie Hills, Alder Creek, Deno Creek and Quartz Hill areas near Wise River, MT.

## 1.2 Background

The ID team assessed the following five Rangeland (Land) Health Standards: Upland Health, Riparian Health, Water Quality, Air Quality, and providing for Diversity (43 CFR 4180) in the UBHE during 2010 and 2011. Nine BLM grazing allotments totaling just over 22,000 acres were assessed to determine whether or not the five Standards for Land Health were being met. The assessment reports documented the condition/function of resources within the assessment area to the Authorized Officer. The Authorized Officer considered the Assessment Report to determine whether Land Health Standards (Standards) were met, and then signed a Determination of Standards documenting where Standards were or were not met. Findings are presented in the evaluation reports for each allotment is located at: http://www.blm.gov/mt/st/en/fo/butte_field_office/landhealth.html.

## 1.3 Need for the Action

The assessed condition/function and recommendations in the Assessment Report and Determination of Standards, along with comments received through public scoping, have

imitated a need for action progress towards meeting land health standards and address site specific resource concerns where needed. Additionally, current fuel loads and continuity of fuels have created public safety risks to those living in the Wildland Urban Interface (WUI) within the, and there is a need to coordinate with private land owners and other agencies to maximize effectiveness of fuels treatments. Travel route designations within portions of the planning area do not conform to the Butte RMP for road densities within elk calving ranges. Travel route inventories conducted in 2011 identified new routes not analyzed in the Butte RMP, in addition to public comments on the existing route designations need to be addressed. This Environmental Assessment (EA) was completed in accordance with established procedures to analyze and implement area, allotment, or site specific changes.

Table 1 summarizes the determination of land health standards by BLM grazing allotment. As required by 43CFR 4180, Table 1 discloses if existing grazing management practices, levels of grazing use, or whether other management practices on public lands are significantly contributing factors in failing to achieve the *Standards for Rangeland Health* and conform with the eleven guidelines for livestock grazing management established for BLM lands in Western Montana.

**Table 1. Land health summary by BLM allotment.**

| Allotment Name | Upland Standard | Riparian Standard | Water Quality Standard | Air Quality Standard | Biodiversity Standard | Significant Causal Factors in Failing to Achieve Standards |
|---|---|---|---|---|---|---|
| Leffler | yes | yes | yes | yes | yes | none |
| Harriet Lou | yes | yes | yes | yes | yes | none |
| Foothills | no | yes | yes | yes | no | Forest health; conifer expansion; livestock grazing in Limekiln Pasture |
| Quartz Hill | yes | yes | no[1] | yes | yes | Big Hole River on 303(d) list as impaired |

| Allotment Name | Upland Standard | Riparian Standard | Water Quality Standard | Air Quality Standard | Biodiversity Standard | Significant Causal Factors in Failing to Achieve Standards |
|---|---|---|---|---|---|---|
| Jerry Creek | no | no | no[1] | yes | no | Forest health; conifer expansion; livestock grazing and past logging in riparian areas; Jerry Creek and Big Hole River 303 (d)-listed streams; wildlife habitat as result of conifer expansion and riparian concerns |
| **Unavailable for Grazing** | | | | | | |
| Charcoal Mountain | yes | yes | no[1] | yes | yes | Big Hole River on 303(d) list as impaired |
| Dickie | no | n/a[2] | n/a[2] | yes | no | Conifer expansion into upland habitats |
| Alder Creek | yes | yes | yes | yes | yes | none |

[1] The Montana Department of Environmental Quality (DEQ) has the responsibility for making water quality determinations and has completed its evaluation of 303(d)-listed streams.

[2] No habitat present in the management unit.

The Authorized Officer determined that livestock grazing impacts are contributing to one or more of the Standards not being met in 2 grazing allotments. Pursuant to 43 CFR 4180.2(c),

livestock-caused failure to meet any of the Standards mandates the BLM to change the terms and conditions of the grazing permit/lease for the applicable grazing allotment prior to the next grazing season and implement actions that will result in significant progress toward fulfillment of the Standards. Further, BLM guidance stipulates that if other actions are necessary and cannot be implemented before the next grazing season interim adjustments will be made prior to the next grazing season and a schedule for final changes must be developed and documented (H-4180-1). Allotments requiring livestock management changes to address specific resource concerns are the Jerry Creek and Foothills allotments.

**1.4 Purpose of the Action(s)**

The BLM Butte Field Office plans to improve land health, enhance habitat conditions, and restore the natural range of variability within vegetation communities on public lands within the UBHE. BLM would also process the applications to renew Term Grazing Permits/Leases on five grazing allotments within the UBHE. Land health would be improved and progress would be made towards meeting land health standards on public lands by:

- Restoring and maintaining riparian, wetland and aquatic habitats through revised livestock grazing management, structural projects, and/or implementing vegetation treatments.
- Restoring historic density, structure, and species composition within the natural range of variability in forest and woodland habitats through mechanical treatments, commercial timber harvest and/or prescribed fire.
- Revising designations of wheeled motorized vehicle routes to correct mapping errors and address resource concerns while maintaining or improving existing levels of public access to public lands.
- Maintaining and improving sagebrush habitats (species composition and structure) through existing and/or revised livestock grazing management, structural projects and vegetation treatments.
- Reduce hazardous fuels within the wildland urban interface to enhance public safety in the event of wildfire.

**1.5 Conformance with the BLM Land Use Plan(s).**

The proposed action is in conformance with the terms and conditions of the Butte Resource Management Plan (RMP) of April 2009 and the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota and South Dakota ("Montana S&G" EIS) approved in August of 1997. Goal LG1 of the Butte RMP states, “Manage for a sustainable level of livestock grazing while meeting or progressing toward Land Health Standards.”

All of the allotments have been monitored, and have been assessed to determine whether land health standards are being met. No known information has been presented that would substantially alter the land use plan decisions. The land use proposed by this action does not differ materially from the allocation made in the above referenced land use plan.

**1.6 Relationship to Statutes, Regulations, or other Plans:**
The proposed action and no action alternatives are consistent with the following federal laws and regulations, address the Standards for Rangeland Health and have taken into consideration Native American religious concerns (including but not limited to):

Federal Land Policy and Management Act (FLMPA)
The Taylor Grazing Act
The National Historic Preservation Act
The Endangered Species Act
The Migratory Bird Treaty Act
The Clean Water Act
The Montana Streamside Management Law and Rules
Standards for Rangeland Health and Guidelines for Grazing Management (43 CFR 4180)
Title 43, USDI-BLM Code of Federal Regulations, Part 4100 as issued July, 11, 2006
Sikes Act of 1960, as amended (Habitat improvement on Public Land)
Carlson-Foley Act of 1968 (Weed Control on Public Lands)
Federal Noxious Weed Act of 1974, as amended in 1988, 1994
Fishery Conservation and Management Act of 1976
Public Rangelands Improvement Act of October 25, 1978
Fish and Wildlife Improvement Act of 1978
Farmland Protection Policy Act of 1981
E.O. 11988, Floodplain Management, as amended
Clean Air Act as amended (42 USC 7401 et seq.)
Clean Air Act of Montana as amended (75-2-102, MCA).
Safe Drinking Water Act, as amended (43 USC 300f et seq.)
Montana Clean Water Act (75-101 et seq., MCA)
E.O. 11990 Protection of Wetlands 5/24/77
Resource Conservation and Recovery Act of 1976 (42 USC 6901 et seq.)

This document is tiered to the Butte RMP/Final Environmental Impact Statement (EIS) (USDI 2009).

All treatments of invasive species proposed under this EA would conform to the guidance and standards set forth in the Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States Programmatic EIS approved on September 29, 2007 and the Noxious Weed Control on Public Lands EA (MT-050-08-12) approved April 2008, to which this EA is tiered.

All pheromone treatments to control forest insects would be completed in accordance with the BFO Pheromone Use EA #MT-DOI-BLM-MT-B070-2011-0041-EA from February 20, 2012, which is a programmatic EA allowing the use of pheromones including verbenone and methylcyclohexenone (MCH) application to deter mountain pine beetle and douglas-fir bark beetle infestations within conifer stands throughout the Butte Field Office.

The proposed action would also be consistent with the BLM's National Sage-grouse Strategy and Management Plan and Conservation Strategies for Sage Grouse in Montana.

## 1.7 Unique Characteristics of the Area

The affected environment of the project area was considered and analyzed by the interdisciplinary team as documented in this EA and the Critical Elements Checklist found in Table 2. The checklist indicates which resources of concern are either not present in the project area or would not be impacted to a degree that requires detailed analysis. Critical Elements of the human environment are those elements that are subject to the requirements specified in statue, regulation or executive order, and must be considered in all EAs (BLM H-1790-1, Appendix 5).

**Table 2. Unique Characteristics of the Geographic Area**

| CRITICAL ELEMENTS | | |
|---|---|---|
| **Determination*** | **Resource** | **Rationale for Determination** |
| PI | Air Quality | Prescribed fire may temporarily affect air quality. |
| NP | Areas of Critical Environmental Concern | Project location not in an ACEC. |
| NI | Environmental Justice | No alternative considered in the course of this analysis resulted in any identifiable effects or issues specific to any minority or low income population or community as defined in Executive Order 12898. |
| NP | Farmlands (Prime or Unique) | No inventoried Prime or Unique Farmlands are present within the areas of proposed treatments. |
| NI | Floodplains | No treatments are proposed in floodplains. Effects from treatments upslope or up drainage of floodplains would not impact or impede floodplain function. |
| PI | Invasive, Non-native Species | Invasive weeds are found in the area but annual spraying and monitoring would be expected to keep noxious weeds under control. |
| NP | Native American Religious Concerns | By avoiding cultural resources, Native American Religious Concerns would not be impacted by any of the alternatives in the EA. |
| PI | Threatened, Endangered or Candidate Plant or Animal Species | Grizzly bear are transient in the project area and would not be affected. Lynx have been observed in the past but due to dry habitats are most likely transient. Both species are "no effect" for this project. The project could impact goshawk and other sensitive species. Lemhi penstemon, sapphire rockcress, and linear fleabane are known to occur in the area, but mitigation measures would be implemented to protect and enhance these species. |
| NP | Wastes (hazardous or solid) | No hazardous wastes have been identified in project area. |
| PI | Water Quality (drinking/ground) | Alternatives B, C and D would improve water quality by decreasing sediment loading in streams. Alternative A would cause water quality to remain static and |

| | | |
|---|---|---|
| | | possibly become more impaired. |
| **Determination*** | **Resource** | **Rationale for Determination** |
| PI | Wetlands/Riparian Zones | Alterantives B, C, and D would improve riparian areas and wetlands. Alternative A would cause riparian condition to remain static in some areas and in other areas conditions could continue to decline. |
| NP | Wild and Scenic Rivers | None present. |
| NP | Wilderness | Project located outside WSA boundary. |

*Possible determinations:
NP = not present in the area impacted by the proposed or alternative actions.
NI = present, but not affected to a degree that detailed analysis is required.
PI = present with potential for impacts and analyzed in detail in the EA.

## 1.8 Issues

### 1.8.1 Identification of Key Issues and Resource Considerations

**Key Issues.** These issues have a direct bearing upon the alternatives and the process of how we achieve the purpose and need. They are used to drive development of alternative ways to achieve the purpose and need. The effects to these issues are analyzed in detail. Differences in these effects are used to measure the trade-offs between alternative actions.

**Resource and Social Considerations**. Resource considerations do not necessarily drive the development of alternatives, but are used to analyze and disclose the effects of various actions in relation to the resource consideration. Issues and resource considerations were identified through the assessment and scoping process.

Not all issues or resource considerations identified below are applicable to all allotments and the unallotted tracts in project area included in this EA. Site specific issues and considerations are shown in Chapter 3 and the evaluation reports for each allotment within the UBHE. Additional information about methodologies and documented resource considerations can be found in the Evaluation Reports, which are available at the Butte Field Office or on the internet at http://www.blm.gov/mt/st/en/fo/butte_field_office/landhealth.html.

Issues are shown below in three primary "land health or habitat" categories in addition to travel management and wildland urban interface (WUI), which was an issue identified by the public and through the IDT process. Resource considerations are organized into eight additional categories for analysis. Fish, wildlife and special status species habitat needs that may be affected by the alternatives are included as Resource Considerations. Additional considerations include noxious and invasive species, soils, recreation, socioeconomics, cultural resources, and visual resources.

A range of management alternatives to address these resource issues and considerations are described in Chapter 2. Analysis in Chapter 3 will answer the question of how each alternative will affect each of the Issues and Resource Considerations listed below.

### 1.8.2 Key Issues

**Resource #1: Decreased Forest Health (Related to Fire Regime Change)**
Existing forests regularly display characteristics that are outside the expected range of natural variability associated with development under a mid-severity fire regime. Historically (pre-settlement) many forests in the area were frequently more open than at present. Smaller sized trees that lacked fireproof bark would regularly be killed in low to moderately intense fire events. Pre-settlement forests often exhibited a patch dynamic across the landscape comprised of park like openings interspersed with groups of trees or areas of multi-aged stands, aspen stands, and meadows. In addition, savannah or open woodland conditions were common on hotter, drier sites and at lower elevations. Overcrowded forest conditions now exist and developed after long periods of fire exclusion. Former gaps and stand openings have filled in with successfully colonizing trees, which often form thickets in the understory. A shift from cyclic low to moderately severe fires to prolonged fire absence allows small colonizing trees to persist and develop dense closed-canopy forests over large areas. This scenario also promotes successful expansion by conifers into aspen and sagebrush communities, which once overtopped, lose vigor, decline, and die-off.

**Issues:**

- Dense stand conditions increase competition between trees for on-site resources such as light, water, and nutrients, ultimately stressing trees and making them more susceptible to attack from insect and disease.
- Crowded overlapping crowns provide favorable conditions for successful spruce budworm infestation; and extensive and/or repeated defoliation by spruce budworm results in increased Douglas-fir beetle activity.
- Successful conifer expansion results in a lack of diversity over the landscape as unique and important features such as forest gaps, meadows, sagebrush, and aspen communities are colonized and overtopped.
- Lack of regular fire (or silvicultural treatments) allows mistletoe to persist and expand.
- Lodgepole stands allowed to mature without intermediate management activities develop a lack of wind firmness that could result in increased blowdown.
- Overstocked, dense forests have increased fuel loads and ladder fuels, which promote severe fire behavior and could result in a loss of forest cover or ecological type conversions especially on hot dry exposures.

**Resource #2: Upland Health**
"Uplands are in PFC" is identified as one of the Western Montana Standards for Rangeland Health. The determination of upland health was based on the evaluation of three criteria: degree of soil stability and watershed function, nutrient cycles and energy flows, and available recovery mechanisms. The indicators used to determine upland health are discussed in the Evaluation Reports.

The uplands in five grazing allotments met the standard, on two allotments the upland standard was not met due to conifer expansion, and a portion of one allotment did not meet the upland standard due to livestock grazing.

**Issue:** Vegetative composition and structure of sagebrush communities

**Resource #3: Riparian, Wetland, and Aquatic Health**
One of the Western Montana Standards for Rangeland Health is **"**Riparian and Wetland Areas are in Proper Functioning Condition (PFC)." PFC is defined as the ability of a stream or wetland to perform its riparian functions. These functions include sediment filtering, bank building, water storage, aquifer recharge and hydrologic energy dissipation. Streams or wetlands that are categorized as Functional-At-Risk (FAR) with an upward trend also meet the riparian health standard. The methods and procedures used to determine riparian health in the project area are discussed in the Evaluation Reports for each allotment.

Seven of the twelve miles of the stream reaches within the Jerry Creek Allotment are FAR and 0.8 miles was rated as non-functioning (NF). These conditions were attributed to several factors including livestock grazing, conifer expansion, wildlife browsing, historic logging activities, and sedimentation from roads in localized areas.

**Issues:**

- Stream channel stability and structure
- Riparian vegetation composition, cover and vigor

**Resource #4: Wildlife (Including Special Status Species) Habitat**
Thinning forest stands, removing conifers from sagebrush meadows, and building or opening roads can make wildlife, especially big game species, more susceptible to human disturbance; cause individuals to avoid areas; make wildlife more vulnerable to mortality from hunting or predation; and reduce the risk of mortality from harsh winter conditions. Converting closed forests to open woodlands or sagebrush meadows can affect those species that depend on dense forest structure by reducing overhead cover, hunting habitat, and nesting and denning sites. Mechanical treatments and prescribed fire can result in an increase in weeds, resulting in a loss of habitat quality. Roads can reduce the quality and quantity of wildlife habitat by the direct loss of vegetation, by creating a conduit for weed establishment and expansion, and by creating disturbance that forces individuals to leave an area.

Special status species include species listed as threatened or endangered under the Endangered Species Act (ESA), species proposed for listing under the ESA, candidates for listing under the ESA, state listed species, and BLM sensitive species. A list of special status species and other species of interest, known to occur within the UBHE project area are included in addition to a Biological Evaluation in Appendix B.

**Issues:**

- Silvicultural treatments and roads can affect the quantity and quality of security, hiding and thermal cover for many wildlife species by removing vegetation screening and creating disturbance.
- Silvicultural treatments and roads can alter wildlife habitats, creating conditions preferred by some species, but avoided by others.

**Resource #5: Wildland Urban Interface/Fuels**
The wildland urban interface (WUI) is defined in the Butte RMP as the line, area or zone where structures and other human developments meet or intermingle with undeveloped wildland or vegetative fuels. Live and dead fuels pose a wildfire threat to scattered permanent homes and seasonally-used dwellings in the UBHE. Overstocked, dense forests have increased fuel loads and ladder fuels, which promote severe fire behavior.

**Issues:**

- Heavy fuel loading and continuity as a result of overstocked, dense forest have created unsafe conditions within the WUI and promote severe fire behavior within in the project area.
- Catastrophic fires can denude the landscape, resulting in a loss of vegetation cover, and soil erosion, burn at temperatures that promote soil sterilization and increase weed infestations, cause ecological type conversions especially on hot dry exposures.

**Resource #6: Travel Management**
Members of the public expressed concerns regarding route designations as a result of the Upper Big Hole TMP (2009) that affected access to traditional use areas for the following activities: Motorized Recreation, Hunting, Dispersed Camping.

**Issues:**

- Closed access to wheeled motorized vehicles on various travel routes.
- Correct travel route designation on Route 010105 to match the USFS designation.

### 1.8.3 Resource Considerations

**Resource #1: Special Status Plants Habitat**
Special status plants species including sapphire rockcress and linear leaf fleabane occur within the project area, and Lemhi beardtongue occurs within the analysis area. Refer to the Biological Evaluations (BE) on Threatened and Endangered (T&E) species, special status plants, wildlife, and fish in Appendix B for additional information. Special Status Species are discussed in the Evaluation Reports for each allotment, as well as Chapter 3 of this EA.

**Consideration:**

- Maintain or increase populations of sapphire rockcress and linear fleabane that are currently located on BLM lands within the project area.
- Improve vegetation habitats that may support Lemhi beardtongue within the project area.

**Resource #2: Socioeconomics**
Many ranches that hold BLM grazing leases/permits have developed operations dependent on a combination of public land grazing preferences and private land resources.

Utilization of timber resources from public lands has historically resulted in an economic benefit to southwest Montana. The potential for utilization of commercial forest products still exists.

Non-commercial hunting opportunities on BLM administered public lands in the UBHE provide an important economic contribution to the local economies of Wise River, Dewey, and Divide. Also, the BLM currently authorizes 3 commercial Special Recreation Permits (SRPs) that allow hunting outfitters to provide guiding services on public lands within the watershed.

**Considerations:**

- Contributions to the local economy from sustainable uses on public land including livestock grazing, utilization of forest products, and recreational activities.

**Resource #3: Soil Quality**

Soil quality was assessed during upland health assessments and Proper Functioning Condition assessments, with localized effects noted. Activities to improve forest and range health may cause temporary, localized compaction, or erosion. Nutrient cycling (carbon and nitrogen) could change as a result of deposition of mulched/masticated trees.

**Considerations:**

- Impacts to soil compaction, erosion and sedimentation, and nutrient cycling.

**Resource #4: Air Quality**

Upland health assessments did not identify air quality impairment. Use of prescribed fire and pile burning to improve forest and range health may temporarily impact air quality.

**Considerations:**

- Impacts to air quality.

**Resource #5: Noxious and Invasive Species**

Spotted knapweed, leafy spurge, houndstongue, Canada thistle, black henbane, common mullein, and cheatgrass occur as relatively small patches or scattered individual plants in various locations within the UBHE. These noxious and invasive species can affect upland health, riparian health and biodiversity. Noxious and Invasive Species are discussed in the Evaluation Reports, as well as Chapter 3 of this EA.

**Considerations:**

- Composition and spread of noxious and invasive vegetative species into, within, or from the watershed.

**Resource #6: Cultural Resources**

A detailed summary and description of the cultural resources identified during Class III inventories, occurring in the UBHE is on file in the Butte Field Office.

**Consideration:**

- Preservation, protection, and/or avoidance of cultural resources

**Resource #7: Recreation**

**Considerations:**

- Public Access
- Opportunities for Hunting, Dispersed Camping and Motorized Recreation
- Producing Positive Beneficial Experiences and Outcomes for Recreation Users

**Resource #8: Visual Resources**

The entire planning area is managed as VRM Class II and III. The objective of Class II is to retain the existing character of the landscape. Levels of noticeable change should be low.

Management actions may be seen, but should not attract attention of casual users. Changes must conform to the basic elements found in the predominant natural features of the characteristic landscape. The objective of Class III is to partially retain the existing character of the landscape. Levels of noticeable change should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should conform to the basic elements found in the predominant natural features of the characteristic landscape.

**Considerations:**

- Changes to the viewshed.

### 1.8.2 Key Issues and/or Resource Considerations considered, but eliminated

**Water Quality and Total Maximum Daily Loads (TMDL)**

The State of Montana's Department of Environmental Quality (DEQ) is responsible for making Beneficial Use Support determinations through a formal process known as Sufficient Credible Data. The BLM does not make Beneficial Use determinations. Water quality and beneficial use determination in the Upper Big Hole East watershed are presented in the "Middle and Lower Big Hole Planning Area TMDLs and Water Quality Improvement Plan" (DEQ, 2009), and available online from the Clean Water Act Information Center (DEQ 2011a). Watershed Assessment data and information is routinely shared with DEQ.

All Montana streams and wetlands are covered under the Clean Water Act and the Montana Water Quality Act. Listed or TMDL streams and wetlands are covered under section 303d of the Federal Clean Water Act. All other streams and wetlands are covered under the anti-degradation provisions of both the Clean Water Act and the Montana Water Quality Act. Both Federal and State legislation for water quality protection and restoration require the use of Best Management Practices. Grazing and Forestry Best Management Practices intended to conserve and restore Riparian, Wetland, Aquatic, Upland and Forest and Woodland Health meet the 303d and anti-degradation provisions of State and Federal water quality legislation. The alternatives developed in Chapter 2 include implementation and/or maintenance of a variety of BMPs.

The BLM recognizes that water quality may be affected by the alternatives, and decided that effectiveness of BMPs intended to improve water quality would be adequately addressed by analyzing the Issues covered under the other categories listed above (Riparian, Wetland, and Aquatic Health, Upland Health, and Forest and Woodland Health).

**Summary**

This chapter has presented the purpose and need of the project, as well as the relevant issues, i.e., those elements of the environment that could be affected by the implementation of the project. In order to meet the purpose and need of the project in a way that resolves the issues, the BLM has developed a range of action alternatives. These alternatives, as well as a no action alternative, are presented in Chapter 2. The potential environmental impacts or consequences resulting from the implementation of each alternative are then analyzed in Chapter 3 for each of the identified issues.

# Chapter 2 - Alternatives

## 2.1 Introduction

This chapter describes the alternative development process, alternatives considered in detail, and alternatives considered but not given detailed study. The alternatives considered in detail have been designed to address the resource issues identified from internal and external scoping.

This chapter compares how alternatives address each issue identified. This comparison, along with a disclosure of environmental impacts (Chapter 3) identifies the tradeoffs to the Authorized Officer (Field Manager) to make an informed choice between alternatives.

## 2.2 Alternative Development

Alternatives were developed based upon National and State BLM direction and policy, existing condition and environmental issues. Issues are discussed in Chapter 1. When developing and considering alternatives, the ID Team evaluated each alternative against the purpose(s) of the proposed action. With the exception of the No Action alternative, alternatives that wouldn't make progress toward meeting resource objectives were not carried forward for further consideration. These alternatives are discussed in "Alternative Considered but Eliminated from Detailed Study."

### 2.2.1 Alternatives Considered but Eliminated From Detailed Study

Analysis of alternatives that would not make significant progress towards meeting the objectives of the proposed action or alternatives not consistent with the intent of current BLM legal and regulatory requirements or policy are not carried through.

### 2.2.1a No Livestock Grazing Alternative

This alternative has been analyzed in detail in the National Rangeland Reform 1994 Environmental Impact Statement. Livestock grazing is authorized by law and regulation and is a well-established use within the BLM's multiple-use mandate. Implementation of a No Grazing Alternative from all public lands in allotments of the project area was considered as one management option to resolve range and watershed management issues. This alternative is not considered feasible or necessary except in specific, localized situations where livestock use may be incompatible with attainment of land health standards or with other management objectives. The Butte RMP authorizes livestock grazing use on approximately 270,000 acres of the Butte Field Office, including most of the BLM-administered lands considered in this EA. In accordance with the Butte Field Office RMP, the Alder Creek, Dickie, and Charcoal Mountain Custodial allotments would continue to be unavailable for livestock grazing.

Land health assessments conducted in 2010 and 2011 do not warrant the prohibition of livestock grazing within the entire project area. The majority of BLM lands that are located within the project area allotments are fenced in with lands that are under the control of entities or agencies other than the BLM. Approximately 10 to 15 miles of additional fencing would be needed to restrict livestock from these BLM managed lands. This additional fencing would create many new barriers to wildlife movement and contribute to habitat fragmentation.

A No Grazing Alternative will be analyzed for two allotments within the project area that are currently authorized for grazing (Jerry Creek and Foothills Allotments). These allotments were

determined not to be meeting one or more of the Standards for Rangeland Health due, at least in part, from current grazing management.

**2.2.1b Travel Management Alternative**
Route BH032 (2.75 miles) and BH271 (0.24 miles), were designated as "Closed Yearlong" to motorized vehicles during the initial Upper Big Hole River TMP process (Figure 8). Due to input from members of the public following the implementation of the Upper Big Hole TMP in 2010, re-opening these routes to motorized vehicles during this process was considered. However, after further analysis, it was determined that the beginning portion of Route BH032 past the hunting camp and near the junction with BH271 has become very faint (vegetation is re-established) since the closure in 2009, and thus essentially no longer exists. The other major connector route (BH271) has significant soil erosion issues. Therefore, re-opening these routes to motorized vehicles would not be further analyzed under this project.

## 2.3 Design Features Common to All Alternatives

### 2.3.1 Livestock Management
In the event of a prescribed fire, allotments or portions of allotments would be rested from livestock grazing up to one year prior to treatment, if necessary, to produce fine fuels to carry the burn. Treatment areas would be rested for a minimum of two growing seasons following treatment to promote recovery of vegetation. Livestock rest for more or less than two growing seasons could be justified on a case-by-case basis (Butte RMP 2009, page 25).

Encourage, and, if warranted, require use of temporary electric fence, livestock supplement (e.g., salt, protein block) placement, riding, and herding as a means of improving livestock distribution in all alternatives.

The following terms and conditions are common to all grazing permits:

> No salt and/or mineral blocks shall be placed within ¼ mile of livestock water, springs, meadows or streams. Coordination will be done with BLM personnel prior to placement of salt each year.
>
> You are required to perform normal maintenance on the range improvements to which you have been assigned maintenance responsibility as part of your signed range improvement permit (s), cooperative agreement (s) or assignment of range improvements agreement.
>
> The terms and conditions of your permit/lease may be modified if additional information indicates that revision is necessary to conform with the standards and guidelines for rangeland health (43 CFR 4180).
>
> No livestock grazing will be allowed within any fenced spring or riparian area or vegetative study exclosure.
>
> Motorized wheeled cross-country travel is limited to the administration of the lease or permit.

## 2.4 Design Features Common to Action Alternatives

### 2.4.1 Riparian and Aquatics

Prescribed burn units and project activities would avoid known western toad, Columbia Frog and long-toed salamander breeding sites and natal areas during breeding and juvenile rearing periods.

Storage of fuels and toxicants within riparian areas would be prohibited. Refueling within riparian areas would be prohibited except for emergency situations, in which case refueling sites would have an approved spill containment plan.

No cutting of vegetation that contributes to bank stability (bank rooted trees) would be allowed.

There would be no pile burning within 25' of perennial streams.

Lop and scatter would be the preferable method to use when reducing low concentrations of conifers in riparian areas.

A BFO specialist would be available at the beginning of implementation to explain design features on the ground.

### 2.4.2 Cultural Resources

Personnel from the BLM would be notified of the presence and location of any cultural resources should they be encountered by any permittees or contractors during the course of operations on public lands.

A Class III cultural resource inventory would be conducted in areas where construction or ground disturbing activity would take place.

Sites located in construction areas would be avoided.

Culturally modified trees (trees scarred intentionally for various purposes) would be protected. These trees would not be cut and would be protected from damage by mechanical equipment or falling trees.

Sites located in burn areas would be avoided by reducing fuels in and around vulnerable features or by stationing suppression equipment in those same areas during implementation.

A 1:24,000 USGS topographic map would be provided to the fire/fuels staff showing the location of all recorded cultural resources.

Hand cutting or slashing of standing or dead trees <8" in diameter would be allowed within the boundary of known cultural resources, as long as the slash is scattered or removed and piled off the site area for burning.

Prior to the initiation of broadcast burning, a safety zone or "black line" 100' in width would be established around the perimeter of the site and/or any wooden structures or features. During the broadcast burning process, fire suppression equipment would be kept on hand and structure protection efforts initiated at all site locations that contain standing or collapsed structures.

The archaeologist would be available to relocate and reestablish site boundaries, as needed.

During the course of project design or implementation, the discovery of any previously unrecorded cultural/heritage resources would cause project operations in the area of the discovery to cease until analysis and evaluation of the heritage resources are completed, including consultation with the Montana SHPO and appropriate Indian Tribes.

### 2.4.3 Noxious Weeds

Management of noxious weeds would continue in cooperation with the Big Hole Watershed Weed Committee, federal and state agencies, private landowners and other partners. All invasive species on the Montana state noxious weed list would be treated as resources allow. Areas where private landowners actively cooperate, participate, and support the BLM's weed management strategies, would be given higher priority for treatment.

Weed patches would be avoided when operating machinery.

All off-road vehicles and heavy equipment would require inspection and approval by BLM personnel prior to moving to the project area. In some cases, weed inspections could also be required before moving between units on the same project.

All heavy equipment and off-road equipment associated with project implementation would be inspected and approved prior to entering the project area to ensure they are "weedfree." Landings would be located so as to avoid areas within existing weed populations. Landings would be monitored during and after harvest operations to facilitate timely weed control treatments.

Areas proposed for burning or for the operation of mechanized equipment that occur within existing weed populations would be treated for weeds prior to activities.

All roads and trails (new and old) would be treated to control weeds before the initiation and after the completion of project activities. All project areas would be monitored for the emergence of new weeds species, as well as the expansion or establishment of known weed species.

All weed treatment sites would be monitored for infestations before operations and weeds would be treated annually after project completion.

### 2.4.4 Prescribed Fire

Prescribed burning treatments would be intended to consume residual slash and to kill or remove 60 percent or more of encroaching/colonizing conifers.

Slash piles would be built so they cover a minimum area of ground (i.e. narrow and tall, rather than broad and short). Piles would be burned when soils are moist and soil temperatures are low, in the fall or spring. To prevent scorching of, and heat stress to live trees, burn piles would be placed at least 20' away from the drip line of crowns of live green trees.

Slashing of small conifers to augment fuel loading could be necessary before prescribed burning. Slashing could be done by hand or by mechanical methods.

Burning of slash piles would be in accordance with Montana/Idaho smoke management programs.

**2.4.5 Soils**

Broadcast and jackpot burning would be performed when soil moisture levels are high as determined by the BLM.

Sufficient residual down woody material (5-20 tons/acre) would be left on-site to maintain nutrient recycling and desirable micro-site conditions.

If skid trails are needed, their locations would be approved by the BLM prior to use.

Designated skid trails would be utilized to limit the amount of soil surface disturbance, to minimize soil erosion and to limit compaction. Skid trails would be designed and located in such a manner to minimize compaction, erosion and loss of soil productivity. Skid trails would avoid wet (hydric) soils and those with a high water table. Examples of skid trail design features include locating them over deep soils, on low slopes and over down woody debris.

Soils rated with a severe or very severe erosion potential would be avoided for mechanical and burn treatments. Soils with a severe compaction risk would be avoided for mechanized use. Wet (hydric) soils, which indicate wetlands, would be excluded from mechanical treatment. Hand-cut operations would be employed on hydric soils and in riparian areas.

Mechanical activity would only be allowed when soils are dry or frozen.

Use of a subsoiler, if available, could be used to accelerate break-up of compacted layers in roads and landings, thereby accelerating recovery and return to normal surface water infiltration rates.

**2.4.6 Special Status Plants**

Field inspections to search for special status plant species prior to authorizing surface disturbing activities in habitats likely to support rare plants would be conducted. If rare plants are found in the course of the botanical survey, adverse impacts would be mitigated through project abandonment or redesign. Activities that disturb mineral soil (such as blading, trenching, ripping, etc.) would be minimized within the boundaries of populations of special status plants.

When sensitive plant habitat occurs within potential burn treatments, the area around this habitat would be subject to weed control activities before and after burning.

### 2.4.7 Structural Projects

Wildlife escape ramps would be installed in all existing and new water developments.
All new fences would be built to standard BLM wildlife specifications (USDI – BLM 1989) in the Bureau of Land Management Fencing Manual, (H1741-1) to allow wildlife passage, with the exception of fences built specifically to keep ungulates out of an area or fences built to meet specific public safety or other administrative purposes. Existing fences not meeting standard BLM wildlife specifications or those that impede wildlife movement would be removed, modified, or rebuilt to BLM specifications on a prioritized schedule (BFO RMP 2009, pg 25).

Range improvements generally would be designed to achieve both wildlife and range objectives (BFO RMP 2009, pg 25).

### 2.4.8 Travel Management

Many of the existing travel routes in the project area would be utilized to implement this project. Under the Upper Big Hole River TMP many of these routes are managed as either "Closed Yearlong" or "Seasonally Restricted" to motorized vehicles. In order to accommodate this project, use of these routes would be temporarily authorized. Under all action alternatives for this project, a travel variance would be issued as part of this document for administrative use related to each of the implementation actions.

Upgrades to the existing access roads would be limited to the minimum standard necessary.

### 2.4.9 Vegetation (including forest and woodland habitats)

Pheromones and/or funnel traps would be utilized in areas where conifers are at risk for bark beetle infestations.

Mechanical equipment used for project implementation would include conventional ground-based harvesting equipment (mechanized harvester, grapple, skidder, forwarder, delimber and masticator, etc.). Ground based harvest techniques could include hand or machine falling, forwarding, tractor, horse and/or cable yarding, and processing merchantable products at landings.

Harvested trees would usually be whole-tree yarded to landings. In lodgepole treatment units, harvested trees could be cut–to-length to allow pine tops to stay in cut units and provide a seed source to promote regeneration.

Non-merchantable trees and slash would be piled and burned, chipped and left on site, and/or utilized for biomass products.

If market conditions permit, biomass material could be removed from within mechanical treatment units. Trees less than sawlog size (under 7"DBH) could be sold as a commercial product (biomass, firewood, or other products), masticated, or burned. Slash could be made available for firewood prior to burning.

Landing site locations would be approved by the BLM prior to establishment. Meadows, sagebrush parks and areas with weed infestations would be avoided as locations for log decks

and landings. Landing piles would be reduced by burning, chipping or other means, as feasible. Log landings would be rehabilitated, treated for weeds, and reseeded with native grasses/forbs upon the completion of treatments. Weed monitoring and control treatments would continue out-year as needed at these locations.

At least 20 percent of forest habitat types would remain uncut and retained for use by wildlife. The size and location of "leave" patches would be determined on a unit by unit basis. These patches could be scattered throughout harvest units and along open travel routes to provide wildlife hiding cover.

Within harvest units, colonizing conifers found in historic openings could be cut to maintain and promote sagebrush habitat.

In sagebrush and savannah treatments, all trees with "old growth" characteristics (large, open grown branches, rough limbs, broken tops, etc.) would be retained. In forest treatments, legacy trees (trees that were well established and mature prior to settlement) and the largest trees with old, structural characteristics or potential to develop old, structural characteristics would be retained.

In all treatment types, limber pine would be retained which are of sufficient size and vigor to produce cone crops, or have the potential to develop into seed bearing trees.

Silvicultural prescriptions would be consistent with accepted methods related to site, species, habitat types, and the individual requirements of the forest stand to which they will be applied.

Where slopes exceed 40 percent, hand cut, lop and scatter to remove conifer colonization. Residual slash must be patchy, not form a continuous mat, not exceed 12" in height, and contain less than 5 percent of pieces greater than 3' long.

Small trees (<7" DBH) and any slash created by forest thinning operations would be lopped and scattered to within 12" of the ground; or these materials could be gathered into small piles and burned. Residual slash would be patchy and not form a continuous mat.

In addition to adhering to Montana Streamside Management Zone (SMZ) Law, Riparian Management Zones (RMZs) would be identified as described in the Butte RMP (USDI 2009). Treatment activities within RMZs would emphasize the promotion, maintenance, and restoration of riparian habitats and their ecological function. Product could only be removed from the riparian areas if structural requirements of the RMZ (such as down wood) are being met.

RMZs are described as: 1), the height of 2 dominant trees along fish bearing streams and water bodies, 2) the height of 1 dominant tree along perennial non-fish bearing streams and water bodies greater than 1 acre, 3) 50 feet on either side of intermittent streams and wetlands less than 1 acre.

To protect water quality, a Clean Water Act/storm water discharge permit, or other permits as required by federal, state, or local law, may be required for new and existing forest road

activities associated with timber harvest, log and heavy equipment hauling, and forest restoration activities.

### 2.4.10 Temporary Roads and Skid Trails

Temporary roads, main skid trails, landings and any ground disturbed by mechanical treatments, as well as all burned slash pile areas covering more than 400 ft2 on the ground, would be re-vegetated with native seed mix approved for the Butte Field Office. Disturbed areas, including roads, trails and skid trails would be rehabilitated and seeded after cessation of operations.

Existing open roads or trails would remain in the same or better condition after forest restoration activities.

All road construction, maintenance and use of heavy equipment that involves or supports harvesting activities would adhere to the Montana Best Management Practices for Forestry.

In areas where haul routes are in close proximity to populated areas and homes, dust control measures may be implemented during periods of heavy truck traffic and hauling.

If hauling and/or heavy truck traffic occurs along the Johnson Creek road, some type of traffic control measures will be employed to secure public safety. This could include such options as temporarily closing the road to public traffic during limited times of hauling, the use of flaggers to stop traffic, etc.

Existing roads and trails in the project area used by heavy equipment and/or commercial trucks would be upgraded, repaired and maintained as necessary. Such roads and trails would be stabilized and returned to a condition appropriate to pre-operations.

Temporary roads would be closed and rehabilitated to eliminate resource impacts such as erosion and noxious weed control within one year of project completion. The roads would be monitored for weeds. If weeds become established to an extent that vehicle access is necessary to control weeds, roads would be managed to allow administrative use for weed control activities while precluding public motorized use.

### 2.4.11 Visual Resources

Caution would be exercised during layout and implementation to avoid unnatural appearing linear features, as seen from Key Observation Points (KOPs) and the surrounding area.

Natural patterns in treatment design and operations would be mimicked, especially in the elements of form and line. Natural appearing, meandering edges, and tie into existing meadows and clearings would be created.

### 2.4.12 Wildlife

Burning would occur after May 15$^{th}$ if surveys identify low potential for nesting birds or if mitigation measures could adequately reduce impacts.

If raptor nests are discovered during marking or logging operations, a 40-acre modified treatment buffer would be established to conserve the nest area. No treatment related disturbance could occur within the nest buffer area from March through late July. The time of implementation could be modified based on the species using the site and the size of the buffer could be larger than 40 acres, depending on species and location of the nest. Although thinning could occur around nest site, suitable habitat would be retained within 40 acres (or the adequate buffer size determined for the site) surrounding any active or inactive raptor or owl nest sites.

Trees and snags containing raptor nests (active or inactive) would not be cut.

Thinning would be minimal or would not occur in critical wildlife habitats (such as around den sites) or in important movement corridors. These sites would be identified on the ground during project implementation. The size of retention patches around important habitat features would be based on the species using the site.

Timing restrictions would be used in crucial wildlife breeding and wintering areas that will be identified during project planning depending on the species present in treatment units.

Project implementation would only be allowed from April through October 1 to protect elk on winter range and to provide for a quality hunting experience during the big game rifle season.

Unless otherwise stated, all snags >15" DBH would be retained, with the exception of those threatening human safety.

Pockets and concentrations of down woody material (>13"DBH) would be protected to the extent possible. Down wood material at 1-3 tons per acre or appropriate concentrations for the site (6-20"DBH) would be created with an emphasis on larger (>10"DBH) size classes.

Native materials or manufactured fencing would be utilized to create barriers to wildlife and livestock, when necessary, to allow for regeneration of riparian habitats or aspen stands.

Large, bushy junipers would be retained for mule deer thermal cover.

### 2.5 Alternative A: Continue Current Management – No Action

The no action alternative was designed to provide a basis for comparison of continuing current levels of use within the project area for livestock grazing, maintaining current travel route designations, managing forests, uplands, and riparian habitats without any addition treatments, and no treatments to address WUI concerns.

#### 2.5.1 Livestock Grazing

Livestock grazing would be authorized on all UBHE allotments as currently permitted, including the class of livestock, season of use, animal unit months (AUMs), percent public land (%PL), and terms and conditions. No new projects would be constructed and no modifications would be made to existing projects.

Jerry Creek:

| | |
|---|---|
| Livestock # and Kind | 686 Cattle |
| Grazing Period | 6/1-7/31 |
| Active BLM AUMs | 600 |
| %PL | 44% |
| Trailing Permit | 9/16-9/30 |
| Grazing Management | Rest Rotation |

Terms and conditions in addition to those terms and conditions common to all grazing permits include:

The Jerry Creek Allotment will be used according to the agreement of June 23, 1992, and the allotment management plan (AMP) signed in May 1987 except as modified by the decision of May 2008.

The grazing season will not extend longer than 45 days in the Dickie Hills and Jimmie New Pastures or longer than 50 days in the Patton (BLM) pasture within the 61 day window (6/1-7/31) that livestock are authorized in any pasture area. The number of days or the number of livestock will be reduced in pasture area in order to keep grazing with the pasture area's carrying capacity. Livestock grazing will be consistent with that outlined in the EA MT 070-08-24.

Foothills:

| | |
|---|---|
| Livestock # and Kind | 150 Cattle |
| Grazing Period | 5/25-6/15 |
| Active BLM AUMs | 108 |
| %PL | 100 |
| Grazing Management | Rest-rotation |

Terms and conditions in addition to those terms and conditions common to all grazing permits include:

The Foothills Allotment will be used according to the BLM-USFS environmental assessment of March 1985. The Foothills Allotment consists of the Deno Creek and Limekiln Pastures. The Deno Creek Pasture is usually grazed on even-numbered years and rested on odd-numbered years. The Limekiln Pasture is grazed and rested just the opposite of the Deno Creek Pasture.

Quartz Hill:

| | |
|---|---|
| Livestock # and Kind | 78 Cattle |
| Grazing Period | 6/1-6/15 |
| Active BLM AUMs | 38 |
| %PL | 100% |
| Grazing Management | Rest-rotation |

Terms and conditions in addition to those terms and conditions common to all grazing permits include:

> The Quartz Hill Allotment will be used according to the June 1983 allotment management plan (AMP) in cooperation with the United State Forest Service (USFS).

Leffler:

| | |
|---|---|
| Livestock # and Kind | 7 Cattle |
| Grazing Period | 5/15-10/15 |
| Active BLM AUMs | 35 |
| %PL | 100% |
| Grazing Management | Early and late season use |

Terms and conditions in addition to those terms and conditions common to all grazing permits include:

> The Leffler Allotment is to be used in conjunction with your normal livestock operation during the period shown as long as use is not detrimental to the public lands and fees are paid prior to turnout.

Harriet Lou Creek:

| | |
|---|---|
| Livestock # and Kind | 2 Cattle |
| Grazing Period | 5/15-11/15 |
| Active BLM AUMs | 10 |
| %PL | 100% |
| Grazing Management | Grazed 2 weeks when used and rested every other year |

Terms and conditions in addition to those terms and conditions common to all grazing permits include:

> The Harriet Lou Allotment is to be used in conjunction with your normal livestock operation during the period shown as long as use is not detrimental to the public lands and fees are paid prior to turnout.

### 2.5.2 Travel Management

Under this alternative, no changes would be made to existing route designations described in the 2009 Upper Big Hole River TMP (Appendix A, Map 3). New travel routes found during the 2011 inventory (approximately 8.5 miles) would be designated as "Closed Yearlong" to motorized vehicles because they were not considered and/or designated in the 2009 Upper Big Hole TMP.

### 2.5.2 Vegetation

Under the No Action Alternative, no new treatments (for restoring vegetation, improving wildlife habitat, aspen restoration, fuels reduction in the WUI, or encroachment treatments) would be implemented.

## 2.6 Alternative B – Proposed Action

Alternative B, the proposed action, is designed to address land health concerns identified in Table 2, page 3-4, as well as other concerns such as travel route designations and WUI. Revised livestock grazing and travel route designation, in addition to fuels treatments in the WUI and other areas, and vegetation treatments in upland, riparian, and forested habitats are designed to address Issues and Resource Concerns identified in Chapter 1, pages 8-12.

### 2.6.1 Livestock Grazing

Under Alternative B, grazing permits for all allotments would be updated, adaptive management would be implemented where appropriate, grazing management improved on allotments where livestock management was a significant factor in failing to achieve land health standards, correct administrative errors, terms and conditions would be updated and modified as appropriate, and trailing permits would be issued where necessary. Compliance with permitted seasons of use, livestock utilization levels, pasture rotations and maintenance of range improvement projects would be emphasized on all allotments.

Jerry Creek:

Table 3. Summary of livestock grazing authorized on the Jerry Creek Allotment.

| Authorization # | Pasture | Season of Use | # Cattle | %PL | Active AUMs |
|---|---|---|---|---|---|
| 2500102 | Jimmie New | 6/1-7/31 | 89 | 98 | 175 |
| | Patton | 6/1-7/31 | 62 | 70 | 87 |
| | Dickie Hills | 6/1-7/31 | 66 | 100 | 64 |
| | | | | | **326** |
| | Trailing | 8/1-8/2 | | | |
| | Trailing | 10/1-10/15 | | | |

| | | | | | |
|---|---|---|---|---|---|
| 2504110 | Jimmie New | 6/1-7/31 | 133 | 98 | 261 |
| | Patton | 6/1-7/31 | 89 | 70 | 125 |
| | Dickie Hills | 6/1-7/31 | 348 | 100 | 96 |
| | | | | | **482** |
| | Trailing | 8/1-8/2 | | | |
| | Trailing | 10/1-10/15 | | | |

Terms and conditions in addition to those terms and conditions common to both grazing permits include:

> If after 5 years, trend monitoring indicates that significant progress is not being made towards meeting Standard 2, and livestock grazing is determined to be a contributing factor, the season of use and/or number of livestock will be adjusted.
>
> Numbers of livestock may vary so long as the carrying capacity and season of use is not exceeded for each pasture and trend monitoring indicates an improvement in riparian condition. Permittees would coordinate with the BLM prior to turn out to determine dates of use and pasture rotations.
>
> Any adjustments to the BLM pasture rotations detailed in EA #: DOI-BLM-MT-B070-2011-55-EA must be approved by the BLM prior to turn-out each year and would be coordinated annually with the USFS Wise River Ranger District.
>
> Livestock may be actively herded/trailed across BLM lands only from 8/1-8/2 and from 10/1-10/15. Permittees will coordinate with BLM prior to trailing to verify routes, timing, etc., and cattle may not be kept overnight during trailing.

For authorization # 2505627, a term and condition would be added to their grazing permit as follows:

> Livestock may be actively herded/trailed across the BLM Jerry Creek Allotment from 7/30-8/10 and 10/1-10/15. Permittees will coordinate with BLM prior to trailing to verify routes, timing, etc., and cattle may not be kept overnight on BLM lands within the Jerry Creek Allotment during trailing.

Under Alternative B, the grazing rotation schedule shown in Table 4 would be implemented and coordinated with the adjacent FS Jerry Creek Allotment.

Table 4. Grazing rotation for the Jerry Creek Allotment under Alt. B

| Pasture | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
|---|---|---|---|---|---|---|
| *Patton* | 1st | 2nd | rest | 2nd | rest | 2nd |
| *Dickie Hills* | 2nd | rest | 2nd | 1st | 2nd | rest |
| *Jimmie New* | rest | 1st | 1st | rest | 1st | 1st |

Table 5 displays the maximum number of days livestock would be allowed in pastures of the Jerry Creek Allotment per season regardless of the stocking rate under Alternative B. Environmental conditions and livestock utilization levels would dictate actual turn-out/off dates each year.

Table 5. Maximum # of days livestock would be allowed in the Jerry Creek Allotment

| Pasture | Season 1 | Season 2 |
|---|---|---|
| *Dickie Hills Pasture* | not to exceed 45 | not to exceed 25 |
| *Patton Pasture* | not to exceed 50 | not to exceed 30 |
| *Jimmie New Pasture* | not to exceed 45 | not to exceed 25 |

In addition to the proposed grazing rotation, further emphasis would be placed on riparian improvement and mitigating impacts to riparian areas. Qualitative monitoring such as the use of proper functioning condition (PFC) assessments and quantitative monitoring including but not limited to; greenline species composition, stubble height, multiple indicator monitoring (MIM), and woody browse regeneration would be used in combination to determine whether significant progress is being made towards meeting MT Dakotas Riparian Standard 2.

A target of 40 percent utilization of desirable streamside herbaceous forage would be implemented within key riparian areas on the Jerry Creek Allotment. BLM personnel would monitor utilization levels throughout the grazing season and notify permittees when the 40 percent benchmark is approaching in order to provide permittees adequate time to take appropriate planning measures. When the benchmark utilization level is met on desirable streamside herbaceous forage, all cattle would be moved out of the pasture. Cattle would not be allowed to graze within that pasture for the remainder of the grazing season and depending on the following year's rotation, may not be allowed back into the pasture for 2 years. BLM would provide a monitoring report to the permittees each fall.

Utilization levels in the uplands would also be monitored to determine whether significant progress is being made towards meeting MT Dakotas Upland Standard 1. Data would be recorded at existing monitoring sites throughout the grazing season.

The BLM's intent with this adaptive management approach is to allow for an improvement in riparian species composition with an emphasis on native grasses, sedges, and woody browse species.

During the land health assessment conducted in 2010, the BLM recognized that livestock grazing is not the only causal factor for the allotment not meeting riparian standards (BLM, 2010). One of the major factors contributing to poor riparian conditions in the Jerry Creek Allotment identified during 2010 and 2011 land health assessments was the boundary fence between the BLM and the USFS (Appendix A, Map 4). This fence was found to be in deteriorating condition and not adequate to hold livestock in the FS allotment. Livestock could freely move out of the FS allotment and back into the Jimmie New pasture.

The reconstruction of the Jerry Creek fence is an integral part of the proposed management changes within the Jerry Creek Allotment. If it is not constructed and maintained on a regular basis, any other proposed treatments or management changes within the Jerry Creek Allotment, particularly within the Jimmie New Pasture, would become less effective.

Under Alternative B, approximately 3 miles of FS/BLM boundary fence in the Jerry Creek Allotment in sections 13-15 would be rebuilt (Appendix A, Map 4). All steel posts and wire that are removed from the site would be properly disposed of or recycled. Old wood jacklegs would be cut up and scattered on site. This section of the fence would be built using 3 barbed wires. The fence wires would be placed approximately 38", 26" and 18" from the ground. The wires would be placed on the north side of these posts. The majority of the livestock pressure on this fence comes from the uphill or north side of the fence. Most of this new fence would be steel post and wood brace construction but approximately ½ mile of treated jackleg and rail construction would be needed, where bedrock is located close to the surface.

Although not common, existing trees could be utilized as fence posts. Where this occurs, wires would not be attached to the tree, but to an intermediary piece of wood. If trees used as posts are dead, they would be cut to a 5-7' stump.

In addition, portions of the fence could be identified as "let down" in areas important for wildlife movement. The "let down" sections would be an appropriate length for the site to allow easier crossings for big game and other wildlife species. These sections of fence would be let down at the end of the grazing season on BLM/FS lands (October 1) and left down until just prior to turn-out on BLM lands. The fence would be put up no earlier than June 1 each year.

The Jerry Creek boundary fence in section 17 was found to be in much better condition than that in sections 13-15. This one mile stretch of the boundary fence would not have to be completely rebuilt but would be repaired (Appendix A, Map 4). Up to ¼ mile along Cat Creek, however, would need to be rebuilt. Existing wire would be stretched and new clips would be installed, as needed. Wood braces would be rebuilt or repaired, where required. Broken or damaged wire would also be repaired or replaced with new wire. This portion of the fence line would remain a 4 wire fence measuring 42", 36", 24" and 18" from the ground. As with the boundary fence in sections 13-15, portions may be identified as "let down" in important wildlife movement corridors.

Along the entire boundary fence, conifers leaning towards or a risk to the new fence could be cut down within one tree length of the fence. This would apply predominately to dead conifers but live trees could be removed if deemed a hazard to the new fence. No trees with active raptor nests would be cut. Conifers would be felled prior to construction and left on site.

The Jerry Creek boundary fence would be reconstructed during the summer of 2012. This project would be done cooperatively between the permittees, FS and the BLM through a combination of government administered contracts and contributions (both monetary and labor) between the BLM, FS and the permittees. Prior to reconstruction and repair of the boundary fence, a cooperative range improvement agreement would be signed by all affected parties including the permittees.

An exclosure fence around Cat Creek is proposed under Alternative B to prevent livestock pressure on riparian vegetation species and stream trampling. The Cat Creek exclosure fence would be a roughly 6,700' in length and encompass approximately 47 acres (Appendix A, Map 4). The northern and western boundaries of the exclosure would be the existing Jerry Creek boundary fence. These sections of fence would be rebuilt or repaired as identified above. The north side is slightly more than ¼ mile of the existing BLM/FS boundary fence while the west side is a private property/BLM boundary fence owned by the private property owners. The south and east sides of this exclosure would be new construction. This construction would be steel post and wood braces with 3 wires placed at 38", 26" and 18" from the ground. The south side of the fence would include a 300' water gap on Cat Creek. The water gap would have jackleg posts and have 4 barbed wires for its entire length in order to withstand the pressure from livestock.

Along the exclosure, conifers leaning towards or a risk to the new fence could be cut down within one tree length of the fence. This would apply predominately to dead conifers but live trees could be removed if deemed a hazard to the new fence. No trees with active raptor nests would be cut. Conifers would be felled prior to construction and left on site.

A steel tracked excavator or a rubber tired vehicle, such as a skid steer, would be used to deliver materials to the fences, construct the fences (use as a post pounder) and to remove the old fence materials. Steep portions of the fence would be built by hand and the old fence removed by hand.

The lack of water in the Dickie Hills area reduces opportunities for livestock use of that pasture. The Decker Spring development pipeline extension would be completed, pending archeological and botanical clearances and engineering design feasibility, to provide an additional supply of livestock water in the Dickie Hills Pasture (Appendix A, Map 4). Stock water would be supplied by the existing Decker Springs development. The stock tank would be equipped with an escape ramp and float valve. The pipe would be 1¼" PE pipe buried up to 18" underground. All excavation would be conducted using the crawler tractor or back-hoe machine and would be confined to only the spring source of the pipeline, the route and the trough locations for both pipelines. Installation would be conducted using a crawler-tractor equipped to install the 1¼" PE pipe in a trench ~18" deep over the total length for the pipeline (~2 ¼ miles). A small berm of approximately 24" wide, as well as the track imprint would remain as the machine passes. A pad for stock tank placement would be leveled approximately 10 x 10ft$^2$. When deemed necessary, any areas with high soil disturbance would be seeded with a BLM approved native seed mix.

Seep Spring is located in T1N, R12W, NE ¼ Sec. 12 within the Dickie Hills Pasture (Appendix A, Map 4). Currently there is a small exclosure fence around the spring and a small pond outside the fence. Water is delivered to this small pond through a pipe and buried headbox that are part of an abandoned range improvement project. The spring does not produce enough water to warrant a major development, but cattle and wildlife do utilize the available water.

The spring would be dug out (by hand) to increase the depth. Rocks would be placed on the banks of the pond to minimize disturbance aquatic habitat disturbance by livestock and wildlife. The rocks would be placed by hand. No rock would be placed in the pond.

Foothills Allotment
The season of use, number and kind of livestock, percent public land, active AUMs, and grazing system for the Foothills Allotment would be the same as described in Alternative A (page 23). Since this allotment did not meet upland standards in the Limekiln pasture, Alternative B would reduce localized pressure by dispersing cattle throughout the area.

On years that cattle are turned into the Limekiln Pasture, a portion of the herd would be turned into the Limekiln Gulch drainage and the remainder of the herd would be turned into the Triangle Gulch drainage.

Terms and conditions in addition to those terms and conditions common to all grazing permits include:

> On years that cattle are turned into the Limekiln Pasture, a portion of the herd would be turned into the pasture into the Limekiln Gulch drainage and the remainder of the herd would be turned into the Triangle Gulch drainage.

Harriet Lou Creek
The terms and conditions, season of use, number and kind of livestock, percent public land, and active AUMs would be same as Alternative A (page 2-11).

Leffler
The terms and conditions, season of use, number and kind of livestock, percent public land, and active AUMs would be same as Alternative A (page 2-11)**.**

Quartz Hill Allotment
The terms and conditions, season of use, number and kind of livestock, percent public land, and active AUMs would be same as Alternative A (page 2-10)

**2.6.2 Travel Management**
Under Alternative B, route designations and changes to existing route designations would be made, as described below.

New Routes
For those newly inventoried routes that are considered to be extensions, or off-shoots, of routes that were "Closed Yearlong" to motorized vehicles during the previous TMP process, no additional evaluation or designation would occur since no viable access to these routes exists. These routes would be signed as "Closed Yearlong" to motorized vehicles, but would remain open to non-motorized uses.

Table 6 shows those 2011 inventoried routes that are located adjacent to, or are considered to be extensions of, routes that are currently "Open with Seasonal Restrictions" and the proposed

designation under Alternative B. These two routes are located in the Jimmie New Area (Appendix A, Map 5)

Table 6. Extension of currently "seasonally restricted" routes in the Jerry Creek area.

| BLM Route # | Original Inventory (Miles) | 2011 Inventory (Miles) | 2009 TMP Designation | Proposed New Designation |
|---|---|---|---|---|
| BH033a | 1.10 | 1.10 + **0.32** | 1.10 Miles Open to Motorized Vehicles for Hunting Access with Seasonal Restriction - Closed 12/2 to 5/15 | 1.10 existing Miles + 0.32 additional Miles Open to Motorized Vehicles for Hunting Access with Seasonal Restriction Closed 12/2 to 5/15 |
| Route # will be assigned only if designated | N/A | 0.43 | Not in Original Route Inventory Located North of Route Junction 0104/BH190a | Open to Motorized Vehicles for Hunting Access with Seasonal Restriction - Closed 12/2 to 6/30 |
| **TOTAL** | **1.10** | **0.75** | | |

Most of the 2011 inventoried routes (approximately 8.5 miles) are not included in the proposed action. Only those routes that provide access to major recreation destinations (i.e. hunting access, camping spots, etc.) or provide other necessary access (i.e. administrative, etc.) would be considered under the proposed action.

Existing Routes

Each of the following routes was designated as "Closed Yearlong" to motorized vehicles during the initial TMP process (2009). However, due to input from several members of the public following the implementation of the Upper Big Hole River TMP in 2010, re-opening five of these routes would occur under this alternative (Appendix A, Map 5). Current road densities within elk calving ranges (May 1-June 30) is currently 1.5 mi/mi$^2$ , in order to comply with the road density requirements for elk calving ranges (1 mi/mi$^2$, Butte RMP, 2009 page 30) all roads within elk calving range would not open until June 30$^{th}$ and would remain open through December 2, with the exception of Route 010105. Therefore, an amendment to the original Upper Big Hole River TPA would occur under this alternative. Table 7 displays the proposed designations for each of these routes.

Table 7**.** Proposed new route designations for existing routes in the Jimmie New Area under Alternative B.

| Route # | Length (Miles) | 2009 TMP Designation | Proposed New Designation |
|---|---|---|---|
| 010100b<br>188 | 0.50<br>0.25 | Closed Yearlong to Motorized Vehicles<br>188 is Preferred Access to 010100b | Open to Wheeled Motorized Vehicles for Hunting Access with Seasonal Restriction - Closed 12/2 to 6/30 |
| 010101 | 1.36 | Closed Yearlong to Motorized Vehicles | Open to Wheeled Motorized Vehicles for Hunting Access with Seasonal Restrictions - Closed 12/2 to 6/30 |
| 010105 | 0.47 | Open to Snowmobiles only Closed Yearlong to Wheeled Motorized Vehicles | Open to Motorized Vehicles for Recreational Access with Seasonal Restrictions to match U.S. Forest Service Designation - Closed 10/15 to 5/15 to Wheeled Motorized Vehicles - Closed 5/15 to 12/1 to Snowmobiles |
| BH191/216 | 0.10 | Closed Yearlong to Motorized Vehicles | Open to Wheeled Motorized Vehicles for Dispersed Camping with Seasonal Restriction - Closed 12/2 to 6/30 |

| | | | |
|---|---|---|---|
| | | Decommission | |
| BH032 | 0.15 | Closed Yearlong to Motorized Vehicles | Open to Wheeled Motorized Vehicles for Dispersed Camping with Seasonal Restriction - Closed 12/2 to 6/30 |
| **TOTAL** | **2.83** | | |
| **Route #** | **Length** | **2009 TMP Designation** | **Proposed New Designation** |
| 010100b<br>188 | 0.50<br>0.25 | Closed Yearlong to Motorized Vehicles<br>188 is Preferred Access to 010100b | Open to Wheeled Motorized Vehicles for Hunting Access with Seasonal Restriction - Closed 12/2 to 5/15 |
| 010101 | 1.36 | Closed Yearlong to Motorized Vehicles | Open to Wheeled Motorized Vehicles for Hunting Access with Seasonal Restrictions - Closed 12/2 to 5/15 |
| 010105 | 0.47 | Open to Snowmobiles only Closed Yearlong to Wheeled Motorized Vehicles | Open to Motorized Vehicles for Recreational Access with Seasonal Restrictions to match U.S. Forest Service Designation - Closed 10/15 to 5/15 to Wheeled Motorized Vehicles - Closed 5/15 to 12/1 to Snowmobiles |
| BH191/216 | 0.10 | Closed Yearlong to Motorized Vehicles Decommission | Open to Wheeled Motorized Vehicles for Dispersed Camping with Seasonal Restriction - Closed 12/2 to 5/15 |
| BH032 | 0.15 | Closed Yearlong to Motorized Vehicles | Open to Wheeled Motorized Vehicles for Dispersed Camping with Seasonal Restriction - Closed 12/2 to 5/15 |
| **TOTAL** | **2.83** | | |

Travel Variance

Design features common to all action alternatives outlines the authorization of a travel variance on closed routes in the project area. To implement range improvement projects, however, cross country travel would be necessary and also require a travel variance. Cross country travel to rebuild and repair the Jerry Creek boundary fence, to implement the Cat Creek exclosure fence and other riparian exclosures as well as to implement the Decker Springs pipeline extension and Seep Springs armoring and pond enhancement would be authorized under Alternative B.

### 2.6.3 Vegetation

Forest

Alternative B would propose thinning conifers in high density Douglas-fir savannah habitat, Douglas-fir forest, and mixed conifer stands. This alternative would also propose thinning of previously harvested lodgepole pine stands and the removal of confers from the wildland urban interface. Conifer would be thinned in areas where sagebrush, aspen and riparian habitats have been colonized by conifers.

This alternative would allow for the commercial removal of timber and biomass as well as commercial and personal firewood permits.

Prescribed burns would be implemented to reduce residual slash after harvest activities, protect WUI areas, promote aspen, and reduce conifer expansion into aspen, and sagebrush meadows.

Douglas-fir Savannah

Non-commercial and a limited amount of commercial thinning of Douglas-fir savannah stands would be accomplished on approximately 1,640 acres (Appendix A, Maps 6-9). Overstory trees

from 7-15" diameter at breast height (DBH) (sawlog size) would be thinned. No trees >15"DBH would be removed unless infested with Douglas-fir beetle and found to be a threat to the stand.

The prescription would reduce stand densities to a residual basal area of 10-50 ft2/acre depending on local site conditions and historic fire occurrence. Basal area is a measurement of stand density, where a given area of trees is described by the cross-section (in square feet) of those trees. The long-term objective is to develop large, open-grown Douglas-fir stands that are resilient to inherent disturbance regimes (insects and fire). After thinning activities, trees under 15"DBH would generally be less than 20 per acre and forest canopies would be open at <30 percent (Heyerdahl 2006).

Where trees with old-growth characteristics have been killed due to Douglas-fir beetle, existing mature trees would be protected and younger trees with good structure would be targeted as future replacement trees.

At least 20 percent of the 1,640 acres identified for thinning in the Douglas-fir savannah habitat type would be retained for cover within wildlife corridors, patches of security habitat and to provide diversity. The size and location of retention patches would be determined on a unit by unit basis.
Up to 25 percent (roughly 400 acres) of Douglas-fir savannah stands could be underburned after thinning but only after Douglas-fir beetle populations declined to endemic levels.

Douglas-fir Forest
Commercial and non-commercial thinning of Douglas-fir forest stands would be accomplished on approximately 820 acres (Appendix A, Maps 7-9). Overstory trees from 7-18"DBH (sawlog size) could be thinned. Up to 20 percent of trees between 15-18" DBH could be removed. No trees >18"DBH would be removed unless infested with Douglas-fir beetle and found to be a threat to the stand.

After thinning activities, trees under 15"DBH would generally be less than 40 per acre and forest canopies would be fairly open at 30-50 percent.

The prescription would reduce stand densities to a residual basal area (BA) of 30-60 ft2/acre depending on local site conditions and historic fire occurrence. The long-term objective is to develop large, open-grown Douglas-fir stands that are resilient to inherent disturbance regimes (insects and fire).

In stands with active western spruce budworm (WSB), even-aged shelterwood systems can be particularly effective in altering stand conditions to create resilience to insect activity. In areas impacted by the WSB, stands on northerly aspects would generally have fewer trees per acre (TPA) after thinning (25-35 TPA at ~39' spacing) while stands on southerly aspects would tend to have more trees per acre after treatment (30-40 TPA at~ 33 ft spacing). Leave trees with full, pointy crowns, live crown ratios (LCRs) of 40 percent, and those showing resistance to WSB on a somewhat even distribution across the unit would be retained.

In stands with low WSB activity, group and individual tree selection methods would be used to promote the development and retention of uneven-aged stands, where applicable. When unbalanced diameter distributions indicate a surplus of larger trees, up to 20 percent of trees 15-18" DBH could be removed. Irregularly shaped openings approximately 2-3 times average tree height could be created.

Where trees with old-growth characteristics have been killed due to Douglas-fir beetle, existing mature trees would be protected (phermone) and younger trees with good structure would be targeted as future replacement trees. To increase vigor of chosen leave trees, all smaller and undesirable trees within one tree length could be removed.

At least 20 percent of the 820 acres identified for thinning in the Douglas-fir forest habitat type would be retained for cover within wildlife movement corridors, patches of security habitat and to provide diversity. The size and location of retention patches would be determined on a unit by unit basis.

Up to 25 percent (roughly 200 acres) of Douglas-fir forest stands could be underburned after thinning but only after Douglas-fir beetle populations declined to endemic levels.

Mixed conifer stands

Alternative B would thin up to 250 acres of mixed conifer stands (Appendix A, Map 9; Appendix C). In mixed conifer stands with a Douglas-fir dominated top story, lodgepole would be removed to release Douglas-fir to achieve 60-120 BA. In mixed stands with a lodgepole pine dominated top story, Douglas-fir would be removed to achieve 60-120 BA.

In single or multi-storied stands, up to 30 percent of the original BA could be removed in successive entries. Openings created by thinning activities would not cover more than 30 percent of entire unit at any given time. The forest canopy would be fairly open after thinning (30-50 percent) but canopy cover could be greater than 50 percent depending on stands characteristics.

To promote uneven-aged character, trees would be removed based on spatial distribution rather than individual characteristics to maintain clumpiness and group structure across the unit.

Previously Harvested Stands Lodgepole Pine

Under Alternative B, treatments in previously harvested lodgepole pine stands would focus on; 1) promoting the development of wind firmness in immature lodgepole stands that are topographically predisposed to wind activity (such as narrow valley bottoms running parallel to prevailing wind, saddles that funnel wind over ridges, and exposed ridge tops (Alexander 1986); 2) decreasing level/rate of infection of dwarf mistletoe; and 3) promotion of increased resistance to damage from insect infestation.

Thinning activities would be carried out in some previously cut stands to promote the development of wind firmness in lodgepole stands prone to damage from moderate wind activity. This type of treatment is effective if stands are thinned early in their development and then

periodically over time to maintain more open stand conditions. Generally, successive entries are about 5-10 years apart, which should allow the stand to develop windfirmness.

Between 20-30 percent of the original BA could be removed at a time in successive entries. No more than 25 percent of the unit area would be opened through thinning activities at any one time.

In up to 310 acres of previously harvested stands, thinning would be done to achieve evenly spaced trees disbursed over the stands. Generally, spacing between residual trees would be 12-15'.

Trees could be removed up to 1 tree length from larger lodgepole pine susceptible to attack by mountain pine beetle. This would increase wind flow and air temperature around susceptible boles, remove trees that shade boles and reduce the risk of attack by mountain pine beetle.

Even-aged thinning methods would be utilized rather than group selection methods.
In areas with localized mistletoe infections, small openings could be created (maximum of 5 acres) to control spread.

Temporary Roads

There is an extensive network of established roads on BLM and FS administered lands in the analysis area. These roads, in most cases, should provide adequate access for mechanized equipment to access and implement treatment activities. However, in some cases, a length of temporary road might be needed to access project treatment units and connect them to the existing road network. When temporary roads are established, Montana Best Management Practices would be adhered to in the construction, maintenance, use, and decommission of these roads. Any temporary roads created for project implementation would not be left open and available for other uses; rather roads would be made unavailable to motorized access through the installation of barricades such as boulders and soil berms. Additionally temporary road surfaces would be deposited with slash to make them unavailable to motorized use. Every effort would be made to plan treatments to minimize the need for temporary road construction.

Table 8. Forest treatment acres by major area and miles of proposed temporary roads under Alternative B

| Area | Total BLM Acres | DF Savannah | DF Forest | Mixed Conifer | Young LP Stands | Temporary Roads (Miles) |
|---|---|---|---|---|---|---|
| **Charcoal Gulch** | 2,766 | 178 | | | | 0 |
| **Jimmie New** | 7,874 | 1,187 | 735 | 0 | 50 | 3.5 |
| **Dickie** | 2,768 | 185 | | 95 | | 0 |
| **Alder** | 2,359 | | | 116(WUI) | 270 | 1 |
| **Deno** | 1,346 | 90 | 85 | 156 | | 2.0 |
| **Total** | 17,113 | 1,640 | 820 | 367 | 320 | 6.5 |

Maintenance activities could be needed on existing open roads prior to use by heavy equipment. This type of maintenance could include improving the existing road surface by blading with heavy equipment or installing drainage features. If existing roads are degraded, they would be improved to stabilize the surface prism and ensure safe passage and minimize erosion.

Maintenance activities would leave existing open roads in as good or better condition after project activities.

Sagebrush Meadows

Approximately 1,400 acres would be thinned to reduce the density of Douglas-fir stands and set back colonization of Douglas-fir in sagebrush meadows (Appendix C). Larger diameter trees would be favored for retention.

Under Alternative B, conifers up to 18"DBH could be removed from within sagebrush habitats or on the edges of sagebrush meadows to mimic historic conditions. Mechanical mastication (grinding) could be used to remove conifer colonization in sagebrush habitats on roughly 570 acres while mechanical thinning and/or prescribed fire could be used on up to 300 acres. In addition, prescribed fire could be used in sagebrush habitats to remove conifer colonization on up 540 acres (Appendix A, Maps 7-9).

Hand cutting of conifers could occur in any sagebrush stand to meet objectives as long as acceptable slash depths are met (less than 12" in height) and slash is not consistent throughout the stand. Slash created could be lopped and scattered or jackpot burned (concentrations are burned, but fire is not carried throughout the unit). Jackpot burning is designed to burn fuel concentrations and additional conifer seedlings and saplings that were not cut down. Hand cutting could also be necessary to create slash before broadcast burning.

Objectives of burning in sagebrush would be to maintain at least 50 percent sage cover while removing as much conifer colonization as possible. Refer to "Prescribed Fire Polygons" for more information on how prescribed fire would be implemented in sagebrush habitats.

Patches of conifers would be retained for hiding cover within sagebrush stands. The size and number of patches would be determined during layout.

Aspen

Under Alternative B, conifers would be removed from approximately 60 individual aspen stands to reduce encroachment of conifers and reduce competition and overtopping of aspen trees by conifers (Appendix C) (Appendix A, Maps 6-9). Addition upland aspen stands could also be treated in conjunction with non-commercial and commercial forest and sagebrush thinning units.

Within aspen stands, conifers could be cut down, lopped and scattered, left intact as slash barriers or girdled to create snags.

Whole trees left on site could be used to provide secure growing locations for seedlings (browse barrier) or slash could be used to create natural barriers around aspen stands. Some slash, however, could be removed to prevent large concentrations of fuels. Slash could be chipped, masticated, lopped and scattered or burned in piles.

The majority of conifers to be cut from within aspen stands would be smaller than 10"DBH but larger trees (between 10-15" DBH) could be cut if found to be out-competing aspen. Conifers greater than 15" DBH could also be girdled to create snags and reduce competition with aspen.

Outside the outer edge of existing aspen stands, conifers up to 15"DBH could be removed from within 2 tree lengths of the stand to reduce competition with aspen and promote expansion of the stand. The appropriate number of conifers to be removed would be determined by site-specific assessment.

Although spruce would not be a target species to remove during aspen restoration, spruce could be cut if found to be out-competing aspen in a stand. No spruce >15" would be cut or girdled.

Hand cutting within aspen stands would be utilized to prevent loss of aspen unless site specific assessment finds that mechanical treatments would not cause impacts to the stand. Mechanical treatments (including mastication or commercial harvest) or hand cutting operations could be implemented outside the outer edge of existing aspen stands if aspen regeneration is fully protected.

Livestock grazing could be excluded through timing or fencing until aspen regeneration is a minimum of five feet tall, on average. Temporary fencing could be required in treatment units or in existing aspen stands where it is determined (through pre and post implementation monitoring) that aspen regeneration is being restricted or lost due to browse pressure by livestock, wildlife or both. Fencing could remain on the site for up to 10 years or until aspen are above the browse level for big game species.

### 2.6.4 Prescribed Fire

Prescribed fire could be used to consume residual slash and to remove greater than 60 percent of encroaching/colonizing conifers in identified units (Appendix A, Map). Burning would occur in spring or fall depending on conditions.

Underburning in the harvest/treatment units could occur to remove slash and to maintain open conditions on up to 25 percent of Douglas-fir habitat types. This would only occur after Douglas-fir beetle populations have returned to endemic levels.

Prescribed Fire Polygons

In addition to individual treatment units, four larger prescribed fire areas have been identified (Appendix A, Map 10). These are areas that historically were maintained as open sagebrush/grassland habitats. The objective in each of these areas is to use prescribed fire and mechanical activities to reduce conifer colonization and move toward an open mosaic of sagebrush/grassland. Each of the four areas would have both long-term restoration goals and short-term acceptable sagebrush cover. Long-term goals are habitat conditions desired within 30 years and would mimic historic conditions. Short-term acceptable sagebrush cover would take into consideration the unavoidable loss of sagebrush due to restoration activities. Some areas of sagebrush could be lost when fire is used to remove conifers, but the areas are expected to be fully recovered within 30 years to meet the long-term objectives. Table 9 provides the acres for each of the prescribed fire polygons as well as long-term sagebrush cover goals and short-term acceptable sage cover for each of these areas.

Table 9. Acres and sagebrush cover goals in Prescribed Fire Polygons.

| Prescribed Fire Polygons Total Acres | | Long-term (30 years) Sagebrush Cover Goals | | | Short-term (10 years) Acceptable Sage Cover | |
|---|---|---|---|---|---|---|
| | | 0-20% | 20-40% | >40% | <40% | >40% |
| **Spring Gulch** | 710 | 135 | 430 | 100 | 500 | 175 |
| **Jimmie New** | 425 | 85 | 275 | 65 | 275 | 150 |
| **Cline Gulch** | 390 | 70 | 225 | 50 | 200 | 150 |
| **Dickie Hills** | 345 | 65 | 210 | 50 | 250 | 75 |

### 2.6.5 Riparian

Under Alternative B, restoration would occur on up to 240 acres of riparian habitats (Appendix C) (Appendix A, Maps 6-9). Riparian restoration could include the removal of conifers to reduce competition and overtopping of aspen, willows and other shade intolerant species by conifers or planting of riparian species.

Within riparian areas where conifers are outcompeting or have the potential to outcompete riparian vegetation that require open growing conditions, conifers would be slashed (cut down), lopped and scattered. Slash could be left on site to create a natural barrier around riparian vegetation or to provide secure growing locations for seedlings (browse barrier). Some slash, however, could be removed to prevent large concentrations of fuels.

The majority of the conifers to be cut from within riparian vegetation would be smaller than 10”DBH but larger trees (between 10-15” DBH) could be cut if found to out-competing desired riparian species. Conifers greater than 15” DBH could also be girdled to create snags and reduce competition with desired riparian species. No trees greater than 18”DBH would be cut.

Spruce would not be a target species to remove for riparian restoration and no spruce would be cut unless found within an aspen stand. Refer to the prescription for aspen stands.

Outside the outer edge of riparian areas dominated by willow, aspen or other riparian species that prefer more open site conditions, conifers up to 15”DBH could be removed from within 1 tree length to reduce competition with these species. The appropriate number of conifers to be removed would be determined by site-specific assessment.

The monitoring identified on page 2-14 would be used to determine whether progress towards meeting riparian standards is being made. Riparian exclosures (temporary and permanent) would be built as a method of comparing differences in vegetation and to determine reasonable objectives for riparian species composition and cover, in addition to trend monitoring data.

Where riparian vegetation has declined or is at low concentrations, willow, aspen or other appropriate riparian vegetation species could be planted. Where necessary, these plants would be protected from ungulate grazing by tree tubes, temporary fencing or natural barriers.

Natural barriers and down woody material could be used to discourage use of riparian habitats by livestock and big game. Native materials (down woody) or manufactured fencing could be utilized to create barriers to wildlife and livestock, when necessary, to protect and promote regeneration of riparian vegetation. Fencing could be temporary (for up to 10 years or until vegetation is recovered) or permanent. If permanent fencing is identified, the location and type of fence would be identified by site specific assessment.

Restoration work would be done predominately through hand cutting. All work done in riparian habitats would be completed to meet riparian objectives. Treatment activities within riparian zones would emphasize the promotion, maintenance, and restoration of riparian habitats and their ecological function. Mechanical activity and product removal could only be done if structural requirements of the riparian area (such as down wood) are being met and if riparian and instream habitats are fully protected.

Riparian Exclosures

Riparian exclosures could be built in several representative locations within the project area. These exclosures, as well as the Cat Creek exclosure, would be used to establish a reasonable expectation of what riparian species could be found within the allotment(s) in the absence of grazing or browsing by livestock and/or wildlife. The size of the additional exclosures would be site dependent but they would be expected to be no larger than 5 acres. These exclosures would not be intended to exclude livestock from large areas. They are intended for comparison purposes to help establish a baseline for future management decisions as well as to recover riparian vegetation in specific areas.

These exclosures would predominately be located in the following drainages; LaDucet Creek, West Fork of Jimmie New Creek, a tributary of W.F. of Jimmie New Creek and the Middle Fork of Jimmie New Creek but they could occur in other drainages throughout the project area. The exclosures would be constructed of lightweight plastic mesh 8’ in height and designed to exclude all grazing, including wildlife. The exclosures would be temporary, lasting up to 10 years, depending on vegetation response.

### 2.6.6 Wildland Urban Interface

Currently, excessive hazardous wildland fuels exist in areas where BLM-administered lands border private property. High fuel concentrations in these areas pose a high risk for large fire events with intense fire behavior that could threaten public property and the safety of responding firefighting resources. Fuel modifications that reduce the fuel loading and modify fuel arrangement would reduce the fire behavior in the WUI, mitigating the impacts in the event of a wildfire.

The proposed action would reinforce vegetation treatments that have occurred on BLM administered lands as well as on private property in the WUI (Appendix A, Maps 8-9). The removal of trees would reduce fuel accumulations and have a direct impact in minimizing fire behavior.

All dead, dying and live trees in the forested WUI units would be removed to achieve a crown spacing of up to 20' in lodgepole stands, and to attain a 2½ times crown spacing in the mixed conifer stands. The WUI units that include sagebrush areas would remove all conifer colonization <12" DBH and under 40' in height.

In the event of mortality and/or blowdown occurring after the initial thinning, additional treatments could be required in the WUI units to meet objectives.

## 2.7 Alternative C

Alternative C was primarily designed in response to the Issues identified on page 1-9, specifically to reduce the direct and indirect impacts to wildlife habitats. Riparian treatments and the number of acres treated in riparian areas would remain the same as Alternative B since those treatments were designed to enhance wildlife habitat. The WUI treatments designed to enhance public safety were reduced, and the number of acres treated in other upland and forested habitats were also reduced. On the Jerry Creek Allotment, average actual use for the previous 10 years was ~10% less than permitted use. In order to analyze a reasonable range of alternatives for an allotment not meeting the standards, in part due to livestock grazing, the average actual use (10% AUM reduction) provides an additional alternative for consideration.

### 2.7.1 Livestock Grazing

Jerry Creek Allotment

Under Alternative C, grazing in the Jerry Creek Allotment would be reduced by approximately 10 percent from the current authorized active use. Trailing would be authorized as proposed in Alternative B. The grazing rotation schedule would be the same as under Alternative B (Table 4, page 2-12). Compliance with permitted seasons of use, livestock utilization levels, pasture rotations and maintenance of range improvement projects would be emphasized on all allotments.

Table 10 displays the maximum number of days livestock would be in pastures of the Jerry Creek Allotment per season regardless of the stocking rate under Alternative C. Environmental conditions and livestock utilization levels would dictate actual turn-out/ off dates each year.

Table 10. Maximum # of days livestock would be allowed in the Jerry Creek Allotment.

| Pasture | Season 1 | Season 2 |
|---|---|---|
| *Dickie Hills Pasture* | not to exceed 30 | not to exceed 15 |
| *Patton Pasture* | not to exceed 40 | not to exceed 20 |
| *Jimmie New Pasture* | not to exceed 30 | not to exceed 15 |

All other portions of the permits associated with the Jerry Creek Allotment would be the same as described in Alternative B. The permits would be issued as follows (Table 11) from 3/1/12 to 2/28/22:

Table 11. Jerry Creek Allotment grazing permits reflecting and 10% reduction in AUMs.

| Authorization # | Pasture | Season of Use | # Cattle | %PL | Active AUMs |
|---|---|---|---|---|---|
| **2500102** | Jimmie New | 6/1-7/31 | 80 | 98 | 157 |
| | Patton | 6/1-7/31 | 54 | 70 | 76 |
| | Dickie Hills | 6/1-7/31 | 30 | 100 | 60 |
| | | | | | **293** |
| | Trailing | 8/1-8/2 | | | |
| | Trailing | 10/1-10/15 | | | |
| **2504110** | Jimmie New | 6/1-7/31 | 118 | 98 | 233 |
| | Patton | 6/1-7/31 | 80 | 70 | 112 |
| | Dickie Hills | 6/1-7/31 | 43 | 100 | 86 |
| | | | | | **431** |
| | Trailing | 8/1-8/2 | | | |
| | Trailing | 10/1-10/15 | | | |

All other portions of Alternative C, including terms and conditions, with respect to the Jerry Creek Allotment would be as described in Alternative B including; proposed pasture rotations, 40 percent utilization level on desirable streamside herbaceous vegetation, construction/ maintenance of the Jerry Creek #2 Fence in 2012, construction of the Cat Creek and comparison exclosures and the Decker Spring pipeline extension.

Foothills Allotment

The season of use, number and kind of livestock, percent public land, and active AUMs would be the same as the no action alternative; however the permittees applied for a new rotation between the Limekiln and Deno Creek Pastures (Table 12) from 3/1/12 to 2/28/22.

Table 12 Proposed grazing system on the Foothills Allotment.

| YEAR | PASTURE | NUMBER of LIVESTOCK | GRAZING DATES |
|---|---|---|---|
| 1 | Deno Creek | 100 | 5/25 – 6/15 |
| 1 | Limekiln | 50 | 5/25 – 6/15 |
| 2 | Deno Creek | 50 | 5/25 – 6/15 |
| 2 | Limekiln | 100 | 5/25 – 6/15 |

Harriet Lou, Leffler and Quartz Hill Allotments

The proposed management for the remaining allotments (Harriet Lou, Leffler, Quartz Hill and under Alternative C would be the same as those describe in Alternative B. All permits would be issued from3/1/12 to 2/28/22.

Just as in Alternative B, compliance with permitted seasons of use, livestock utilization levels, pasture rotations and maintenance of range improvement projects would be emphasized on all allotments under Alternative C.

### 2.7.2 Travel Management

Under Alternative C, route designations and the cross country travel variance would be the same as those described in Alternative B (Appendix A, Map 5).

### 2.7.3 Vegetation

Forest

As with Alternative B, Alternative C would allow the thinning of conifers in high density Douglas-fir savannah habitat, Douglas-fir forest, and mixed conifer stands. This alternative would also allow precommercial thinning of previously harvested lodgepole pine stands and the removal of confers from the wildland urban interface. Conifer colonized sagebrush, aspen and riparian habitats would also be proposed for thinning under Alternative C.

Like Alternative B, this alternative would allow for commercial removal of timber and biomass as well as commercial and personal use firewood permits. Alternative C would also allow for the use pheromones to help control insect activity and rates of infestation in lodgepole pine and Douglas-fir stands.

Prescribed burns could be implemented under this alternative to reduce residual slash after harvest activities, protect WUI areas, promote aspen, and reduce conifer expansion into aspen, and sagebrush.

Appendix C outlines the proposed treatment acres by habitat type as well as objectives and type treatment under Alternative B. Unit locations and boundaries are shown for the 6 major areas of the project in Appendix A, Map 2.

Douglas-fir Savannah

Non-commercial and a limited amount of commercial thinning of Douglas-fir savannah stands could be accomplished on approximately 940 acres under Alternative C (Appendix C) (Appendix A, Maps 11-13 ). The objectives for restoration and prescriptions proposed for Douglas-fir savannah would be the same as described under Alternative B.

At least 20 percent of the 940 acres identified for thinning in the Douglas-fir savannah habitat type would be retained for cover within wildlife corridors, patches of security habitat and to provide diversity. The size and location of retention patches would be determined on a unit by unit basis.

Up to 25 percent (235 acres) of Douglas-fir savannah stands could be underburned after thinning but only after Douglas-fir beetle populations declined to endemic levels.

Douglas-fir Forest

Commercial and non-commercial thinning of Douglas-fir forest stands would be accomplished on approximately 500 acres under Alternative C (Appendix C) (Appendix A, Maps 12-14). The objectives for restoration and prescriptions proposed for Douglas-fir forest would be the same as described under Alternative B.

At least 20 percent of the 500 acres identified for thinning in the Douglas-fir forest habitat type would be retained for cover within wildlife movement corridors, patches of security habitat and to provide diversity. The size and location of retention patches would be determined on a unit by unit basis.

Mixed Conifer Forest

Commercial and non-commercial thinning of mixed conifer stands would be accomplished on approximately 40 acres under Alternative C (Appendix C). The objectives for restoration and prescriptions proposed for mixed conifer forest would be the same as described under Alternative B.

Previously Harvested Lodgepole Pine Stands

Thinning of previously harvested lodgepole pine stands would be accomplished on approximately 120 acres under Alternative C (Appendix C). The objectives for restoration and prescriptions proposed for previously harvested lodgepole pine stands would be the same as described under Alternative B.

Temporary Roads

Like Alternative B, the use of temporary roads could be necessary to implement forest restoration or timber harvest activities. Temporary roads would be addressed the same way for Alternative C as under Alternative B.

Table 13 displays proposed forest treatment acres and the anticipated miles of temporary road associated with forest treatment activities under Alternative C by the 5 major locations in the project area (Appendix A, Map 2).

Table 13. Forest treatment acres by major area and miles of proposed temporary roads under Alternative C.

| Area | Total Acres | DF Savannah | DF Forest | Mixed Conifer | Young LP Stands | Temporary Roads (Miles) |
|---|---|---|---|---|---|---|
| **Charcoal Gulch** | 2,766 | 130 | | | | 0 |
| **Jimmie New** | 7,874 | 600 | 473 | | 50 | 1.75 |
| **Dickie** | 2,768 | 180 | | | | 0 |
| **Alder** | 2,359 | | | 40 | 70 | 0.5 |
| **Deno** | 1,346 | 30 | 27 | | | 1.0 |
| **Total** | 17,113 | 940 | 500 | 40 | 120 | 3.25 |

Sagebrush Meadows

Under Alternative C, approximately 760 acres would be thinned or burned to reduce the density of Douglas-fir and set back colonization of Douglas-fir in sagebrush meadows (Appendix C). Larger diameter trees would be favored for retention. The objectives for restoration and proposed prescriptions in sagebrush habitats would be the same as described under Alternative B.

Mechanical mastication (grinding) could be used to remove conifer colonization in sagebrush habitats on roughly 425 acres while mechanical thinning and/or prescribed fire could be used on up to 160 acres. In addition, prescribed fire could be used in sagebrush habitats to remove conifer colonization on up 175 acres (Appendix C). Objectives of burning in sagebrush would be to maintain at least 50 percent sage cover while removing as much conifer colonization as possible.

Patches of conifers would be retained for hiding cover within sagebrush stands. The size and number of patches would be determined on a unit by unit basis.

### 2.7.4 Aspen and Riparian Habitats

The number of aspen stands treated (60) and the number of riparian acres proposed for restoration activities (240 acres) would be the same under Alternative C as Alternative B (Appendix C) (Appendix A, Maps 11-13). The objectives and prescriptions for aspen stands and riparian habitat would be same as described under Alternative B.

### 2.7.5 Prescribed Fire and Wildland Urban Interface

Like Alternative B, prescribed fire could be used to consume residual slash and to remove greater than 60 percent of encroaching/colonizing conifers in identified units under Alternative C (Appendix A, Maps 13-14).

Underburning in harvest/treatment units could also occur to remove slash and maintain open forest conditions. This would only occur after Douglas-fir beetle populations have returned to endemic levels.

Although fire could be used to remove conifers in up to 335 acres of sagebrush stands under Alternative C, there would be no prescribed fire polygons under this alternative.

The objectives and prescriptions for WUI units would be the same as described under Alternative B but Alternative C would treat fewer acres in the WUI. Under Alternative C, 315 acres would be thinned in the WUI to reduce the hazard of wildfire to adjacent private property.

### 2.8 Alternative D

Alternative D was designed to provide an additional basis for comparison on the Jerry Creek and Foothills allotments, which did not meeting standards, in part due to livestock grazing. Additionally, minor adjustments to travel route designations were included to provide dispersed camping opportunities in areas where camping previously occurred. To further reduce the impacts to wildlife habitats and address Issues on page 1-9, prescribed fire polygons were removed, and WUI treatments would not occur in all the areas identified that pose a risk to public safety similar as in Alternative C.

#### 2.8.1 Livestock Grazing

Under Alternative D, no livestock grazing would be authorized on either the Jerry Creek or Foothills Allotments and trailing permits would be issued for the Jerry Creek Allotment. The trailing permits would be issued only to allow the cattle to be actively trailed across BLM lands. Permittees would not be authorized to "overnight" cattle on BLM lands. Exact dates would be coordinated annually between the BLM, USFS and permittees.

The projects proposed in Alternatives B and C for the Jerry Creek Allotment; construction/ maintenance of the Jerry Creek #2 Fence in 2012, construction of the Cat Creek and comparison exclosures and the Decker Spring pipeline extension would not be proposed under Alternative D.

The management proposed under Alternative D for the remaining allotments (Harriet Lou, Leffler and Quartz Hill) would be the same as described in Alternative B. Permits would be issued from 3/1/12 to 2/28/22.

Just as in Alternatives B and C, compliance with permitted seasons of use, livestock utilization levels, pasture rotations and maintenance of range improvement projects would be emphasized on all allotments under Alternative D.

#### 2.8.2 Travel Management

Under Alternative D, approximately 0.72 mile of routes would be opened with seasonal restrictions in the Jimmie New area (Table 14) (Appendix A, Map 15). As in Alternatives B and C, routes BH191/216 and BH032 would be open from June 30 to December 2 to address concerns with elk calving ranges and road densities within those calving ranges. Route 010105 would be open from May 15 to October 15 to match the USFS designation.

Table 14. Proposed changes in travel management under Alternative D.

| Route # | Length (Miles) | 2009 TMP Designation | Proposed New Designation |
|---|---|---|---|
| 010105 | 0.47 | Open to Snowmobiles only<br>Closed Yearlong to Wheeled Motorized Vehicles | Open to Motorized Vehicles for Recreational Access with Seasonal Restrictions to match current U.S. Forest Service Designation<br>Closed 10/15 to 5/15 to Wheeled Motorized Vehicles<br>Closed 5/15 to 12/1 to Snowmobiles |
| BH191/216 | 0.10 | Closed Yearlong to Motorized Vehicles<br>Decommission | Open to Wheeled Motorized Vehicles for Dispersed Camping with<br>Seasonal Restriction - Closed 12/2 to 6/30 |
| BH032 | 0.15 | Closed Yearlong to Motorized Vehicles | Open to Wheeled Motorized Vehicles for Dispersed Camping with Seasonal Restriction - Closed 12/2 to 6/30 |
| **TOTAL** | **0.72** | | |

Under Alternative D, travel variances would be the same as those described for Alternative B.

### 2.8.3 Vegetation

Under Alternative D, acres of vegetation treatments and prescriptions for all habitat types (Douglas-fir savannah, Douglas-fir forest, mixed conifer forest and previously harvested lodgepole pine stands) would be the same as described in Alternative C (Appendix C). Temporary roads would also be the same as under Alternative C.

Although fire could be used to remove conifers in sagebrush stands under Alternative D, there would be no prescribed fire polygons under this alternative (this is the same as Alternative C). Objectives of burning in sagebrush would be to maintain at least 50 percent sage cover while removing as much conifer colonization as possible.

### 2.8.4 Prescribed Fire and Wildland Urban Interface

Under Alternative D, prescribed fire prescriptions and acres proposed for burning would be the same as Alternative C (Appendix A, Maps 13-14).

The objectives for WUI treatments, prescriptions and acres would be the same as described under Alternative C.

## 2.9 Summary Comparison of Alternative Actions:

Table 15. Summary comparison of each alternative including livestock grazing, vegetation treatments, travel management, WUI, and riparian and aquatic treatments.

| | Alternative A | Alternative B | Alternative C | Alternative D |
|---|---|---|---|---|
| **Livestock Grazing** | | | | |
| **Jerry Creek:** | | | | |
| Livestock # and Kind | 686 Cattle | 487 | 405 | None |
| Grazing Period | 6/1-7/31 | 6/1-7/31 | 6/1-7/31 | None |
| Active BLM AUMs | 600 | 808 | 724 | None |
| Trailing Authorized | Yes | Yes | Yes | Yes |
| Grazing Management | Rest-rotation | Rest-rotation, with allowable use levels in riparian areas | Rest-rotation, with allowable use levels in riparian areas; AUMs based on actual use | None |
| Range Improvement Projects | No new projects | Boundary fence, pipeline extension, spring improvement, | Boundary fence, pipeline extension, spring improvement, | No new projects |
| **Foothills:** | | | | |
| Livestock # and Kind | 150 Cattle | 150 Cattle | 150 Cattle | None |
| Grazing Period | 5/25-6/15 | 5/25-6/15 | 5/25-6/15 | None |
| Active BLM AUMs | 108 | 108 | 108 | None |
| Grazing Management | Rest-rotation | Rest-rotation; improve cattle distribution in Limekiln Pasture | Season long; both pastures grazed at the same time | None |
| Range Improvement Projects | No new projects | No new projects | No new projects | No new projects |
| **Leffler:** | | | | |
| Livestock # and Kind | 7 Cattle | 7 Cattle | 7 Cattle | 7 Cattle |
| Grazing Period | 5/15-10/15 | 5/15-10/15 | 5/15-10/15 | 5/15-10/15 |
| Active BLM AUMs | 35 | 35 | 35 | 35 |
| Grazing Management | Early and late season use | Early and late season use | Early and late season use | Early and late season use |
| **Quartz Hill:** | | | | |
| Livestock # and Kind | 78 Cattle | 78 Cattle | 78 Cattle | 78 Cattle |
| Grazing Period | 6/1-6/15 | 6/1-6/15 | 6/1-6/15 | 6/1-6/15 |
| Active BLM AUMs | 38 | 38 | 38 | 38 |
| Grazing Management | Rest-rotation | Rest-rotation | Rest-rotation | Rest-rotation |
| **Harriet Lou:** | | | | |
| Livestock # and Kind | 2 Cattle | 2 Cattle | 2 Cattle | 2 Cattle |
| Grazing Period | 5/15-11/15 | 5/15-11/15 | 5/15-11/15 | 5/15-11/15 |
| Active BLM AUMs | 10 | 10 | 10 | 10 |

| Grazing Management | Grazed 2 weeks when used and rested every other year | Grazed 2 weeks when used and rested every other year | Grazed 2 weeks when used and rested every other year | Grazed 2 weeks when used and rested every other year |
|---|---|---|---|---|
| **Travel** | 8.5 miles of recently inventoried travel routes would be closed yearlong | In addition to the travel routes that are currently open to wheeled vehicles:<br><br>2.79 miles would be opened from 6/30-12/2<br><br>.32 miles would be opened from 5/15 to 12/2<br><br>.47 miles of travel routes would be opened from 5/15 to 10/15 | In addition to the travel routes that are currently open to wheeled vehicles:<br><br>2.79 miles would be opened from 6/30-12/2<br><br>.32 miles would be opened from 5/15 to 12/2<br><br>.47 miles of travel routes would be opened from 5/15 to 10/15 | In addition to the travel routes that are currently open to wheeled vehicles:<br><br>0.72 miles would be open 6/30-12/2 |
| **Vegetation Treatments** | | | | |
| Forested Habitats | No treatements | 3020 acres | 1,600 acres | 1,600 acres |
| Sagebrush | No treatements | 1,460 acres | 810 acres | 810 acres |
| Aspen | No treatements | 60 Stands | 60 Stands | 60 Stands |
| **Riparian and Acquatic (Vegetation and Instream Habitats)** | No treatements | 240 acres | 240 acres | 240 acres |
| **Wildland Urban Interface/Fuels** | No treatments to reduce risk of wildfire on adjacent private property | 430 acres treated to reduce risk of wildfire on adjacent private property | 315 acres treated to reduce risk of wildfire on adjacent private property | 315 acres treated to reduce risk of wildfire on adjacent private property |

# Chapter 3 – Affected Environment and Environment Consequences

## 3.1 Introduction

This chapter presents the potentially affected existing environment (i.e. the physical, biological, social, and economic values and resources) of the impact area as identified through the ID team process and scoping from Chapter 1 of this EA. This chapter also describes the changes to those resources that could occur if each alternative were implemented

## 3.2 General Setting

Vegetation in the watershed reflects the diversity of ecological conditions across the landscape. The dominant plant communities and habitat types change according to soils, precipitation, elevation, slope and aspect (direction the slopes are facing). A wide variety of vegetation is found, from riparian species dependent on water and moist soils, to sagebrush and grass dominated plant communities that thrive on dryer sites.
Forested habitats cover the mid to higher elevations. This diverse landscape provides habitat and structural niches for a wide variety and abundance of wildlife.

Dominant Processes and Historical Uses

Composition and configuration of vegetation in the UBHE analysis area prior to European settlement was shaped by natural disturbances and processes and, to a lesser extent, Native American land management. Natural disturbances and processes that influenced and will likely continue to influence vegetation in this area include climate variability, watershed processes (i.e. flooding, mass wasting, debris flows, avalanches), fire events, and insect population dynamics. Native American land management was characterized by fire ignitions for travel corridors, forage improvement, game habitat improvement, and maintenance of native plant food sources.

More recently, vegetation after European settlement has been shaped by BLM, FS and private land management practices, such as timber sale activity, domestic grazing and fire suppression.

Fire suppression has increased stand density and physiological stress for the Douglas-fir in this zone. Large areas of now pole-sized trees became established between 1895 and 1918. This may be related to heavy livestock grazing pressure along with better than normal moisture conditions. Reasons for the decline in conifer establishment after 1918 are not clear. However, drought was common starting in 1918 and prevalent from 1930 through 1940 (Arno and Gruell 1986). Sapling invasion began in 1941 and continued until 1955. This was attributed to good seed crops that coincided with unusually moist spring weather over several years. Fire suppression contributed to the increase in big sagebrush which in turn provided microsites for seedling establishment.

Livestock grazing currently occurs in the adjacent valley bottom and has for at least 150 years. Domestic livestock grazing increased dramatically in the Big Hole River area in the mid-1800s. The level of use tremendously reduced fine fuel loads. Additionally, several decades of relatively low summer precipitation followed this grazing period. Such a lack of moisture enhances the growth of stress tolerant shrubs such as big sagebrush and increases the mortality of less stress-tolerant perennial grasses and forbs (Anderson and Inouye 2001). When combined, the reduction of fine fuels and drought pushes vegetation communities away from more open

grasslands and savannahs to more sagebrush and conifer-dominated sites, often with more stems per acre than stands which occurred previously (Heyerdahl et al 2006).

Although scientific research specific to the UBHE specific to the project area is limited, results of studies completed in ecosystems and landscapes of the western United States and northern Rocky Mountains can be used to assess the historic conditions and processes that operated in these watersheds.

Current Levels of Use

Much of the land within the project area is used for a variety of activities including motorized and non-motorized recreation, hunting, fishing, camping, wildlife viewing, firewood cutting, commercial uses including outfitting/guiding and timber harvest, as well as livestock grazing. Current levels of livestock grazing for each BLM grazing allotment within the planning area include:

*Jerry Creek Allotment*:

There are approximately 10,130 acres of BLM managed lands, 760 acres of state land and 30 acres of deeded land associated with the Jerry Creek Allotment. The current permitted use is 600 AUMs. The current grazing permit is issued as described in Alternative A to two permittees who graze in common (Grazing Authorizations 2500102 and 2504110).

Grazing is currently authorized from 6/1-7/31 annually. The BLM-Jerry Creek Allotment is directly adjacent to and managed in coordination with the FS-Jerry Creek Allotment. The FS-Jerry Creek Allotment is approximately 41,000 acres and managed under a rest-rotation system from late July to September 30 each year.

The BLM-Jerry Creek Allotment is fenced into three (3) pastures (Jimmie New, Patton and Dickie Hills). The allotment is currently grazed using a 2 pasture rest rotation system with Patton and Dickie Hills being considered one pasture. The Patton and Dickie Hills Pastures are grazed in conjunction with the USFS Patton Pasture.

The current permit currently allows for livestock use to occur for 45 to 50 days within the 6/1-7/31 grazing season. With the Patton/Dickie Hills Pastures authorized to be grazed 45-50 days within the 6/1-7/31 window every other year and the Jimmie New Pasture authorized to be grazed 45 days within the 6/1-7/31 window.

The FS-Jerry Creek Allotment is permitted to the two permittees who graze on the BLM-Jerry Creek Allotment as well as an additional USFS permittee. This additional USFS permittee currently has a BLM trailing permit that allows them to cross the BLM-Jerry Creek Allotment from 9/16-9/30 annually (Grazing Authorization #2505627).

Table 16. Current Grazing System on Pastures within BLM-Jerry Creek Allotment.

| Pasture | **Year 1** | **Year 2** | **Year 3** | **Year 4** |
|---|---|---|---|---|
| *Dickie Hills* | grazed | rest | grazed | rest |
| *Patton* | grazed | rest | grazed | rest |
| *Jimmie New* | rest | grazed | rest | grazed |

Actual use reports submitted annually by the permittees to the BLM indicate that the rest rotation system has not been followed. This may be due, at least partially, to the status of the fence that is located between the BLM and USFS in the Jimmie New Pasture. The fence's current condition allows livestock to move freely between the Granulated and Patton Pastures (USFS Jerry Creek Allotment) and the Jimmie New Pasture (BLM Jerry Creek Allotment). This can become particularly problematic during the hot portion of the grazing season when cattle are able to move back down to the Jimmie New Pasture from FS lands. This unauthorized use has resulted in areas of high livestock concentration and damage to riparian features by cattle. This damage includes the heavy browsing of woody riparian vegetation and stream bank trampling.

*Harriet Lou Allotment*:
There are approximately 80 acres of BLM managed lands associated with the Harriet Lou Allotment. The current permitted use is 12 AUMs. The current grazing permit is issued as described in Alternative A.

Grazing is currently authorized from 5/15-11/15 annually, however the allotment typically receives one week of livestock use every other year. The allotment receives complete rest from livestock every other year.

*Leffler Allotment:*
There are approximately 884 acres of BLM managed lands and 640 acres of deeded land associated with the Leffler Allotment. The current permitted use is 32 AUMs. The current grazing permit is issued as described in Alternative A.

Grazing is currently authorized from 5/15-10/15 annually. The allotment is typically grazed for approximately 6 to 7 weeks prior to the permittee moving the cattle to the USFS Jerry Creek Allotment on July1.

The majority of livestock use occurs on the deeded lands within the allotment. The grazing management within the allotment was developed in coordination with the USFS and the permittee. The allotment receives light use in the fall when cattle are trailed home in late September or early October.

*Quartz Hill Allotment:*
There are approximately 921 acres of BLM lands associated with the Quartz Hill Allotment. The current permitted use is 78 AUMs. The current grazing permit is issued as described in Alternative A.

Grazing is currently authorized from 6/1-6/15 each year. The BLM Quartz Hill Allotment is managed in conjunction with the USFS's Quartz Hill Allotment through a coordinated livestock grazing plan. The BLM Quartz Hill Allotment is managed in a 2 pasture rest rotation system. Cattle move off the BLM allotment on 6/15 and spend the remainder of the grazing season on the USFS Quartz Hill Allotment. The USFS portion of the Quartz Hill Allotment is managed as a 4 pasture rest rotation system with a grazing season of 6/16-10/5.

*Foothills Allotment*:
There are 3,103 acres of BLM lands associated with the Foothills Allotment. The current permitted use is 219 AUMs. The current grazing permit is issued as described in Alternative A.

Grazing is currently authorized from 5/25-6/15 each year. The allotment is currently managed using a 2 pasture rest rotation system. This plan was developed through a coordinated management plan with the USFS. The typical season of use is in late spring or early summer prior to the cattle entering the USFS Pattengail Allotment for the remainder of the grazing season.

Table 17: Current Grazing System for the Foothills Allotment

| YEAR | PASTURE | NUMBER of LIVESTOCK | GRAZING DATES |
|---|---|---|---|
| 1 | Deno Creek | 150 | 5/25 – 6/15 |
| | Limekiln | 0 | Rest |
| 2 | Limekiln | 150 | 5/25 – 6/15 |
| | Deno Creek | 0 | Rest |

The Limekiln Pasture was included in the Wise River Health and Habitat Restoration Project. This plan proposed vegetation treatments within the Limekiln Pasture. A number of these treatments have occurred and some are still planned.

*Alder Creek Allotment:*
There are approximately 2,164 acres of BLM lands associated with the Alder Creek Allotment. The allotment was made unavailable for grazing through the Butte RMP in April 2009.

The allotment was previously permitted for 119 AUMs and has not been grazed by authorized livestock since 1993 or been permitted since 2000. There are several reasons for the removal of livestock from the allotment. These include; the reduction in available forage due to lodgepole pine regeneration post-timber harvest, the adjacent USFS allotment was closed to livestock grazing, lack of fencing along private property boundaries and the subdivision and development of adjacent private property in the 1990's.

*Dickie Allotment:*
There are approximately 117 acres of BLM lands associated with the Dickie Allotment. The allotment was made unavailable for grazing through the Butte RMP in April 2009.
The allotment was previously permitted for 11 AUMs. Livestock were removed from the allotment due to the lack of adequate forage due steep topography and thick stands of Douglas fir and lodgepole pine. The Dickie Allotment is adjacent to the Alder Creek Allotment.

*Charcoal Mountain Custodial Allotment:*
There are approximately 1,861 acres of BLM lands associated with the Charcoal Mountain Custodial Allotment. The allotment was made unavailable for grazing through the Butte RMP in April 2009, and had not been grazed by domestic livestock since the 1960's with the exception of trespasses.

The allotment was previously permitted for 193 AUMs. The allotment is adjacent to the Fleecer Mountain Wildlife Management Area (WMA) which is administered by Montana Department of Fish, Wildlife and Parks.

Analysis

The UBHE project area encompasses approximately 23,000 acres of BLM land along the Big Hole River from Divide to the Mill Creek Highway 274. Direct and indirect effects of the UBHE project resulting will be analyzed for the entire 23,000 acres of BLM lands in the project area (Appendix A, Map 1). This includes the 6 major locations within the project area; Charcoal Gulch, Jimmie New, Dickie Hills, Alder Creek, Deno Creek and Wise River areas (Figures 11-14 and Figures 16-19). Cumulative effects will consider the entire analysis area (160,000 acres) (Appendix A, Map 1).

Direct and indirect effects that could result from the UBHE project due to vegetation treatments will be analyzed for approximately 16,740 acres within the project area. The portion of the project area previously analyzed under the Wise River Landscape Restoration Project (USDI 2009) for restoration activities will not be considered under this EA. No new vegetation management activities are proposed in the Wise River Landscape Restoration project area. Locations proposed for vegetation treatments under this EA include; Charcoal Gulch, Jimmie New, Dickie Hills, Alder Creek, Deno Creek (Appendix A, Map 2).

Cumulative effects and a discussion of the vegetation "reference" condition will be completed for a larger analysis area consisting of the Upper Big Hole East Planning Area (with the exception of the Wise River Project Area) and will include roughly 110,600 acres.

## 3.3 Resource #1 Forest and Woodland Health

### 3.3.1 Description of Affected Resources/Issues

Using both BLM and FS stand data, the existing condition was determined for both the UBHE project area as well as the larger "landscape" analysis area. The analysis area includes the UBHE planning area (excluding the Wise River Landscape Project area) as well as FS and State lands (Appendix A, Map 1). The potential "historic" reference condition for both the project and analysis areas was also estimated by using the LANDFIRE Biophysical Setting Model (USGS 2007) (Table 18).

Forested habitats within the project area are a blend of cool, dry and cool, moderately moist habitat types, with Douglas-fir being the dominant tree species. The project area is dominated by Douglas-fir habitats (7,550 acres) and sagebrush (5,870 acres) while the analysis area is dominated by lodgepole pine (38,200 acres) and subalpine forest (17,700 acres) (Table 18).

The project area historically had fire frequencies between 2 and 80 years, with an estimated mean fire interval of 35-40 years (Heyerdahl et al. 2006, USDA 1998 and USDA 2001b). A fire history study in the Big Hole watershed near Wise River found surface fires that historically maintained open "savannah" and woodland Douglas-fir forests in the project area were excluded around 1855 (Heyerdahl et al. 2006). The likely cause of surface fire exclusion was found to be a loss of fine fuels from cattle grazing, as well as a period of dry summers and active fire suppression. Historic fires were found to be extremely important in creating heterogeneous

landscapes of the Douglas-fir forest types and in maintaining mountain big sagebrush and grasslands. Crown fires were probably not common in overstory Douglas-fir stands in the Wise River fire history study area. Overstory tree density was most likely too low to carry active crown fires, and most plots had fewer than 127 Douglas-fir trees/ha (Heyerdahl et al. 2006). Two fire history studies conducted by the Beaverhead-Deerlodge National Forest in 1996 and 1997 also found that prior to the 1860s, the analysis area was dominated by open habitats and an old-growth forest component constituted less than 5 percent of the forested habitats (USDA 2001b).

When compared to the reference condition, the existing condition shows a clear departure from the diversity of seral stages that historically occupied the analysis and project areas (Tables 18). Although the acres displayed under the reference condition are only estimates of what were likely found at the landscape level, they do display how diverse the habitat was due to frequent fires that burned through the area.

While the overall climate condition prevailing during the various time periods determined the typical plant community, fire in southwest Montana was the fine-tuning mechanism. In these fire dependent communities, fire was responsible for the long-term stability of woodlands and a diversity of vegetation species. The lack of fire might be considered more of a "disturbance" to the overall system, causing widespread species replacement
and loss of heterogeneity of habitats (Losensky 2002).

Table 18. Existing and reference forest habitat conditions in the project and analysis areas. (Early<6.9" DBH, Mid 7-12.9" DBH and Late >13" DBH.)

| Habitat Type | Seral Stage | Existing Vegetation (Acres) | | | Historic Reference Condition (Acres) | | |
|---|---|---|---|---|---|---|---|
| | | BLM (Project area) | FS/State/Private | Total Analysis area | BLM (Project area) | FS/State/Private | Total Analysis area |
| **Douglas-fir Savannah** | Early | 0 | 273 | 273 | 565 | 1120 | 1685 |
| | Mid Open | 218 | 810 | 1028 | 1694 | 3360 | 5054 |
| | Mid Closed | 4405 | 7198 | 11603 | 847 | 1680 | 2527 |
| | Late Open | 111 | 0 | 111 | 1976 | 3920 | 5896 |
| | Late Closed | 0 | 107 | 107 | 564 | 1120 | 1684 |
| | Total | **4734** | **8388** | **13122** | **5646** | **11200** | **16846** |
| **Douglas-fir Forest** | Early | 52 | 51 | 103 | 311 | 1393 | 1704 |
| | Mid Open | 0 | 0 | 0 | 467 | 2090 | 2557 |
| | Mid Closed | 2734 | 6071 | 8805 | 233 | 1045 | 1278 |
| | Late Open | 0 | 0 | 0 | 311 | 1393 | 1704 |
| | Late Closed | 27 | 34 | 61 | 233 | 1045 | 1278 |
| | Total | **2813** | **6156** | **8969** | **1555** | **6966** | **8521** |
| **Mixed Conifer/ Lodgepole Pine** | Early | 654 | 12418 | 13072 | 306 | 5352 | 5658 |
| | Mid Open | 0 | 228 | 228 | 306 | 5352 | 5658 |
| | Mid Closed | 2026 | 25421 | 27447 | 918 | 16056 | 16974 |
| | Late Open | 0 | 0 | 0 | 102 | 1784 | 1886 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Late Closed | 0 | 137 | 137 | 408 | 7136 | 7544 |
| | Total | **2680** | **38204** | **40884** | **2040** | **35680** | **37720** |
| **Subalpine Forest** | Total | **0** | **17704** | **17704** | **0** | **20163** | **20163** |
| **Other** | Campground/ Riparian/Baren | **11** | **5779** | **5790** | **832** | **8477** | **9309** |

Douglas-fir Savannah

In contrast to pre-settlement conditions, Douglas-fir stands on this landscape are continuous, mid-successional, densely stocked, and establishing in Douglas-fir savannah, sagebrush, grassland, aspen, curlleaf mountain mahogany, and riparian communities.

Fire management practices and turn-of-the-century logging have had a dramatic influence on Douglas-fir stand size class as well as allowing colonization of Douglas-fir in unique habitats. Overall, there is more Douglas-fir at higher densities and in locations not typically seen with vegetation that develops under mid-severity fire regimes. Fire suppression and elimination of indigenous burning, in combination with intense livestock grazing during the first half of the 20th century has resulted in an increase of Douglas-fir in the area including successfully colonizing many sagebrush meadows (Heyerdahl et al. 2006).

The increase in extent and continuity of this coniferous vegetation type has effectively reduced landscape vegetation heterogeneity and associated biodiversity and put unique habitat types of the UBHE assessment area (most importantly aspen and mountain mahogany) at risk of irreversible habitat conversion. Densely crowded stands of Douglas-fir have been affected by western spruce budworm with whole-stand mortality in the Jerry Creek to Johnson Creek area. In addition, an increase of individual tree mortality resulting from Douglas-fir bark beetle activity is occurring in the assessment area. Trees killed by the Douglas-fir beetle are usually large (>16" DBH) desirable, and high value trees that are important stand and landscape components.

Characteristics of historic savannah habitat include groups of large, presettlement trees, trees with old-forest structure and open canopies. Historically, savannah habitats became increasingly open with decreasing elevation or increasingly dry soils, until they were so sparse that they are no longer considered forests. These Douglas-fir savannas are woodland type stands in which trees are either so few or widely spaced that none of their crowns touch, and the resulting overstory canopy is open. These savannas are common at lower timberline and or warmer, south facing slopes. Douglas-fir savannas typically mark the transition from forest to grassland or shrubland. This transition generally occurs within 1,000' of the valley floor, or between about 5,700–7,000' in southwestern Montana (Arno 1979).

The understories of dry montane forests are usually sparse due to the lack of moisture. Common native grasses and grass-like plants include Idaho fescue, rough fescue, bluebunch wheatgrass, pinegrass, sun sedge, and elk sedge. Forbs include arrowleaf balsamroot , lupine spp., heartleaf arnica, mountain sweetroot, and western meadowrue. Common snowberry, mountain snowberry, antelope bitterbrush, bearberry, white spirea, Oregon-grape, Saskatoon serviceberry, ninebark,

russet buffaloberry, common juniper, and chokecherry are important woody species (Pfister et al. 1973).

Historically, fire was likely the dominant disturbance agent in the project area, with insects and disease causing localized mortality. Historic fire played a role in keeping Douglas-fir savannah stands open by burning seedlings, saplings, and pole-sized trees too small to have developed fire resistant bark. Ignitions were lightening caused as well as from Native Americans (Barrett 1980**).** Historically, drier lower elevations had more frequent low intensity fires that cleared ground fuels without affecting the overstory. In these locations, severe fires may have occurred in periods of drought. Exclusion of fire and years of drought have made savannah habitats overcrowded and susceptible to continued insect activity and disease.

In the UBHE analysis area, most Douglas-fir savanna stands were correlated with Douglas-fir/bluebunch wheatgrass and Douglas-fir/Idaho fescue habitat types (Pfister 1973). Bunchgrasses dominate the understory in these habitats and they represent the warm dry extreme of Douglas-fir climax types.

These types occur mostly on the southern and western exposures of the project area between Jerry and Johnson Creek as well as some sites in the Deno Creek area. Forest structure is expected to be rather open in these stands as fire return interval is typically estimated to range from 5 to 25 years on bluebunch sites and up to 35-45 years on fescue sites (Fischer and Bradley 1987). Approximately 28 percent of BLM land (4,730 acres) in the project area falls into these warmer dry Douglas fir-habitat types. Of these 4,734 acres of Douglas-fir savannas, 93 percent are in stands with "closed" canopies, which represent seral states that develop with a prolonged absence of fire (Fischer and Bradley 1987).

The Douglas-fir savannah community provides important habitat to wildlife species such as flammulated owls, which utilize large snags for nesting habitat. Large Douglas-fir snags historically occurred in low densities but due to elevated populations of the Douglas-fir beetle, many large (>18"DBH) snags have been created across the landscape. These large snags can persist on the landscape for long periods and provide a critical habitat component.

Savannah habitat has been identified as important communities within winter range for elk, moose, and mule deer. These areas can also be critical for providing transitional habitat between winter and summer range and travel corridors for wildlife. Within the project area there are approximately 4,700 acres identified as Douglas-fir savannah habitat. In the past, Douglas-fir savannah would have consisted of a mosaic of sagebrush/grasslands with stable islands of Douglas-fir (Heyerdahl et al. 2006). Table 18, however, shows that the majority of Douglas-fir savannah is currently in closed canopy condition. Of the roughly 4,700 acres in savannah habitats, only 330 acres are currently in an open canopy condition compared to the historic reference condition where up to 4,200 acres could have been in an open savannah. The lack of open habitat has resulted in a more homogeneous habitat of Douglas-fir with a loss of shrubs, grasses and forbs that would be been found between groups of Douglas-fir trees. Although insect activity is reducing the number of pole size trees in the project area, many medium size trees are surviving, are in poor condition and continue to put a strain on available resources. In addition, the largest, oldest trees are being killed due to Douglas-fir beetle.

In Douglas-fir savannahs, the desired condition would be to have very open tree canopy cover (from 5-25 percent according to Pfister, 1973) with trees scattered or spaced very widely apart resulting in very low stem densities per acre. Heyerdahl (2006) estimated 19 stems per acre represented the pre-settlement condition in historic Douglas-fir savannas in the project area. Mature trees display characteristics of being open-grown such as full crowns with large limbs near the ground. Other vegetation such as grasses and shrubs are dominant savanna features and are common when not restricted by ecological site conditions (e.g. hot dry sites).

Douglas-fir Forest

The Douglas-fir/pinegrass habitat type is well represented and occurs frequently in the entire analysis area. It is represented by pure stands of Douglas-fir or as mixed seral stands having a lodgepole pine component at middle to upper elevations of BLM lands. These stands occur commonly in the Deno Creek area as well as from Jerry to Johnson Creeks. Approximately 2,810 acres of Douglas-fir forests occur on BLM lands within the UBHE project area. Of these, about 97 percent are in "closed" canopy stands. While multi-aged stand structure is expected, fire-maintained open parklike settings in these forests are occurring less frequently than expected (Fischer and Bradley 1987).

Douglas-fir forests in the project area still provide habitat for wildlife in the form of snags, down woody material, and closed canopies but conditions are rapidly changing and declining in quality. Overcrowding by small to medium-sized Douglas-fir is reducing the diversity of understory plant species, reducing the quality of trees and putting the stands at risk from continued insect activity.

As with savannah habitats, exclusion of fire and years of drought have created overcrowded forest stands that are susceptible to continued insect activity and disease. Heavy defoliation by western spruce budworm is prevalent throughout the project area. Epidemic levels of forest insects have reduced the number of live trees in forest stands and are removing all size and age classes, including the healthiest trees in a stand. Often times, however, heavily defoliated trees can survive an epidemic but end up in poor condition and may continue to compete with other trees for resources.

Western spruce budworm larvae, pupae and adults are parasitized and preyed upon by several groups of insects and other arthropods, small mammals and birds. There are more than 40 species of insect parasites (small wasps and flies) of the western spruce budworm, of which four or five species are most common. Spiders, ants, snakeflies, true bugs and larvae of certain beetles feed on the budworm, as do chipmunks and squirrels.

Birds known to feed on the budworm include grosbeaks, warblers, thrushes, sparrows, flycatchers, tanagers, siskins and waxwings. These natural enemies are probably responsible for considerable mortality when budworm populations are low but seldom have a regulating influence when populations are in epidemic proportions (Fellen and Dewey 1985).

Trees weakened by defoliation are more susceptible to Douglas-fir beetle, the most destructive bark beetle in North America. Whereas spruce budworm feeding can cause dramatic visual changes in a tree's appearance, more mortality in Montana is attributable to Douglas-fir beetle

(USDA 2007a). The Douglas-fir beetle is attacking and killing the largest and oldest Douglas-fir in stands throughout the planning area. This has resulted in a significant loss of the largest Douglas-fir in many stands, causing severe impacts on wildlife and avian habitats.

Historically, Douglas-fir stands would have been fairly open with less than 50 percent canopy cover, dominated by medium to large size Douglas-fir and had a diversity of understory vegetation. As shown in Table 18, the diversity of seral stages under the historic reference condition would have been much greater compared to the existing condition. Almost all acres of Douglas-fir forest are currently in a closed forest condition and dominated by medium to small size trees.

Snags and down wood provide important habitat components of this community. Standing snags provide foraging, roosting, denning, and nesting habitat for many wildlife species. A variety of cavity nesters and forest mammals rely on the presence of large diameter snags for reproduction and protection. Historically, snags were probably found in low densities on the landscape but these snags would have been large and persisted over a long period of time. Due to spruce budworm and mortality from the Douglas fir beetle, snag habitat and potential snag habitat has increased significantly over historic conditions.

Historically, aspen and upland willows were common throughout late seral Douglas-fir stands in the project area. Due to fire suppression and the subsequent increase in conifer densities, upland aspen stands have declined substantially.

In drier, lower elevation Douglas-fir-dominated forest stands, the desired condition would be to have widely spaced trees whose crowns do not interlace, rather a glade-like or park-like stand would be characteristic. Larger trees (>18" DBH) would be promoted, thickets of smaller trees would be scarce (but exhibit good vigor) and shrubs, forbs, and grasses would be common.

Lodgepole Pine/Mixed Forest

Lodgepole may occur in pure stands as a climax or in mixed stands as a seral component. In mixed stands, lodgepole occurs with Douglas-fir at lower elevations and spruce and/or subalpine fir at higher elevations.

Contrary to the leading paradigm that lodgepole pine forests result almost exclusively from stand-replacement wildfire, there is strong evidence that many lodgepole pine forests in the interior West were historically in a multi-aged stand structure, implying that natural disturbances (fire or beetle kill) do not necessarily result in total consumption and subsequent replacement of entire stands (Hardy et al. 2000; Alexander 1986).

Along with fire, mountain pine beetle (MPB) is one of the major natural disturbance factors that shape lodgepole pine forests in SW Montana. The beetles effect pure lodgepole pine stands and mixed stands of pine/Douglas-fir in a wide variety of ecosystems. MPB outbreaks strongly influence forest dynamics and the mortality of mature lodgepole pine results in changes of tree species composition, stand structure and canopy closure. In mixed stands, MPB attack will result in residual stands with a smaller pine component and more species such as Douglas-fir, spruce or subalpine fir. Reduction in the basal area of large diameter lodgepole pine may result in an increase in the growth rate of residual pine and other species. Reduction in canopy closure

may allow for regeneration of lodgepole, Douglas-fir as well as grasses, forbs and shrubs. Tree mortality due to MPB and reduction in canopy closure can result in substantial increases in standing, and ultimately downed, woody debris in lodgepole pine and mixed conifer stands.

Cool habitats dominated by lodgepole pine or mixed conifer stands are most common in the Tie Creek and Deno Creek locations of the project area and occur sporadically in the area from Jerry to Johnson Creek. Most of the lodgepole/mixed conifer stands on BLM land occur below 7,500' in the UBHE area. These stands have long expected fire return intervals ranging from about 100-500 years in length (Fischer and Bradley 1987). Lodgepole may occur on lodgepole pine habitat types or as a seral component in mixed stands of Douglas-fir, spruce or subalpine-fir habitat types. In the absence of fire, shade tolerant species have replaced lodgepole on many sites in UBHE. This scenario contributes to more homogeneous landscapes than those which historically characterized this area.

Increased competition within maturing stands coupled with drought has resulted in stand conditions susceptible to mountain pine beetle activity in the project area, as well as in adjacent areas on the Beaverhead-Deerlodge National Forest; mortality in lodgepole pine stands is quite severe from a current MPB epidemic.

Roughly 2,000 acres of the project area are characterized by mature, dead lodgepole pine and/or Douglas-fir with an understory of lodgepole or mix of climax lodgepole pine and Douglas-fir. Up to 70 percent of the mature lodgepole pine has experienced mortality in areas of the project area due to the mountain pine beetle.

It is assumed that under a "natural" fire regime, there would have been more lodgepole pine in different seral stages throughout both the project and analysis areas, although on BLM lands, lodgepole pine would still have been expected to be a smaller habitat component compared to Douglas fir.

Past harvest, especially in the Alder Creek area, has created 12-40 year old young stands of lodgepole pine. Approximately 650 acres of young, homogenous stands of lodgepole are found in the Alder Creek area (Table 18).

The desired forest condition for previously harvested lodgepole pine would be to perpetuate open to moderately dense stands. Overall, treatments would be carried out to improve individual tree growth and vigor, promote younger age class of wind-firm trees, and create bark beetle-resistant lodgepole pine.

Aspen

Regionwide, aspen is considered a community at risk due to declining patch sizes and vigor. The State Comprehensive Plan (MFWP 2005) has identified altered fire regimes in aspen stands with resulting conifer encroachment as a conservation concern.

Aspen is relatively short lived, usually maturing in 60 to 80 years, followed by a rapid decline in vigor with increased susceptibility to disease. As aspen stands mature and decline in growth and

vigor, conifers begin to dominate the sites. Without fire, logging, or some other disturbance, aspen does not effectively reproduce (USDA 1985).

Aspen trees are in poor condition over many parts of Montana. Most of the aspen stands remaining in the state are in mature age classes and in critical need of regeneration. Older stands are usually less vigorous and least likely to regenerate successfully. Many of these stands are currently being crowded out by competing conifers, and aspen will eventually be lost from the site (as is the case in the project area). In addition, pure and mixed stands of older aspen age classes can be heavily infested with pathogens. Effective fire suppression over the past 100 years has permitted competition and disease to reduce clone vigor to levels lower than would be expected under natural conditions.

Compounding the situation, fire suppression has drastically reduced fire-induced regeneration in recent years resulting in few young-aged stands (USDA 2001a). The loss of aspen can result in a potential decrease in water yields. The loss of water means that it is not available to produce undergrowth vegetation, recharge soil profiles or increase flows in springs and/or streams (USDA 2001a).

Under a historic fire regime, aspen would have been a much larger component of landscape in the project area. Aspen stands are relatively rare in Montana when compared to the other Rocky Mountain States; where they occur, they support a diverse avifauna. Aspen, often the only broadleafed tree within coniferous forests, provides unique foraging substrates for a variety of insectivorous birds. Aspen suckers, twigs and bark are used by wintering ungulates, particularly deer, elk and moose. Snowshoe hare and cottontail rabbits feed on its twigs and buds, while ruffed grouse are highly dependent on aspen buds in winter. Because aspen stands provide habitat for many song birds and small mammals, these areas are often frequented by hunting raptors and other predators. Aspen is very susceptible to heart rot and provides cavities and snags for cavity-dependent wildlife. In mature aspen stands, many of the trees that otherwise appear healthy are infested with decay fungi. The punky interiors of these trees are readily excavated by woodpeckers, but live trees may stand for years after initial decay permits cavity excavation (USDA 1985).

Other than moose and livestock, elk are the largest herbivore that use aspen ecosystems. When concentrated, elk can have considerable impacts on aspen stands. Where aspen occurs on elk winter range, it can be heavily utilized (USDA 1985). Aspen stands can also be heavily used along spring migration routes and can be an important habitat during the calving season. Aspen can be a major part of the elk diet and is considered a highly valuable browse species in winter, spring and fall (USDA 1985). An aspen understory can be rich in forbs and grasses and provide excellent quality forage, while the overstory provides cover. If elk remain within an aspen stand, they can browse aspen to a height of approximately 6’ and chew the bark of mature trees, especially during the winter season. Aspen suckers growing in the open and not browsed would extend their crowns above the reach of elk in 6-8 years.

Aspen-dominated sites are high in biodiversity (second only to riparian areas in western sites) and provide important habitat for many wildlife species (Wooley et al 2008). When aspen stands

are converted to conifers, there is a marked change in both flora and fauna. Not only is there a loss of forage, but there is a substantial decrease in plant species and richness.

The density and diversity of birds are much greater in aspen than conifer stands, and older aspen stands have more bird species than young aspen stands. Bird species diversity also increases with the size of aspen stands; cavities in aspen are especially critical for numerous bird and mammal species (USDA 2001a and USDA 1985). Bat species are also found to be more diverse in aspen stands.

Conifer colonization has resulted in a decline in the abundance and/or health of quaking aspen stands. Small patches of aspen are scattered throughout the project area, suggesting there was once larger stands of pure aspen. Overall, aspen habitat covers <1 percent of the project area. Aspen sometimes occurs in large enough patches to form individual stands (2-5 acres) but more often is found in small patches (<1acre) along ephemeral drainages and within forest and meadow habitats.

The desired condition for aspen in the project area would be to increase the frequency and extent of the aspen component across the landscape. This would be achieved by creating site conditions which allow for an increase in the vigor of individual aspen stands, and by providing opportunities for aspen regeneration. In general, aspen stands are at high risk due to colonization of conifers, browsing pressure, and site dewatering resulting from water tables being lowered through erosion and down cutting. The overriding objective for aspen would be to remove conifer competition while providing for the protection of current or future aspen regeneration from browsing pressure.

### 3.3.2 Impacts of Affected Resources/Issues

**Alternative A:**

Douglas-fir Savannah

There are roughly 4,700 acres of Douglas-fir savannah stands in the project area. The No Action Alternative would not thin historically open savannah habitat types and no proposed treatments (thinning, mastication of noncommercial biomass, commercial removal of product, thinning in aspen stands) would occur. The direct and indirect effects of no action would be a continued trend away from the desired future condition as well as variability outside the range of what is expected when plant communities develop under a mid-severity fire regime.

Unlike the action alternatives, the No Action Alternative would not promote a diversity of understory shrubs, grasses and forbs and would not restore or maintain any open savannah habitat types.

Mortality and damage from bark beetles and defoliators would continue throughout forests on the landscape as epidemic populations of insect pests continue to reside and move through the area.

High fire risk would continue in overcrowded stands where fire has been absent for prolonged periods and both standing and down fuels have accumulated; and in stands with mortality

induced from insect infestations. Damage from crown fires resulting from extreme fire behavior on the landscape could be severe, resulting in potential loss of forest cover including overstory trees over large areas.

In the absence of regular low intensity fires, conifer stem densities would continue to increase and expand into openings within savanna communities. Young Douglas-fir trees would continue to invade and persist into formerly open areas, overtopping grass and shrubs, and reducing the vigor of "relict" trees and understory species. Savanna sites would continue to be converted to dense thickets or forests, losing their characteristic open canopies, and associated understory grasses, forbs and shrubs.

Unique features such as sagebrush meadows and aspen stands interspersed with savannah habitats would continue to diminish in the absence of fire, as conifers successfully colonize and persist in these areas.

Douglas-fir Forest

There are roughly 2,800 acres of Douglas-fir forest stands in the project area. The No Action Alternative would not thin overcrowded stands and would not promote the development of large trees, increase the vigor of mid-seral trees or promote a diversity of understory vegetative species.

Nearly all Douglas-fir forest habitats in the project area have closed canopies, with the exception of 52 acres that are in an early seral condition. When compared to the historic reference condition shown in Table 18, the amount of Douglas-fir forest habitats with closed canopies is significantly higher and the number of acres with open canopies significantly lower than under the existing condition.

Many forested stands would continue to exist in an overcrowded condition, resulting in a reduction in tree and stand vigor and an increased susceptibility to damage from disturbance events such as insect infestation, disease, and fire.

The risk of stand replacing fires in crowded forest stands would continue to increase as stems densities, the amount of overlapping crowns, and fuel loading increase. In the absence of moderate to severe fire activity, Douglas-fir stands would continue to in-fill, increasing the number of stems per acre and canopy layering, while decreasing tree and stand vigor and resilience to disturbance. In the densest stands, insect activity and competition would likely cause mortality of individual trees, creating small gaps in the canopy, which provide opportunity for seedlings and saplings to develop. Over time, canopy gaps would fill-in and competition for resources would increase, creating a potential decline of other species like lodgepole, aspen, shrubs, and herbaceous understory species. Under this scenario, potential for stagnation of understory and overstory components exists as vigor declines. In approximately 50 years, some well-established more open Douglas-fir stands could attain old-growth characteristics (Koch 1996).

Insect activity would continue to cause tree mortality if there is no change in stand density or multi-layered, interlaced crowns. Western spruce budworm and Douglas-fir beetle activity

would likely continue unless environmental conditions provide relief by directly affecting population numbers (extreme cold temperatures in early winter/late fall) or alleviating competition for water (increased summer precipitation). In some stands, entire overstories might be affected. With the No Action Alternative, increases in Douglas-fir mortality would be expected. Douglas-fir beetles usually attack and kill the largest, oldest trees in the stand. Unfortunately these can also be the most valuable trees from a wildlife, genetics, and diversity standpoint.

The No Action Alternative would not restore any acres of mid-seral Douglas-fir stands towards a more open, historic reference condition.

Mixed Conifer Stands and Previously Harvested Lodgepole Pine Stands

There are roughly 2,700 acres of mixed conifer forest in the project area. The No Action Alternative would not thin overcrowded stands and would not promote the development of lodgepole pine or a combination of species in mixed conifer stands.

The No Action Alternative would not thin previously harvested lodgepole pine stands to perpetuate open to moderately dense stands. These stands (roughly 650 acres) would begin to stagnate, reducing individual tree growth and vigor. Windfirm young trees would not be promoted and thinning would not occur to promote bark beetle-resistant lodgepole pine.

Aspen

Aspen stands would continue to dwindle in size and eventually be lost due to over-topping and competing Douglas-fir. The expansion of conifers into aspen habitat would continue unchecked resulting in increased mortality of aspen and mature aspen stands would continue to lose vigor and die-off. Browsing pressure on existing aspen regeneration would not be managed and would continue to degrade and ultimately kill off young aspen suckers and shoots before they can grow and mature through the "browse zone. Aspen communities would continue to be pressured in this way, becoming threatened, as they are not able to successfully reproduce and continue to occupy their current sites.

**Alternative B:**

To protect water quality, a Clean Water Act/storm water discharge permit, or other permits as required by federal, state, or local law, may be required for new and existing forest road activities associated with timber harvest, log and heavy equipment hauling, and forest restoration activities.

Douglas-fir Savannah

Alternative B would thin up to 1,640 acres of closed canopy savannah habitat. This alternative would restore roughly 35 percent of savannah habitat towards a more historic open conditions (Appendix C). The majority of restoration of Douglas-fir savannah would occur in the Jimmie New area (Appendix A, Map 7) with 1,190 acres proposed for thinning (15 percent of the total habitat) (Table 21).

Table 20. Alternative B proposed treatment acres by major area in the UBHE planning area.

| Area | Total Acres | DF Savannah | DF Forest | Sage | Mixed Conifer | Young LP Stands | Riparian/ Aspen | Shrub Develop-ment |
|---|---|---|---|---|---|---|---|---|
| **Charcoal Gulch** | 2,766 | 178 | | | | | 70 | |
| **Jimmie New** | 7,874 | 1,187 | 735 | 625 | 0 | 50 | 150 | 50 |
| **Dickie** | 2,768 | 185 | | 279 | 95 | | | |
| **Alder** | 2,359 | | | 241 | 116(WUI) | 270 | 20 | |
| **Deno** | 1,346 | 90 | 85 | 265 | 156 | | | |
| **Total** | 17,113 | 1,640 | 820 | 1,410 | 367 | 320 | | 50 |

The objective of removing conifers from savannah habitats would be to maintain or restore an open woodland condition with a canopy cover of <30 percent. Under all action alternatives, thinning would be done to promote a diversity of understory shrubs, grasses and forbs. Open woodlands and savannah forest types provide habitat for a variety of wildlife species and critical structure and forage for big game winter range, calving habitat, denning sites and nesting habitat. Large trees and open canopies provide important perches for hunting raptors.

The direct effect of the proposed action is to remove conifers from historic Douglas-fir savannas where there are more trees per acre than expected (Heyerdahl estimated 19 trees per acre in these historic savannas); this would reverse the current trend of hundreds of trees per acre crowding desirable old relict trees and overtopping sage on these sites. It is more than likely these conifers would be removed by mastication. There are few if any locations in historic savannas where existing stand structure supports harvest activities (trees are usually below merchantable standards), and mastication is preferred as it would prevent the accumulation of excess down fuel that would likely result from hand thinning activities.

A desirable indirect effect of these savanna treatments would be first the stopping and then the slowing of the colonization trend by conifers into sagebrush and grassland openings for at least the next 30 years. An additional indirect effect would be a reduction in western spruce budworm activity in these areas; as it is nearly impossible for budworms to successfully use webs to move between tree crowns that are widely spaced and do not overlap.

Proposed underburning in savanna areas would be designed to burn residual small conifer seedlings and saplings, reduce undesirable concentrations of fuel, and reinvigorate fire-adapted herbaceous and shrubby vegetation that sprout after fire. Even though burning would be carried out under fuel and moisture conditions that produce predominantly low to mid severity burn conditions, one direct effect could be small incidental pockets that produce more severe burn conditions than desired.

A direct effect of prescribed burning activities would be the immediate reduction of the aerial portions of non-fire proof vegetation; residual conifer seedlings and saplings (without fireproof bark) would be killed; aerial portions of grasses, forbs and shrubs would be consumed.

An indirect effect of burning would be the re-sprouting of fire adapted grasses, forbs, and shrubs usually within the first year of the burn. Another indirect effect of prescribed underburning is the increased vigor and growth of herbaceous and shrubby plants that were formerly suppressed in the understory. Fire rejuvenated re-sprouters tend to be more vigorous growers than their old, decadent predecessors, especially when the overstory that overtops and shades these plants is removed.

The greatest potential indirect effect with the use of fire in is creating conditions favorable for weed spread. To mitigate these effects, prescribed fire would be conducted in spring, when fuel and moisture conditions reduce the intensity of the fire, thereby reducing the propensity for weed spread. Additionally, pre and post-burn monitoring for, and spraying of, existing weed populations in the general vicinity of proposed burn units would be completed. Prescribed underburning activities in forest stands would be planned and implemented to avoid active, viable weed populations.
project activities.

Douglas-fir Forest

Alternative B proposes to mechanically thin mid-seral Douglas-fir forest stands to promote the development of large trees, increase the vigor and health of mid-seral trees and promote a diversity of understory vegetative species. After thinning, canopy cover would be between 30-50 percent in a patchy distribution.

Commercial or non-commercial activities would remove sawlog-sized trees (>7”DBH) on up to 820 acres of Douglas-fir type in the project area. No trees greater than 18 inches DBH would be cut unless infested by Douglas-fir beetle and found to be a threat to the stand. The direct effect of this action would reduce stem densities in forest stands. Non-commercial trees (<7”DBH) would be removed from the understories of crowded Douglas-fir stands by mastication or chipping.

An indirect effect would be the reduction in competition for water, nutrients, and light between remaining trees; which in turn improves growing conditions for residual trees, thereby increasing vigor and resiliency of thinned stands. Furthermore, as thinning operations are implemented, conditions favoring spruce budworm activity would be eliminated or reduced as spacing between trees is increased. An additional indirect effect would be the promotion of a landscape with increased structural diversity by creating stands with decreased stem densities and increased openings which occur within rather large monocultures of densely stocked stands.

Healthy smaller trees would be expected to occur in the mid and understories at spacing that prevents competition for resources between trees, precludes spruce budworm activity, and does not create ladder fuels. Groupings of smaller trees would be expected to occur in gaps within the tree canopy.

There are roughly 2,800 acres of Douglas-fir forest stands in the proposed project area (Table 18). Alternative B would restore up to 820 acres of Douglas-fir forest. Nearly all these acres would be in the Jimmie New area (Table 20).

Under all action alternatives, the number of trees per acre would be reduced in dense Douglas-fir forests and thinning would focus on removing the numerous smaller sized trees crowding the under or mid stories. Residual stands would be more open and have canopies where most individual tree crowns do not touch or overlap one another promoting increased vigor of remaining trees. Stand structure would be shifted from having large numbers of trees in the smaller size classes to having few trees in the smaller size classes. To promote uneven-aged stand structure, residual conifers would be retained in several age classes. Species composition would favor Douglas-fir, although other species such as lodgepole pine, and Engelmann spruce could be present.

Previously Harvested Lodgepole Pine Stands

Thinning under Alternative B would reduce residual trees per acre and result in stands that would be resilient to future bark beetle infestations, with lower risk of crown fire, and are less susceptible to blowdown. Forest character would be retained throughout the treatment cycle as these partial cuts would not remove all trees from a site.

The direct result of this type of thinning is the removal of some trees from a stand; generally individual "take" trees would be dispersed evenly throughout the stand. Individual trees selected for removal would be selected based on density and spacing guidelines. Direct effects would be the removal of about 100 to 300 trees per acre (approximately 150 to 300 trees per acre would be retained after thinning) and the creation of residual stands that have increased spacing between leave trees.

The direct result of this type of thinning is the removal of some trees from a stand; generally individual "take" trees would be dispersed evenly throughout the stand. Individual trees selected for removal would be selected based on density and spacing guidelines. Direct effects would be the removal of about 100 to 300 trees per acre (approximately 150 to 300 trees per acre would be retained after thinning) and the creation of residual stands that have increased spacing between leave trees.

An indirect effect of thinning is the reduction of competition between trees, which results in an increase in growth rates and vigor of residual trees. As a result, trees increase in size at a quicker rate than those left in untreated crowded dense stands. A long term indirect effect is an increase in the number of vigorous, larger diameter trees developing within the project area in the next 50 years; rather than the retention of numerous small diameter trees with suppressed growth rates.

To control spread in areas with localized mistletoe infections, small openings could be created up to a maximum of 5 acres. Mistletoe reduces vigor, affects growth form, and weakens stems and boles of infected trees. Direct effects could include the loss of all trees in a given area, up to 5 acres in size; as well as reduction in infection rate by direct removal of mistletoe infected trees. An indirect effect would be increased sunlight, soil temperature, and available water, resulting in

increased growth of new, uninfected seedlings, grasses, and shrubs. New uninfected trees would have faster growth rates, good form, and stronger limbs as they are free from mistletoe.

Dense young lodgepole stands that are at risk to increased levels of wind throw from moderate to high wind exposure would be thinned to increase resistance to wind over time. On sites such as exposed ridges, saddles that funnel wind, and valley bottoms that run parallel to prevailing winds repeated thinnings would be implemented over time to gently open up stands and increase wind firmness of residual trees. Generally, successive treatments spaced about 5-15 years apart would reduce stem densities from 20-30 percent of initial basal area during each entry. The immediate direct effect would be the removal of some, but not all trees from the site, the forest overstory would be retained throughout the treatment cycle. Generally trees to be removed are individual trees dispersed evenly throughout the stand. Indirect effects would be increased growth in trees that gradually results in lengthening of live crown ratios; increased root mass and root strength resulting from exposure to moderate amounts of wind over time, reduction in wind related downfall and fuel loading, as well as increased stand stability. Beetle populations would occur at much lower levels and infrequently, as pockets of downfall would not be available.

Mixed Conifer Forest

Under Alternative B, commercial thinning would remove sawlog-sized trees (>7”DBH) on up to 250 acres of the 2,680 acres of mixed conifer type in the project area. No trees greater than 18” DBH would be cut unless infected with Douglas-fir beetle or mountain pine beetle and considered to be a threat to the stand. The direct effect of this action would remove about 60 to 120 square feet of basal area per acre reducing stem densities in forest stands. Another direct effect would be a change in species composition when trees would be removed to promote the retention of Douglas-fir or lodgepole pine, rather than maintaining a mixed composition.

An additional direct effect would be the removal of non-commercial trees (<7”DBH) from understories of crowded mixed conifer stands by mastication or chipping. In the absence of fire, many of these stands have developed thickets of small, suppressed trees in the understories. In some multi-storied stands, severe defoliation from spruce budworm has led to a loss of viable trees in stand understories.

An indirect effect would be the reduction in competition for water, nutrients, and light between remaining trees; which in turn improves growing conditions for residual trees, thereby increasing vigor and resiliency of thinned stands. Furthermore, as thinning operations are implemented, conditions favoring spruce budworm activity would be eliminated or reduced as spacing between trees is increased. An additional indirect effect would be the promotion of a landscape with increased structural diversity by creating stands with decreased stem densities and increased openings which occur within rather large monocultures of densely stocked stands.

Thinning activities would promote healthy, smaller trees in the mid and understories at spacing that prevents competition for resources between trees, precludes spruce budworm activity, and does not create ladder fuels. Groupings of smaller trees would commonly occur in gaps within the tree canopy.

Aspen

Aspen are found throughout many forest stands in the project area. Aspen in overcrowded Douglas-fir stands are currently in poor condition due to competition with conifers and from a lack of resources and nutrients. Aspen clones would be provided adequate growing space where they occur interspersed in forest stands.

The most recent monitoring report for the Beaverhead-Deerlodge National Forest found that nonstand-replacement treatments such as conifer clearing adjacent to and within aspen stands are effective in stimulating long-term sprouting even if browsing continues to limit growth (USDA 2011). Treatment areas can continue to exhibit dense sprouting even after 25 years. Another effective approach to encourage aspen across the landscape was found to be treating many acres, thereby distributing the effects of browsing over a larger number of acres. This approach allows some of the sprouting to successfully grow above browse height, effectively recruiting young growth to older aspen stands (USDA 2011).

The removal of conifers from aspen stands would promote suckering and regeneration of aspen and riparian species and move towards restoring these habitat types under all action alternatives. Producing profuse suckering from aspen regeneration practices does not ensure the reestablishment of new aspen stands. Suckers are highly palatable to wildlife such as elk and moose, and entire stands of young aspen can be lost to browsing. In addition, young aspen are quite fragile and susceptible to physical damage caused by trampling from hoofed animals, including livestock. For these reasons, efforts to reestablish aspen in small localized areas often fail. Isolated pockets of young aspen tend to draw elk, moose, and deer to these areas resulting in unacceptable levels of browsing. Similarly, efforts to reestablish aspen in areas of heavy livestock use often results in excessive damage to young trees.

All action alternatives propose removing conifer competition and overtopping conifers within up to 60 individual aspen stands. In addition, thinning forest stands would also have a substantial benefit to aspen interspersed in these habitat types. To maintain open Douglas-fir forest stands after thinning activities, approximately 600 acres of underburning is proposed under Alternative B in Douglas-fir stands. This would be beneficial to restoring or maintaining aspen interspersed or adjacent to these stands.

The indirect effect of thinning activities would create favorable growing conditions that allow for recruitment of early seral aspen as well as other desirable vegetation species. The increased growing space created by the proposed action would allow young trees within the clones to increase in size, and over time would become the overstory trees that perpetuate the clone. The aspen patch size and distribution in the areas treated would reestablish, maintaining or reestablishing a component of healthy aspen within the project area. Thinning conifers out from existing stands up to 2 tree lengths would not only reduce competition but could also allow aspen stands to expand in size.

Cut trees would be retained throughout aspen stands in suitable concentrations to discourage livestock and big game use. In areas with heavy livestock or big game pressure, temporary fences could be used to prevent browsing by livestock and big game until aspen is above the browse level.

Restoring aspen on the landscape would improve foraging, hiding and nesting habitat and, in the long-term, create cooler microsites that provide cover and thermal relief for many species.

The effects from livestock grazing in aspen stands would be the same for the Harriet Lou, Leffler and Quartz Hill Allotments under all alternatives including the No Action Alternative.

The change in the livestock grazing system under Alternative B along with associated range improvement projects should improve aspen habitats in the Jerry Creek Allotment. Adaptive management would be used to ensure an increase in size and quality of aspen stands.

Temporary Roads

There is an extensive network of established roads on BLM and FS administered lands in the analysis area. These roads, in most cases, should provide adequate access for mechanized equipment to access and implement treatment activities. However, in some cases, a length of temporary road might be needed to access project treatment units and connect them to the existing road network. When temporary roads are established, Montana Best Management Practices would be adhered to in the construction, maintenance, use, and decommission of these roads. Any temporary roads created for project implementation would not be left open and available for other uses; rather roads would be made unavailable to motorized access through the installation of barricades such as boulders and soil berms. Additionally temporary road surfaces would be deposited with slash to make them unavailable to motorized use. Every effort would be made to plan treatments to minimize the need for temporary road construction.

Table 21. Forest treatment acres by major area and miles of proposed temporary roads under Alternative B.

| Area | Total Acres | DF Savannah | DF Forest | Mixed Conifer | Young LP Stands | Temporary Roads (Miles) |
|---|---|---|---|---|---|---|
| **Charcoal Gulch** | 2,766 | 178 | | | | 0 |
| **Jimmie New** | 7,874 | 1,187 | 735 | 0 | 50 | 3.5 |
| **Dickie** | 2,768 | 185 | | 95 | | 0 |
| **Alder** | 2,359 | | | 116(WUI) | 270 | 1 |
| **Deno** | 1,346 | 90 | 85 | 156 | | 2.0 |
| **Total** | 17,113 | 1,640 | 820 | 367 | 320 | 6.5 |

Maintenance activities could be needed on existing open roads prior to use by heavy equipment. This type of maintenance could include improving the existing road surface by blading with heavy equipment or installing drainage features. If existing roads are degraded, they would be improved to stabilize the surface prism and ensure safe passage and minimize erosion. Maintenance activities would leave existing open roads in as good or better condition after project activities.

**Alternative C:**
To protect water quality, a Clean Water Act/storm water discharge permit, or other permits as required by federal, state, or local law, may be required for new and existing forest road activities associated with timber harvest, log and heavy equipment hauling, and forest restoration activities.

Douglas-fir Savannah
To address resource concerns specific to wildlife including thermal, hiding, and security cover, Alternative C would thin fewer acres of Douglas-fir Savannah.

Table 22. Alternative C treatment acres by major area in the UBHE planning area.

| Area | **Total Acres** | **DF Savannah** | **DF Forest** | **Sage** | **Mixed Conifer** | **Young LP Stands** | **Riparian/ Aspen** | **Shrub Develop-ment** |
|---|---|---|---|---|---|---|---|---|
| Charcoal Gulch | 2,766 | 130 | | | | | 70 | |
| Jimmie New | 7,874 | 600 | 473 | 320 | | 50 | 150 | 50 |
| Dickie | 2,768 | 180 | | | | | | |
| Alder | 2,359 | | | 230 | 40 | 70 | 20 | |
| Deno | 1,346 | 30 | 27 | 210 | | | | |
| Total | 17,113 | 940 | 500 | 760 | 40 | 120 | | 50 |

Douglas-fir Forest
The effects of thinning Douglas-fir forest would be the same as Alternative B but to a much lesser extent due to fewer acres treated.

Previously Harvested Lodgepole Pine Stands
The effects of thinning mixed conifer forest would be the same as Alternative B but to a much lesser extent due to fewer acres treated.

Mixed Conifer Forest
The effects of thinning mixed conifer forest would be the same as Alternative B but to a much lesser extent due to fewer acres treated.

Aspen
The effects to aspen would be the same as alternative B.

**Alternative D:**
The effects to Douglas-fir savannah, Douglas-fir forest, mixed conifer forest and young lodgepole pine stands, and aspen from forest restoration, thinning and underburning would be the

same as under Alternative C. To protect water quality, a Clean Water Act/storm water discharge permit, or other permits as required by federal, state, or local law, may be required for new and existing forest road activities associated with timber harvest, log and heavy equipment hauling, and forest restoration activities.

## 3.4 Resource #2 Upland Health

### 3.4.1 Description of Affected Resources/Issues

Sagebrush Communities

Management practices in the last century, including fire suppression and livestock grazing, have allowed Douglas-fir to colonize sagebrush parks that historically had low densities of conifers. These important plant communities provide valuable habitat for a variety of wildlife species and are diminishing in size and quality.

A study conducted adjacent to the UBHE analysis area in the Fleecer Mountains quantified the relative area occupied by sagebrush-grasslands versus Douglas-fir savanna today and in the past. Prior to 1855, fires occurred frequently enough in the study area to limit Douglas-fir establishment, but not so frequently that they eliminated mountain big sagebrush (Heyerdahl et al. 2006). There is evidence in the Fleecer Mountain area that Douglas-fir trees were limited to "islands" in the past, and more recently have encroached into sagebrush/grassland areas. Historically, fire was important at creating heterogeneous landscapes of Douglas-fir savannas, mountain big sagebrush, and grasslands. In the continued absence of fire, these landscapes are likely to become more homogeneous as trees dominate much of the landscape (Heyerdahl et al. 2006).

Sagebrush communities are found along the lower slopes of the project area, along ridges and intermixed throughout forested habitats. The project area has roughly 5,870 acres of sagebrush stands (Table 23). In the project area, there are two types of sagebrush communities; basin big sagebrush and mountain big sagebrush.

Sagebrush steppe dominated by basin big sagebrush occur on more xeric locations compared to mountain big sagebrush and support fewer perennial herbs and would have less overall plant cover. This community is found at the interface between larger riparian areas and the adjacent upland shrublands and forests, usually occurring as small dense thickets, narrow bands, or irregular patches. Shrub cover can range from 0-60 percent. Under the historic reference condition at the landscape scale, roughly 20 percent of this community would be expected to have low sage cover (<20 percent), 40 percent would have moderate cover (20-40 percent) and 40 percent would have high sage cover (>40 percent).

Mountain big sagebrush is located at mid to upper foothill locations and in parks within coniferous vegetation, and is associated with a high diversity of bunchgrasses and perennial vegetation. Other co-dominant shrubs can include snowberry, serviceberry, rose, and current. As with basin big sagebrush, shrub cover for mountain big sage can range from 0-60 percent. This community, however, would be expected to have fewer acres with high sage cover compared to basin big sagebrush and have mores acres of sage stands with moderate canopy cover. Across the landscape roughly 20 percent of this community would be expected to have

low sage cover (<20 percent), 65 percent would have moderate cover (20-40 percent) and 15 percent would have high sage cover (>40 percent) under historic reference conditions.

Both of these sagebrush steppe community types historically included a large grass component and fire was the dominant agent of change with fire frequency expected to be between 10-150 years. While the majority of fires were likely stand-replacing, some mixed severity fire could have occurred.

Although the amount of basin big sagebrush and mountain sagebrush communities in the project area is similar to the historic reference condition (Table 23), what's clearly different is the number of acres in different structure stages (low, moderate and high canopy cover).

The basin big sagebrush community comprises roughly 2,790 acres in the project area. Of this, roughly 107 acres (4 percent) are in low canopy condition, 1,234 acres are in moderate cover (44 percent) and 1,448 are in high canopy condition (52 percent). The percentages of low and high sage cover compared to the historic reference condition reflect the lack of disturbance across the landscape, specifically fire. Although the number of acres in moderate sage cover is similar to the historic condition, low and high cover appears to be out of the range of natural variability (Table 23). In addition, roughly 940 acres (34 percent) in the basin big sagebrush community has greater than 20 percent conifer colonization.

The mountain big sagebrush community comprises roughly 3,080 acres in the project area. Of this, roughly 790 acres (26 percent) are in low canopy condition, 850 acres are in moderate cover (28 percent) and 1,437 are in high canopy condition (47 percent). Unlike the basin big sagebrush community, low sage canopy exceed what is expected under the historic reference condition and moderate conditions are lower than expected (Table 23). This is likely due to past prescribed burns in the project area. Under historic reference conditions, however, it is expected that there would be substantially fewer acres with high canopy cover. Since mountain big sagebrush is more susceptible to conifer colonization, it is assumed that both conifer colonization and past prescribed burns have reduced sagebrush cover in the project area resulting in skewed percentages of both low and moderate cover. However, a lack of fire in other areas of the landscape may have contributed to an overall greater percentage of mountain big sagebrush communities with high sage cover. Mountain big sagebrush is more susceptible to conifer encroachment due to its location adjacent to forest stands and it is often intermingled within forest and savannah habitats. Although past projects burned roughly 556 acres in the project area to remove conifer colonization, there are still 910 acres (30 percent) of mountain big sagebrush stands with greater than 20 percent conifer colonization. Under historic conditions, greater than 10 percent canopy cover by conifers would be considered uncharacteristic for mountain big sagebrush communities (USGS 2007).

Sagebrush meadows are important areas for a variety of wildlife species as they provide critical winter range for game species, especially elk and mule deer, as well as provide habitat for many species that are sagebrush obligates. The common species of sagebrush found in the project area, big sagebrush, provides nutrition for many mammal and bird species, and hundreds of insects. In addition, the deep roots of big sagebrush can absorb water which is unavailable to

other plants and redistribute it into the upper, drier layers of the soil through a process of hydrolic lift (Mendelsohn 2010).

Sagebrush has been demonstrated to be a critical food source for several wildlife species during various seasons of the year (particularly fall, winter and spring). Big sagebrush is a highly nutritious and digestible food source for big game animals, such as mule deer. Sagebrush also provides cover (nesting, resting, and escape, protective cover for fawns, calves, nesting birds, and grouse broods) for a wide variety of game and non-game species including Brewer's sparrows that nest in the foliage of big sagebrush plants. Research in Montana revealed that during the breeding season sage grouse utilize habitat with 20-50 percent canopy coverage of big sagebrush (MSGWG 2005). Wintering grouse were found in areas with 20 percent sagebrush cover, and nesting birds were found in areas with an average of 15-30 percent sagebrush cover (MSGWG 2005).

In the project area, approximately 32 percent (1,855 acres) of all sagebrush habitats have more than 20 percent of encroachment by Douglas-fir. Colonization by conifers into sagebrush communities has reduced the amount of available forage, breeding habitat and hiding cover for a variety of wildlife and avian species. Douglas-fir trees undoubtedly encroached into grassland and sagebrush habitats at various times in the past. However, surface fires were frequent enough to kill many trees before they reached fire-resistant size.

Table 23. Existing and reference shrubland and grassland habitat conditions in the project and analysis areas. (Early<6.9" DBH, Mid 7-12.9" DBH and Late >13" DBH.)

| Habitat Type | Seral Stage | Existing Vegetation (Acres) | | | Historic Reference Condition (Acres) | | |
|---|---|---|---|---|---|---|---|
| | | BLM (Project area) | FS/State/Private | Total Analysis area | BLM (Project area) | FS/State/Private | Total Analysis area |
| **Mountain Big Sagebrush** | Low Cover | 790 | 851 | 1641 | 467 | 398 | 865 |
| | Mod. Cover | 850 | 887 | 1737 | 1639 | 1293 | 2932 |
| | High Cover | 1437 | 2038 | 3475 | 574 | 298 | 872 |
| | Total | **3077** | **3776** | **6853** | **2680** | **1989** | **4669** |
| **Basin Big Sagebrush** | Low Cover | 107 | 165 | 272 | 587 | 1478 | 2065 |
| | Mod. Cover | 1234 | 1747 | 2981 | 1174 | 2956 | 4130 |
| | High Cover | 1448 | 1005 | 2453 | 1174 | 2956 | 4130 |
| | Total | **2789** | **2917** | **5706** | **2935** | **7390** | **10325** |
| **Grassland** | Total | **0** | **4385** | **4385** | **302** | **1577** | **1879** |
| **Mnt Mahogany** | Total | **639** | **360** | **999** | **753** | **409** | **1162** |
| **Agriculture** | | **0** | **6182** | **6182** | 0 | 0 | **0** |

### 3.4.2 Impacts of Affected Resources/Issues

**Alternative A:**
The No Action Alternative would not remove conifer encroachment from grassland and sagebrush habitats. Sagebrush meadows and grasslands would continue to be colonized by conifers, and the acres of sagebrush meadows and grasslands could continue to decline in the absence of disturbance.

Livestock utilization levels within all allotments, which are currently permitted for livestock, would continue at or near current levels. The Foothills Allotment, which did not meet the Upland Standard in the Limekiln Pasture due to concentrated livestock use in an open meadow, would not be expected to meet the Upland Standard by continuing current livestock management. The Jerry Creek and Dickie allotments did not meet the Upland Standard due to conifer expansion into sagebrush meadows would also not be expected to meet the Upland Standard without vegetation treatments to reduce conifer expansion. All other allotments in the UBHE that currently meet the Upland Standard would be expected to so under this alternative.

**Alternative B:**
In sagebrush parks, conifer removal under Alternative B would allow for increases in grasses, forbs and shrubs where they are currently being replaced by conifers. Conifers could be removed on up to 1,410 acres of mountain big sagebrush under Alternative B. Of these 1,410 acres, mechanical or hand cutting could occur on up to 570 acres, while prescribed burning in conjunction with hand cutting or mechanical activities could be used on up to 840 acres. Prescribed burning would be emphasized in the four prescribed fire polygons (PFP) (Appendix A, Map 10) but some burn units are found outside of these locations such as in the Alder and Deno Creek areas. Within the PFPs, fire would be used as a "tool" to maintain restore and maintain sagebrush habitat. Although specific burn units are identified for the prescribe fire polygons, fire could be used anywhere in the polygon to meet restoration goals and objectives.

In sagebrush parks, conifer removal would allow for increases in grasses, forbs and shrubs where they are currently being replaced by conifers. Of the two sagebrush communities found in the planning area, only mountain big sagebrush would be proposed for prescribed fire.

Prescribed fire can be the most efficient way to remove conifers, especial small seedlings. Unlike hand cutting or mechanical treatments, prescribed fire also removes the conifer seed source, ensuring less time between re-treatments. Since sagebrush would be lost with removal of colonizing conifers and because dense stands of Douglas-fir have reduced historic levels of sagebrush in areas, it is recognized that sage cover could be lower than preferred in the short-term (10 years) after burning. Prescribed burns would be implemented in the spring to control and reduce the intensity of fire as well as to maintain as much sage cover as possible while removing conifers. All burns would be designed to create a mosaic of sagebrush cover and would strive to maintain at least 50 percent sagebrush after burning. Due to differences in conifer density and size, topography, and holding lines, more sage could be removed than desired in the short-term.

Conifers could be removed on up to 1,410 acres of mountain big sagebrush under Alternative B. Of these 1,410 acres, mechanical or hand cutting could occur on up to 570 acres, while prescribed burning in conjunction with hand cutting or mechanical activities could be used on up to 840 acres. Prescribed burning would be emphasized in the four prescribed fire polygons (PFP) (Appendix A, Map 11) but some burn units are found outside of these locations such as in the Alder and Deno Creek areas. Within the PFPs, fire would be used as a "tool" to maintain restore and maintain sagebrush habitat. Although specific burn units are identified for the prescribe fire polygons, fire could be used anywhere in the polygon to meet restoration goals and objectives.

The Spring Gulch PFP is 710 acres. Of these 710 acres, 665 acres are in sagebrush or Douglas-fir savannah habitats. Table 9 in Chapter 2 displays the long-term goals and short term acceptable sage cover for this PFP. Prescribed fire would be expected to be used on approximately 100 acres over the next 10 years in the Spring Gulch PFP but, like all the PFPs, fire could be used anywhere to move towards meeting long-term goals. The proposed units to burn in this PFP would be in overcrowded Douglas-fir savannah habitats where sage has either been lost or is in significant decline due to overtopping conifers. Previous burns have been used in the PFP to control conifer colonization, so the amount of sage proposed to burn under the next 10 year would be minimal unless necessary to remove heavy regrowth of conifer seedlings. Short-term loss of sagebrush cover would be expected to be minimal and the percent of sage in low cover (0-20 percent) could be increased from roughly 194 acres to 300 acres. This would still be within the range of short-term acceptable cover requirements (Table 9).

The Jimmie New PFP is 425 acres of sagebrush and Douglas-fir savannah habitat. As with the Spring Gulch PFP, previous burns were used to reduce conifer colonization but previous restoration activities were ineffective in some areas and conifers have continued to invade habitats since past restoration activities were completed. Prescribed fire is expected to be used on approximately 180 acres to reduce conifers under Alternative B. This could move the percent in of sage in low cover (0-20 percent) from 65 to 245 acres. This would be within the range of short-term acceptable cover requirements (Table 9).

The Cline Gulch PFP is 390 acres in size. Of these 390 acres, 345 acres are in sagebrush or Douglas-fir savannah habitats. Under Alternative B, prescribed fire could be used to remove conifers on approximately 200 acres within this PFP. This could move the percent in of sage in low cover (0-20 percent) from 0 to 200 acres. This would be at the high end of the short-term acceptable cover requirements for sagebrush (Table 9).

The Dickie Hills PFP is 345 acres in size. Nearly all these acres are in sagebrush or Douglas-fir savannah habitats. As with the Spring Gulch PFP, previous burns were used to reduce conifer colonization but conifers have continued to invade habitats since past restoration was completed. Under Alternative B, prescribed fire could be used on approximately 180 acres within this PFP. This could move the percent of sage in low cover (0-20 percent) from 65 to 205 acres. This would be at the high end of the short-term acceptable cover requirements for sagebrush (Table 9).

Under Alternative B, roughly 560 acres of sagebrush could be burned in three of the four PFPs (Jimmie New, Cline Gulch and Dickie Hills). An additional 280 acres of sagebrush could also be burned in other locations of the planning area including the Deno and Alder Creek areas. Implementation of prescribed burning in sagebrush units outside of PFP's would strive to maintain 50 percent sage canopy.

On the Foothills Allotment, livestock distribution was identified as a primary factor with regards to livestock contributing to the uplands not meeting Standard 1 in the 2011 land health assessment (USDI 2011). This alternative would require the permittee to turn-in cattle into two separate portions of the Limekiln Pasture on years that the pasture is grazed. This is intended to more evenly distribute use and reduce grazing pressure, especially early in the grazing season, particularly on the portion of the pasture that was identified during the 2011 land health assessment as not meeting Standard 1.

This portion of the pasture is on the west end of the Limekiln Pasture and is adjacent to a spring that is located on private land. The 2011 ID team noted that the majority of livestock use within the pasture is currently occurring on this western portion of the Limekiln Pasture.

The cattle that would be turned into the Limekiln Gulch area would be over 1 mile away from the west end of the pasture. Available livestock water would be a limiting factor in the Limekiln Gulch area; however this improvement in distribution would help to ensure that the uplands identified in 2011 would receive less grazing pressure, especially early in the grazing season. The topography of the area and the adequate amount of available forage in the Limekiln Gulch drainage would ensure that at least a portion of the cattle would remain there for the 3 weeks that cattle are authorized every other year.

The coordination between the BLM and the permittee, for the placement of salt prior to turn out, would provide for better livestock distribution. The salting locations would be selected in a manner that would ensure that salt is placed an adequate distance from water (> ¼ mile) and areas of historic heavy livestock use to help ensure that areas are not being overused.

Issuing trailing permits would allow for the trailing of cows across BLM lands either to or from the neighboring USFS lands. The narrow window of the trailing permits would ensure that the permittees are not utilizing uplands in the allotment for grazing but merely for a route to or from their private property and USFS lands, therefore no impacts as a result of trailing across upland habitats would occur.

**Alternative C:**
Conifers could be removed on up to 760 acres of mountain big sagebrush under Alternatives C. Of these 760 acres, mechanical or hand cutting could occur on up to 425 acres. Prescribed burning or mechanical thinning could be used on up to 160 acres and prescribed burning is proposed on up to 175 acres. Mechanical or hand cutting would restore up to 425 acres with little damage to remaining sagebrush plants. Some crushing and mortality of sage could be expected to occur but damage or loss would be expected to be minimal. Effects of sagebrush treatments would be the same as alternative B, but over few acres. By treating less acres with Alternative C, the short term loss of sagebrush would be much less; however this alternatives

could have substantially more impacts from the long-term loss of sage across the landscape due to conifer encroachment.

The management for the Foothills Allotment under this alternative would eliminate the 2 pasture rest-rotation system that is currently in place. When compared to the current grazing plan, this alternative would reduce the stocking rate on one pasture by 1/3 every other year. However, the pasture scheduled for rest during that same year would be grazed by 50 c/c pairs for over three (3) weeks during the growing season.

Moderate continuous grazing has been shown to give better vegetation, livestock and financial performance than rotational grazing at heavy stocking rates. However, under moderate stocking rates there is evidence that some rotation grazing systems give equal or superior vegetation, livestock and financial performance to continuous grazing (Holechek et al. 1999). If the available soil moisture and nutrients are adequate, light grazing pressure would allow plants sufficient time to recover and regrow post-grazing due to a greater amount of leaf area remaining. Cattle would be removed by 6/15 each year which would allow the plants ample opportunity for regrowth.

**Alternative D:**
Affects would be the same as Alternative C.

## 3.5 Resource #3: Riparian, Wetland, and Aquatic Health

### 3.5.1 Description of Affected Resources/Issues

Riparian areas and associated wetlands are some of the most important habitats across the landscape for providing ecological functions and values. Riparian areas are the green strips bordering springs, streams, and other bodies of water and include wetlands, stream channels, and vegetation adapted to soil and moisture conditions transitional between uplands and wetlands.

Riparian areas are important, because they generally have better quality soils than the surrounding uplands and, because of their position lower in the landscape, often retain moisture over a longer period. Riparian areas support a higher diversity of plants and animals than non-riparian land. This is a result of the wider range of habitats and food types present as well as the proximity to water, microclimate, and refuge. Many native plants are found only, or primarily, in riparian areas, and these areas are essential to many animals for all or part of their lifecycle. Riparian areas also provide a refuge for native plants and animals in times of stress, such as drought or fire, and play a large role in providing corridors for wildlife movement.

**Charcoal Gulch Area**
<u>Charcoal Mountain Custodial Allotment</u>
Charcoal Gulch is the main drainage and the only perennial (non-fish bearing) stream in the Charcoal Mountain Custodial Allotment (Appendix A, Map 1; Table 24). Although a road parallels the stream along the entire length of BLM, the riparian vegetation is still diverse and healthy. Moose and other wildlife species use this riparian area as a movement corridor but summer use may be limited due to use of the access road. This road is closed to both vehicles and snowmobiles during the winter so the area would be available, without disturbance, to the wildlife during this part of the year.

There are approximately 2 miles of riparian/stream habitat within 3 streams of the Charcoal Mountain Custodial Allotment (Table 24). All streams were rated as Proper Functioning Condition (PFC). Hydrologic function, vegetation and erosion/deposition along these reaches were found to be in a healthy and satisfactory condition. Many species of willows, sedges, and riparian grasses and forbs were present along all stream reaches.

Charcoal Creek, a perennial stream, was previously rated as Functional at Risk (FAR) condition. However, during the assessment in 2011, the team concluded that conditions had improved and the reach is PFC. The previous assessment noted erosion and hydrology problems associated with the stream following the road bed. Since the previous assessment, culverts have been installed or repaired and there were no longer any signs of erosion or hydrological issues within the stream channel. A thick vegetated buffer along the stream likely filters out potential sediment from the road.

Leffler Allotment

There is approximately 1 mile of riparian and stream habitats within 2 streams of the Leffler Allotment. These streams are tributaries of the Big Hole River and both reaches go subsurface before reaching the river.

During a 2011 assessment, stream reach BHDV-12 was rated as FAR with an upward trend (Table 24). This intermittent stream was found to be FAR due to historic logging where logs were apparently skidded down the streambed. As a result, the streambed had downcut 5-6' to bedrock. At the time of the 2011 assessment, however, riparian vegetation was found to be re-established and banks were becoming stabilized. This stream channel was found to have one of the largest aspen stands in the project area, but juniper and Douglas-fir were causing the loss of regeneration of aspen in portions of the drainage. Noxious weeds were also identified as an issue in this reach with houndstongue, Canada thistle, knapweed and yellow toadflax identified during the survey.

Stream Reach BHDV-15 was previously rated as FAR. During the 2011 assessment, however, the ID team concluded that conditions had improved and the reach was PFC. The previous assessment noted significant erosion from a historic logging road and a lack of riparian woody vegetation. Since the previous assessment, the sediment balance of the stream had stabilized, and the historic logging road was not adversely impacting the reach. During the assessment in 2011, the ID team concluded that the stream's lack of consistent flow, shallow soils, and extent of conifer canopy over the stream limited its ability to support riparian shrubs. Therefore, a lack of shrubs was not impairing its proper functioning condition. The reach was determined to have intermittent flows, with a perennial seep and was rated as PFC.

## Jimmie New Area

Jerry Creek Allotment

There are four main drainages with 12 miles of riparian and stream habitats in the Jimmie New Area; LaDucet Creek, Jimmie New Creek (including Spring Gulch and West Fork Jimmie New Creek), Patton Gulch and Cat Creek.

The main stem of Jimmie New Creek, a fish bearing stream and tributary to the Big Hole River, was rated as FAR in 2010 due to excessive erosion, loss of willows and other riparian species, and evidence that riparian woody shrubs are continuing to decline. Of the roughly 12 miles of stream in the Jimmie New watershed, approximately 8.5 miles (71 percent) have been impacted by historic logging, livestock grazing, roads and the loss of beaver. Regeneration of riparian vegetation is currently limited by grazing and browsing.

Jimmie New Creek is the only stream in this drainage that supports fish, but instream habitat (structure and cover) is limited. The stream lacks pools, instream woody material, and spawining gravels. Fish observed in Jimmie New Creek (including West Fork of Jimmie New) are likely brook trout, according to Montana Fish, Wildlife and Parks.

The Middle Fork of Jimmie New (BHDV-27, 28, 29), a perennial stream, was found to be functioning at risk due to heavy browing pressure, lack of conifers in a harvested timber unit, downcutting and erosion, and a lack of healthy vigorous riparian vegetation (Table 24). The stream had evidence of historic beaver activity but no recent or active dams were found.

The West Fork of Jimmie New Creek (BHDV-21 and BHDV-22) is a perennial stream and was previously rated as functioning at risk. During the 2010 assessment, however, the team concluded that conditions had improved and the reach was PFC. Although different age classes of aspen were limited, the reach was found to have diverse and healthy riparian vegetation of willows, rushes, and sedges. Old beaver dams were present in this stream but no active dams were identified.

A new tributary to the West Fork of Jimmie New Creek was identified during the allotment assessment in 2010 and was found to be NF. This tributary was found to have very limited riparian vegetation, excessive erosion, and a 4’ deep headcut (Table 24).

LaDucet Creek, a perennial stream, is a tributary to Jerry Creek. Although portions of this stream were historically logged, similar to other reaches in the area, LaDucet Creek is PFC. Although conifers were removed, streambanks were found to be stable along this low gradient stream. Hummocks were present in seeps along the stream, but they were vegetated and did not appear to be increasing, nor were the hummocks affecting stream processes or functions. Evidence of woody regeneration was occurring in many areas along the stream.

Spring Gulch, a perennial stream, was previously rated FAR, and was also found to be FAR during the 2010 assessment. Although the lower portion of this stream was well vegetated and in good condition, the majority of the stream lacked adequate riparian vegetation and had excessive erosion and bank trampling in many areas. Spring Gulch also had several active head cuts and areas where streambank instability led to excessive bank erosion. Plainleaf willow and aspen that were present along the reach had been repeatedly and heavily browsed, which limited successful recruitment. Several seeps and springs within the floodplain contained only decadent willows and limited desirable herbaceous species.

Patton Gulch, an intermittent stream and tributary to the Big Hole River, was previously rated FAR, and was also found to be FAR during the 2010 assessment. The upper portion of Patton

Gulch was rated as FAR with the trend not apparent and lower reach was rate FAR with a downward trend. The lower portion of Patton Gulch was found to have substantial downcutting and was deeply entrenched, which likely led to the lowering of the water table in this area. Where the water table had dropped, the floodplain and streambanks were found to no longer support riparian vegetation. Throughout the entire reach, aspen recruitment was low and young aspen that were present had been heavily browsed.

Cat Creek, a tributary to Johnson Creek, provides habitat for non-native brook trout and nearly genetically pure westslope cutthroat trout. Cat Creek was rated in prior assessments as PFC, during the 2010 evaluation the team rated the reach as FAR. Both sinuosity and width depth ratio were not as expected. Willow and aspen recruitment were found to be limited and adjacent riparian areas with seeps and springs were heavily trampled. Although Cat Creek was found to have some of the best riparian vegetation in the Jimmie New area, willow and aspen recruitment was still found to be limited.

## Alder Creek Area

Alder Creek Allotment

There are approximately 2.5 miles of riparian and stream habitats in 2 streams of the Alder Creek Allotment. Big Hole Tributary BHFT-8 and Tie Creek BHFT-9 both rated as PFC. Hydrologic function, vegetation and erosion/deposition along these reaches were found to be in a healthy and satisfactory condition. Many species of willows, carex, and riparian grasses and forbs were present along all stream reaches.

## Deno Creek Area

Harriet Lou Allotment

There is one stream, Harriet Lou (BHFT-3), in the Harriet Lou Allotment. This fish bearing stream and tributary to the Big Hole River is approximately 0.3 mile long and provides habitat for westslope cutthroat trout (BLM sensitive species) and, possibly, rainbow trout. Overall, it was assessed to be in PFC in 1988, 2006, and again in 2011.

In 2006, the upper 0.2 mile was rated as PFC, with the lower portion FAR. Loss of beaver dams was thought to have facilitated down cutting and bank erosion in this lower portion of the reach. Trampling from livestock was also identified as a possible source of sediment. Browsing of riparian vegetation by wildlife and livestock as well as a lowering of the water table was thought to have contributed to a narrowing of the riparian area.

The 2011 assessment found the upper and lower portions of the reach to be in PFC. Recruitment of young aspen and willow was occurring, but a lack of young alder was observed. The heavy browsing noted in 2006 was no longer occurring. The lack of beaver has affected the stream morphology but banks appeared to have stabilized since the 2006 assessment.

The upper portion of this stream was found to be dominated by conifers with aspen and willow interspersed. Instream habitat appeared to be in good condition with frequent pools, good amounts of down woody material and low bank cutting. Spawning gravels appeared free of fine sediment. The lower portion of the reach was dominated by willow through an old beaver dam complex. There was no evidence of active beaver use and the stream has downcut through the

old beaver dam complex. The lack of beaver has likely affected stream morphology but banks appear to have stabilized.

Foothills Allotment (Deno Creek Pasture)
Deno Creek was surveyed during the summer of 2011 and found to be an intermittent/ephemeral stream. Because flow in Deno Creek was inconsistent and subsurface for most of the length of this reach, a properly functioning survey was not completed. This reach, however, was found to have aspen and other riparian species along an approximately 0.5 mile stretch of the drainage.

Two other reaches were also addressed during the 2011 field season. Like Deno Creek, these reaches were found to be ephemeral systems with pockets of aspen and willow along the drainages. At the head of one of these drainages is a small pond/wetland. As with Deno Creek, these reaches were not rated but no concerns were identified.

## Quartz Gulch Area

Foothills Allotment (Limekiln Pasture)
Nez Perce Gulch (BHDV-11), an intermittent stream, was assessed in 2011. The lower end of the stream (0.8 mile) has been heavily altered by historic mining. This section of stream was found to be an entrenched channel that transitions into a ditch. This portion of Nez Perce Gulch flows during spring run-off or during heavy rain events and goes subsurface before reaching the Big Hole River.

The upper end of the reach (0.8 mile) is a spring dominated system. Flow is predominately during spring run-off but springs and seeps throughout the drainage provide some consistent year-round flow. Riparian vegetation is dominated by willow, dogwood, and aspen with an overstory of spruce and Douglas-fir. Conifers were removed from aspen and willow patches in 2010 to improve regeneration of these species (USDI 2009). The lower, heavily altered section of Nez Perce Gulch would rate as FAR or, more likely, NF. The upper, section was found to be PFC. Restoring the lower section of stream (ditch) would not be likely, as realignment would likely result in flooding and washout of the cemetery.

Table 24. Riparian condition class rating by allotment, area and stream.

| Allotment | Area | Stream Name | Miles | Type | Rating | Trend |
|---|---|---|---|---|---|---|
| Charcoal Mnt. | Charcoal Gulch | Charcoal Gulch | 1.1 | Perennial | PFC | |
| Charcoal Mnt. | Charcoal Gulch | Sheep Creek | 0.4 | Ephemeral | PFC | |
| Charcoal Mnt. | Charcoal Gulch | Leffler Creek | 0.3 | Intermittent | PFC | |
| Leffler | Charcoal Gulch | Big Hole Tributary | 1 | Intermittent | FAR | Upward |
| Leffler | Charcoal Gulch | Big Hole Tributary | 0.2 | Intermittent | PFC | |
| Jerry Creek | Jimmie New | LaDucet Creek | 0.8 | Perennial | PFC | |
| Jerry Creek | Jimmie New | Patton Gulch | 1.5 | Intermittent | FAR | Lower reach downward, upper reach not apparent |
| Jerry Creek | Jimmie New | Cat Creek | 0.5 | Fish Bearing | FAR | Downward |
| Jerry Creek | Jimmie New | West Fork Jimmie New Creek | 0.5 | Perennial | PFC | |
| Jerry Creek | Jimmie New | West Fork Jimmie New Creek | 1.6 | Perennial | PFC | |
| Jerry Creek | Jimmie New | Trib to W. Fork Jimmie New | 0.8 | Perennial/ Ephemeral | NF | Not apparent |
| Jerry Creek | Jimmie New | Trib to W. Fork Jimmie New | 0.3 | Perennial | PFC | Not really PFC |
| Jerry Creek | Jimmie New | Jimmie New | 2.0 | Fish Bearing | FAR | Downward |
| Jerry Creek | Jimmie New | Middle Fork Jimmie New | 1.6 | Perennial | FAR | Downward |
| Jerry Creek | Jimmie New | Spring Gulch | 2.2 | Perennial | FAR | Downward |
| Alder Creek | Alder Creek | Big Hole Tributary | 1 | Perennial | PFC | |
| Alder Creek | Alder Creek | Tie/Teddy Creek | 1.5 | Perennial | PFC | |
| Harriet Lou | Deno Creek | Harriet Lou | 0.3 | Fish Bearing | PFC | |
| Foothills | Quartz Hill | Nez Perce | 0.8<br>0.8 | Intermittent | NF<br>PFC | |

### 3.5.2 Impacts of Affected Resources/Issues

**Alternative A:**
Riparian areas currently with limited composition of desirable vegetation would not benefit from planting under the No Action Alternative. Recovery of desired riparian species in these areas would not be expected to occur.

Continuing current management on the Charcoal Mountain Custodial, Alder Creek, Harriet Lou, Leffler and Quartz Hill Allotments would promote the healthy riparian conditions that currently exist.

Continuing the same livestock grazing system as well as not rebuilding the Jerry Creek fence under Alternative A would allow continued degradation of riparian reaches that are currently FAR or NF in the Jerry Creek allotment. By not rebuilding the Jerry Creek boundary fence, livestock would continue to trespass during the hot season, when they typically seek the shade and lush vegetation offered by riparian areas on the allotment. Continuing this type of management would cause further losses of desirable riparian species, such as sedges, riparian grasses, and riparian shrubs.

**Alternative B:**
Thinning conifers could lead to an expansion of riparian vegetation across the landscape, and increase desired riparian species and vigor of plants. More favorable growing conditions would be created to allow for recruitment of early seral aspen, willow and other desired riparian species.

Under this alternative one of three pastures within the Jerry Creek Allotment would be rested each year. The maximum number of days allowed in each pasture would be 45 days (Jimmie New and Dickie Hills Pastures) and 50 days (Patton Pasture). This is would help ensure that the benchmark riparian utilization levels are not exceeded. When a pasture is grazed for more than one year in a row, the pasture would be grazed for shorter period the subsequent year (see Chapter 2, Alternative B, page 2-12 for exact dates per pasture). This would promote the reduction of livestock utilization levels in that particular pasture.

In mountainous areas rotational grazing systems give riparian areas the opportunity for recovery, and can be advantageous over season-long grazing (Holechek et al. 1999). Additionally, season of use is an important factor with regards to livestock grazing. Spring grazing of riparian areas has several advantages over late summer and fall grazing. Early season grazing usually provides for better use distribution between the riparian area and the adjacent uplands. There is greater similarity in vegetation succulence between riparian and upland areas, cooler temperatures encourage animal mobility, and, in some cases, livestock will avoid streamside areas that are wet in the spring. Early grazing, followed by complete livestock removal, allows for the regrowth of riparian plants before fall dormancy. The ability of most streamside species to reproduce vegetatively reduces the concerns about the effects of early season grazing on seed production (Clary et al. 1990).

Utilization levels on desirable streamside herbaceous forage would be monitored throughout the grazing season and a benchmark of 40% would be implemented on herbaceous riparian species. Utilization levels in the uplands would also be monitored using existing monitoring points. The monitoring of the uplands is necessary as repeated spring grazing may lead to reduced condition of upland vegetation communities, which in turn could lead to increased sediment loads in nearby streams (Marlow et al. 1986).

The level of utilization occurring on a site, including riparian areas, is the most important consideration. Most results suggest that the specific grazing system is not of dominant importance, but good management is, with control of use in the riparian area a key item. Specifically designed grazing systems that control degree and timing of use in the riparian area can be highly beneficial (Clary et al. 1989). The monitoring of livestock utilization levels throughout the grazing season would help to ensure that the BLM can measure whether or not significant progress is being made towards the allotment meeting the BLM's standards per 43 CFR 4180.1.

Utilization levels would also provide the BLM and permittees the ability to know when the benchmark levels are approaching within a specific pasture and would help to facilitate the goals of adaptive management. If utilization levels at the end of the growing season indicate that grazing management is not achieving use levels compatible with the desired riparian resource objectives, then the appropriate action should be identified and implemented (The University of Idaho Stubble Height Review Team 2006).

Maintaining a minimum stubble height helps to preserve forage plant vigor, retain sufficient forage to reduce cattle browsing of willows (*Salix* spp.), stabilize sediments, indirectly limit stream bank trampling, maintain cattle gains, and provides an easily communicated management benchmark. Based on limited specific research of riparian system response and on the knowledge of how cattle graze, a residual stubble height of 10 cm (approx. 4") is recommended as a starting point for improved riparian grazing management (Clary et al. 2000). Research indicates that 30 percent utilization levels on Nebraska sedge (*Carex nebrascensis*) in early August results in a stubble height of approximately 10 cm and 50% utilization on tufted hairgrass (Deschampsia cespitosa) results in a stubble height of approximately 4 cm (approx. 1.6").

When stubble heights are reduced to less than 10 cm, the ability of cattle to forage becomes less effective and efficient. This can result in increased livestock trailing and increased browsing of woody species such as willows. Data indicates that when considering a number of riparian issues such as; maintaining forage vigor, entrapping and stabilizing sediment under inundated flow, trampling of stream banks, sustaining forage intake and cattle gain and diversion of willow browsing that a stubble height of 10 cm on streamside graminoids may be the best compromise in many situations (Clary et al. 2000).

The projects proposed under Alternative B would provide the BLM and permittees some of the tools necessary for improved livestock management. The projects would provide the opportunity to make significant progress towards meeting the BLM's Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota and South Dakota. The change to the livestock grazing system under Alternative B along with associated range improvement projects is expected to improve riparian habitats in the Jerry Creek Allotment. Rebuilding the Jerry Creek boundary fence, would prevent hot season grazing in the Jimmie New and Patton Pastures. The combination of removing the hot season grazing and implementing the rest-rotation grazing system would promote regrowth of grazed and browsed riparian species. Over time, species composition and cover of desirable riparian species would increase, and also improve streambank stability and structure
The construction and/or maintenance of the fence would ensure that the permittees have the ability to more effectively control their cattle and the ability to keep cattle in the authorized pasture and off the allotment outside of their authorized dates.

The Cat Creek exclosure would exclude livestock from of the stream on BLM lands in an effort to improve willow and aspen recruitment, improve streambanks and channel characteristics such as sinuosity and width depth ratio.

The construction of the additional exclosures would allow for the establishment of what riparian species could reasonably be expected to be found within the Jerry Creek Allotment in the absence of grazing or browsing by livestock and/or wildlife.

The development of an additional reliable source of water within the Dickie Hills Pasture would improve livestock distribution and provide additional management options for the permittees. With an additional source of developed water in the uplands, cattle would not have to travel into or utilize adjacent riparian areas as frequently as the current water situation within the pasture dictates.

In the Dickie Hills Pasture, stabilizing the banks of the small pond that is fenced outside of the existing exclosure (excluded from the exclosure to provide a water source for wildlife and livestock) would reduce the turbidity and trampling to provide and cleaner water source.

The effects of Alternative B would the same as Alternative A for the Charcoal Mountain Custodial, Alder Creek, Harriet Lou, Leffler and Quartz Hill Allotments.

**Alternative C:**
On the Jerry Creek Allotment, the pasture rotations, benchmark utilization rates (40 percent on herbaceous riparian vegetation) and management objectives between both alternatives are identical for alternative C and B. One of three pastures within the allotment would be rested each year. The maximum number of days allowed in each pasture would be 30 days (Jimmie New and Dickie Hills Pastures) and 40 days (Patton Pasture). This is would help ensure that the benchmark riparian utilization levels are not exceeded. When a pasture is grazed for more than one year in a row, the pasture would be grazed for shorter period the subsequent year (see Chapter 2, Alternative C, page 2-31).

Range improvement projects proposed under Alternative C would be the same as Alternative B; therefore the resulting environmental consequences would be the same as Alternative B. Effects of vegetation treatments on riparian areas would be the same as Alternative B.

**Alternative D:**
The beneficial effects from active habitat restoration (removing overtopping/competing conifers or planting riparian vegetation) to riparian habitats would be the same for Alternative D as under Alternatives B and C.

No livestock grazing would occur on the Jerry Creek Allotment, where 4 miles of stream reaches are currently FAR and 0.5 miles is NF. Streambank trampling from livestock grazing would no longer occur, however improvements to riparian vegetation may not occur under this alternative, because livestock grazing was not the only causal factor in riparian standards not being met.

In the 1970's, livestock exclosures were constructed by a number of researchers and land managers to evaluate the potential for vegetation change following livestock removal. Results were often dramatic. However, grazing management outside the exclosure was generally not changed and the dramatic improvements were compared to inappropriate grazing practices outside the exclosures. The conclusion has been that livestock grazing is not suitable when trying to improve degraded riparian areas. A more accurate conclusion should be that cattle exclusion is an improvement over inappropriate grazing. Grazing can often be compatible with improving deteriorated riparian conditions and with maintain those functioning properly. The key is appropriate grazing prescription, which must be site and situation specific, and adherence to that prescription (Borman et al. 1999).

It appears that grazing exclusion should be the management alternative of last choice when comparing the exclusion of livestock grazing in riparian areas to the effects of deferred rotational grazing, time control grazing (Savory Method) and season long grazing (Marlow et al. 1989).

## 3.6 Resource # 4 Wildlife Habitat

### 3.6.1 Description of Affected Resources/Issues

Refer to Appendix B for more detailed information Threatened, Endangered, and Candidate Wildlife Species, as well as for BLM sensitive species and species of interest. The UBHE Project Area and the lands surrounding support a variety of wildlife including TES species. TES species, such as grizzly bear and lynx that have a "No Effect" determination are discussed in Appendix B, and not included in the affected environment or analysis in the narrative below.

**General Forest**

The project area and surrounding FS and private lands provide habitat for a wide variety of wildlife species. The area provides diverse habitat of mature, dry and moist forest types, as well as open meadows of sagebrush and grasslands. Although both the analysis and planning areas still provide a variety of structure from doghair thickets to large, mature Douglas-fir, and aspen stands, the diversity of habitats has been reduced due to a lack of fire on the landscape as well as from anthropomorphic activities and forest insect epidemics. Habitats on BLM lands have become fairly homogenous with dense stands of Douglas-fir. Sagebrush meadows are being lost or reduced in size or quality due to conifer colonization while old growth Douglas-fir and mature lodgepole pine are dead or dying from forest insects. Aspen and riparian habitats have declined in size or quality due to conifer competition, livestock and big game use, and from the loss of beavers.

Although most wildlife and avian species that occurred in the project area under a historic fire regime most likely continue to occur within the area today, it is probable that there has been a shift in the number of individuals or species using the available habitat. For example, under a historic fire regime with a more open savannah/woodland type habitat, forage for big game and other species would have been more abundant throughout the year. The existing habitat, however, provides for more hiding cover for big game (important during the hunting season). It is expected that populations of species (such as the flammulated owl) that depend on more open forest habitats would have declined in both the project and analysis areas, whereas those that prefer dense forest (such as the pine marten) or forest generalists would have increased.

Existing stands of dense Douglas-fir forest mixed with lodgepole pine currently provide habitat for those wildlife and avian species that prefer closed canopy, dense forest or forest generalists. The project area also provides habitat for those species that use sagebrush habitat or the edge of forest and shrubland openings.

**Snags and Down Wood**

Snags are a natural component of healthy forest ecosystems, and can occur in low numbers within live stands from agents such as disease, insects, or simply due to the end of a trees life cycle. Conversely, large stands of snags occur from events such as fire or epidemic insect outbreaks. Snag development through both processes is desirable on a landscape scale to provide for the diversity of wildlife species dependent on this component. Large stands of snags across a landscape will result in a high density of snag dependent birds that serve as source populations for outlying areas.

Large dead trees provide nesting habitat for raptors, owls, woodpeckers and other avian species that need large trees for stick nests or cavities. Cavities are excavated by birds and can also form from decay and broken branches. Cavities provide for nesting, rearing young, roosting, feeding, storing food, escaping predators and hibernating. Bird and mammal species that use cavities can be divided into two groups; primary and secondary cavity users. Primary cavity users, such as woodpeckers, chickadees and the red-breasted nuthatch, make their own cavities. Secondary cavity users are unable to excavate their own cavities and rely on cavities excavated by other birds and on naturally occurring cavities. Secondary cavity users include saw-whet owls, deer mice, pine marten, fisher, porcupine, weasel and black bear. Roughly 85 percent of bird species in North America use tree cavities for nesting with 34 of these species found in the West (USDA 1985).

Trees killed by Douglas-fir or mountain pine beetle provide years of foraging and nesting habitat for snag-dependent wildlife. The trees fall at varying rates depending on species. Large Douglas-fir trees can stand for 60 to over 100 years while lodgepole pines typically begin to fall between 5 to 15 years. When a snag falls, it creates downed wood for a diversity of wildlife and openings in the canopy that allow sunlight to penetrate the forest floor resulting in the regeneration of forbs, grasses, shrubs and trees that are utilized by a number of wildlife for forage, nesting, denning and cover.

As a tree decays, it can support members of different wildlife groups that use it for foraging substrate, nesting, denning, perching, roosting, and shelter. After trees fall to the ground, persistence through time of dead trees (especially those of large diameter) can last several decades. Besides providing a source of organic and inorganic nutrients for soil development, these logs also provide valuable habitat for small mammals, birds, and reptiles.

**Security, Thermal and Hiding Cover**

*Spring and Calving Habitats* – Spring and calving areas are locations that provide forage and protection from predators and weather. The use of traditional calving areas varies with snow melt and other weather-related variables. The most valuable calving habitats (those which contribute to successful calving) are found in Douglas-fir/sagebrush areas and sagebrush/grasslands adjacent to mature conifers. Considering the value of sagebrush meadows for calving habitat, the planning area provides approximately 5,900 acres of spring and calving habitat (depending on snow conditions).

Open roads during the spring and early summer can reduce the amount of available calving habitat by creating disturbance. Table 25 displays the open road density during the calving season in 5 major locations of the project area (Appendix A, Map 3). As seen in Table 25, all areas are near the Butte Resource Management Plan target of 1.0 mile/sq. mile in big game calving habitat with the exception of Deno Creek. Deno Creek has a current road density of 2 $mi/mi^2$ during the latter part of the calving season. Although the road density is higher than preferred, access into the Deno Creek area is limited and can be difficult during spring and early summer depending on snow conditions.

Table 25. Road density and security habitat for five major locations in the project area.

| Area | Total Acres | Open Road (miles) | Seasonally Restricted (Miles) | Road Density Calving Season ($mi/mi^2$) | Winter Use – Open Road Snowmobile Density ($mi/mi^2$) | Security Habitat (Acres) |
|---|---|---|---|---|---|---|
| Charcoal Gulch | 2,766 | 0.2 | 2.7 | 0.67 | 0.05 vehicle (closed to snowmobile) | 1,956 |
| Jimmie New | 7,874 | 0 | 14.6 | 1.19 | 0.10 snowmobile | 2,540 |
| Dickie Hills | 2,768 | 0 | 5.7 | 1.3 | Closed | 556 |
| Alder Creek | 2,359 | 1.8 | 4.3 | 1.2 | 0.4 vehicle only/3.6 snowmobile & vehicle | 50 |
| Deno Creek | 1,346 | 1.9 | 2.4 | 2 | 0.9 vehicle only/4.9 snowmobile & vehicle | 11 |

*Winter Range* – Most of Montana elk populations are migratory. They are widely dispersed from spring through fall but congregate in winter on traditional winter ranges comprising small but critical portions of their yearlong range. Elk requirements during the winter include accessibility to palatable forage as well as topographic and thermal cover conditions conducive to energy conservation. The key attributes that promote forage on elk winter range is south or southwest exposures that accelerate snow melt and prevailing winds that prevent snow from accumulating. Timber cover provides thermal protection and areas of shallow snow that enable elk to escape predators and avoid other disturbance with minimal energy expenditure. Steep slopes provide favorable conditions for resting elk to absorb solar radiation and vantage points from which bedded elk can detect predators.

Elk migrate seasonally between winter and summer ranges with snow accumulation being the significant factor influencing migration. Wintering grounds, such as those found in the UBHE project area, are commonly located within foothill areas with southsouthwest exposures and windblown ridges. Grassland and shrublands are typically used as winter range. Available winter range is commonly the limiting factor for elk populations; therefore, proper management of identified winter range is important for maintaining stable elk populations.

Almost the entire project area has been designated by FWP as elk winter range. Effective winter range is habitat that occurs at least 0.5 miles from a road/trail open to motorized travel during the winter. Rost and Baily (1979) reported that roads and human activities significantly influenced elk use of winter range. The general avoidance of human disturbance is particularly pronounced in heavily hunted populations (Craighead et al. 1973). For vehicle traffic, all five of the major locations in the project area have low open road densities for full size vehicles and ATVs during the winter (less than 1.0 mi/sq. mi).

Snowmobile use can have substantial effects to big game during the winter. The Dickie Hills and Charcoal Gulch areas are closed to snowmobile use. The Jimmie New area is nearly completely closed with snowmobile access to the Beaverhead-Deerlodge National Forest allowed in the northeast corner of this area. The Tie Creek and Deno Creek areas, however, are open to snowmobile use on all existing roads (open or closed) as well as open to cross country use. If road density takes into consideration snowmobile use that could occur and all roads in

both the Tie and Deno Creek areas, the open road densities during the winter for these areas would be 3.6 and 4.9 mi./sq. mi., respectively.

*Elk Security* - Elk security measures the inherent protection allowing elk to remain in an area despite increases in stress or disturbance associated with hunting or other human activities. Security areas are often larger than 250 acres, nonlinear, at least 0.5 mile from an open road, and occupying at least 30 percent of the area used during autumn (Hillis et al. 1991).

The Butte RMP (2009) state functional blocks of security habitat for big game species will be maintained across BLM lands. Where minimum-size blocks of security habitat (250 acres), as defined by Hillis et al. (1991), are located, they will be addressed and retained in a suitable condition through project planning and implementation. Where security habitat is limited or fragmented across the landscape, the BLM will emphasize improving habitat through vegetation treatments and road closures (including seasonal closures) to increase security habitat for big game species.

Security areas near winter ranges are used when deep snow forces elk into wintering areas during the hunting season. This solution causes spike bulls to be particularly vulnerable to hunter harvest. Lack of security can also cause hunter harvest to be concentrated during the first week of the season and can result in displacing elk to private land. This displacement reduces the availability of elk for hunters later in the season.

Vulnerability of elk during the hunting season is related to the probability of displacement from preferred habitats and the likeliness of being killed. Factors influencing vulnerability include habitat variables (vegetation, topography, weather), land management policies (road density, distance from roads), and human variables (hunter numbers, type and length of hunting season).

Although open and seasonally restricted road densities are currently low throughout the planning area, the location of those roads along with the fairly small blocks of BLM lands on the landscape result in less than desired security habitat in the Tie Creek, Deno Creek, Dickie Hills and Jimmie New areas. Of the 2,766 acres in Charcoal Gulch, 71 percent provides adequate security habitat (1,956 acres). In Jimmie New, only 32 percent (2,540 acres) of the area is considered to provide security habitat during the hunting season. Roughly 20 percent (556 acres) of the Dickie Hills area provides a refuge for big game during the hunting season and Tie Creek and Deno Creek provide less than 2 percent of security habitat (Table 25).

Where elk are located during the fall is highly dependent on weather conditions. Elk tend to stay at higher elevations when fall weather is warmer and there is less snow. Security habitat on BLM lands, however, is extremely critical when fall conditions force elk to lower elevations. With the exception of Charcoal Gulch, security habitat on BLM lands is severely limited in the project area.

*Summer Range /Summer Habitat Effectiveness* - Christensen et al. (1993) defined habitat effectiveness as the ability of habitat to meet elk needs for growth and welfare during the summer. Factors influencing this are: roads, wet sites, cover, livestock grazing, and their spatial distribution. Christensen et al. (1993) recommends that areas intended to benefit summer elk

range should have an open road density of <0.7 mi/mi$^2$. In other areas where elk are a primary consideration, open road density should not exceed 1.9 mi/sq. mi. Current open road densities throughout the planning area are less than 1.3 mi/sq. mile with the exception of Deno Creek where the road density is 2 mi/mi$^2$ (Table 25).

*Movement Corridors* – Important elk movement corridors help elk safely move between seasonal habitats such as summer and winter ranges. These areas are often referred to as transitional ranges and provide important security during the spring and fall (Lyon and Christensen 1992). Security habitat value of transitional areas is most important as elk move to fall and winter ranges with the onset of fall snowstorms. It's during this time that animals are the most vulnerable. Many variables contribute to increased elk vulnerability in these areas including; open roads, lack of stand structure and a general hunting season that extends through the end of November. Elk moving between summer and winter ranges on the Fleecer Wildlife Management Area and the Mount Haggin Wildlife Management move through the project area. Elk also move north and south between the Fleecer Mountain area and the Pioneers Mountains.

**Wildlife Movement Corridors**

The Alder Creek and Deno Creek area of the project area are within the Pioneer Mountains linkage area identified by American Wildlands (American Wildlands 2009). This linkage area provides year-long core habitat for wolverine, fisher, mountain lion, wolves, and black bear. Elk, mule deer, and moose are also present on seasonal ranges throughout the year, with movements dependent on location, forage availability, and winter snow.

Increasing human presence in the Pioneer Mountains linkage area during the summer may be displacing or diverting some wildlife use. Snowmobile use along the Byway and in the West Pioneers may conflict with wolverines and fisher security. Increasing tree mortality in Douglas-fir and lodgepole forest is reducing wildlife cover and security habitat, as well as representing a significant wildfire hazard.

The Quartz Hill, Charcoal Gulch, Jerry Creek and Dickie Hills areas are within the Dewey linkage area identified by American Wildlands (American Wildlands 2009). The Dewy linkage allows north-south wildlife movement between the Mount Haggin-Fleecer Mountain area into the Pioneer Mountains and east-west movement between the Divide area and Highland Mountains and the Upper Big Hole River watershed.

Conservation issues identified for the Dewey linkage area includes forest insect/disease and conifer colonization of sagebrush/grassland habitats. Spruce budworm is reducing crowns and causing mortality of all size classes of Douglas-fir while a major mountain pine beetle infestation is attacking lodgepole pine throughout southwest Montana. Sagebrush/grassland meadows are being reduced in size and quality by conifer encroachment. Moose populations are declining in this region due to hunting pressure and other environmental factors.

The project and analysis areas are mapped as "core or subcore habitat" and also mapped as a wildlife movement corridor. Core areas are areas large enough for wildlife (especially animals with large home ranges such as carnivores and big game) to forage and reproduce and subcore areas are described as areas that could act as stepping stones for wildlife as they move through

the region. Wildlife corridors are areas of predicted movement within or between core and subcore areas. The project area receives a high amount of use by resident and migratory moose, elk, deer and black bear.

Relative connectivity patterns that occurred historically cannot be known exactly but can be inferred from current patterns and vegetation. Under historic fire regimes, forested stands within the project area would have been more open and savannah like. The nature of these fire regimes suggests that dry Douglas-fir forests had a mosaic of age classes and that native fauna could disperse readily through patches of habitat. Under the current condition, disturbance from human use affects how wildlife disperse across the landscape and how habitats are used. Roads open to motor vehicles often follow drainage bottoms that provide movement corridors for different species. These roads likely have significant effects on how wildlife use these movement corridors.

Linkage areas for Canada lynx were identified for the Northern Rockies Planning Area (USDA 2007). This map shows a linkage on the north end of the Fleecer Mountain area heading northwest to the Anaconda Mountains and Anaconda-Pintler Wilderness and a linkage to the southwest to the Pioneer Mountains (USDA 2007).

**Migratory Birds**

Migratory Birds can be classified as canopy nesters, shrub nesters and cavity nesters. The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC. 703-711) states that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg or product, manufactured or not. Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (2001), addresses the need to "minimize…adverse impacts." This order also requires that each agency shall "restore and enhance habitat for migratory birds." This would include management of vegetation to maintain or improve habitats for a variety of grassland, shrubland and forest bird species in the Butte Field Office. Management for neotropical migratory birds is generally accomplished by focusing on providing a diversity of habitat conditions at appropriate levels across the landscape.

Specific surveys for neotropical birds were not done in the project area. However, data obtained from the Northern Region Landbird Monitoring Program within the project area was used to determine representative species. Species found at two monitoring sites included; American robin, ruby-crowned kinglet, song sparrow, spotted towhee, green-tail towhee, vesper sparrow, warbling vireo, western wood pewee, white-breasted nuthatch, white-crowned sparrow, yellow-rumped warbler, yellow warbler, mountain bluebird, mountain chickadee, northern flicker, pine siskin, rock wren, Swainson's thrush, western tanager, and Williamson's sapsucker.

Other species observed during field surveys or suspected to use the project area include; American kestrel, Cassin's finch, chipping sparrow, Clark's nutcracker, western flycatcher, dusky flycatcher, willow flycatcher, evening grosbeak, common nighthawk, starling, red-naped sapsucker, white-throated swift, tree swallow, Townsend's solitaire, lazuli bunting, pileated woodpecker, downy woodpecker, hairy woodpecker, and three-toed woodpecker.

Fire exclusion and other human activities (logging, grazing and mining) have altered the structure of pre-settlement Douglas-fir communities from open savannah with large scattered Douglas-fir trees to a dense forest. This situation is typical of Douglas-fir communities over the west. Many breeding bird inventories done in interior Douglas-fir forests have occurred after the natural open grown forests had closed in and may not reflect all species or density of use that historically occurred in these habitats.

### 3.6.2 Impacts of Affected Resources/Issues

Effects to wildlife species are analyzed by looking at changes in habitats, as well as considering disturbance associated with activities. Vegetation management activities may affect stand age, structure, or species composition, thereby affecting habitat. Actions with potential for direct effects on habitat include thinning in Douglas-fir and mixed conifer habitats, thinning and burning in sagebrush meadows, removing conifers from aspen/riparian areas, and livestock grazing. Indirect effects after project implementation include changes in vegetation structure over time.

**Alternative A:**

General Forest

If no action is taken, the progression of forest stands would continue trending away from the desired future condition. The expansion of conifers into aspen stands, sagebrush (especially edges adjacent to Douglas-fir stands) and understory of Douglas-fir stands would continue. In the aspen stands, seedling and sapling-sized trees would continue to see browse pressure, and the mature stands that exist today would continue to lose vigor, and eventually be replaced by conifers. In sagebrush, understory grasses, forbs and shrubs would continue to decrease as conifers increase.

Riparian habitats would not be restored under the No Action Alternative. The lack of diverse and quality riparian vegetation and habitat for wildlife that use these areas would continue to be absent over portions of the landscape.

In the event of a wildfire, fire intensity would increase due to the increase of biomass.
In Douglas-fir stands, trees would continue to increase in density and canopy layering. Where the stands are densest, individual trees may die from competition or insects. Over time, canopy gaps would fill in and result in a decline of other species (aspen, shrubs, herbaceous vegetation). Both spruce budworm and Douglas-fir beetle would continue to cause mortality, reducing important structure across the landscape for numerous wildlife species.

Wildlife Species of Interest

No habitat for any species of interest would be directly removed. There would be no direct effects to any species of interest (including elk, mule deer, moose, black bear, pine marten and pileated woodpecker).

The No Action Alternative would maintain both overstory and understory vegetation and would not have an immediate impact on hiding habitat or thermal cover for elk, mule deer and moose in the project area. Although there would be no short-term effects to hiding and thermal cover with the No Action Alternative, there could be long-term effects due to the mortality of all sizes of

trees from the spruce budworm and Douglas-fir beetle. Ultimately, this could result in a loss of hiding and thermal habitat for big game species.

Winter range used by both elk and especially mule deer could experience a decline in quantity and quality under the No Action Alternative, as conifers continue to invade grassland and sagebrush meadows.

Due to the location of the project area, it is easily accessed by hunters and the area does receive a fair amount of hunting pressure. Roads within the project area also receive use by ATVs and snowmobiles. Open roads typically increase the level of recreation adjacent to roads. Such use can result in additional disturbance and displacement of wildlife species.

Roads can cause direct mortality to wildlife through road kill, prevent wildlife movement, create disturbance to wildlife via vehicular use, cause the spread of noxious weeds, reduce or eliminate habitat and cause habitat fragmentation on the landscape (Joslin et al. 1999). Open road miles that exceed 1 $mi/mi^2$ have been found to provide <60 percent of functional habitat for elk (Christensen et al. 1993). Permanent and temporary roads can impact wildlife, including special status species, particularly if roads are open during critical periods such as during the winter or breeding seasons. The No Action Alternative would have no impacts to any species from new, reopened or temporary roads. Road densities would not be increased under the No Action Alternative.

The continued loss of aspen in the project area could impact numerous wildlife and avian species under the No Action Alternative.

Because black bear depend on a variety of habitat types to fulfill their needs throughout the seasons, the change in forest type due to spruce budworm, Douglas-fir beetle and mountain pine beetle could benefit black bear. The No Action Alternative, however, would maintain a more dense forest for a longer period of time.

The pine marten requires forest with high overstory density and structural complexity at ground level. The Douglas-fir forest within the project area is currently changing due to insects and is expected to become more open in the future. Even though forest conditions could be more open under the No Action Alternative, trees could be in poor condition and there would likely be a loss of many trees with desired structure, such as very large, old trees. The No Action Alternative would maintain a more dense forest for a longer period of time without disturbance. However, the No Action Alternative may allow for more mortality of large size Douglas-fir, a preferred habitat component of the pine marten.

As more mortality occurs from spruce budworm and Douglas-fir beetle, more foraging and nesting habitat is created for the pileated woodpecker. The loss of mid to large size trees, however, would prevent recruitment of suitable habitat for the pileated woodpecker in the long-term (>100 years).

Under the No Action Alternative, the grazing system would remain the same as the existing condition. The Quartz Hill, Leffler and Harriet Lou Allotments would continue to provide adequate wildlife habitat.

The use of the existing grazing system and not reconstructing the boundary fence in the Jerry Creek Allotment would continue to prevent recovery of many riparian areas in the allotment. The management of livestock would continue to be difficult in this allotment and allow animals to spend a substantial amount of time in riparian and aspen habitats during the hot season when they use riparian areas more frequently, preventing recovery and allowing continued degradation of these critical habitat types. Habitat for numerous wildlife species from big game and small mammals to avian species would continue to be limited along many riparian areas and aspen stands and would not be restored under the No Action Alternative.

The use of the existing grazing system in the Foothills Allotment would continue to allow the degradation of upland habitat in the Limekiln Pasture. Upland habitat for species that prefer of depend on sagebrush/grassland habitat would not improve in the Limekiln Pasture.

BLM Sensitive Species

The No Action Alternative would not remove any trees in the project area. No habitat for any BLM sensitive species would be directly removed. The No Action Alternative would not remove habitat for any BLM sensitive species that depend on upland forests or sagebrush habitats and all BLM sensitive species would have a "No Impact" determination for this alternative.

The mortality of mature, overstory trees due to the spruce budworm and Douglas-fir beetle would increase foraging and nesting habitat for the three-toed woodpecker, which could be a "Beneficial Effect" to this species. In the long-term, the loss of late successional habitat under the No Action Alternative could impact sensitive species that depend on structure provided by old forests. A decrease in canopy cover could make the project area more attractive to the flammulated owl in the short-term, but the loss of large, old trees could ultimately lead to unsuitable habitat under the No Action Alternative after large snags have fallen.

Great gray owls nest primarily in old raptor nests or broken-topped trees and snags. These structures occur most commonly in mature, old forests. Taking no action would not cause immediate direct effects to the great gray owl or owl habitat. Nesting habitat would increase for the great gray owl as Douglas-fir mortality increases and snags are created. However, as snags begin to fall to the forest floor (20-100 years out) there could be a long-term loss of nesting habitat for this species.

Taking no action would not cause immediate direct effects to the goshawk or goshawk habitats. Over the next 1 to 10 years, the spruce budworm, Douglas-fir beetle and mountain pine beetle could cause significant mortality of the potential nesting habitat (10,200 acres) currently available in the project area. Areas that experience greater than 50 percent mortality may no longer provide suitable goshawk nesting habitat (Reynolds et al 1991). In the Basin Creek Hazardous Fuels Reduction project area of the Beaverhead-Deerlodge National Forest (USDA 2004), one of two recently occupied goshawk nest stands experienced 70 percent tree mortality in 2001 from mountain pine beetle; the goshawk re-nested there in 2002 (USDA 2004).

In similar beetle-killed nest stands in Oregon, goshawks returned to nest for two to three years until the needles fell from killed trees and the trees no longer provided sufficient canopy closure for nesting thermal cover (USDA 2004). Beetle-killed areas would continue to provide habitat for goshawk prey including snowshoe hare, red squirrel and grouse species; however, once trees fall to the ground (20-100 years out), the high density of down material could actually impede the ability of goshawks to hunt and capture prey.

The No Action Alternative would not remove conifer colonization from sagebrush habitats. The reduction of sagebrush across the landscape could result in a loss of habitat for sage grouse, Brewer's sparrow and other sagebrush obligate species. The No Action Alternative would impact these and other species that depend on sagebrush for all or part of their lifecycle.

The No Action Alternatives would not reduce prey or cause gray wolf to not use the project area. Human development, disturbance and control efforts could likely continue to prevent wolves from denning in this area.

Wildlife Movement Corridors

The condition of wildlife movement corridors and core habitats would change under all alternatives. While the No Action Alternative would have no direct effects to these habitat components; corridors and core habitat would become more open as insects cause mortality to large and small trees. The change in habitat types, however, would happen more slowly under the No Action than with the direct management of the action alternatives. Core areas could see an increase in forage from understory forbs, grasses and shrubs under all alternatives, but this would also be expected to happen more slowly under the No Action Alternative.

Retaining dense stands of trees presents a risk from uncharacteristically large or severe wildfire events. If these stands should burn in their current condition, the fire would be hot and more severe than under historic conditions. This could result in the loss of overstory trees and possibly damage to soils, preventing regeneration of vegetation.

Migratory Birds

No habitat for migratory birds would be directly altered or restored under the No Action Alternative. Forested stands would continue to provide habitat for those species that are generalists or prefer dense forest stands. There would be no restoration of forested habitats back towards a more open canopy condition with a mosaic of vegetation patterns, providing habitat for a variety of species.

Species that depend on sagebrush habitats would see a decline in the quality and quantity of these habitat types, as conifer encroachment continues. In the long-term, there would be a decline in the amount of nesting, brood rearing and foraging habitat for these species.

No disturbance to migratory birds would occur under the No Action Alternative.

Fisheries

There would be no direct effects to fish and aquatic habitats from the No Action Alternative. Under a wildfire scenario, the No Action Alternative would likely burn hotter than under the action alternatives, potentially causing run-off and sedimentation to the Big Hole River.

**Alternative B**:
Effects to wildlife species are analyzed by examining changes in habitats, as well as considering disturbance associated with activities. Vegetation management activities may affect stand age, structure, or species composition, thereby affecting habitat. Actions with potential for direct effects on habitat include thinning in Douglas-fir and mixed conifer habitats, thinning and burning in sagebrush meadows, and removing conifers from aspen/riparian areas. Indirect effects after project implementation include changes in vegetation structure over time.

General Forest
Direct effects from thinning could result in a reduction of nesting, breeding and foraging habitat for raptors, as well as nesting and foraging habitat for red squirrels, ruby-crowned kinglet, pine siskin, mountain chickadee and other songbirds and mammals that depend on live forests for nesting and foraging. Cover and food resources are essential to small mammal populations. Shrubs, down wood and snags provide important cover from predators; the loss of these habitat elements may have consequences for some small mammal species (Chambers 2002). However, other species prefer open habitat conditions and may benefit from the food resources provided by early and mid-seral fruit producing shrubs and the plentiful grasses and forbs that establish after thinning and/or burning. Small mammals may recolonize disturbed areas soon after disturbance, although diversity and species dominance would differ as succession progresses. Generalist species are typically dominant in the early seral stages, while specialist species are dominant in the later seral stages.

Both chipmunks and deer mice would likely increase in numbers after thinning in Douglas-fir forests (Medin and Booth 1989). In a lodgepole pine and mixed conifer forest in northeastern Oregon, a commercial thinning designed as a fuels reduction treatment resulted in an increase in chipmunks and a decrease in red-backed voles, red squirrels and snowshoe hares one year after thinning (Bull and Blumton 1999). Some species of small mammals prefer high canopy closure and thus may be adversely affected by thinning treatments.

Alternative B would allow thinning of trees up to 18”DBH during restoration activities. The loss of large live trees could reduce potential nesting and foraging habitat for those species dependent on more dense forest, including raptors and owls that require large diameter trees. Since no live trees greater than 18”DBH and no snags greater than 15”DBH would be allowed to be removed (with the exception of in WUI units), many suitable nest trees would remain after restoration activities, although the habitat surrounding those trees would be altered and, possibly, made unsuitable. Habitat within 170 acres of WUI units in the Alder Creek and Deno Creek areas would be altered by the loss of all size classes of conifers as well as the removal of snags.

Alternative B would have a greater beneficial effect for those species that prefer open forest habitats, because vegetation treatments would alter up to 1,640 acres of Douglas-fir savannah. To maintain movement corridors, hiding cover and diversity within these habitats, at least 20 percent of all forest treatment areas would remain unaltered. Douglas-fir savannah habitat would

have very open canopies after restoration activities and some species (such as great gray owls) would find these conditions unsuitable for nesting whereas others would prefer these conditions. Douglas-fir and mixed conifer forest stands would be remain clumpy after thinning and have overall canopies between 30-50 percent; maintaining higher canopy cover after thinning for those species that prefer higher canopy conditions.

Alternative B could have both beneficial and harmful effects to species that use Douglas-fir and mixed conifer forest habitats. This alternative proposes thinning up to 1,070 acres forest habitats. Although the overall canopy would remain between 30-50 percent in these habitats, wildlife and invertebrate species that depend on down wood, dense forests with saplings and small poles and closed canopy forests for survival and reproduction could be detrimentally affected by thinning treatments that alter these habitat elements.

The removal of overstory and understory trees would reduce habitat for wildlife species that prefer dense, mature conifer forest (such as the pine marten) and would reduce hiding and security cover for big game species. However, as trees are lost due to mortality from the spruce budworm and Douglas-fir beetle, habitat for those species that prefer or depend on dense forest habitats would be altered and may not provide the forest structure to support a variety of species. Although there could be effects to those species that prefer or depend on closed canopy forests, Alternative B could protect the long-term structure and function of forest stands and allow the stands (and habitats) to recovery more rapidly. Thinning would ultimately result in healthier forests with more vigorous trees and diversity of vegetation size classes.

Since this alternative promotes the protection and retention of forest structure and function, there could be long-term beneficial effects associated with the Alternative B.

Alternative B would directly effect to those species that depend on closed canopy forests but would move forest stands more towards the historic condition. Alternative B could greater short-term effects to species that prefer dense forest habitat but in the long-term, could have greater beneficial effects.

Snags

Snags provide valuable micro-habitats for a multitude of wildlife. Animals use snags for nesting, roosting and feeding. The value of and preference for large diameter snags for nesting has been well documented for numerous species including pileated woodpecker, hairy woodpecker and northern flicker (McClelland et al. 1979). Additionally, previously excavated cavities provide nesting, roosting and shelter habitat for secondary cavity nesting birds and some mammals (Bull et al. 1997, Saab et al. 2004). Under Alternative B, existing snags >15” DBH would not be removed with the exception of those removed for safety reasons.

The removal of the large (live) insect-infested trees as well as the removal of large live trees (up to 18”DBH) under all action alternatives could decrease future snag patches and down woody material that would have become available to a variety of wildlife species, including three-toed and black-backed woodpeckers. Due to the recent epidemic of spruce budworm, Douglas-fir beetle and mountain pine beetle, however, snag habitat is not currently limited on the landscape.

One of the objectives of the project is to promote the development of trees with "old growth" characteristics. Trees with these characteristics would become valuable snag habitat in the future.

Under Alternative B, the amount of snag habitat expected to be removed would be negligible across the project area compared to what is currently available with the exception of in 170 acres of forested WUI units. Breeding and foraging habitat provided by snags for species including but not limited to; black-backed and three-toed woodpeckers; hairy, downy and pileated woodpeckers; forest bat species; pine marten and black bear could be removed or altered but would still be available across the landscape. In WUI units, snags of any size would be removed to a 15' spacing, substantially reducing snag habitat in these areas.

The use of prescribed fire in this alternative and the use of fire for underburning to maintain open stands could increase the number of small to large diameter snags, depending on fire intensity. Through prescribed fire, a greater number of small (<13" DBH) snags could be created since burning would be designed to protect large trees.

Down Wood

As snags and fallen trees decay, they support members of different wildlife groups that use down trees for foraging substrate, nesting, denning, perching, roosting and shelter. After trees fall to the ground, persistence through time of dead trees (especially those of large diameter) can last several decades. Besides providing a source of organic and inorganic nutrients for soil development, these logs also provide nesting, denning and/or hiding cover, as well as foraging opportunities for small mammals, birds and reptiles. Down wood provides valuable micro-habitats for a multitude of wildlife. Ground-dwelling species use down logs for cover from predators, as travel corridors and many animals feed on the arthropods attracted to the decaying wood. Forest management can increase down woody material in a stand by leaving logging slash after harvest. Although this creates material for nutrient recycling, the smaller logging slash is less desirable for wildlife. Piling and burning woody debris during site preparation can lessen down wood accumulations.

The direct loss of habitat for species that require larger diameter dead down trees would be low under all action alternatives, because no down woody material would be removed from the site. Since trees would be removed from the site, an indirect effect from all action alternatives could be the loss of future down woody material. All action alternatives, however, would retain residual down woody material (5-20 tons/acre) to maintain nutrient recycling, desirable micro-site conditions and to create down woody material appropriate for the site. In addition, no trees greater than 18"DBH would be removed, ensuring very large future down wood.

Under Alternative B, whole trees would be yarded to landings or pulled into piles for burning to reduce the amount of fine fuels on the ground. Existing down wood would be targeted for protection, but some down trees could be broken or crushed during implementation, especially during ground-based operations. Underburning proposed in could also reduce the amount of down woody material.

Prescribed Burning

Fire is a natural force that shapes plant and animal communities. Because many wildlife species evolved with fire, they are well-adapted to its presence on the landscape. Many species benefit from fire; some even require it to produce habitat conditions necessary for survival. Most species have behavioral adaptations to avoid being killed during fires. Small mammals, reptiles and amphibians remain underground or under rocks and downed logs; and larger animals and birds generally escape a fire by running or flying.

The season when prescribed fires are conducted has important consequences for wildlife and invertebrates. Whereas spring burns may remove grasses and shrubs that provide critical forage, cover and breeding habitat for small mammals, birds, ungulates and invertebrates, late summer and fall burns remove senescent plant biomass and usually stimulate growth of grass and shrubs the following spring. Spring burns conducted prior to green-up can cause many grasses, forbs, and some shrubs to sprout or re-sprout within a few weeks of the fire. Fall fires tend to burn hotter and consume more of the down wood and snags. A spring burn would retain more sagebrush and trees per acre than a fall burn, creating more mosaic habitats. A fall burn, however, would tend to allow for more consumption of biomass.

To control the intensity of fire Alternative B, burning would occur in the spring when snow is still on the ground and soils are moist, or during fall if conditions were appropriate. Burning in the spring would allow more control of fire and create a greater mosaic of habitats with patches of unburned or lightly burned areas. These would help maintain sage cover while still removing conifers. Jackpot burning would allow concentrations of fuels to be consumed without having to burn the entire area.

Fire-killed trees can become infested with insects that are food for woodpeckers and snags created by fire provide perches for raptors. Trees infected by decay after fire provides nest sites for woodpeckers and secondary cavity nesters (birds and mammals). As these snags fall and become coarse woody debris, nest sites for cavity nesting species would be reduced but the fallen wood would serve as cover for small mammals, reptiles and ground nesting birds. The fungi and invertebrates living in the dead wood provide food for many birds and small mammals.

Prescribed fire can improve wildlife habitat by encouraging lush groundcover of shrubs, grasses and forbs that provide food and cover. Fire can also increase palatability and nutrition of new growth for at least one year after a burn as well as increase fruit, seed, and beneficial insect production. Variation in the severity of a prescribed burn influences residual stand characteristics, including the spatial distribution and availability of litter, down wood, snags and vegetation (Pilliod et al. 2006). In most cases, prescribed fire results in increased structural complexity and habitat heterogeneity.

Anecdotal information from Folk and Bales (1982) suggest that direct mortality of wildlife from incineration or asphyxiation during prescribed burning could be minor. Most species are able to find refuge microsites (inside burrows or under surface objects) or move away from approaching equipment, heat or smoke. However, spring prescribed fire during the breeding season could result in mortality of ground and shrub nesting bird nestlings and species living within litter such as small mammals, reptiles, amphibians and invertebrates. Although fires are more likely to kill slow moving animals that are unable to find refugia quickly or animals that are physiologically

compromised, even mobile species like birds and large mammals are occasionally killed in fires (Folk and Bales 1982 and Horton 1929). Therefore, a planned burn would likely kill some individuals and that mortality could be significant for some populations.

Fire creates vegetative diversity and therefore enhances wildlife habitat. Optimum benefits occur where fire creates a mosaic pattern of burned and unburned vegetation which provides new growth of nutritional forages, seasonal habitats, and maintenance of vegetation in early stages of succession. Improved habitat and forage increases the carrying capacity of habitats for large mammals.

After fire, grasses, forbs, shrubs and saplings would re-occupy the site. These would provide forage and cover for small mammals, a concentrated food source for grazing and browsing ungulates and, within 10 years, nest sites for shrubland birds. Short-term effects of fire could occur to species such as shrews, voles, rabbits, sagebrush birds, red squirrels and northern flying squirrels. In contrast, deer mice, chipmunks, pocket gophers and ground squirrels may favor disturbances and be less affected by prescribed fires.

Under Alternative B, prescribed burning would be implemented to reduce competing vegetation, and to encourage regeneration of shrubs, grasses, forbs, and aspen.

Underburning to maintain open Douglas-fire stands could also occur in this alternative but would only be implemented after populations of Douglas-fir beetles have declined. Up to 600 acres could be underburned after forest thinning activities in Douglas-fir savannah and forest habitats under Alternative B.

Although the risk of undesirable conditions is always greater when using controlled burning, Alternative B would target burning in the spring when snow would aid in controlling the intensity of the burn and multiple burns over a number of years could be used to meet habitat objectives.

Wildlife Species of Interest

*Big Game:*
North American ungulates (including elk, mule deer and moose) are generally associated with a mosaic of open areas used for foraging and forested areas used for cover. Elk, mule deer and moose use dense thickets of shrubs and trees as thermal cover and as cover to hide from predators, for daybeds and for fawning. All species are associated with areas of abundant forage (grasses, forbs and shrubs) and forested habitats. The proximity of these habitats is important. In Douglas-fir and mixed conifer forests in western Montana, elk generally remain within 656' of foraging areas during the summer (Edge et al. 1987).

For centuries, Native Americans and land managers have used prescribed fire to improve habitat for ungulates. Burning improves the quality of browse vegetation and affects plant communities primarily through the nutritional content, quantity, and availability of forage. In an aspen stand in Idaho, a prescribed fire greatly improved the amount and nutritional quality of forage for elk

within one to two years after prescribed burning (Canon et al. 1987). This finding is consistent with deer and elk responses to recovering vegetation after wildfire. For example, one year after a wildfire in Idaho, mule deer preferred the burned Douglas-fir/ninebark and burned ponderosa pine/bluebunch wheatgrass habitat types compared to unburned areas (Keay and Peek 1980). The use of burned areas by elk, deer and bighorn sheep has also been documented for various projects throughout the Butte Field Office.

Fire can adversely affects population densities of animals, principally by altering habitats. Ordinarily after large burns, the food supply exceeds demand, and large areas away from suitable cover receive little browsing pressure. In areas of light browsing, shrubs will rapidly grow back into dense stands. Wright (1974) suggested a patchy, mosaic burn with greater than 20 percent unburned vegetation is most desirable for most wildlife species because this leaves adequate cover for big game and a winter food supply.

Prescribed burns in sagebrush communities can benefit elk through increased forage quantity and quality, but such benefits may persist <2 years under certain conditions (VanDyke and Darragh 2005). Although prescribed burning in sagebrush can be of benefit to grasses, forbs, and wildlife, burning may not be beneficial to all conservation objectives. Elevated plant production and protein levels observed in burned sagebrush communities are typically short-term responses, and even short-term effects do not always occur (VanDyke and Darragh 2005). Large-scale removal of sagebrush is likely to lower habitat and landscape diversity and reduce populations of indigenous species. In fact, models relating fire, grazing, and landscape characteristics predict that prescribed fires affecting >60 percent of winter range produce no site-specific responses in ungulates and may reduce winter survival (Turner et al. 1994). However, mesic conditions and plant competitive characteristics unique in higher elevation big sagebrush communities could result in greater increases in plant productivity and nutrient concentrations compared to sagebrush communities at lower, drier elevations (Cook et al 1994). Burning big sagebrush in these communities probably increases the availability of soil water, soil nutrients, and radiant energy flux to the surviving plants (Cook et al 1994). These changes may account for increased nutrient content by facilitating earlier growth, increased rates of growth, and delayed senescence.

Cook at el (1994) postulates that high elevation plant communities with dense big sagebrush without aggressive introduced annual herbs such as cheatgrass will respond well to prescribed burning. Reductions in shrub density and associated evapotranspiration losses should increase growth rates and extend the growing season, thereby enhancing vegetative productivity and quality. The length of time these enhancements persist likely depends on the rate of successional advance. In rangeland plant communities where (1) burning does not substantially alter plant composition, such as mountain grasslands, (2) burning results in rapid increases in competitive annual herbs, or (3) plant growth is restricted by severely limited precipitation, the effects of burning on vegetative productivity and nutrient content may be inconsistent and short-lived.

Although prescribed burning could increase the amount or quality of forage, the loss of browse (sagebrush) from burning would result in a loss of an important component of the mule diet, especially during the winter. The regenerating brush sprouts and seedlings, however, following fire could offer deer a palatable and nutritious diet.

For optimal benefits to elk and other grazing ungulates, and to achieve increased biodiversity in native plant communities, small, dispersed burns that are separated in space and time should be used. Such dispersion permits ungulates to have ongoing accessibility to newly burned sites that provide greater increases in plant production and nutritional quality compared to older burns and unburned sites on larger landscape scales, and permits a greater opportunity for monitoring precision in assessing the effects.

Thinning overcrowded stands of Douglas-fir and creating open mixed conifer stands would reduce thermal, hiding, and security habitat for big game species.

The use of prescribed fire and thinning would be expected to reduce thermal and hiding cover levels with Alternative B. The amount of cover loss, however, could be mitigated by rugged topography combined with the surviving and regenerating vegetation from prescribed fire and thinning activities.

Under Alternative B, approximately 2,700 acres of mature forest habitats could be thinned. Douglas-fir savannah would be the habitat type the most altered with canopy covers reduced to less than 30 percent and, likely, closer to 10 percent in many areas. Of the 1,640 acres of Douglas-fir savannah proposed for restoration under Alternative B, 20 percent would be retained for hiding and thermal cover and for movement corridors within treatment units. This would help off-set the impacts, but still up to 1,310 acres of hiding and thermal cover (in winter range) could be lost under Alternative B.

Of the forest types proposed for thinning, 170 acres of lodgepole pine or mixed forest would be thinned in the WUI under Alternative B, adding to the potential loss of hiding and thermal cover.

Under Alternative B, forage for big game species would be expected to increase. Thinning along with prescribed fire would likely increase both forage quantity and quality for elk, mule deer and moose.

Alternative B proposes 3.58 miles of new seasonally restricted (closed 12/2-6/30) roads in the Jimmie New area. The increase of seasonally restricted roads would not impact big game during the winter season, but could have minimal effects during the calving season as well as adverse effects during the hunting season. One of the biggest issues with the proposed open roads under Alternatives B is the location of the roads on the landscape. Each of the 5 proposed routes is less than 0.7 mi. from another route that is proposed to be open and all routes are within 1.6 miles of all other routes (Appendix A, Map 5). This could create concentrated human use within this area during hunting season.

The road density for the four other major locations in the project area (Charcoal Gulch, Dickie Hills, Alder Creek and Deno Creek) would remain the same as under the No Action Alternative.

Although open and seasonally restricted road densities are low throughout the planning area, the location of those roads along with the fairly small blocks of BLM lands on the landscape result in less than desired security habitat in Alder Creek, Deno Creek, Dickie Hills and Jimmie New.

There would be no change in the amount or quality of security habitat in the Charcoal Gulch, Alder Creek, Deno Creek or Dickie Hills areas in Alternative B.

In the Jimmie New area, however, a proposed increase of 3.58 miles of seasonally restricted roads that are open during the hunting season would affect the amount of security habitat in this area. The increase in 3.58 miles of open roads during the hunting season would reduce the amount of secure habitat in the Jimmie New area from 2,540 acres (32 percent of the area) to 1,980 (25 percent of the area). The Butte RMP (2009) states that; "the BLM will maintain functional blocks of security habitat for big game species across BLM lands." The plan continues with "where security habitat is limited or fragmented across the landscape, the BLM will emphasize improving habitat through vegetation treatments and road closures (including seasonal closures) to increase security habitat for big game species." Again, each of the 5 proposed routes is less than 0.7 mi. from another route that is proposed to be open and all routes are within 1.6 miles of all other routes. This could concentrate human use within this area during hunting season.

Temporary roads could be created for ground-based thinning activities. Most of the temporary roads would be located in the Jimmie New and Deno Creek areas. Temporary roads would not be open to the public and would be stabilized and closed after the project is complete. There could be short-term disturbance to big game and other species during project implementation from the use of roads and trails.

Under Alternative B, the effects from livestock grazing on big game habitat would be the same for the Harriet Lou, Leffler and Quartz Hill Allotments as under the No Action Alternative.

The change in the livestock grazing system under Alternative B along with associated range improvement projects would be expected to improve riparian habitats in the Jerry Creek Allotment.

Improving the quantity and quality of riparian vegetation would benefit big game by improving movement corridors as well as forage and browse species (in the long-term).

The timing and number of cattle would remain the same in the Foothills Allotment under Alternative B as the No Action Alternative. Under this alternative, however, livestock in the Limekiln pasture would be better disbursed to reduce impacts associated with cattle congregating in small areas of the pasture. Disbursing livestock use should lead to improved upland range conditions including an increase in desired plant species in the allotment.

*Black Bear*

Thinned stands may provide dependable food sources for bears, such as when fruit, mast, grass, and herbaceous plant production increases after prescribed fire or thinning (Pilliod et al. 2006). Thinning, however, may decrease the amount of escape cover, which may be the most critical component of black bear habitat. Sites used by black bears for traveling and resting typically have high stem density and dense canopy closure, presumably for security (Pilliod et al. 2006).

Alternative B would increase forage and hunting potential for the black bear but would reduce hiding, security and travel habitat.

*Pine Marten*
Pine marten prefer older-aged forested stands with high overstory density and structural complexity. Changing closed canopy forest to stands with <30 percent canopy on up to 1,640 acres under Alternatives B would potentially convert 16 percent of the currently suitable habitat in the project area to unsuitable for the pine marten.

Thinning Douglas-fir forest and mixed forest stands would result in canopy cover between 30-50 percent on up to 1,070 acres under Alternative B. Although canopy cover could be retained at suitable levels for the pine marten (>40 percent), the quality of habitat in some forest stands could be reduced.

Thinning treatments to reduce the risk of fire in the WUI would also reduce the quality of pine marten habitat on an additional 170 acres of lodgepole and mixed conifer stands in the Tie Creek and Deno Creek areas.

*Pileated Woodpecker*
Alternative B would attempt to protect large diameter Douglas-fir from mortality due to the Douglas-fir beetle, promote large replacement trees and maintain late seral habitats. This would ensure that habitat for the pileated woodpecker would be maintained in the long-term.

No trees greater than 15"DBH would be removed from Douglas-fir savannah habitat and few trees between 15-18"DBH would be removed in Douglas-fir forest and mixed forest stands. All snags >15"DBH would be retained (unless for human safety or in 170 acres of WUI units). Although habitat in the WUI could be altered with the loss of all size classes of conifers as well as the removal of snags, habitat for the pileated woodpecker would be retained in restoration units by protecting existing and future nesting trees for this species.

More aggressive treatments proposed under Alternative B could result in a greater number of large (13-15"DBH) trees removed to reduce populations of Douglas-fir beetle or to restore forest habitats. The loss of insect-infested trees could reduce the amount of foraging habitat for pileated and other woodpecker species.

The use of prescribed fire in sagebrush under Alternative B would not have impacts to pileated woodpecker habitat, but woodpeckers could be temporarily displaced during implementation due to smoke and activity. Underburning forest stands, depending on the intensity, could increase the number of small to large diameter snags.

<u>BLM Sensitive Species</u>

*Brewer's Sparrow*
Burning of sagebrush could decrease the abundance of Brewer's Sparrows. A study in shrubsteppe habitat of southcentral Wyoming found the abundance of Brewer's sparrows were four times higher on untreated control plots with 37 percent average sagebrush cover than on

burned areas with 6 percent average sagebrush cover (Kerley and Anderson 1995). In southcentral Montana, Brewer's sparrows were absent from a site 2-3 years after a fire eliminated all sagebrush cover (Bock and Bock 1987). Castrale (1982) compared Brewer's sparrow abundance on a regenerating 4-yr-old burn, a regenerating 4-yr-old chained site, and a regenerating 17-yr-old plowed site. Brewer's sparrows were absent from burned areas, except in intact remnants of sagebrush, and they occurred at relatively low densities (about 0.4 pairs/ha) on chained and plowed sites.

Partial burns may have little or no long-term effects on Brewer's sparrow populations. In southeastern Idaho, an incomplete prescribed burn (45 percent burned) resulted in significantly lower densities of Brewer's sparrows for 2 years following the burn, but densities exceeded those on control plots during the third and fourth years after burning (Petersen and Best 1987). In the 4th year following the burn, there was no consistent effect of prescribed burning on return rates, mating success, nestling growth rate, reproductive success, or nest survival. Continued monitoring of burned and unburned plots over 7 years indicated that prescribed burning by itself did not have any long-term effects on abundance (Petersen and Best 1999). However, burning may affect populations by promoting the spread of non-native weeds.

Partial removal of sagebrush reduces foraging opportunities for individual Brewer's sparrows. In central Oregon, experimental reductions of sagebrush cover from 14 to 22 percent did not affect the placement or size of territories but caused males on treatment plots to forage less and sing more than males on control plots (Wiens et al. 1986). Within the treatment area, birds spent proportionally more time in unmanipulated blocks (those with no shrubs removed) than in blocks in which shrubs had been removed.

Partial burns are less detrimental to Brewer's sparrows than complete burns. In burned mountain big sagebrush of western Wyoming, Brewer's Sparrows continued to nest in remaining patches of unburned shrubs (Petersen and Best 1987a). Arthropods make up the majority (70-80 percent) of the adult diet and 100 percent of the nestling diet during the breeding season. In southeastern Idaho, prescribed burning did not affect the composition of nestling diets, largely because adults avoided burned areas and continued to forage for arthropods in unburned areas (Petersen and Best 1986). Although nesting Brewer's Sparrows spend 40-50 percent of their time foraging, prescribed burning had no effect on their activity budgets, feeding-trip frequency, or prey load size (Petersen and Best 1986). After burning, males flew 1.5 times farther from the nest to forage, but this did not change the duration of their foraging bouts (Petersen and Best 1986). In southern British Columbia, birds continued to nest in burns that were 4 years old, but they used a much greater diversity of plant species for nesting, including large perennial forbs (Gebauer 2004). Six years after burning, birds switched back to nesting in sagebrush that had germinated after fire (Gebauer 2004).

Mosaic-pattern, narrow-strip, or small-block burns can provide considerable edge and excellent interspersion of habitat types for the Brewer's sparrow.

Removing conifer colonization in sagebrush through mechanical treatments or hand cutting would maintain or increase the amount of suitable nesting and foraging habitat for the Brewer's

sparrow. Under Alternative B, roughly 570 acres of sagebrush would be maintained or restored using mechanical or hand thinning activities.

Removing conifer colonization in sagebrush through the use of prescribed burning could reduce the amount of suitable nesting habitat on up to 840 acres in the planning area under Alternative B. Under all action alternatives, the objective of controlled burning would be to reduce as much conifer colonization while protecting as much sagebrush as possible. Prescribed burns would be conducted in the spring and designed to protect at least 50 percent of sage in a mosaic pattern. Where spring burns successfully retain 50 percent sagebrush in a mosaic pattern, the effects to Brewer's sparrows would be expected to be moderate and short-term. Where prescribed burning does not meet the desired condition due to weather, terrain or density of conifers, the amount of sage removed would be higher and effects to the Brewer's sparrow much greater and long lasting.

The effects to Brewer's sparrows from livestock grazing would be the same for the Quartz Hill, Leffler and Harriet Lou Allotments for all action alternatives. No impacts would be expected to sagebrush in these allotments from continued levels of livestock grazing. Since livestock grazing would be authorized during the nesting season, however, there could potentially be impacts to Brewer's sparrow's nests and young from livestock trampling.

The change in the grazing schedule in the Jerry Creek Allotment along with associated range improvement projects would be expected to be beneficial by preventing livestock use outside of the permitted grazing system and reducing livestock pressure in riparian habitats. However, the effect to upland sagebrush habitats is not known. This allotment met standards for the uplands so in increase or maintenance in sage with a change in livestock management might not be measurable. As with the other allotments, permitting livestock grazing during the nesting season could result in trampled or dislodged nest sites and young.

The timing and number of cattle would remain the same in the Foothills Allotment under Alternative B as the No Action Alternative. Livestock in the Limekiln pasture, however, would be more disbursed to reduce impacts associated with cattle congregating in specific areas. Disbursing livestock use should lead to improved upland range conditions including an increase in desired plant species in the allotment. Alternative B would be expected to improve range conditions and Brewer's sparrow habitat.

*Sage Grouse*

The potential for the project area to be used by nesting sage grouse is considered low. It is possible that some nesting activity could occur within the Charcoal Gulch drainage since this area is the closest to a potential (but unconfirmed) lek. In Montana, the majority of nesting occurs within 2 miles of a lek. Although nesting can occur further than 2 miles from a lek, the potential of nesting beyond 6.5 miles begins to diminish.

Although nesting habitat is suspected to be unlikely, sage grouse have been observed in the project area during late summer in the Jimmie New and Dickie Hills areas. No young were observed. The project area, especially the north side of the river, has the potential to provide future lek and brood rearing habitat and portions of the Jimmie New and Dickie Hills areas are

considered to be occupied sage grouse habitat by FWP, however national BLM guidance has indicate that no Preliminary Primary Habitat for sage grouse occurs within the projects area.

Removing conifer colonization in sagebrush through mechanical treatments or hand cutting would maintain or increase the amount of suitable sage grouse habitat. Under Alternative B, roughly 570 acres of sagebrush would be maintained or restored using mechanical or hand thinning activities.

Removing conifer colonization in sagebrush through the use of prescribed burning could reduce the amount of suitable sage grouse habitat on up to 840 acres in the planning area.
The objective of prescribed burns is to reduce as much conifer colonization while protecting as much sagebrush as possible. Prescribed burns would be conducted in the spring and designed to protect at least 50 percent of sage in a mosaic pattern. Where spring burns successfully retain 50 percent sagebrush in a mosaic pattern, the effects to sage grouse habitat would be expected to be moderate and short-term. Where prescribed burning does not meet the desired condition due to weather, terrain or density of conifers, the amount of sage removed would be higher and effects to sage grouse habitat much greater and long lasting.

Effects of livestock grazing on vegetation species composition and structure in the sagebrush community have been well documented (Rowland 2004). However, few empirical studies report the responses of sage grouse to grazing, and experimental research on effects of livestock on sage grouse is lacking (Rowland 2004). Many studies imply effects of livestock grazing on sage grouse by noting that grazing systems must be designed such that adequate herbaceous and shrub cover for nesting or brood rearing are maintained. DeLong et al. (1995) found that predation rates on sage grouse nests in Oregon were related to reducing the percent cover of tall grass and medium-height shrubs, and suggested that practices, such as livestock grazing, that remove grass cover may affect nesting sage grouse.

Danvir (2002) reported two instances of nest abandonment related to livestock grazing in northern Utah during 7 years of observations; one was caused by cattle, the other by sheep. Sage grouse behavior on leks did not appear to be altered by the presence of cattle grazing (Danvir 2002).

Research on upland meadows in Nevada showed that pastures under a rest-rotation system provided better production of those forb species preferred by sage grouse than did pastures that were not rested, but sage grouse also used a pasture not grazed by cattle for 10 years (Neel 1980). It was concluded that light grazing in meadows might enhance habitat for sage grouse. It has also been reported that grazing by cattle stimulated production of forb species used by sage-grouse in upland meadows in Nevada.

The effects to sage grouse habitats from livestock grazing would be the same for the Quartz Hill, Leffler and Harriet Lou Allotments under all action alternatives. Since these allotments met upland standards, any effects to sage habitat would be the same as the No Action Alternative.

The change in the grazing schedule in the Jerry Creek Allotment and associated range improvement projects would be expected to be beneficial by preventing livestock use outside of the permitted grazing season and reducing livestock pressure in riparian habitats.

The timing and number of cattle would remain the same in the Foothills Allotment under Alternative B as the No Action Alternative, but livestock in the Limekiln pasture would be better disbursed to reduce the impacts associated with cattle congregating in specific areas. Disbursing livestock should lead to improved upland range conditions including an increase in desired plant species in the allotment.

*Great Gray Owl*
Known great gray owl habitat is found in the Jimmie New, Alder Creek and Deno Creek areas. Forest restoration activities can effect nesting great gray owl habitat by reducing the density of trees adjacent to nest sites.

Active nest sites would be protected during the nesting season from disturbance, and habitat surrounding any nest sites (active or inactive) would remain in suitable condition after treatment. These project design features should ensure adequate protection of great gray owls during critical incubation, nesting and post fledgling periods and to maintain suitable habitat surrounding nest sites.

In the Jimmie New area, returning overstocked Douglas-fir stands to more open habitats could increase the amount and quality of hunting habitat for the great gray owl. Up to 20 percent of the total number of forest acres thinned would be retained (refer to design features common to all action alternatives) for habitat diversity. This would allow for patches of dense forest between treatment units and protect future nest sites and roosting habitat adjacent to hunting areas.

In the Jimmie New area, thinning roughly 735 acres of Douglas-fir forest would result in a reduction of canopy cover but overall canopy would remain between 30-50 percent. No trees larger than 18”DBH would be removed. The retention of suitable nest trees and maintenance of higher canopy covers would be expected to maintain suitable habitat for the owl in this area.

In the Alder Creek area, thinning of previously harvested lodgepole pine would be expected to have minimal impacts to great gray owl. Removing mature lodgepole pine to reduce the risk of wildfire in the wildland urban interface, however, could reduce suitable nesting habitat on up to 170 acres. Existing nest sites would be protected and adjacent habitat maintained in a suitable condition for the owl.

In the Deno Creek area, thinning roughly 240 acres of mixed conifer and Douglas-fir forests would result in a reduction of canopy cover but overall canopy would remain between 30-50 percent. No trees larger than 18”DBH would be removed. The retention of suitable nest trees and maintenance of higher canopy cover should maintain suitable habitat for the owl in this area.

No currently suitable nest trees would be removed with this project and patches of suitable nesting habitat would be retained across the landscape. In addition, the project is designed to promote the development of trees with old-growth characteristics to replace many old growth trees lost due to the Douglas-fir and mountain pine beetle. Promoting long-term development of structure preferred for nesting great grey owls would benefit the owl.

Although Alternative B, could impact individuals or habitats (due disturbance during implementation from the number of acres thinned), this alternative would not result in a trend toward federal listing or reduce viability for great gray owl populations.

*Northern Goshawk*
Northern goshawks prefer closed canopy forests of larger diameter trees with relatively open understory. Management recommendations for sustaining habitat for the northern goshawk and their prey include prescribed fire, thinning from below to achieve non-uniform spacing of trees >18" DBH (not to exceed 30-50 percent canopy opening) and various slash treatments (Reynolds et al. 1992). Large snags, down woody material and mature, old live trees in clumps or stringers with interlocking crowns should also be maintained or promoted as a desired condition in goshawk habitat (Reynolds et al. 1992). High quality goshawk habitat consists of a mosaic of vegetation structure stages interspersed throughout the post fledging area. Currently, forested habitats within the project area are dominated by mid seral stands with closed canopies.

Active nest sites would be protected during the nesting season from disturbance, and habitat surrounding any nest sites (active or inactive) would remain in a suitable habitat condition after treatment. No trees greater than 18" would be removed under all action alternatives (unless infested with insects and found to be a "threat" to the stand). These project design features should ensure adequate protection of nesting goshawks during critical incubation, nesting and post fledgling periods and to maintain suitable habitat surrounding nest sites.

Due to the recent epidemic levels of spruce budworm and Douglas-fir beetle, the amount of snag habitat available for nesting goshawk and great grey owl has substantially increased in the project area. The quality of habitat around these potential future nest trees, however, could be altered through forest thinning activities.

Under Alternative B, up to 1,640 acres of overstocked Douglas-fir savannah could be thinned to less than 30 percent canopy cover and, possibly, to less than 10 percent. This could have the potential to convert up to 16 percent of the currently suitable (although moving towards unsuitable) habitat in the project area to marginal or unsuitable habitat for the northern goshawk.

Alternative B could also thin up to 820 acres of Douglas-fir forest and 250 acres of mixed conifer stands to between 30-50 percent canopy cover. It is expected that maintaining 30-50 percent canopy cover in these habitat types would maintain suitable goshawk habitat. Maintaining 30-50 percent canopy cover and promoting a diversity of age classes and understory vegetation species would be expected maintain or improve habitat in up to 10 percent of the project area for the northern goshawk.

Creating open forest conditions with an understory of grasses, forbs and shrubs as well as providing more diversity of habitats would likely increase prey species for the northern goshawk under all action alternatives.

Reducing conifers of all sizes, including snags, in the WUI units of Alder Creek would reduce suitable habitat for the northern goshawk on up to 170 acres. Although goshawk nests in the vicinity would be protected and suitable habitat retained immediately around active or inactive

nest sites, Alternative B could affect goshawk habitat in the area from thinning 170 acres of WUI units.

Although the action alternatives could have direct effects on raptor habitat by removing potential nest trees and structure, there could be beneficial effects if mature Douglas-fir trees survive to provide long-term nest sites for these species.

Alternative B would move more potential goshawk habitat into marginal or unsuitable condition compared to the other action alternatives. Alternative B could impact individuals or habitats, but this would not result in a trend toward federal listing or reduce viability for northern goshawk populations.

*Flammulated Owl*
Flammulated owls prefer mature trees with open canopies and avoid dense young stands. Flammulated owls consistently select habitat that combines open forest stands with large trees and snags for nesting and foraging, occasional clusters of thick understory vegetation for roosting and calling and adjacent grassland openings that provide optimum edge habitat for foraging.

Reducing canopy cover to <30 percent on up to 1,640 acres of mid seral Douglas-fir savannah habitat through thinning under Alternative B could have the potential to convert up to 37 percent of currently unsuitable or marginal habitat for the flammulated owl to suitable or desired habitat.

Thinning an additional 820 acres of dry Douglas-fir stands could also improve habitat conditions for the owl.

Maintaining at least 20 percent of treatment units as untreated would retain pockets of dense thickets interspersed with open forests and create conditions preferred by the owl for nesting, roosting and foraging.

Although no flammulated owls have been documented in the project area, all action alternatives would likely have beneficial effects on flammulated owl habitats.

*Three-toed woodpecker*
Three-toed woodpeckers key in on forests suffering from insect epidemics, oftentimes after fire, or any event that causes stress to host trees and attracts insects.

Under Alternative B, reducing the number of overstory trees on up to 2,700 acres through thinning could impact and degrade approximately 26 percent of the currently suitable habitat for three-toed woodpeckers in the project area. Thinning in Douglas-fir and mixed conifer stands would be less affected due to more trees per acre retained after thinning.

Although habitat for this species would be altered under Alternative B, suitable habitat would remain after thinning. In addition, adjacent untreated forest would continue to provide adequate forage and nesting habitat for the three-toed woodpecker. Alternative B could impact individual

three-toed woodpeckers or its habitats, but would not result in a trend toward federal listing or reduce viability of the three-toed woodpecker population.

*Boreal Toad*

Upland habitat use by forest amphibians largely depends on the availability of moist duff and litter and rotting down wood. Unlike reptiles, amphibian response to reduced canopy cover would likely be less favorable due to the warmer and drier conditions created in the understory. Frogs and toads, however, may be less affected by changes in environmental conditions associated with thinning because of their tendency to travel at night and during rain events.

Species that frequently occupy terrestrial habitats (such as boreal toads) may be killed during vegetation treatments or find post-treatment conditions unsuitable (Pilliod et al. 2003). Boreal toads, however, can readily occupy burned habitats. This species forages on ants and ground beetles and seeks out shelter under logs, rocks and in rodent burrows (Pilliod et al. 2006). The boreal toad appears to be attracted to recently disturbed areas and may benefit from vegetation treatments. Toads colonized and bred in dozens of shallow ponds in burned lodgepole pine forests in Glacier National Park but not in adjacent unburned areas (Pilliod et al. 2006). Although the environmental factors attracting the toads to the ponds in the burned forests are unclear, another study found toads in greater abundances in burned forests (Kirkland et al. 1996).

Habitat for the boreal toad would not be directly impacted by this project, but dispersing individuals could be killed by equipment during project implementation. Thinning and burning, especially under Alternatives B, could have a beneficial effect to boreal toads after project implementation.

Riparian restoration under Alternative B would benefit the boreal toad. Changes to livestock grazing in the Jerry Creek Allotment could result in an increase of riparian habitats if utilization monitoring and removal of cattle off riparian zones is successful when triggers were met. This would also lead to beneficial effects to boreal toad habitat.

Alternative B could impact individual boreal toads or its habitat, but would not result in a trend toward federal listing or reduced viability to the population or species.

*Gray Wolf*

The potential effects to wolves can be measured by looking at sufficient, year-round prey base (elk and deer); suitable and somewhat secluded denning and rendezvous sites (wet meadows); and sufficient space with minimal exposure to humans. Although there are wolf packs in the Big Hole watershed, there are no known den or rendezvous sites in the project area.

Road access is directly related to the potential for wolf/human interaction and potential human-caused mortality. In the project area, most human activity is concentrated around the big game hunting season. In addition, FWP also allows the harvest of wolves to occur in this area. Alternative B would increase the miles of seasonally restricted roads (open during spring through fall) in the Jimmie New area from 1.19 mi/sq. mile to 1.5 mi/sq. mile. This could have an impact on the distribution of big game, especially during the hunting season. A change in elk distribution in the Jimmie New area could result in fewer elk in this area, but is not expected to

reduce the overall big game population in the analysis area. All other roads associated with the UBHE project would be temporary and closed after project implementation.

The prey base for wolves in the project area includes primarily deer, elk, and, possibly, moose. Vegetation activities including thinning and burning would move closed forest stands and heavily encroached sagebrush to more open conditions. This could result in a change in distribution of big game across the landscape, especially in the Jimmie New and Alder Creek areas, but the overall population of big game is not expected to be reduced in the analysis area.

Because Alternative B would thin and burn more habitat, and therefore, reduce hiding cover for big game. This could result in a greater change in the distribution of big game, but would also result in a greater numbers of acres restored to healthier conditions for prey species.

Wildlife Movement Corridors

Since the entire project area is within wildlife core habitat and movement corridors, Alternative B would have both beneficial and harmful effects to these habitats. Reducing the loss of old growth Douglas-fir by improving the vigor of stands would retain crucial habitat components in the long-term. Increasing plant diversity through thinning and burning would improve forage for big game, as well as for black bear and other species with large and small home ranges.

Under "historic" conditions, native wildlife would have been able to move between patches of dense forest within a mosaic of open, savannah and woodland habitats and sagebrush/grassland meadows. Under current management, roads and other disturbances due to anthropogenic activities affect how wildlife disperses across the landscape. All action alternatives could affect on movement corridors, especially if thinning treatments are adjacent to roads. Alternative B would more impacts on movement corridors due to forest thinning activities and from an increase in road densities.

Migratory Birds

Several factors influence the richness and diversity of bird species in a stand including the structure and composition of living and dead vegetation. In western dry coniferous forests, bird community composition depends on the heterogeneity of habitats available, proximity to water, fire history and stand structure. Like other wildlife, the species that are most likely to be affected by vegetation treatments are those species whose nesting and foraging habitats are associated with the structure being removed or created and species that either prefer or avoid disturbed areas.

Birds are often grouped based on foraging or nesting location or characteristics. Because of their great mobility as adults, population level responses of birds are strongly influenced by their distribution and abundance in the surrounding landscape, although the existing conditions prior to treatment would also influence responses.

As a result of recent fire history, many coniferous forests in Montana are composed of densely stocked Douglas-fir stands. Often these stands are structurally simple (a single canopy layer with one or two overstory tree species) and have a relatively sparse understory. The lack of

structural complexity in these stands may limit the availability of key habitat components for migratory birds.

Thinning increases structural diversity by reducing competition among overstory trees and increasing the amount of sunlight reaching the forest floor, thereby increasing development of understory vegetation. In the project area, pre-settlement forests developed under lower tree densities than is typical found under current conditions. Thinning would likely accelerate the development of late seral forest conditions and create heterogeneity of habitats. An open understory tends to attract more ground feeding birds (such as northern flickers and dark-eyed juncos) or birds that favor open woodlands (such as western bluebirds, mountain bluebirds or blue grouse), while displacing some canopy feeders (such as ruby-crowned kinglets and solitary vireos).

Species that prefer or are dependent on closed canopies or more dense canopies (such as the golden-crowned kinglet and brown creeper) may be expected to decrease in numbers after thinning, while species such as the Townsend's solitaire, Hammond's flycatcher, western tanager, evening grosbeak and hairy woodpecker could be expected to increase in numbers.

The more open understory created by thinning could be advantageous to some species of hawks and owls that prey on small mammals and birds in open forests and small clearings. Prey species that have less cover are more easily captured, and some prey species, such as deer mice, prefer open forests. However, some raptor species and some small mammal and avian prey prefer closed canopy forests and may avoid stands that have been thinned.

The removal of trees with dwarf mistletoe brooms during thinning treatments would likely be detrimental to wildlife species (including great gray owl, long-eared owl, great horned owl, northern goshawk, Cooper's hawk and red-tailed hawk) that nest in mistletoe brooms (Bull et al. 1997).

Thinning or prescribed burning treatments conducted during the nesting season are more likely to result in high mortality of nestlings, especially for species nesting on the ground and in shrubs and small trees (Smith 2000). If conducted prior to the nesting season, prescribed fire is likely to reduce nesting habitat for ground and shrub nesting species. Shrubs and ground cover lost during treatments would likely recover within a few years.
Aerial, ground and bark insectivores favor burned habitats, whereas foliage gleaners prefer unburned habitats. Species with closed nests respond more favorably to burned habitats than species with open-cup nests; and birds nesting in the ground and canopy layers generally favor burned habitats compared to shrub nesters.

A potential increase in food supply (seeds and insects) following fire could provide better foraging for certain bird species because there is greater access due to the removal of grass and forbs. This increase in food supply influences mostly granivorous species and some omnivorous and carnivorous species that feed on the ground. Burn edges can also be important for some birds by providing a heterogeneous mix of burned and unburned trees, possibly providing opportunistic foraging while maintaining cover from predators. Hence, the juxtaposition of live and dead trees may benefit olive-sided flycatchers (Kotliar et al. 2002).

Bird responses to prescribed burning depend on the species and other factors. Bird populations respond to changes in food, cover and nesting habitat caused by fire. Some bird species prefer early seral and open habitats; these species are likely to increase in abundance after burning. Foliage gleaners, however, prefer unburned forests and often decrease in abundance with increasing burn severity (Kotliar et al. 2002). Prescribed burning can also alter bird foraging habitats and the primary components of bird diets (such as insect populations and fruit production of plants).

Removing conifer colonization in sagebrush through the use of prescribed burning could alter sagebrush on up to 840 acres in the planning area. The objective of prescribed burns is to reduce as much conifer colonization while protecting as much sagebrush as possible. Prescribed burns would be conducted in the spring and designed to protect at least 50 percent of sage in a mosaic pattern. Where spring burns successfully retain 50 percent sagebrush in a mosaic pattern, the effects to those migratory species that use sage habitat would be expected to be moderate and short-term. Where prescribed burning does not meet the desired condition due to weather, terrain or density of conifers, the amount of sage removed would be higher and effects to species that use sagebrush much greater and long lasting.

Mechanical thinning could occur on up to 2,700 acres of forest habitat under Alternative B. Alternative B would have the greatest potential to improve conditions for avian species that prefer open forest, but would also remove more habitats for those species dependent on closed canopy habitats.

Underburning of up to 25 percent (600 acres) of proposed thinning units in Douglas-fir habitats could occur under Alternative B. The effects to birds from fire in forested stands depend on fire severity. Although underburns would be designed to prevent fire in the crowns of trees, species nesting in the canopy could be injured by intense surface fire and crown fire if it does occur. Many birds leave burning areas to avoid injury. Some return to take advantage of the altered habitat, but others abandon burned areas because the habitat does not provide the structure or foods that they require to survive and reproduce. There may be a decline in species abundance and diversity in the first several years after a burn, but bird species (especially bark insect eaters) may become more abundant in communities recently burned by stand-replacing fire than in other habitats.
Under Alternative B, prescribed burning would not be expected to occur after May 15. Due to snow conditions, however, prescribed burning might not be possible until after May 15. Under these conditions, surveys would be completed to document avian use. Burns would be allowed to occur if low nesting use is documented or mitigation measures are done to protect nesting birds.

Under this alternative, the impacts to nesting song birds would be expected to be moderate. With a spring burn, there could be direct impacts to birds during the early part of the nesting season but adults would be expected to leave the area and nest in adjacent stands. The effects to nesting northern flickers, mountain bluebirds, grouse, owls or raptors, however, could be higher due to the earlier season of nesting. These species could be affected by the direct loss of habitat or disturbance from smoke and activity.

If any raptor nests are found in proposed burn units they would be avoided. Most raptor populations are unaffected or respond favorably to burned habitats. Fires often favor raptors by reducing hiding cover and exposing prey populations. The effects to raptors are expected to be moderate and the effects would be both harmful and beneficial.

Approximately 8 percent of the entire project area could be affected and altered by prescribed burning under Alternative B. Prescribed burning could impact up to 14 percent of sagebrush habitats in the planning area under this alternative.

*Fisheries*

Under Alterntaive B, burning and ground-based thinning could expose mineral soil and create localized surface erosion. Adequate buffers, however, would be retained on perennial streams to prevent sedimentation from reaching streams. Riparian restoration under all action alternatives would be beneficial to both perennial and fish bearing streams throughout the project area. Although thinning would occur in riparian zones, it would be done to release desired riparian species and promote an increase in riparian vegetation. No bank rooted trees would be removed and no trees would be removed from the area unless adequate instream and down woody material in the riparian zone was available. Mechanical treatments in riparian zones would only be allowed if protection of the stream and riparian structure could be guaranteed.

New seasonally restricted roads proposed under Alternative B would not cross and are not located immediately adjacent to perennial streams. There would be no effects to fish, including westslope cutthroat trout, or other aquatic species from the increase in road density in the Jimmie New area.

Temporary roads would be required to implement forest restoration activities. Temporary roads would avoid riparian zones and streams. In some cases, such as in Patton Gulch, temporary culverts would be installed to protect the stream. Culverts would adequately sized, fine material would be prevented from entering streams through the use of sediment barriers and appropriate permits would be obtained before construction to ensure proper design and placement is done to protect stream and riparian habitats.

Constructing an exclosure fence along Cat Creek would allow recovery of riparian vegetation, protect instream habitat for westslope cutthroat trout and prevent bank trampling from livestock use. This would improve and protect long-term habitat for westslope cutthroat trout in this drainage under Alternative B.

Changing the grazing system in the Jerry Creek allotment along with the reconstruction of the boundary fence is expected to improve riparian conditions throughout the Jimmie New pasture. Early spring grazing and reducing livestock pressure along perennial and fish bearing streams should allow for recovery of desired riparian vegetation as well as reduce bank trampling and improve instream habitats.

Due to the number of acres treated and proposed acres of prescribed burns, Alternative B would have a greater potential for sediment to reach streams compared to the other action alternatives.

This could be especially true if prescribed fire is lost and more acres are burned during implementation. Alternative B, however, would also reduce fuels, leading to less risk of an uncontrollable wildlife in the project area.

Riparian restoration under this alternative would benefit riparian and instream habitat throughout the project area.

Overall, the effects to westslope cutthroat trout would be expected to be beneficial from the UBHE project under Alternative B.

**Alternative C:**

General Forest

Alternative C would have the same prescriptions and protections for restoration activities in forested habitats as Alternative B, but the number of acres proposed for thinning would be roughly 1,220 acres less.

Alternative C would have fewer direct effects to those species that prefer or depend on closed canopy forests. This alternative, however, could protect the long-term structure and function of forest stands and allow the stands (and habitats) to recovery more rapidly.

Alternative C would directly alter habitat for avian and small and large mammal species on up to 1,480 acres of forest habitats. Wildlife and invertebrate species that depend on down wood and dense forests with abundant saplings and closed canopy forests for survival and reproduction would likely be detrimentally affected by thinning that alter these habitat elements on 6% of the project area.

In contrast, species that are associated with open canopies and an open forest floor would benefit from thinning activities. Because Alternative C opens forest canopy, this alternative could have fewer beneficial effects to those species that prefer open forest habitats.

Snags

Under Alternative C, existing snags >15" DBH would not be removed with the exception of those removed for safety reasons. The amount of snag habitat expected to be removed under restoration activities would be negligible across the project area compared to what is currently available with this alternative. There would be, however, a loss of snags in the WUI units. Breeding and foraging habitat provided by snags for species including but not limited to; black-backed and three-toed woodpeckers; hairy, downy and pileated woodpeckers; forest bat species; pine marten and black bear would be removed from 40 acres in forest WUI units but would be protected across the rest of the landscape during restoration activities. In addition, no snags >15" DBH would be removed from WUI units.

The use of prescribed fire Alternative C and the use of fire for underburning to maintain open forest stands could increase the number of small to large diameter snags, depending on fire intensity. Through prescribed fire, a greater number of small (<13" DBH) snags would be created since burning would be designed to protect large trees.

Down Wood

Under Alternative C sufficient residual down woody material (5-20 tons/acre) would be left on-site to maintain nutrient recycling, desirable micro-site conditions and to create down woody material appropriate for the site.

Under Alternative C, whole trees would be yarded to landings or pulled into piles for burning to reduce the amount of fine fuels on the ground. Existing down wood would be targeted for protection, but some could be broken or crushed during implementation, especially during ground-based operations. Trees that could become future down wood in forest stands would be removed through thinning operations. Underburning proposed in Alternative C could also reduce the amount of down woody material.

Prescribed Burning

Like Alternative B, Alternative C proposes prescribed burning to reduce competing vegetation, and to encourage regeneration of shrubs, grasses, forbs, and aspen.

Although the risk of undesirable conditions is always greater when using controlled burning, Alternative C would target burning in the spring or fall if moisture conditions promote controlling the intensity of the burn and multiple burns would be proposed over a number of years to meet habitat objectives.

Alternative C would have fewer effects on nesting birds, small mammals and elk calving habitat. Under Alternative C, roughly 335 acres would be proposed for burning in sagebrush.

Wildlife Species of Interest

*Big Game*

The use of prescribed fire and forest thinning would be expected to reduce thermal and hiding cover levels in Alternatives C.

Under Alternatives C and D, approximately 1,480 acres of forest habitats would be thinned. Douglas-fir savannah would be the habitat type most altered with canopy cover reduced to less than 30 percent and, likely, closer to 10 percent in many areas. Of the 940 acres of Douglas-fir savannah proposed for restoration under Alternatives C and D, 20 percent would be retained for hiding and thermal cover and movement corridors within treatment units. This would help off-set the impacts but still maintain up to 705 acres of hiding and thermal cover (in winter range) could be lost under Alternatives C and D.

Alternative C would retain up to 1,500 more acres of hiding and thermal cover for big game and other wildlife species.

Under Alternative C, forage for big game species would be expected to increase. Thinning along with prescribed fire would likely increase both forage quantity and quality for elk, mule deer and moose to a lesser degree when compared to Alternative B.

Like Alternative B, Alternative C proposes 3.58 miles of new seasonally restricted (closed 12/2-6/30) roads in the Jimmie New area. One of the concerns with the proposed open roads under Alternative C is the location of the roads on the landscape. Each of the 5 proposed routes is less than 0.7 mi. from another route that is proposed to be open and all routes are within 1.6 miles of all other routes. This would create concentrated use within this area during both hunting season.

The road density for the four other major locations in the project area (Charcoal Gulch, Dickie Hills, Alder Creek and Deno Creek) as well as in the Wise River project area would remain the same as under the No Action Alternative.

The decrease of security habitat from 32 to 25 percent due to roads open during the big game hunting season in the Jimmie New area would be the same as described under Alternative B. As with Alternative B, there would be some loss of elk security habitat during the big game hunting season under Alternative C.

Temporary roads could be created for ground-based thinning activities. Alternative C would have fewer temporary roads (3.25 miles) compared to Alternative B (6.5 miles). Most of the temporary roads would be located in the Jimmie New and Deno Creek areas. Like Alternative B, temporary roads would not be open to the public and would be stabilized and closed after the project is complete. There could be short-term disturbance to big game and other species during project implementation from use of roads and trails.

The effects from livestock grazing on big game habitat would be the same for the Harriet Lou, Leffler and Quartz Hill Allotments under all alternatives including the No Action Alternative. Effects on the Jerry Creek Allotment would be similar to Alternative B, except slightly more herbaceous vegetation would be available for wildlife.

Alternative C would have the same rest-rotation livestock grazing schedule and range improvement projects in the Jerry Creek Allotment as Alternative B but would also reduce the amount of authorized use by 10 percent. This would be expected to result in greater improvements or quicker recovery of riparian habitats than under Alternative B but would still be expected to have less recovery of riparian habitats and aspen stands than under Alternative D (no livestock grazing).

On the Foothills Allotment, Alternative C proposes changing the grazing system from a two pasture rest-rotation system to each pasture grazed every year. The change from resting a pasture every other year to having 100 animals in one pasture and 50 animals in the other pasture each year could reduce grazing pressure in both pastures which would leave more residual herbaceous vegetation for wildlife.

*Black Bear*
Alternative C would increase forage and hunting potential for the black bear but would reduce hiding, security and travel habitat. Forage and hunting opportunities would also be enhanced. Alternative C would have fewer impacts to black bear hiding, security and travel habitat.

*Pine Marten*

Changing closed canopy forest to stands with <30 percent canopy on up to 940 acres under Alternative C would potentially convert 9 percent of the currently suitable habitat in the project area to unsuitable for the pine marten. Thinning of Douglas-fir forest and mixed conifer stands could also effect pine marten habitat but to a much less degree than in Douglas-fir savannah because canopy cover would be retained at 30-50 percent.

Thinning treatments to reduce the risk of fire in the WUI would also reduce the quality of pine marten habitat on an additional 40 acres of lodgepole and mixed conifer stands in the Tie Creek and Deno Creek areas.

*Pileated Woodpecker*
Under Alternative C most large diameter Douglas-fir would be protected from mortality due to the Douglas-fir beetle, and late seral habitats would be maintained. This would ensure that habitat for the pileated woodpecker would be maintained in the long-term.

Under all action alternatives, no trees greater than 15"DBH would be removed from Douglas-fir savannah habitat and few trees between 15-18"DBH would be removed in Douglas-fir forest and mixed forest stands. Although habitat in the WUI could be altered with the loss of all size classes of conifers as well as the removal of snags on up to 40 acres, habitat for the pileated woodpecker would be retained in restoration units by protecting existing and future nesting trees for this species.

Less aggressive and fewer acres proposed for thinning under Alternative C would result in fewer numbers of larger (13-15"DBH), trees removed to reduce populations of Douglas-fir beetle or to restore forest habitats. The loss of insect-infested trees could reduce the amount of foraging habitat for pileated and other woodpecker species under all action alternatives but would be less under Alternative C.

The use of prescribed fire in sagebrush under Alternative C would not impact pileated woodpecker habitat but woodpeckers could be temporarily displaced during implementation due to smoke and activity. Underburning forest stands, depending on the intensity, could increase the number of small to large diameter snags.

BLM Sensitive Species

*Brewer's Sparrow*
Removing conifer colonization in sagebrush through mechanical treatments or hand cutting would maintain or increase the amount of suitable nesting habitat for the Brewer's sparrow. Under Alternative C, roughly 425 acres of sagebrush would be maintained or restored using mechanical or hand thinning activities.

Removing conifer colonization in sagebrush through the use of prescribed burning could reduce the amount of suitable nesting habitat on up to 335 acres in the planning area.
The objective of prescribed burns is to reduce as much conifer colonization while protecting as much sagebrush as possible. Like Alternative B, prescribed burns would be conducted in the

spring and designed to protect at least 50 percent of sage in a mosaic pattern. Where spring burns successfully retain 50 percent sagebrush in a mosaic pattern, the effects to Brewer's sparrows would be expected to be moderate and short-term. Where prescribed burning does not meet the desired condition due to weather, terrain or density of conifers, the amount of sage removed could be higher and the effects to the Brewer's sparrow much greater and long lasting.

The potential effects to Brewer's sparrows would be less under Alternative C from prescribed burning, because fewer acres would be treated to restore or maintain long-term sagebrush habitat. Over the long-term, however, treating fewer acres could be more detrimental to Brewer's sparrow habitat.

The effects to Brewer's sparrows from livestock grazing would be the same in the Quartz Hill, Leffler and Harriet Lou Allotments for all action alternatives. No impacts would be expected to sagebrush in these allotments from continued levels or use of livestock grazing although a loss of potential foraging habitat for Brewer's sparrow could continue. Because livestock grazing would be authorized during the nesting season, there could still be impacts to Brewer's sparrow's nests and young from livestock trampling.

Alternative C would have the same rest-rotation livestock grazing schedule and range improvement projects in the Jerry Creek Allotment as Alternative B but would also reduce the amount of authorized livestock use by 10 percent. This would be expected to result in maintenance healthy upland habitats that occur outside of conifer encroached uplands, especially foraging habitat, for Brewer's sparrow.

Alternative C proposes changing the grazing system from a two pasture rest-rotation system in the Foothills Allotment to each pasture grazed every year. Allowing each pasture to be grazed with 50 or 100 cattle every year could reduce grazing pressure in both pastures. Although the effects of this new grazing system on Brewer's sparrow habitat are unknown, it is suspected that livestock would continue to congregate in the same locations and that recovery of the uplands would occur slowly and could take many years.

Although Alternative C could impact individuals or habitats, these alternatives would not result in a trend toward federal listing or reduce viability for Brewer's sparrow populations.

*Sage Grouse*

Removing conifer colonization in sagebrush through mechanical treatments or hand cutting would maintain or increase the amount of suitable sage grouse habitat. Under Alternative C, roughly 425 acres of sagebrush would be maintained or restored using mechanical or hand thinning activities. This would ensure long-term maintenance of sagebrush habitat, but to a lesser extent with fewer acres treated.

Removing conifer colonization in sagebrush through the use of prescribed burning could reduce the amount of suitable sage grouse habitat on up to 335 acres in the planning area.
The objective of prescribed burns is to reduce as much conifer colonization while protecting as much sagebrush as possible. Prescribed burns would be conducted in the spring and designed to protect at least 50 percent of sage in a mosaic pattern. Where spring burns successfully retain 50

percent sagebrush in a mosaic pattern, the effects to sage grouse habitat would be expected to be moderate and short-term. Where prescribed burning does not meet the desired condition due to weather, terrain or density of conifers, the amount of sage removed would be higher and the effects to sage grouse habitat much greater and long-term.

Alternative C would have fewer short-term (10 years) effects to sage grouse habitat from the use of prescribed fire to remove conifer colonization in sagebrush. In contrast, there would be fewer long-term benefits under Alternative C since more sage would continue to be lost as conifers invade sagebrush habitats.

The effects to sage grouse habitats from livestock grazing would be the same for the Quartz Hill, Leffler and Harriet Lou Allotments for all action alternatives. No impacts would be expected to sagebrush in these allotments from continued levels or use of livestock grazing although a loss of potential foraging habitat for sage grouse could continue.

Alternative C would have the same rest-rotation livestock grazing schedule and range improvement projects in the Jerry Creek Allotment as Alternative B, but would also reduce the amount of authorized livestock use by 10 percent. The slight reduction in livestock would have little to no impact on sage grouse habitat,

Alternative C proposes changing the grazing system from a two pasture rest-rotation system in the Foothills Allotment to each pasture grazed every year. Allowing each pasture to be grazed with 50 or 100 cattle every year could reduce grazing pressure in both pastures. Light grazing would leave more residual herbaceous forage available for sage grouse.

Restoration of riparian habitats under this alternative would improve habitat for the sage grouse.

*Great Gray Owl*
Like Alternative B, no suitable nest trees would be removed under Alternative C and patches of suitable nesting habitat would be retained across the landscape. In addition, the project was designed to promote the development of trees with old-growth characteristics to replace many large, old trees killed due to Douglas-fir and mountain pine beetle. Promoting the long-term development of structure preferred by nesting great grey owls would benefit the owl under all action alternatives.

Alternatives C would have fewer beneficial effects to the owl, although this alternative could impact individuals or habitats (due to the number of acres thinned or disturbance during implementation), actions would not result in a trend toward federal listing or reduce viability for great gray owl populations.

*Northern Goshawk*
Under Alternatives C, up to 940 acres of overstocked Douglas-fir savannah could be thinned to less than 30 percent canopy cover and, possibly, to less than 10 percent. This could have the potential to convert up to 9 percent of the currently suitable (although moving towards unsuitable) habitat in the project area to marginal or unsuitable habitat for the northern goshawk.

Alternatives C would also thin up to 500 acres of Douglas-fir forest and 40 acres of mixed conifer stands to between 30-50 percent canopy cover. Although these alternatives would have direct effects on raptor habitat by removing potential nest trees and structure, there could be beneficial effects if mature Douglas-fir trees survive to provide long-term nest sites for these species. It is also expected that maintaining 30-50 percent canopy cover would preserve suitable goshawk habitat in forest stands. Maintaining 30-50 percent canopy cover and promoting a diversity of age classes and understory vegetation species would be expected maintain or improve habitat in up to 5 percent of the project area for the northern goshawk.

Although restoration activities would directly reduce the amount of suitable habitat for the northern goshawk, the goal for forest restoration under this alternative would be to retain habitat components such as large, pre-settlement trees.

Reducing conifers of all sizes, including snags, in the WUI units of Alder Creek would reduce suitable habitat for the northern goshawk on up to 40 acres. Goshawk nests in the vicinity would be protected and suitable habitat retained around active or inactive nest sites.

Alternatives C would move fewer acres of potential goshawk habitat into marginal or unsuitable condition. Alternative C could impact individuals or habitats, but would not result in a trend toward federal listing or reduce viability for northern goshawk populations.

*Flammulated Owl*
Under Alternatives C, reducing canopy cover to <30 percent on up to 940 acres of mid seral Douglas-fir savannah habitat through thinning could have the potential to convert up to 21 percent of currently unsuitable or marginal habitat for the flammulated owl to suitable or desired habitat.

Thinning an additional 500 acres of dry Douglas-fir stands could also improve habitat conditions for the owl. Maintaining at least 20 percent of treatment acres as untreated would retain pockets of dense thickets interspersed with open forests and create conditions preferred by the owl for nesting, roosting and foraging.

Although no flammulated owls have been documented in the project area, Alternative C would likely have beneficial effects on flammulated owl habitats.

*Three-toed woodpecker*
Under Alternatives C, reducing the number of overstory trees on up to 1,480 acres through thinning would impact approximately 14 percent of currently suitable habitat for the three-toed woodpecker in the project area.

Although habitat for this species would be altered, suitable habitat would remain after thinning. In addition, adjacent untreated forest would continue to provide adequate forage and nesting habitat for the three-toed woodpecker. Alternative C could impact individuals or habitats, but

would not result in a trend toward federal listing or reduce viability of the three-toed woodpecker population.

*Boreal Toad*
Habitat for the boreal toad would not be directly impacted by this project, but dispersing individuals could be killed by equipment during project implementation. Thinning and burning could have a beneficial effect to dispersing boreal toads. Since Alternative C proposes to thin and burn fewer acres, the benefits to the boreal toad could be less because fewer acres would be treated.

Riparian restoration under Alternative C would benefit the boreal toad.

Alternatives C could impact individual boreal toads or its habitat but would not result in a trend toward federal listing or reduced viability to the population or species.

*Gray Wolf*
Alternatives C could result in fewer changes in the distribution of big game from restoration activities, but could also result in fewer acres restored to healthier conditions for prey species. In addition, the increase in roads open during the big game calving season could cause elk and deer to change their use patterns in the Jimmie New area during the spring. Although this alternative would not cause impacts on wolves in the project area, there could be a greater change in how big game use the area under Alternative C.

Wildlife Movement Corridors
Alternative C could have effects on movement corridors, especially if thinning treatments are adjacent to roads. Since Alternative C proposes less removal of vegetation through thinning and burning, fewer impacts to movement corridors would be expected to occur.

Riparian restoration under this alternative would improve movement corridors for a variety of species.

Migratory Birds
All action alternatives would reduce the density of conifers in forested stands. Mechanical thinning could occur on up to 940 acres of forest habitats under Alternatives C. This alternative would alter less closed canopy forest than Alternative B, and would have less potential to improve conditions for avian species that prefer open forest but would protect more habitats for those species dependent on closed canopy habitats.

Approximately 4 percent of the entire project area could be affected and altered by prescribed burning under Alternatives C. Prescribed burning could impact up to 6 percent of sagebrush habitat in the planning area under Alternatives C. Like Alternative B, controlled fire would be done in the spring or fall when moisture conditions would help to reduce the intensity and extent of the fire. Burning during the nesting season would cause the most impacts to birds, but over a very small percentage of the project area.

Under Alternatives C, prescribed burning impacts would be the same as Alternative B.

Fisheries
The effects to aquatic species from increased sedimentation and runoff would be similar to Alternative B, but would be less under Alternatives C due to fewer acres disturbed by mechanical activities or prescribed burning.

Riparian restoration and improved livestock grazing management would have the same beneficial effects as under Alternative B.

**Alternative D:**

General Forest, Snags, Down Wood, Prescribed Burning
Effects to forest wildlife and avian species as well as the effects to habitat structure such as snags and down woody material would be the same as described under Alternative C.

The effects to wildlife and avian species from prescribed burning would be same as under Alternative C.

Wildlife Species of Interest

*Big Game*
The effects of forest thinning and removing conifer colonization from sagebrush would to big game species would be the same as described under Alternative C.

Under this alternative, three road segments ranging from 0.1 to 0.5 mile in length (totaling 0.72 mile) would be proposed as opened (Table 13, page 2-30). Security habitat under Alternative D would be identical to the No Action Alternative with only 24 acres difference.

Due to the small increase in road density under Alternative D, the effects of roads to big game species would be the same as described under the No Action Alternative.

The effects of temporary roads on big game species would be the same as described under Alternative C.

Removing livestock grazing from the Jerry Creek Allotment could allow aspen and riparian habitats to recovery more quickly and increase composition of desired native riparian species. The quantity of forage and browse for big game species would be expected to improve over time.

*Black Bear, Pine Marten, and Pileated Woodpecker*
The effects to black bear, pine marten and pileated woodpecker from forest thinning and the removal of conifers from sagebrush habitats would be the same under Alternative D as Alternative C.

BLM Sensitive Species

*Brewer's Sparrow and Sage Grouse*

The effects of sagebrush restoration through the use of mechanical, hand or prescribed fire activities would be the same as described under Alternative C.

The effects to Brewer's sparrows and sage grouse from livestock grazing would be the same for the Quartz Hill, Leffler and Harriet Lou Allotments for all action alternatives.

Restoration of riparian habitats under all action alternatives would benefit habitat for the Brewer's sparrow and sage grouse.

*Great Gray Owl, Northern Goshawk, Flammulated Owl and Three-toed Woodpecker*
Proposed forest restoration activities under Alternative D would have the same effects to the great gray owl, northern goshawk and flammulated owl as described under Alternative C.

*Gray Wolf*
Under Alternative D, the effects to gray wolves from restoration activities would be the same as described for Alternative C.

*Boreal Toad*
Activities proposed under Alternative D would have the same effects to the boreal toad as described under Alternative C.

Riparian restoration under all action alternatives would benefit the boreal toad.

Wildlife Movement Corridors
Potential effects from forest thinning and the removal of conifers from sagebrush stands would be the same under Alternative D as described for Alternative C.

Riparian restoration under all action alternatives would improve movement corridors for a variety of species.

Migratory Birds
Effects to migratory birds due to vegetation restoration activities under Alternative D would be the same as described for Alternative C.

Removing livestock grazing from the Jerry Creek Allotment under Alternative D could allow aspen and riparian habitats to recovery more quickly and allow for a greater increase in desired vegetation. Alternative D could allow a greater amount of riparian and aspen recovery for migratory bird habitat in the Jerry Creek Allotment.

Riparian restoration under Alternative D would benefit to migratory birds.

Fisheries
Effects to aquatic species, including westslope cutthroat trout, due to vegetation restoration activities under Alternative D would be the same as described for Alternative C.

Removing livestock grazing from the Jerry Creek Allotment under Alternative D could allow aspen and riparian habitats to recovery more quickly and allow for a greater increase in desired vegetation than under all other alternatives. Preventing livestock use along perennial and fish bearing streams would promote riparian vegetation for shade and structure to the streams, prevent bank trampling and improve the quality of instream habitat for aquatic species. Browsing of woody riparian species would still occur by wild ungulates.

## 3.7 Resource # 5: WUI/Fuels

### 3.7.1 Description of Affected Resources/Issues

The presence or absence of fire plays a key role in the composition and structure of vegetation that occurs across the landscape. Fire has been an integral part of this analysis area, and the exclusion of fire from these ecosystems has resulted in a different range of vegetation conditions than what occurred historically. The lack of fire on the landscape has resulted in a change from a mosaic of different age classes and tree densities to a more continuous cover of mature trees. A study by Heyerdahl et al. (2006) conducted in the Fleecer Mountains of southwest Montana stated "In the past, a mosaic of sagebrush-grasslands with stable islands of Douglas-fir savanna probably dominated the study area much of the time, whereas today it is dominated by Douglas-fir forest. In 1855 less than half the study area sustained trees whereas all but six plots have trees today and average tree density at plots has increased from 45 trees/ha in 1855 to 166 trees/ha today."

According to the 2009 Butte Resource Management Plan, all fire management activities will use Fire Regime Condition Class (FRCC) to determine levels of fuel treatment. FRCC assessments determine how similar a landscape's fire regime is to its natural or historical state (Table 26). Fire regime condition classes are broken down into three categories: 1, 2, and 3. Landscapes determined to fall within the category of FRCC 1 contain vegetation, fuels, and disturbances characteristic of the natural regime; FRCC 2 landscapes are those that are moderately departed from the natural regime; and FRCC 3 landscapes reflect vegetation, fuels, and disturbances that are uncharacteristic of the natural regime. A landscape in FRCC 1 has key ecosystem components, such as large old trees and soil characteristics that would naturally be found on that site, intact. A landscape with an FRCC rating of 3 indicates that the land is not very similar to its natural regime in terms of its vegetation or disturbance or both.

Table 26. A simplified description of the FRCC Classes (Hann and Bunnell 2001).

| FRCC | DESCRIPTION |
|---|---|
| Condition Class 1 | Less than 33 percent departure from the central tendency of the historical range of variation. Fire regimes are within the natural or historical range, and the risk of losing key ecosystems components is low. Vegetation attributes are well intact and functioning. |
| Condition Class 2 | 33-66 percent departure. Fire regimes have been moderately altered. Risk of losing key ecosystems components may have departed by one or more return intervals (either increased or decreased). This departure may result in moderate changes in fire and vegetation attributes. |
| Condition Class 3 | Greater than 66 percent departure. Fire regimes have been substantially altered. Risk of losing key economical components is high. Fire frequency may have departed by multiple return intervals. This may result in dramatic changes in fire size, fire intensity and severity and landscape patterns. Vegetation attributes have been substantially altered. |

To determine the existing vegetation, 110,600 acres were delineated using both BLM and FS stand data across eleven 6th code hydrological unit's code (HUC) watersheds. Through photo interpretation, 5,790 acres were identified as water, barren, and/or developed and were removed from the FRCC analysis. The project area accounts for 16,743 acres of BLM-administered lands. The historical reference condition was determined for the landscape by using the LANDFIRE Biophysical Setting Model (USGS 2007).

The UBHE landscape was distributed among the eight major Biophysical Settings (BpS) for analysis of the FRCC (Table 27). BpS is described as a way of grouping ecologically similar vegetation types modeled with characteristic disturbance inputs and uses for FRCC assessments. The eight BpS for the UBHE area were selected through a GIS exercise that allowed evaluation of all the BpS habitat types on the landscape. The smaller BpS polygons were grouped into one of the eight BpS that closely represents the habitat type through referencing the vegetation descriptions of the BpS. Table 27 shows how far out of departure or the percentage of difference between current and reference acres for each seral state on the UBHE landscape.

Table 27. Existing vegetation conditions compared to historic reference condition for UBHE planning area. FRCC Program run. These acres accounted for riparian areas, developed recreation sites, and barren sites. Historically, there was a larger area that consisted of riparian acres on this landscape

| **Biophysical Settings (Bps)** | **Seral Stage** | **Existing Condition (Acres)** | **Historic Reference Condition (Acres)** | **Departure (Acres) -shortage + abundance** |
|---|---|---|---|---|
| **Douglas-fir Savannah** | Early | 273 | 1685 | -1412 |
| | Mid Open | 1028 | 5054 | -4026 |
| | Mid Closed | 11603 | 2527 | +9076 |
| | Late Open | 111 | 5896 | -5785 |
| | Late Closed | 107 | 1684 | -1577 |
| | Total | **13122** | **16846** | **-3724** |
| **Douglas-fir Forest** | Early | 103 | 1704 | -1601 |
| | Mid Open | 0 | 2557 | -2557 |
| | Mid Closed | 8805 | 1278 | +7527 |
| | Late Open | 0 | 1704 | -1704 |
| | Late Closed | 61 | 1278 | -1217 |
| | Total | **8969** | **8521** | **+448** |
| **Lodgepole Pine** | Early | 13072 | 5658 | +7414 |
| | Mid Open | 228 | 5658 | -5430 |
| | Mid Closed | 27447 | 16974 | +10473 |
| | Late Open | 0 | 1886 | -1886 |
| | Late Closed | 137 | 7544 | -7407 |
| | Total | **40884** | **37720** | **+3164** |
| **Subalpine Forest** | Early | 950 | 4033 | **-3083** |
| | Mid Open | 510 | 3024 | **-2514** |
| | Mid Closed | 16214 | 8065 | **+8149** |
| | Late open | 0 | 1008 | **-1008** |
| | Late Closed | 30 | 4033 | **-4003** |
| | Total | **17704** | **20163** | **-2459** |
| **Mountain Big** | Low Cover | 1230 | 865 | +365 |

| | | | | |
|---|---|---|---|---|
| **Sage (Higher Elevation)** | Mod. Cover | 504 | 2932 | -2428 |
| | High Cover | 1010 | 872 | +138 |
| | Conifer Encroachment | **4109** | **0** | **+4109** |
| | Total | **6853** | **4669** | **+2184** |
| **Big Basin Sage (Lower Elevation)** | Low Cover | 594 | 2065 | -1793 |
| | Mod. Cover | 6185 | 4130 | -1149 |
| | High Cover | 5112 | 4130 | -1677 |
| | Total | **11888** | **10325** | **+1563** |
| **Grassland** | Early, Mid and Late Development | **3568** | **1879** | **+1689** |
| | Conifer Encroachment | **817** | **0** | **+817** |
| | Total | **4385** | **1879** | **+2506** |
| **Mountain Mahogany** | Total | **999** | **1162** | **-163** |
| **Other** | ** | **5790** | **9309** | **-3519** |
| | **Total** | **110594** | **110594** | |
| **FRCC Calculation** | **Total (minus other)** | **104804** | | |

With the use of the LANDFIRE FRCC Software Application, 3.0, the current vegetation condition was compared to the reference condition of the landscape. Table 28 shows the summary report from the FRCC software program. The Fire Regime Groups for the BpS and acres of the BpS breakdown in regards to Condition Class are included. The landscape was calculated to have an overall departure of 44 percent which equated to a rating of Condition Class 2, a condition that is moderately departed from historic reference values. A complete FRCC report can be found in the Project Administration Record.

Table 28. FRCC landscape report for the Upper Big Hole.

| FRCC Landscape Report for Upper Bighole | | | | | |
|---|---|---|---|---|---|
| Biophysical Setting (BpS Code) | FRG (I-V) | Condition Class 1 (Acres) | Condition Class 2 (Acres) | Condition Class 3 (Acres) | Total Acres |
| Northern Rocky Mountain Dry-Mesic .... (1910451) | I | 1635 | 0 | 11990 | 13625 |
| Middle Rocky Mountain Montane Doug... (1911661) | I | 189 | 0 | 9244 | 9432 |
| Rocky Mountain Subalpine Dry-Mesic... (1910550) | III | 817 | 40056 | 0 | 40874 |
| Inter-Mountain Basins Montane Sage... (1911260) | I | 2578 | 0 | 3710 | 6288 |
| Inter-Mountain Basins Big Sagebrus... (1911250) | III | 6571 | 4957 | 0 | 11528 |
| Northern Rocky Mountain Lower Mont... (1911390) | II | 3354 | 0 | 838 | 4192 |
| Northern Rocky Mountain Subalpine .... (1910460) | III | 1425 | 16391 | 0 | 17817 |
| Inter-Mountain Basins Curl-leaf Mo... (1910620) | III | 524 | 524 | 0 | 1048 |
| **Total Acres** | | 17094 | 61929 | 25782 | 104804 |

### 3.7.2 Impacts of Affected Resources/Issues

Alternative A

With the No Action Alternative, no vegetative treatments would occur on the UBHE landscape. The amount of dead and dying trees, small diameter encroachment and ladder fuels would continue to increase. This alternative would not treat any of the eight BpS's identified in Chapter 3. The FRCC on this landscape was rated at Condition Class 2 - a condition moderately departed from historic reference values. With the No Action Alternative, these conditions would continue to degrade and could potentially reach a Condition Class 3, indicating the land is not very similar to its natural regime in terms of its vegetation or disturbance or both. Additionally, the lack of treatments would maintain approximately 79 percent of the forested areas in a mid-closed canopy structure. Under this alternative, the purpose and need of this EA and/or the objectives set for vegetative treatment per decade in the Big Hole watershed, as stated in the 2009 Butte Resource Management Plan, would not be met.

Alternative B

Vegetation treatment in six of the eight identified BpS's would occur under Alternative B. The proposed action would treat 1,460 acres of shrub and sagebrush habitat; 3,020 acres of forested stands; 240 acres in riparian habitat; an estimated 60 acres of aspen stands (60 individual stands), and 430 acres identified as WUI (sagebrush and forest) units. This accounts for 5,210 acres of treatment or approximately 31 percent of the BLM-administered lands in the UBH.

Under Alternative B, treatments on approximately 1,700 acres could occur in the Douglas-fir Savannah BpS. The proposed treatments would involve an approximate13 percent change in the seral stage from the mid-closed canopy toward a mid-open canopy structure. These treatments, however, would not be enough to change this individual BpS from its current rating of FRCC 3 to FRCC 2.

Treatments in the Douglas-fir Forest BpS could occur on up to 820 acres, with all acres designed to move the seral stage from a mid-closed to a mid-open stand. This treatment would result in an approximate 9 percent change in the FRCC modeling, which would reduce the FRCC rating of this BpS to FRCC 2.

Thinning would also be proposed on 560 acres in the Lodgepole BpS. This treatment would reduce the mid-closed seral stage in Lodgepole by 2 percent on the landscape by moving acres to early-open and mid- open seral stages, respectively. The small percentage of lodgepole treated on this landscape would not reduce the FRCC rating but would maintain it at a FRCC 2.

Treatments proposed in the Mountain Big Sage BpS are estimated on 1,410 acres. The proposed treatment in this BpS would reduce conifer colonization by 41 percent and would reduce the FRCC rating in Mountain Big Sage to a FRCC 2.

The additional acres proposed for restoration under Alternative B in aspen and riparian habitats would have little impact on the overall FRCC rating on the landscape.

Table 29 shows a summary report of the FRCC software program once the treatments in Alternative B are completed. With the proposed action treatment occurring, the treatment would

result in a drop in the overall departure to 40 percent, down from the existing condition of 44 percent. This departure maintains a rating of Condition Class 2- a condition that is moderately departed from historic reference values of vegetation characteristics, fuel composition, fire frequency, fire severity, fire pattern and other associated disturbances. A complete FRCC report can be found in the Project File.

Table 29. FRCC landscape report for the Upper Big Hole once Alternative B (proposed action) vegetation treatments occur.

| FRCC Landscape Report for Upper Bighole | | | | | | |
|---|---|---|---|---|---|---|
| Biophysical Setting (BpS Code) | | FRG (I-V) | Condition Class 1 (Acres) | Condition Class 2 (Acres) | Condition Class 3 (Acres) | Total Acres |
| Northern Rocky Mountain Dry-Mesic ... | (1910451) | I | 3406 | 10218 | 0 | 13625 |
| Middle Rocky Mountain Montane Doug... | (1911661) | I | 1038 | 0 | 8395 | 9432 |
| Rocky Mountain Subalpine Dry-Mesic... | (1910550) | III | 1226 | 39647 | 0 | 40874 |
| Inter-Mountain Basins Montane Sage... | (1911260) | I | 1446 | 2704 | 2138 | 6288 |
| Inter-Mountain Basins Big Sagebrus... | (1911250) | III | 6571 | 4957 | 0 | 11528 |
| Northern Rocky Mountain Lower Mont... | (1911390) | II | 3354 | 0 | 838 | 4192 |
| Northern Rocky Mountain Subalpine ... | (1910460) | III | 1425 | 16391 | 0 | 17817 |
| Inter-Mountain Basins Curl-leaf Mo... | (1910620) | III | 524 | 524 | 0 | 1048 |
| Total Acres | | | 18990 | 74442 | 11371 | 104804 |

The WUI prescriptions have been identified to enhance the natural features in the area, along with past vegetation projects to create an environment that would reduce the potential for uncontrollable wildfire. These treatments would reduce the fuel loading, the amount of ladder fuels and modify the fuel arrangement in these units. When the vegetation treatments are completed, there would be an expected decrease in fire behavior that would allow responding resources a higher success rate when suppressing a wildfire. A fire in these areas would exhibit a slower rate of spread, lower flame lengths, and less potential of a ground fire transitioning to the crowns.

The treatments meet the purpose and need of this project, as stated in Chapter 1, and are supported by the following management action in the Butte RMP: Goal FM2 – Move toward restoring and maintaining desired ecological conditions consistent with appropriate fire regimes.

Alternatives C and D

The vegetative treatments, prescription and acres would be the same for Alternatives C and D. Also similar to Alternative B, units are identified in six of the eight BPS's but smaller acres of treatment are proposed on the landscape: 760 acres of shrub and sagebrush habitat; 1,500 of forested stands; 240 acres in riparian habitat; an estimated 60 acres of aspen (60 individual stands) and 315 acres identified as WUI (sagebrush and forest) units, which would account for approximately 18 percent of the BLM-administered lands in the UBH.

Treatments on approximately 990 acres would occur in the Douglas-fir Savannah BpS; the proposed treatments would involve an approximate 8 percent change in the seral stage from the mid-closed canopy toward a mid-open canopy structure. These treatments would not be enough to change this individual BpS from its current rating of FRCC 3 to FRCC 2, however. Treatments in the Douglas-fir Forest BpS would occur on approximately 500 acres, with all acres designed to move the seral stage from a mid- closed to a mid-open stand. This treatment would result in an approximate 6 percent change in the FRCC modeling, which unlike Alternative B, would not reduce the FRCC rating of this BpS to Condition Class 2. Treatments are proposed on 160 acres in the Lodgepole BpS. This treatment would reduce the mid-closed seral stage in lodgepole by <1 percent on the landscape by moving acres to early-open and mid- open serel stages, respectively. The small percentage of lodgepole treated on this landscape would not reduce the FRCC rating but would maintain it at a condition class 2. Treatments proposed in Mountain Big Sage BpS are estimated on 760 acres. The proposed treatment in this BpS would reduce conifer colonization by 23 percent and, similar to Alternative B, would reduce the FRCC rating in Mountain Big Sage to a Condition Class 2. All alternatives have identified the same number of acres of aspen and riparian for treatment, which would have little impact on the overall FRCC rating on the landscape.

Table 30 shows a summary report of the FRCC software program once the proposed treatments are completed. Alternative C or D vegetation treatments would result in a drop in the overall departure to 42 percent, down from the existing condition of 44 percent. This departure maintains a rating of Condition Class 2- a condition that is moderately departed from historic reference values of vegetation characteristics, fuel composition, fire frequency, fire severity, fire pattern and other associated disturbances. A complete FRCC report can be found in the Project File.

Table 30. FRCC landscape report for the Upper Big Hole once vegetation treatments occur under Alternative C or D.

| FRCC Landscape Report for Upper Bighole | | | | | |
|---|---|---|---|---|---|
| Biophysical Setting (BpS Code) | FRG (I-V) | Condition Class 1 (Acres) | Condition Class 2 (Acres) | Condition Class 3 (Acres) | Total Acres |
| Northern Rocky Mountain Dry-Mesic ... (1910451) | I | 2589 | 0 | 11036 | 13625 |
| Middle Rocky Mountain Montane Doug... (1911661) | I | 755 | 0 | 8678 | 9432 |
| Rocky Mountain Subalpine Dry-Mesic... (1910550) | III | 817 | 40056 | 0 | 40874 |
| Inter-Mountain Basins Montane Sage... (1911260) | I | 1446 | 2012 | 2830 | 6288 |
| Inter-Mountain Basins Big Sagebrus... (1911250) | III | 6571 | 4957 | 0 | 11528 |
| Northern Rocky Mountain Lower Mont... (1911390) | II | 3354 | 0 | 838 | 4192 |
| Northern Rocky Mountain Subalpine ... (1910460) | III | 1425 | 16391 | 0 | 17817 |
| Inter-Mountain Basins Curl-leaf Mo... (1910620) | III | 524 | 524 | 0 | 1048 |
| **Total Acres** | | 17481 | 63941 | 23382 | 104804 |

The WUI acres have been reduced in Alternative C and D compared to the Alternative B by 115 acres. This reduction in acres would limit the amount of fuels treatment to occur near the boundary between private property and BLM administered lands. The WUI units proposed in Alternative C would not take full advantage of the natural features or past vegetation treatments in these areas. The reduction in acres would leave larger amounts of untreated fuels in these areas near private property, which could aid in an uncontrolled wildfire moving across the landscape. The fire behavior in these untreated areas will exhibit larger flame lengths, higher rates of spread and the potential for fire of becoming established in the crowns, which would promote spotting to occur and could cause control issues for responding resources.

## 3.8 Resource #6 Travel Management

### 3.8.1 Description of Affected Resources/Issues

A Travel Management Plan (TMP) was completed for the Upper Big Hole Travel Planning Area (TPA) in 2009, including all lands within the Upper Big Hole East Landscape Restoration Project Area. This effort was completed concurrently with the Butte Resource Management Plan and Final Environmental Impact Statement (USDI 2009).

An existing BLM inventory of travel routes for the Upper Big Hole TPA was used as the baseline during the TMP process. A total of 88 miles of travel routes were inventoried and evaluated during this process. However, due to time and budgetary constraints, a full ground-truthing of the original BLM route inventory was only partially completed prior to the start of travel planning for the area. Since that time, it has been determined that the original BLM travel route inventory was not comprehensive, and thus a complete inventory, including ground-truthing, was completed for this project in July and August of 2011. A total of 89 linear miles of travel routes were inventoried and evaluated during this process. Many of the routes discovered during this inventory effort were determined to be extensions, or off-shoots, of existing travel routes. The difference between the original inventory and the 2011 inventory was a total of one linear mile. However, it has been determined that approximately 8.5 linear miles of new travel routes were recorded during the 2011 inventory process. Therefore, for the purposes of this document, the actual difference between the two inventories is an additional 8.5 linear miles. The discrepancy in these figures is most likely due to the fact that many routes that were evaluated during the original inventory no longer appear to exist, due to vegetation growth, etc.

Implementation of the 2009 TMP was completed during the 2010 field season. Informational signs were installed at the majority of major route intersections, and at the beginning and end of the majority of travel routes in the area. During the 2011 field season, an inventory/condition assessment of each sign was completed. Missing or vandalized signs were repaired or replaced. Therefore, the majority of travel routes within the project area have appropriate informational signing currently in place, with the exception of the new routes found during the 2011 inventory. These remaining routes will be signed during the 2012 field season, in accordance with the decisions made during this planning process.

### 3.8.2 Impacts of Affected Resources/Issues

<u>Alternative A</u>

Under the No Action Alternative, no changes would be made to the existing route designations described in the 2009 Upper Big Hole River TMP. In addition, new travel routes found during

the 2011 inventory would be designated as "Closed Yearlong" to motorized vehicles because they were not considered or designated in the 2009 Upper Big Hole River Travel Management Plan (TMP).

Following the implementation of the 2009 TMP, multiple members of the public expressed their frustrations with the new route closures. Many stated that they were unaware that a TMP process had occurred until signs depicting route closures and restrictions were installed. Therefore, if no action is taken, motorized travel opportunities would continue to be limited by yearlong and seasonal closures in the area. This would result in adverse outcomes and visitor experiences for those motorized users who wish to have access opportunities to travel routes that were previously open in the area for such recreational pursuits as hunting, camping and driving for pleasure (Driver 2008). Non-motorized access opportunities would not change from their current condition under this alternative.

Alternative B

Under this alternative, the overall increase to linear road length in the planning area would increase by 3.58 miles. Therefore, motorized access opportunities for recreation and non-recreation related travel would be improved and road density would only increase (approximately 4 percent of the total route inventory collected in 2011). It also should be noted that, due to a mapping and documentation error, Route 010105 (.47 mile), was mistakenly designated as "Open to Snowmobiles Only" in the 2009, TMP. It should have been designated as "Open to Wheeled Vehicles" from 5/15/ to 10/15 and "Open to Snowmobiles" 12/1 to 5/15. This designation would correspond with the USFS designation of the same route (known as Bean Ridge). Therefore, when this error is figured into the equation, the actual overall increase to road would be 3.11 miles (approximately 3.5 percent of the total route inventory collected in 2011).

Alternative C

Under this alternative, impacts to travel management would be the same as those described in Alternative B because route designations would not change.

Alternative D

Under this alternative, minimal changes would be made to the existing route designations described in the 2009 Upper Big Hole River TMP. Specifically, .25 mile (.10 mile on BH route # 191/216 and .15 mile on BH route # 032) of routes would be re-opened to motorized vehicles for dispersed camping access. While re-opening these routes would improve motorized access opportunities, it would only do so to a minimal degree. The majority of visitors to this area have expressed a desire to see more routes available for hunting access (as described in Alternative B), not just dispersed camping access.

In addition to re-opening the previously described 0.25 mile of routes for dispersed camping access, route # 010105 (.47 mile) would be re-opened to wheeled motorized vehicle and snowmobile use (both with seasonal restrictions) to match the adjacent FS designation. This proposed designation was intended to be the original designation in the 2009 Upper Big Hole TMP. However, due to a mapping and documentation error, it received the wrong designation. Therefore, while re-opening this route would technically increase overall motorized access opportunities, in reality it is simply a correction to an error in the previous TMP. Therefore,

motorized access opportunities and overall road density would not actually increase; they would simply be restored to the levels originally intended in the previous TMP.

Overall, motorized travel opportunities in the area would continue to be limited by yearlong and seasonal closures under this alternative. This would result in adverse outcomes and visitor experiences for those motorized users who wish to have access opportunities to travel routes that were previously open in the area for such recreational pursuits as hunting and driving for pleasure (Driver 2008). Non-motorized access opportunities would not change from their current condition under this alternative.

## 3.9 Resource #7: Special Status Species Habitat

### 3.9.1 Description of Affected Resources/Issues

Special Status Plants

Three BLM designated special status plants occur in within the boundaries of the Upper Big Hole East planning area. These species include sapphire rockcress (*Arabis Fecunda*), Linear-leaf fleabane (*Erigon linearis*), and Lemhi beardtongue (*Penstemon lemhiensis*). Sapphire rockcress and linear-leaf fleabane have known populations on BLM managed lands within the planning area. Lemhi beartongue has no known populations on BLM lands within the planning area but is found on adjacent private, FS, and state lands. This plant also occurs on BLM lands outside of the planning area. Refer to Appendix B for the Biological Evaluation of special status plants.

### 3.9.2 Impacts of Affected Resources/Issues

Alternative A

All three sensitive plant species found within the UBHE planning area have relatively stable populations. A few of the populations may be in a decline due to expansion of big sagebrush into previously sparsely vegetated areas, lack of fire, and overall lack of disturbance (Mincemoyer 2005). Under current conditions and management populations may continue to decline and possibilities of new populations are reduced.

Alternative B

Under alternative B, two known sensitive plant populations are in the direct proximity of proposed units. Of these two populations one is Linear-leaf fleabane and the other is Sapphire rockcress. Direct disturbance of current habitat is not expected of these two populations. Indirect creation of new habitat adjacent to known populations as a result of proposed treatments is expected. Non-native plant species will have to be closely managed so as not to diminish the native plants' opportunities to establish new populations or increase the size and density of current populations.

Currently there are eleven known populations of Arabis fecunda found within the UBHE planning area. Of these eleven only one population is in close proximity of a proposed treatment area. The treatment proposed is a hand cut in a riparian area and Sapphire rockcress occurs in areas of relatively sparse vegetation (Mincemoyer 2005). Known plants occur on calc-silicate, rocky outcrops and soils, beneath Juniperus scopulorum and Pseudotsuga menziesii, with Cercocarpus ledifolius. The possible area of overlap is expected to be less than one half acre.

The careful removal of the over-story may benefit the population by reducing competition and restoring the habitat to the more open habitat that Sapphire rockcress prefers. Sapphire rockcress may benefit from expansion into other treatment areas that are opened up from either a remnant seed bank or seed dispersal. Sapphire rockcress establishes best when not competing with other species and grazing may limit competition. (Mincemoyer 2005)

There is one known population of Erigeron linearis within the boundaries of the UBHE planning area. The Linear-leaf fleabane population is adjacent to a unit proposed for mastication. Linear-leaf fleabane was found on a gravelly, wind-blown, upper slope with little competing vegetation. Mastication is not likely to occur in the direct area of known plants because they do not occupy the same spaces and therefore direct effects on known populations is expected to be minimal if any.

Observations suggest that this species may respond positively to disturbance. At one known population in Beaverhead County it was speculated that the site may have been grubbed or burned, resulting in removal of the sagebrush cover. The low stature of this plant probably means that is responds positively to the disturbance of livestock (Mincemoyer 2005). An overall reduction in cover and competition, whether it be by mechanical, hand, fire, or grazing, may create new habitat for this species.

Though no known populations of Lemhi penstemon occur on BLM lands within the UBHE planning area, there are known populations adjacent to BLM lands. Expansion onto BLM lands is possible where new habitat is created. It is recommended that prescribed burning be used as a habitat restoration tool for Penstemon lemhiensis (Heidel and Shelly 2001). This removal of sage cover may create new habitat for seeds stored in the seedbank to sprout.

Special Status Plants

Vegetation treatments with possible direct interactions with known sensitive plant populations would still be proposed under Alternative C. Direct effects of Alternative C would be the same as Alternative B.

Indirect effects would be altered because of the reduction in treatments that could have possibly created new habitats. Also the removal of fire would not provide possible new habitat but would possibly reduce current viable habitat by allowing increased competition. Livestock grazing would be reduced and current vegetation may increase competition. Increased competition may result in an overall reduction of known population health and quantity.

Alternative D

Vegetation treatments with possible direct interactions with known sensitive plant populations would still be proposed under Alternative D. Direct effects of Alternative D would be the same as Alternative B.

Indirect effects would be similar to Alternative C. The greater reduction in livestock grazing may slightly increase competition.

## 3.10 Resource #8: Socioeconomics

### 3.10.1 Description of Affected Resources/Issues

Meetings with permittees within the UBHE project area indicate that these ranch operations have tightly woven public land grazing preferences together with private land management. In most cases, private land owned by the permittees is adjacent to and/or intermingled with these public land allotments. Changes in numbers of livestock, seasons of use, and/or increased labor inputs may have considerable economic impacts on individual operations. The BLM forage often provides a critical element of the livestock producer's matched complement of grazing, forage, and hay production.

Three (3) individual operators (Grazing Authorizations 2500102, 2504110 & 2505627) have grazing permits/leases on approximately 15,118 acres (5 allotments) of public lands administered by the BLM within the UBHE project area. All allotments in the Butte Field Office have been categorized as *Improve* (I) *Maintain* (M) or *Custodial* (C) based on resource values and opportunities for improvement. The three (3) allotments (Alder Creek, Dickie and Charcoal Mountain Custodial) within the UBHE project area that are unavailable for grazing total approximately 4,142 acres. BLM administered lands within the project area provide an important source of late spring, summer and fall livestock forage. The BLM currently permits 941 total AUMs on the allotments included in this project.

Labor associated with managing livestock on the BLM allotments includes herding and doctoring cattle, supplement placement and project construction and maintenance. Specific costs associated with managing livestock on individual allotments are not known and vary substantially by allotment. Other land uses on BLM lands in the project area, such as commercial recreation and logging on public lands is also an important contribution to the local economies in Wise River, Dewey, and Divide.

BLM costs associated with the UBHE allotments include grazing administration (preparing applications, bills, issuing grazing permits/leases, and transfers), grazing compliance inspections, resource inventory and monitoring, project construction, clearances for projects, and preparation of reports and environmental documents.

### 3.10.2 Impacts of Affected Resources/Issues

Alternative A

Because current use levels on all grazing allotments would continue, no additional economic impacts would occur to permittees utilizing the allotments within the project area. With the exception of firewood permits, no commercial timber harvest activities would occur within the project area, and as a result no economic opportunities would be available for the local timber industry. No impacts to commercial recreation businesses would be expected.

Alternative B

The addition of the range improvement projects on the Jerry Creek Allotment would add increased construction and maintenance expenses for the permittees and the BLM. While the cost of the Jerry Creek boundary fence would be split among the BLM and the permittees, the fence could cost near $35,000 dollars to complete. Commercial timber harvest would benefit the local economy.

Alternative C
Altering the authorized use periods within the Jerry Creek Allotment and/or altering the numbers of livestock may necessitate using private pastures or other areas for longer or at different periods of time. These changes may also necessitate reducing the herd size depending on the operator and may cause more economic hardship for some operators than others. Costs to the BLM and the permittees for new range improvements would the same as Alternative B. Impacts to commercial recreation businesses would be the same as Alternative A. Impacts to the local timber industry would be similar to Alternative B.

Alternative D
Economic impacts and social values would be similar to Alternative B for the majority of allotments within the UBHE, with the exception of the Jerry Creek and Foothills allotments where livestock would no longer be permitted. The economic loss to the permittees who depend upon these allotments could result in a reduction in livestock numbers to a point that their operations would no longer be economically sustainable. Under Alternative D, none of the projects proposed on BLM lands within the Jerry Creek Allotment in Alternative B or C would be constructed and no additional costs to the BLM would occur. Impacts to commercial recreation businesses would be the same as Alternative B, and impacts to the local timber industry would be the same as Alternative C.

## 3.11 Resource #9: Soil Quality

### 3.11.1 Description of Affected Resources/Issues
Soil information for the project area was obtained from the SSURGO certified soil survey of the project area completed by the Natural Resources Conservation Service (NRCS, 2011a). The landscape is dominated by moderately to steeply sloping (>30 percent) mountains and gradual to moderately sloping (5-30 percent) hills, dissected by drainages with gradual sloping (0-15 percent) alluvial fans and fan remnants found at lower hill slope positions. Ridge tops, saddles and meadows tend to be gradual sloping and are found throughout the project area. South facing slopes are drier and more dominated by grass and sagebrush than north facing slopes which are more dominated by pine and Douglas-fir. Soils are primarily derived from five types of parent material including limestone, granite, quartzite, argillite and mixed material. The combination of the diverse range of parent material, landforms, climate and slopes results in over 109 mapped soil map units, containing multiple soil types exhibiting unique combinations of physical and chemical properties that support different vegetative communities. This diversity of soil types influences land management activity considerations and mitigation measures. Information about soil types, and ratings for factors such as compaction and erosion are available on the internet for download at the Soil Data Mart (NRCS, 2011a), or through an interactive mapping tool, the Web Soil Survey (NRCS, 2011b).

Soil becomes more susceptible to erosion as slopes steepen, if the soil surface is exposed (lacks vegetative cover), is not frozen or snow covered and lacks rocks. Soil becomes more prone to compaction if rubber-tired vehicles are used (as opposed to tracked vehicles), the soil surface is exposed, high water tables are present and the soil is fine textured and lacks rocks (NRCS, 2004 and Carr et al. 1991). Soils most susceptible to risk from fire are those that could develop a hydrophobic (water repellent) layer, generally found to be sandy soils, on steep south facing slopes, with high surface rock content.

Given the wide range of soil types, implementation of a management activity would require site-specific oversight and application of Best Management Practices. The most developed soils (darkly colored and rich in organic matter) are generally found on lower slopes, in riparian areas and below grass, shrub and aspen vegetation. They also tend to have finer, less sandy textures. They tend to be less susceptible to erosion than soils found under Douglas-fir due to the lower slopes; however, they are more susceptible to compaction because they are not dominated by rock fragments. Douglas-fir dominated soils also tend to have shallower soils and exhibit more bedrock outcrops. Activities on steep slopes have a greater likelihood of producing soil erosion that can enter streams. Compacted soils can reduce site productivity, reduce the soil's capacity for infiltration of surface water and hydraulic conductivity (NRCS 2004, Carr et al. 1991, Siegel-Issam et al. 2005), and possibly increase greenhouse gas emissions from the soil (Horn et al. 1995) resulting from decreased inter-aggregate pore space and decreasing air permeability.

No wetland inventory for the project area exists, but approximately ten acres of hydric (wet) soils are present within the project area. Hydric soils are considered to be wetland indicators (EnvLab 1987). About 36 acres of soils having shallow water tables (6-48" from the soil surface) are also present. These hydric and shallow water table soils are not resilient to the effects of equipment on compaction and erosion, so require special mitigation or should be excluded from the effects of timber harvesting activities so as to maintain their hydrologic function.
Most current soil disturbance in the area is associated with recreational use of roads and trails. Organic matter content varies in the soils. Younger soils, generally found adjacent to rock outcrops have less organic matter in the subsurface, but those found in riparian areas can have substantially enough organic matter on the surface to form an organic matter surface horizon. Soils under Douglas-fir have more organic matter on the surface (litter) resulting from needles falling from the trees. Such material does not break down as readily as deciduous leaves and grasses, leaving less organic matter incorporated into the soil as plant available nutrients. Litter captures rainfall and snow melt, facilitating infiltration and reducing potential for soil erosion but also provides potential fuels for wildfire. Wildfires that consume litter, expose the soil surface, rendering it susceptible to soil erosion.

In addition to consuming organic matter, if a wildfire burns hot enough, it can cause a soil to become hydrophobic or water-repelling for up to a year following the fire (Neary et al. 2005, MacDonald and Huffman 2004). When the soil surface becomes hydrophobic, precipitation may run off the soil surface rather than infiltrate it, thereby impairing the groundwater recharge capability of the soil and increasing surface erosion and potential sedimentation into streams (Robichaud 2000, Wondzell and King 2003). Litter also helps protect the soil against compaction resulting from wheeled mechanical treatments.

### 3.11.2 Impacts of Affected Resources/Issues

Alternative A
Under the No Action Alternative, current trends and processes would continue. Beetle-killed trees would continue to pose a threat of high-intensity wildfire. Conifer encroachment into aspen stands, grass/shrublands and riparian areas would also continue. The risk of soil erosion, sedimentation and degraded soil productivity resulting from fire consumption of organic matter and soil heating (Neary et al. 2005) would continue to increase in response to an increasing

possibility of wildfire. Current uses would continue, and undisturbed sites would continue to function as they are presently. High-intensity fire has the potential to cause soils to become hydrophobic (water-repellent) the first year following the fire, resulting in increased runoff of precipitation that would otherwise infiltrate the soil surface. This increased runoff can cause soil erosion at rates in excess of rates for bare ground alone.

Soil quality and infiltration issues identified as not meeting the BLM's Standards for Rangeland Health due to livestock grazing would be expected to continue to not meet the standards.

Alternative B

The greatest possibility of erosion due to management actions is expected in mechanical treatment and prescribed burn treatment areas. Hand-cutting operations would be expected to have the least impact on soils. Prescribed burning would be controlled so as not to produce sufficient heat to produce hydrophobic soils, as would be the case in a wildfire scenario. Soils that have a high probability of erosion in response to prescribed fire, namely coarse textured soils on south facing, steep (>30 percent slopes), are not proposed for treatment. Opening approximately 3.58 miles of existing roads to seasonally restricted motorized travel would result in an increase of the amount of roads to be monitored and maintained to ensure there is no erosion or sedimentation.

Prescribed burning would not adversely affect productivity, but wildfire could. The use of prescribed burning would likely produce a short-term increase in soil productivity and a long-term decline in response to changes in available organic matter as a source of nutrient supply.

Generally, mechanical prescription units are situated on soils that have a moderate potential for soil erosion and slight to moderate soil compaction potential (NRCS 2011b, NRCS 2004). Low intensity broadcast burning would occur on soils rated with a slight to moderate erosion potential and slight to moderate compaction potential. Soils rated with a combination of severe erosion and severe compaction potentials are generally avoided for treatment but can occur as small inclusions within treatment areas.

*Mechanical*

Mechanical treatments are expected to expose the soil surface, such as on skid trails, which would temporarily increase the risk of erosion and displace surface organic matter (litter). No effects to organic matter that is incorporated in the soil matrix (mineral soil below the litter layer) would be expected. Potential erosion, sedimentation, and compaction is less using tracked, rather than wheeled equipment because equipment load is more evenly distributed over the soil surface. Impacts are further minimized where mastication is employed, because it can travel over masticated material (mulch) it creates, thereby protecting the soil surface.

Accurately predicting impeded tree growth resulting from mechanical treatment is difficult, and varies by soil type, which would need to be monitored on site (Siegel-Issam, et al 2005). Generally, compaction on roads and skid trails can cause slow regeneration of plants due to the root limiting nature of a compacted layer, and loss of pore space and structure that can lower water storage capability and aeration (Siegel-Issam, et al. 2005; Daddow and Warrington, 1983). The tap rooting systems of the native Douglas-fir and lodgepole pine trees work well in concert

with natural weathering processes to break up and break through these compacted layers. Over time, organisms would create burrows and macro-pores. A high percentage of gravel (15-35 percent) in the mineral soil section of the profile lowers the erosion potential resulting from rubber tired equipment (NRCS 2004).

The risk of compaction is higher on soils with low amounts of rock fragments in the profile, particularly on the soil surface and on wet soils. No mechanical treatments are planned on wet soils (those soils with a year-long shallow water table). High rock content is present on most soils targeted for mechanical treatment. Use of tracked or other low-impact equipment and methods would pose lower levels of risk than rubber tired equipment.

Mechanized equipment can displace organic matter and reduce pore space in the soil matrix through compaction. Concentrating activities on skid trails and employing BMPs would limit the extent of these impacts. Re-seeding disturbed areas would speed the recovery time of these temporary effects by restoring a source of organic matter. Although the rate of plant growth is expected to be slower on soil within treatment areas than on adjacent undisturbed soil, the amount of compaction and erosion would not be significant to alter soils to such a degree that it is no longer capable of supporting the correlated ecological site (plant community). A high-intensity wildfire could produce amounts of soil erosion significant enough to discontinue supporting the existing ecological site.

*Hand-cut operations*

Hand-cutting treatments are planned on erosive soils, in riparian areas, and on hydric soils. Effects from trails, which may be used to access units for treatment, would be less severe than those described for skid trails associated with mechanized harvest operations. Existing trails would be used where possible, but new trails may be created. Soil erosion would be minimal and easily mitigated due to the lack of ground disturbing activities, except for potential access trails. Less organic matter would be disturbed in hand-cut areas, and displacement would be limited to trails. Compaction would be minimal and limited to trails. Minimizing impacts to litter levels maintains the carbon and nutrient pool, thereby having less of an impact on soil productivity than mechanized treatments.

*Prescribed Burning*

Areas planned for prescribed burning would likely experience significant amounts of soil erosion in response to a high-intensity wildfire. Prescribed burning would involve use of a low-intensity fire which would not have the same degree of effects. Wildfire can cause soils to become hydrophobic and would impact soil organisms severely, directly through the heat of the fire and through consumption of organic matter and plants that would provide organic matter in the future. Low intensity controlled burning would consume organic matter and would impact soil biota in the soil profile but typically would not produce hydrophobic soils and would leave behind vegetation to produce organic matter necessary for soil productivity. Managing the intensity of the burn and avoiding burning on soils with a surface horizon that has high sand content (near or greater than 90 percent), high rock fragment content (near or greater than 60 percent) and slopes greater than 30 percent would reduce risk of hydrophobicity and related problems with excessive runoff (NRCS 2011).

Prescribed burning would release carbon stored in soil surface organic matter into the atmosphere.

Soil productivity should increase the year following low-intensity prescribed burning because nutrients are readily released from ash (Robichaud et al. 2000), but may decline over time due to leaching and the loss of organic matter (a nutrient source) due to fire (Caldwell et al. 2002). Productivity is affected in the short- and long-term in the case of wildfire, which has a higher probability of occurring under Alternative A. More organic matter is consumed and the heat kills microorganisms in the soil. The use of prescribed burning may attenuate the effects of wildfire on soil productivity, should a wildfire occur, post-prescribed burning by increasing the resistance of soil microbes to fire (Choromanska and DeLuca 2001).

Prescribed burning would occur when soils are moist or frozen and less prone to erosion, and grass can recover quickly to hold soil in place and provide a source of soil carbon and nutrients. Soil erosion that would occur would be temporary and insufficient to change the potential of the soil to maintain existing correlated ecological sites. However, in the case of a high-severity fire, erosion could be significant enough to alter soils to the point that they could not support plants in the existing ecological site.

Regeneration following prescribed fire is expected to occur within one year following the fire. Some soils within treatment areas, on steep slopes (>30 percent), have a very severe risk of erosion due to fire removing stabilizing vegetation and surface litter. These soils can experience large amounts of erosion following fire, so would be avoided for treatment by prescribed burning. Soil compaction related to prescribed burning is not expected.

Organic matter is an important sink of atmospheric carbon and an important source of nutrients for plants. Many organisms including fauna, enzymes and microbes act to mix soil and break down organic matter to forms that provide nutrients to forest plants. High-intensity wildfire has the potential to disrupt this natural nutrient cycle by consuming organic matter, releasing carbon into the atmosphere and killing organisms close to the soil surface (Smith et al. 2005). A low-intensity controlled burn would consume some organic matter but would affect the microorganism community for a shorter period of time than a high intensity burn. A low-intensity burn would not remove potential sources of future organic matter contributions (such as trees and grasses) to the extent that a high-intensity fire would, so recovery is quicker.

*Pile Burning*
Effects would be limited to the pile burn area, where the soil surface would be exposed and some localized erosion may occur. The amount of erosion would be insignificant and temporary due to the small area of disturbance.

Alternative C
Mechanical treatments would expose the soil surface, rendering it subject to sedimentation. Positioning hand-cutting operations on soils with a higher risk of erosion, rather than those targeted for mechanical and burn treatments, lowers the risk of erosion and probability of sedimentation. Fewer acres of vegetation would be treated, therefore the risk of high severity wildfire would be greater.

Effects of opening approximately 3.58 miles of existing constructed roads to seasonally restricted motorized travel would be the same as Alternative B.

*Pile Burning*
Effects would be limited to the pile burn area, where the soil surface would be exposed and some localized erosion may occur. The amount of erosion would be insignificant and temporary due to the small area of disturbance.

Alternative D
Mechanical treatments would expose the soil surface, rendering it subject to sedimentation. Positioning hand-cutting operations on soils with a higher risk of erosion, rather than those targeted for mechanical and burn treatments, lowers the risk of erosion and probability of sedimentation. Opening approximately 0.7 miles of existing constructed roads to seasonally restricted motorized travel would increase the amount of road to be monitored and maintained to ensure there is no erosion or sedimentation.

*Pile Burning*
Impacts would be the same as Alternative C.

## 3.12 Resource # 10 Air Quality

### 3.12.1 Description of Affected Resources/Issues
The state of Montana is divided into ten airsheds by the Montana Air Quality Bureau (DEQ 2011b) and monitored by the Idaho/Montana Airshed Group. Each airshed in Montana is designated as "Class 1" or "Class 2", with "Class 1" having the strictest standards. Air Quality Standards are set by the state. The project area lies within Airshed 7, having a "Class 2" air quality designation. The Anaconda- Pintler Wilderness Area, which has a "Class 1" designation, is located approximately 15 miles northwest of the project area. In addition to monitoring, the ID/MT Airshed Group has established Smoke Impact Zones. These zones surround cities where prescribed burning emissions could adversely affect air quality. Butte is the closest Smoke Impact Zone and is located approximately 11 miles northeast of the project area. This Smoke Impact Zone coincides with a State and Environmental Protection Agency (EPA) designation for Butte as a particulate nonattainment zone. Existing air quality within the airshed and project area is affected by smoke, dust and motor vehicle exhaust. Smoke is produced from wildland fires, prescribed burning, residential wood burning and agricultural field burning. Additional smoke is blown into the area from fires outside the area, including western Montana, Idaho, the Pacific Northwest and Canada. Sources of dust primarily result from wind erosion of cropland and vehicle traffic on gravel roads.

Land Health Assessments found no adverse impacts to air quality. Dust from roads is localized and temporary.

### 3.12.2 Impacts of Affected Resources/Issues

Alternative A

Under the No Action Alternative, current uses would continue, and undisturbed sites would continue to function as they are presently. Current trends and processes would continue. Beetle-killed trees would continue to pose a threat of high-intensity wildfire. Wildfire would result in temporary conditions of smoke and particulates that could exceed air quality standards. Carbon dioxide (CO2) would also be released into the atmosphere; this gas is considered by the BLM and State of Montana, among other agencies, to be a greenhouse gas. Wildfire would expose the soil surface, subjecting it to wind erosion in excess of current background levels. This would be a temporary effect until vegetative re-growth and litter cover reestablishes.

Alternative B

Mechanical and burn treatments would expose the soil surface, subjecting it to wind erosion. Fugitive dust would be temporary, lasting for the duration of operations and ceasing upon reclamation of roads and natural recovery of burned areas. Exhaust from equipment would also be temporary. Prescribed burning would release carbon dioxide (CO2) into the atmosphere; this gas is considered by the BLM and State of Montana, among other agencies, to be a greenhouse gas. CO2 emissions from exhaust and prescribed burning would be temporary and, given the comparative acreage of fuels consumed, would be less than what would be emitted in the case of wildfire. Dust resulting from unauthorized motorized access by the public into the area would be prevented by reclaiming temporary roads.

Effects would be short term, limited to the period of treatment. Temporary roads would be decommissioned and reseeded to prevent erosion and fugitive dust.

Alternative C

Effects from mechanical and pile burn treatments would be similar to Alternative B, but with few acres treated. Effects to air quality from prescribed fire proposed in Alternative B would not be present in Alternative C. Fugitive dust from exposed soil on temporary roads would be less than Alternative B, reflecting the relative mileage of temporary roads proposed. Effects would be short term, limited to the period of treatment. Temporary roads would be decommissioned and reseeded to prevent erosion and fugitive dust. Effects of opening existing roads to seasonally restricted motorized travel would be the same as for Alternative B.

Alternative D

Effects from mechanical and pile burn treatments would be similar to Alternative C. Temporary roads would be decommissioned and reseeded to prevent erosion and fugitive dust. Opening approximately 0.7 miles of existing constructed roads to seasonally restricted motorized travel would increase the amount of fugitive dust.

## 3.13 Resource #11: Noxious and Invasive Species

### 3.13.1 Description of Affected Resources/Issues

The primary noxious weeds in the Upper Big Hole East are spotted knapweed (*Centaurea maculosa*), yellow toadflax (*Linaria vulgaris*), houndstongue (*Cynoglossum officinale*) and Canada thistle (*Cirsium arvense*). Two locations of leafy spurge (*Euphorbia esula*) have been

found in the planning area in the past; one location in the Charcoal Gulch area, which has not been found again in three years, and a small location north of the Dickie Hills road which gets chemically treated twice a year. Leafy spurge seeds may stay viable in the soil for up to 8 years and an extensive root system containing large nutrient reserves makes leafy spurge extremely difficult to control. There are also several County listed undesirable, invasive species present (including common mullein, black henbane and musk thistle). Most infestations are found along roadways, animal trails, old disturbance areas and south-facing slopes.

A partial noxious weed inventory was done in the planning area along roadways and disturbance areas in the summer of 2010. Of those areas inventoried (Jerry Creek Road, Jimmy New Road, Johnson Creek Road and Charcoal Mountain), <25 acres of spotted knapweed, <20 acres of yellow toadflax, and <10 acres of houndstongue were found along these roads and Charcoal Mountain. Further inventory is scheduled for the summer of 2012 in the UBHE project area.

### 3.13.2 Impacts of Affected Resources/Issues

Alternative A

Under this alternative, no vegetation treatments, aquatic improvements, or temporary road construction would occur. Previously approved and ongoing activities such as livestock grazing, motorized vehicle travel on open designated routes, firewood cutting, and noxious weed control would continue. Livestock grazing activities would continue at existing levels.

The No Action alternative would not result in any additional risk of invasive plant establishment and spread over what is currently occurring within the analysis area. The ongoing and reasonably foreseeable activities would be expected to result in a continued moderate risk of weed spread. Ongoing activities (excluding weed control) would continue to provide potential vectors for weed spread.

The use of open, motorized roads and trails by the public would continue to result in a moderate threat of weed seed transport and deposition within the analysis area. Based on existing levels of weed infestation and the continuation of future livestock grazing actions, there is low to moderate potential for livestock grazing activities to result in measureable weed spread into uninfested lands within the analysis area. Even in the absence of these ongoing activities there would be potential for weeds to invade.

Treatment of existing noxious weed infestations would continue to occur on an annual basis by Bureau of Land Management Weed Control Crew and in accordance with the Butte Field Office Weed Management Plan Revision EA 2009. The BLM Weed Crew, Beaverhead County Weed District, Butte-Silver Bow Weed District, and the Big Hole Watershed Weed Committee have very active weed control programs, and current and planned weed control would continue to benefit native plant communities within the analysis area by containing and reducing the coverage and density of existing weed infestations.

Alternative B

Timber harvest activities under Alternative B have the potential to create ground disturbance that is susceptible to weed invasion; however, it is the connected actions such as temporary road construction, and subsequent motorized travel on these roads (or off road), that are thought to

serve as the major vectors for weed spread into timber harvest areas. This ground disturbance is also very susceptible to invasion if weed infestations are found in close proximity, such as along existing, open motorized routes. Burning also opens up areas for weed establishment with the added nitrogen into the soil.

Under this alternative, the overall increase to linear road length in the planning area would increase by roughly 3.58 miles. Alternative B would have 6.5 miles of temporary roads. Although temporary roads would be closed under all action alternatives, the potential for unauthorized use on temporary roads would be higher under Alternative B due to more miles of temporary roads. With an increase in roads, there is an increase in the risk new infestations of noxious weed establishment. The use of open, motorized roads and trails by the public would continue to result in a moderate threat of weed seed transport and deposition within the analysis area.

There is a low to moderate potential for continued livestock grazing to result in measurable weed spread, based on existing levels of weed infestation.

Habitat restoration (timber harvest, hazard tree removal, commercial thinning, and burning) activities have the potential to create ground disturbance that is susceptible to weed invasion, and would be expected to result in a moderate potential for weed establishment and spread.

Temporary roads would not be open to the public and would be stabilized, revegetated, weed free and closed after the project is complete. All equipment would be required to be washed before project implementation to reduce the risk of noxious weed infestations, but the risk of weed infestations is always much higher on roadbeds and disturbed sites.

Appendix B displays how invasive plants are given a risk rating. This alternative is estimated to have an overall low-moderate risk of increasing the density and spread of weeds into uninfested lands in the short term, and the presence of mostly small, low-density invasive plant species infestations in the proposed treatment units. This risk rating would also apply to access roads and haul routes used for project activities, and identified aquatic habitat improvement projects. The rationale for this low-moderate risk rating is that (1) existing weed infestations within the proposed treatment units are small, (2) treatment of infestations within harvest units, and along access roads and haul routes would occur prior to vegetation management actions, (3) post-activity monitoring (and retreatment, if necessary) would occur following cessation of project activities and (4) project activities would avoid known cheatgrass infestations.

Pre-activity treatment and a high commitment to post-activity monitoring and retreatment of existing noxious weed infestations in proposed units would result in a high potential for success for controlling these weed occurrences within 3 to 5 years. Some invasive plants such as cheatgrass can dominate plant communities for up to 80 years in the absence of further disturbance, and are often a permanent and widespread feature of the landscape (Zouhar 2003). In regards to cheatgrass infestations in units avoidance of these populations would ensure that project activities do not increase the spread or density of this invasive species.

In the long term, the continued treatment of weed infestations by BLM weed control crews, counties crews, and the BHWWC would result in an estimated moderate success for keeping any new infestations at a manageable level within proposed treatment units, at aquatic improvement structures, and along harvest unit access and haul routes.

Alternative C
Under this alternative, impacts to noxious weeds would be the same as those described in Alternative B except Alternatives C and D would have 3.25 miles of temporary roads compared to Alternative B (6.5 miles).

Alternative D
Under Alternative D, the risk from an increase in noxious weed infestations from restoration activities and roads would be the same as under Alternative C.

## 3.14 Resource # 12 Cultural Resources

### 3.14.1 Description of Affected Resources/Issues
Three Class III cultural resource inventories have been conducted at various times throughout the project units, and only one of them recorded any cultural resources. Other Class III inventories have recorded prehistoric sites in the vicinity of the proposed treatment units, but none are present in those described in this EA. One previously-recorded site lies within one of the proposed treatment units, and while described as a "logging camp" in 1977, is hardly recognizable today. No other cultural resources were observed in the proposed units.

Correspondence received in August of 2011 from the Confederated Salish and Kootenai Tribes, requested the BLM address scarred trees (culturally modified trees) in the projects area. These trees are considered sacred by the tribes. Surveys were conducted during the fall of 2011 in areas thought to be "high potential" for culturally modified trees to occur. Trees with potential for sacred status were photographed and a companion GPS point was taken to document the location of these specimens. The trees are located on knobby outcrops that would not be included in proposed harvest areas. Since trees with "old growth characteristics" would not be harvested, the likelihood of cutting a sacred tree is remote in the extreme. Consultation with the Salish and Kootenai Tribal Historic Preservation Office is ongoing.

### 3.14.2 Impacts of Affected Resources/Issues

Alternative A
There would be no ground disturbing activities under the No Action Alternative so no cultural resources would be affected.

Alternative B
Information on archeological and historical site locations is exempt from public documentation by statute. Those provisions outlined in this document to protect known and inadvertently discovered sites, as well as currently significant Traditional Cultural Properties, are completely adequate. Therefore, "no historic properties would be affected" (36 CFR 800.4(d)) as a result of vegetation treatment activities or other proposed activities under all action alternatives.

Alternative C
No historic properties would be affected as a result of vegetation treatments or other proposed activities under all action alternatives.

Alternative D
No historic properties would be affected as a result of vegetation treatments or other proposed activities under all action alternatives.

## 3.15 Resource #13 Recreation

### 3.15.1 Descripton of Affected Resources/Issues

The Upper Big Hole East project area is located within the Upper Big Hole River Special Recreation Management Area (SRMA), which totals approximately 15,000 acres. The management plan for this SRMA was completed in 1985, with modifications added in the Record of Decision and Approved Butte Resource Management Plan, which was completed in 2009. The primary outcome of the decisions made in each of these plans is to maintain and enhance recreational opportunities and user experiences within the river corridor and to develop guidelines for establishing and maintaining recreation sites, where deemed appropriate.

Management objectives for this SRMA include the following:

- Maintain SRMA resources and sites to provide quality recreation experiences.
- The Big Hole River is recognized nationally as a Class I fishery and was designated as a Blue Ribbon Trout Stream by Montana Fish, Wildlife and Parks (2008). The river is very popular for rainbow and brown trout fishing. Due to its national and regional appeal, BLM has designated its Recreation Tourism Market as a "Destination-SRMA." Other primary recreation opportunities within the project area and river segment include river floating, semi-primitive camping, picnicking, hiking, motorized driving, hunting and nature viewing.
- Manage BLM lands under the "Roaded Natural" and "Semi-Primitive Motorized" classes of the Recreation Opportunity Spectrum (ROS).
  Roaded-Natural: Setting is generally natural, with modifications only moderately evident. Interactions with other users are relatively common; opportunities for both motorized and non-motorized uses are present.
  Semi-Primitive Motorized: Predominantly unmodified setting. Social interactions are relatively low; some opportunities for isolation from human intrusions remain; and motorized uses are more restricted, but still prevalent.
- Maintain visual qualities on BLM lands, as seen from the river, to protect recreation quality and scenic viewing in accordance with VRM Classifications. Refer to Visual Resource section.
- Mitigate timber harvests or other related vegetative treatment activities within seen BLM lands in order to protect scenic qualities.
- Insure all road construction on BLM lands within the SRMA is compatible with the specific management objectives (VRM, ROS, Travel Plans, etc.).
- Retain all BLM lands within a one-mile corridor from each side of the river in public ownership.

- Maintain and supervise visitor use within the SRMA. Provide visitor information, interpretation and signs within the SRMA. Post BLM boundary signs within the SRMA at primary entrance points.
- Develop and maintain recreation sites in accordance with project plans, ROS, NEPA and SRMA priorities/objectives.
- Continue management coordination efforts within the corridor with MFWP, who has lead authority for the use of the river.

### 3.15.2 Impacts of Affected Resources/Issues

Alternative A
Under the No Action Alternative, no vegetative treatments would occur and project implementation impacts to the existing Upper Big Hole River SRMA would not occur. However, the No Action Alternative would subject the area to a wider scale natural fire and greater tree stand mortality, as fuel conditions and forest health treatments would not occur. These natural events, depending on their scale, could create high impacts to the scenic quality of the area, both in the short and long terms. Motorized recreation and travel opportunities would continue to be limited under this alternative. The impacts to these users are described in the Travel Management section of this alternative (see page 3-84).

Alternative B
Under Alternative B, the proposed treatment activities would occur within the Upper Big Hole River SRMA, which is a popular destination for fishing, floating, camping, picnicking, hunting, motorized travel and scenic viewing. Recreation opportunities, experiences and benefits to motorized users would increase, as described in the Travel Management section of this EA (see page 3-84). Non-motorized access opportunities would not be impacted under this alternative because travel routes would be open to motorized and non-motorized users. However, non-motorized recreation experiences in the area could be impacted by increased motorized use. However, because the increase in road density would be relatively low, and because there are multiple non-motorized opportunities in the immediate and surrounding areas, the overall impacts would be minimal.

Alternative C
Under this alternative, impacts to recreation would be the same as those described in Alternative B because route designations would not change.

Alternative D
Motorized recreation and travel opportunities would continue to be limited under this alternative. The impacts to these users are described in the Travel Management section of this alternative (see page 3-84).

## 3.16 Resource #14: Visual Resources

### 3.16.1 Description of Affected Resources/Issues
The BLM managed lands located within the project area were inventoried for visual resources during the Butte Field Office's Resource Management Planning effort, which was completed in

April 2009. For each area inventoried, specific Visual Resource Management (VRM) classes were assigned. For the UBHE project area, the VRM classes and associated acres are as follows:

Table 31: VRM classes and acres within the project area

| VRM CLASS | ACRES |
|---|---|
| I | 0 |
| II | 10,503 |
| III | 12,309 |
| IV | 0 |
| TOTAL | **22,812** |

**Management objectives for VRM Class II and III areas are as follows**:

- Class II: The objective of this class is to retain the existing character of the landscape. Levels of noticeable change should be low. Management actions may be seen but should not attract attention of casual users. Changes must conform to the basic elements found in the predominant natural features of the characteristic landscape.

- Class III: The objective of this class is to partially retain the existing character of the landscape. Levels of noticeable change should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should conform to the basic elements found in the predominant natural features of the characteristic landscape.

These management classes were derived from assessing a combination of three important visual factors (Scenic Quality, Sensitivity Levels and Distance Zones). Management Classes are used to assess visual resource values and to determine degrees of modifications allowed to the basic elements of the project area landscape.

Key Observation Points (KOPs) established for this project area include the town of Wise River and the Jerry Creek Bridge. Although many portions of the affected landscape are not visible or "seldom seen" from these specific locations, the overall noticeability increases dramatically when consideration is given to visitors floating the river segment and/or driving along the Highway 43.

### 3.16.2 Impacts of Affected Resources/Issues

Alternative A

Under the No Action Alternative, no vegetative treatments would occur to the existing landscape; impacts to visual resources would not be human-induced. However, no action would subject the area to a potentially more extensive wildland fire and greater tree stand mortality due to insects and diseases over the long-term. These events, depending on their scale, could create high impacts to the scenic quality of the area (both short and long term). In addition, opportunities to create more visual diversity to the basic elements (irregular park openings, feathered edgings, uneven aged stands, lower confer densities and greater frequencies of deciduous growth in the drainage bottoms) through mitigated treatments would not be available.

Alternative B
Under this alternative, approximately 1,102 acres of proposed treatments would occur within VRM class II areas and 3,746 acres within VRM Class III areas.

Burn treatments proposed under this alternative would generally not meet VRM class II objectives because they tend to create moderate changes to color over the short-term. Broadcast burns within the project area would create strong contrasts in color, form and texture (short-term) that would attract attention. Additionally, the visible broadcast burns in class III areas would present strong short-term contrasts to the basic element of color.

Although adverse short-term impacts of the proposed treatments exist, they would generally be off-set by the beneficial long-term impacts of reducing catastrophic fire danger and returning the area to a pre-European settlement condition, all of which would reduce monotony and increase scenic diversity on the landscape.

Alternative C
Under this alternative, approximately 412 acres of proposed treatments would occur within VRM class II areas and 2,273 acres within VRM Class III areas. The impacts on visual resources would be the same as those described for Alternative B, but would be to a lesser extent because the treatment units would be reduced by approximately 62 and 40 percent, respectively.

Alternative D
Under this alternative, vegetation treatments would be the same as those described in Alternative C. The fact that there would be no grazing under this alternative would generally improve scenic quality of the area to some observers over the long-term, but would not be noticeable to most casual observers.

## Cumulative Effects

### Cumulative Effects for All Alternatives
Cumulative effects are those that result from adding the anticipated direct and indirect effects of the proposed action, to impacts from other past, present and reasonably foreseeable future actions. These additional impacts are considered regardless of what agency or person undertakes such actions. The Cumulative Impacts Area for this EA includes all lands within the greater UBHE assessment area. The temporal boundary when analyzing cumulative impacts is 10 years.

### Past and Present Actions
The project area shows evidence of human activities, which have affected the disturbance regime and thus plant succession and existing vegetation. Most of the harvested basal area was taken from larger diameter trees, as evidenced by large (>17" DBH) persistent stumps and slash. Smaller diameter materials (pole-sized and smaller) were apparently not removed. There has been timber harvest, pole cutting, and firewood collecting in the past throughout the analysis area.

Timber harvest likely began in the UBHE area in the 1870s, and increased primarily in support of mining activities in the Butte and Anaconda areas.

The total estimated forested area treated by past commercial harvest activities on adjacent FS administered lands (within the Fleecer Watershed area) in the last 60 years is approximately 7,500 acres (out of a total 100,000 acres of analysis area); while noncommercial activities occurred on over 1,500 acres of the area. Silvicultural treatments include, but are not limited to fire salvage, clear-cut, selection cut, sanitation cut, hazard tree removal, commercial thin, and special products removal.

Approximately 1,700 acres of commercial timber harvest has occurred on forested BLM administered lands in the UBHE project area in the past 40 years. These acres are accounted for in available project records. It is probable that acres of past treatment go unaccounted for in this summation as treatments may pre-date records kept for NEPA (which was passed in 1970) such as in the Dino Creek and Jimmie New areas. Timber project records in the Butte Field Office go back to the late 1960s. Types of past treatments included clear cuts, shelterwood cuts, partial cuts, post and pole harvesting, and firewood harvesting.

The Wise River Habitat Restoration Project was implemented by the Butte Field Office (2009-2011). Under this project, approximately 411 acres of savannas and sagebrush were masticated to reduce encroachment of colonizing conifers and 206 acres of forest stands were thinned.

In 2011, approximately 40 acres of lodgepole pine was harvested to salvage commercial product from mountain pine beetle affected stands within and in close proximity to the Dickie Bridge and East Bank developed campgrounds.

Livestock grazing currently occurs in the adjacent valley bottom and has for at least 150 years. Domestic livestock grazing increased dramatically in the Big Hole River area in the mid-1800s. The level of use reduced fine fuel loads.

Additionally, public land management agencies have suppressed almost all fire starts in recent decades (since about 1911). As a result, biomass and fuel loads have increased in forests managed under this strategy; and species composition shifted away from more fire-tolerant species to less fire tolerant species (Barrett & Arno 1982). Exclusion of fire from the landscape (e.g. removal of fine fuels by livestock, coupled with fire suppression over the past century), has increased fuel loads decreased forest health.

Prescribed fire has been used to reduce conifers colonization over the past 25 years and has accounted for 556 acres of treatment on the BLM managed lands in this project area. The Forest Service has burned 2,957 acres in the analysis area since the mid-1980s. A 4-mile fuels break was constructed between the Bryant Creek and Alder Creek roads as a contingency line in the event the wildfire would reach this populated area.

Severe over-trapping of beavers and unregulated livestock use during the late 1800s and early 1900s changed the character (hydrologically and vegetatively) of most mountain streams in the Intermountain West (Elmore and Beschta 1987). Currently, there is very little beaver active in the UBHE.

Watershed-wide, under management on all land ownerships, there has been and continues to be a decline in aspen vigor and extent. This is a west wide phenomenon that can be attributed primarily to a combination of successional processes including reduction (or elimination) of fire, loss of predator influence on herbivores, and long-term overuse by ungulates (Beschta 2003) and drought.

Historic irrigation practices have resulted in the construction of irrigation ditches as well as channel alterations that have removed vegetation and beaver dams, lowered water tables and altered hydrology. Floodplains have been disconnected from stream channels. Streams altered by straightening are no longer able to form and maintain channels. Sediment transport is disrupted, channels are widened and stream power is reduced.

Degradation of riparian habitat, competition from non-native fish, changes in water use, and climate change have all combined to greatly reduce the amount of habitat for fluvial grayling and substantially reduce the numbers of grayling in the Big Hole River and its tributary streams.

In an effort to preclude listing of the fluvial arctic grayling under the ESA and/or to protect private land owner rights in the event of listing, the Candidate Conservation Agreement with Assurances (CCAA) program is currently being implemented on non-federal lands in the Upper Big Hole Watershed. This cooperative effort is resulting in constructing structural projects, completing vegetative projects, and implementing grazing systems on private land, as well as voluntary reductions in water use. More conservative irrigation practices are also being implemented.

The introduction of non-native trout into the Big Hole watershed has resulted in the loss of nearly all native WCT populations through hybridization, competition and predation from the non-native species.

The economic situation of the grazing permittees/lessees is affected by changes in livestock, hay, and fuel prices, interest rates, land prices, labor costs, labor inputs, equipment costs, including maintenance, cost of feed supplements, cost and availability of irrigation water, livestock loss, private land lease rates, veterinary costs, local weather and other miscellaneous factors. Cumulative economic impacts to permittees could add pressure to subdivide private land to maintain cash flow.

### Reasonably Foreseeable Action Scenario (RFAS)

The following RFAS identifies reasonably foreseeable future actions that would affect the same resources in the cumulative impact area as the proposed action and alternatives.

As the cumulative effects of the grayling CCAA program on non-federal lands and efforts to improve potential habitat on public land begin to mature, the predicted results of rising water tables, reconnected floodplains, streams capable of self-maintenance of channel dimensions, and lower water temperatures, would lead to improvements to fluvial arctic grayling habitat and potentially a corresponding increase in the population. This would result in expanded use of previously unoccupied habitats throughout the drainage. The non-federal lands included in the

CCAA program will be re-assessed every five years to measure progress towards objectives and adjustments to management made as indicated.

The risk of wildfire on all ownerships will continue. Fire suppression efforts, utilizing resource benefit objectives, will continue on federally-administered lands in the watershed.

Fencing on other land ownerships and on BLM boundaries may lessen the benefit of fence modification efforts on public lands to improve wildlife movements.

Sub-dividing of private land within the watershed is currently occurring on a very small scale. Although not expected to be extensive, subdivision may expand in the foreseeable future. Sub-dividing and development cause's habitat fragmentation and increases traffic, soil and vegetation disturbance, spread of noxious and invasive species, and other human uses in the area, and may increase the demand for water.

Increasing loss of aspen due to the succession to conifers and/or the expansion of conifers can be anticipated. Areas that are treated to enhance and maintain existing habitats would create structural diversity within aspen/woodland habitats across the landscape.

The Montana Department of Fish Wildlife and Parks is pursuing the construction of an instream barrier on private land within the project area. The purpose of this barrier would be to allow for the restoration of westslope cutthroat trout within Johnson Creek upstream of the barrier.

Within the Jimmie New area, Section 16 is Montana State School Trust Land. The Department of Natural Resources has indicated they have plans for possibly implementing forest treatments in this section. Such treatments would most likely emphasize restoration of healthy forest conditions (e.g. reduction of trees per acre in densely crowded stands) and involve mechanized thinning or masticating operations.

In the Wise River Habitat Restoration Project area, another 60 acres of planned mastication treatments has yet to be implemented, as well an additional 74 acres of thinning.

## Cumulative Effects of Alternative A – No Action

Without grazing management changes and new range improvement projects, livestock induced riparian health concerns on BLM administered lands identified in the allotment evaluation reports would not be addressed and objectives for improving riparian health would not be accomplished. Static or downward trends would continue along ~4.5 miles of stream reaches which could affect riparian health, fisheries and wildlife habitat in localized areas.

The loss of forest canopy and cover due to insect and disease mortality is likely to continue across all ownerships with the accompanying loss of wildlife habitat. As fuel loading increases due to conifer mortality, it will create a higher risk of catastrophic wildfire, especially while the needles are dead, but still on the trees.

Motorized users of the area would continue to feel displaced. This is often a result of surrounding travel route systems on adjacent and regional lands becoming more restrictive to motorized vehicle use.

Private home construction and access roads would continue to have varying degrees of impacts on the visual resources within the river corridor. The No Action Alternative would subject the area to the least reasonably foreseeable impacts, since visual contrasts to the affected landscapes would be not induced by humans.

Since no actions would be implemented under this alternative, there would be no cumulative effects to noxious weed spread.

Since no actions would be implemented under this alternative, there would be no cumulative effects associated with treatment activities such as mechanized thinning or mastication.

Deleterious effects of insect activity (defoliation from spruce budworm) would continue unchecked in crowded stands resulting in the increased mortality and loss of large diameter high value trees susceptible to attack from Douglas-fir beetle over many acres of the landscape.

Stand conditions outside the expected range of natural variability for pre-settlement fire regimes would persist and increase the likelihood of environmental response to disturbance events over large areas.

Personal use firewood cutting would continue. Since most of this activity would occur along open roadways effects from this activity would be somewhat negligible and restricted to open road corridors.

Fuels would persist and continue to accumulate in stands with damaging levels of insect activity and in stands with more trees per acre than expected resulting from successful colonization in the prolonged absence of fire. Increased risk of severe fire behavior would occur in overcrowded stands, and this risk would not be mitigated in the WUI.

Habitat for a wide variety of wildlife species would continue to decline under the No Action Alternative due to the lack of vegetation restoration activities and continuing with the current livestock grazing system in the Jerry Creek and Foothills Allotments.

### Cumulative Effects of Alternative B

Managing to improve riparian conditions throughout the watershed would allow for better dispersal of wildlife and reduce site specific riparian impacts. The proposed changes in livestock management would generally improve riparian function on BLM-administered land and other lands within BLM allotments at varying degrees and timeframes. The expected effect to these riparian habitats would be improved sediment transport, better access to floodplains, dissipation of energy and, over time, improvements in channel morphology and fisheries habitat. Since BLM administered lands comprise less than 15 percent of the land base within the UBHE, improvements to riparian condition and water quality on BLM administered lands alone, would not have a measurable effect on water quality within the larger UBHE analysis area.

The intermingling of private and state lands with public lands throughout the watershed ensures that activities outside the control of BLM will continue. Grazing on these lands at various times throughout the year will influence forage and cover availability, and distribution of seasonal wildlife uses. Although wildlife habitat needs are generally met within the watershed, this grazing may influence suitability and availability of that habitat on a localized basis or during a specific time frame.

Current impacts resulting from grazing, timber harvest, recreation, and other activities on private and State lands, would continue. This could affect wildlife migration and dispersal depending on timber harvests planned on State and private lands in the future.

As surrounding travel route systems on adjacent and regional lands become more restricted, motorized users often become displaced. Under this alternative, motorized access opportunities would be improved, with only a small gain in road density, especially when compared with the overall number of linear miles of routes in the immediate and surrounding areas.

The impacts of these treatments, coupled with other reasonably foreseeable actions within the Big Hole River corridor, could subject the area to greater visual impacts over both the short and long terms. The varying visual contrasts created by the treatment actions, although mitigated, would create adverse short-term term visual resource impacts on the affected landscape as viewed from the KOPs, highways and river. However, long-term visual impacts would be improved.

Ongoing and future activities would continue to provide potential vectors for weed spread. The use of open, motorized roads and trails by the public would continue to result in a moderate threat of weed seed transport and deposition within the analysis area.

There is a low to moderate potential for continued livestock and wildlife to spread weeds spread, based on existing levels of weed infestation. Timber harvest (hazard tree removal and commercial thinning) and mastication activities under Alternative B (4,430 acres) would have the potential to create ground disturbance that is susceptible to weed invasion, and would be expected to result in a moderate potential for weed establishment and spread.

The effects of the proposed action through commercial harvesting, noncommercial thinning, mastication, under burning, and pile burning, would be similar to past activities in the project area. Past forest activities include various types of harvest treatments (thinning, partial cuts, clear cuts) implemented mechanically and by hand crews; as well as prescribed burning. Most of the proposed activities would occur within previously harvested or disturbed stands or within the general vicinity of stands previously disturbed by human activity.

This alternative would create conditions which align with Butte RMP goals and objectives over more acres than any other Alternative (to restore and/or maintain the health and balance of public forests; maintain and/or improve sustainability and diversity of woodland communities; manage dry forests to contain healthy relatively open stands; manage moist forests to contain healthy diverse ages, densities, and structure, and manage old forest structure).

All potential actions, on up to 4,720 potential acres, would restore more forest stands than the other action alternatives by promoting stand conditions more consistent with those created and maintained under a mid-severity fire regime; a mosaic of various forest stands would be retained and promoted on the landscape, increasing landscape complexity and therefore increasing resilience to disturbance events.

While there could be almost a 30-60 percent reduction in overall tree populations within any given stand, the average size, health and vigor of the residual trees within thinned stands would increase as a result of the removal of the smaller and weaker trees, many of which are competing for resources against larger trees with fuller crowns or intense competition of their neighbors.

Alternative B incorporates prescribed broadcast under-burning, which increases the efficacy and longevity of thinning treatments, and also stimulates sprouting and increased growth of desirable understory species (grasses and shrubs).

BLM lands within the project area occur on very accessible low to mid slope positions, relative to the valley bottom. Since the mid to late 1800s, man-made disturbances have occurred with some regularity throughout the project area. As a result many acres of second growth occur within the project area. Since very few acres of old growth forests are recognized in this area, it is unlikely that the effects of planned activities will affect the characteristics of old growth forests. In addition, the Butte RMP calls for "managing old forest structure in a sustainable manner"; therefore silvicultural prescriptions designed to retain and promote old forest structure would be implemented (e.g. upper diameter limits of 15 or 18" for cut trees, retention of snags, and retention or creation of down woody material). In the Tie Creek area, some mixed conifer stands that appear to have had no past treatments occur in Sections 15 and 10, near the north and northwest boundary. These areas are set aside from any proposed treatment activities.

Activities associated with the proposed action will generate commercial products which would stimulate the local economy.

Personal use firewood collection activities would continue to occur and would still be predominantly focused along open road corridors; in thinned stands, firewood gathering and cutting may be allowed from piles and decks.

### Cumulative Effects of Alternative C

As surrounding travel route systems on adjacent and regional lands become more restricted, motorized users often become displaced. Under this alternative, motorized access opportunities would be improved, with only a small gain in road density, especially when compared with the overall number of linear miles of routes in the immediate and surrounding areas.

The cumulative impacts under this alternative would generally be the same as described in Alternative B. However, these impacts would be to a lesser degree because the proposed vegetation treatments would be reduced significantly under this alternative.

The cumulative impacts under this alternative would generally be the same as described in Alternative B. However, these impacts would be to a lesser degree because the proposed vegetation treatments would be reduced significantly under this alternative.

The cumulative effects to forest, sagebrush, riparian and instream habitats under Alternative C would generally be the same as those described in Alternative B, however, fewer acres would be treated by proposed activities. As a result, desirable conditions, which align with Butte RMP goals and objectives, would occur less frequently. Although habitat for wildlife species that prefer closed canopies would be greater under Alternatives C and D, these alternatives would not move forest or shrubland habitats towards a range of natural variability. More acres of forest stands would remain overcrowded or in a stagnant state under this alternative. Fewer acres of sagebrush would be treated to remove conifer colonization and aspen/riparian areas would continue to decline in health and extent. Wildlife species diversity would be expected to less under Alternatives C.

### Cumulative Effects of Alternative D

As surrounding travel route systems on adjacent and regional lands become more restricted, motorized users often become displaced. Under this alternative, motorized access opportunities would be improved, with only a small gain in road density, especially when compared with the overall number of linear miles of routes in the immediate and surrounding areas.

The cumulative impacts to visual resources under this alternative would generally be the same as described in Alternative C.

The cumulative impacts to weeds under this alternative would generally be the same as described in Alternative C. Eliminating livestock grazing in the Jerry Creek and Foothills Allotments could lessen the risk of weed distribution in these areas; however wildlife would continue to transport weeds.

The cumulative effects of vegetation management under Alternative D would be the same as those described in Alternative C. Elimination of livestock grazing in the Foothills Allotment would be expected to improve upland habitats, and eliminating grazing on the Jerry Creek Allotment could improve riparian and instream habitats.

**3.18 Comparison of Effects by Alternative**

| Resource | No Action | Alternative B – Proposed Action | Alternative C | Alternative D |
|---|---|---|---|---|
| Douglas-fir Habitat Types | Would continue to be overcrowded. | Moves up to 2,460 acres towards more historic, open condition. | Moves up to 1,440 acres towards historic condition. | Same as C |
| Uplands | Conifers would continue expanding and colonizing sagebrush meadows. | Removes conifers from up to 1,410 acres of sagebrush habitats. | Removes conifers from up to 760 acres of sagebrush habitats. | Same as C |
| Aspen/Riparian | Douglas fir would continue outcompeting aspen stands. | Thinning/removing conifers, improved grazing management and structural projects on the Jerry Creek Allotment would improve growing conditions and encourage expansion of 60 aspen stands and 240 riparian acres. | Same as B | Same as B, however removing livestock grazing from the Jerry Creek Allotment may allow faster recovery of riparian species. |
| Big Game Hiding Cover | No Change | Loss of up to 1,500 acres of hiding over a 10 year timeframe, but increase in forage quality and quantity. | Loss of up to 940 acres of hiding and thermal habitat. | Same as C. |
| Big Game Security (based on road density) | <u>No Change to Security by Area</u><br>Charcoal Gulch – 71%<br>Dickie Hills – 20%<br>Alder Creek - <2%<br>Deno Creek - <2 %<br>Jimmie New – 32% | Same as No Action for Charcoal Gulch, Dickie Hills, Alder Creek or Deno Creek.<br><br>Jimmie New – 25% - Reduction in security habitat. | Same as B | Same as No Action for all areas. |

| Resource | No Action | Alternative B – Proposed Action | Alternative C | Alternative D |
|---|---|---|---|---|
| Brewer's Sparrow and Sage Grouse | No Change | Short term reduction of habitat quality on up to 840 acres. Long term benefits by maintaining more sage across the landscape | Short term reduction of habitat quality on 335 acres. Fewer long term benefits to sage compared to Alt. B | Same as C |
| Northern Goshawk | No Change | Reduce 16% of habitat<br>Benefit or minimal effects on 10% | Reduce 9% of habitat<br>Benefit or minimal effects on 5% | Same as C |
| Flammulated Owl | No Change | Beneficial effect on 1,640 acres (37% of potential habitat) | Beneficial effect on 940 acres (21% of potential habitat) | Same as C |
| Listed Species | No Effect to Grizzly Bear or Lynx | Same as No Action | Same as No Action | Same as No Action |
| WUI/Fuels | No treatments, public safety in the WUI would be at risk. | Reduce hazardous fuels in the WUI on 430 acres. | Reduce hazardous fuels in the WUI on 315 acres. Fewer acres would be treated to reduce hazardous fuels in the WUI in the Alder Creek and Deno Creek areas. | Same as C. |
| Travel Management | No change | Increased motorized recreation and access opportunities. | Same as Alternative B. | Minor increase in motorized recreation and access opportunities. |
| Special Status Plants | No impact | Vegetation treatments may enhance habitat and allow plants to expand. | Same as B | Same as B. |

| Resource | No Action | Alternative B – Proposed Action | Alternative C | Alternative D |
|---|---|---|---|---|
| Socioeconomics | No new economic opportunities for timber industry | Economic opportunities for timber industry. Increased expenses for Jerry Creek permittees and BLM for construction of range improvement projects. | Same as B, except reducing AUMs on Jerry Allotment may affect permittees since fewer cattle could be grazed on BLM. | Same as B, except for Jerry Creek and Foothills Allotment would not be grazed. Would cause economic hardship for the permittees, although expenses for maintaining range projects on BLM would not occur. |
| Soil Quality | No change. Risk of soil loss in response to wildfire remains. | Greatest risk reduction of soil loss due to wildfire because more acres of Douglas-fir habitat types are treated than for other alternatives. Risk of soil compaction at roads and landings is highest. | Less risk reduction of soil loss due to wildfire than B due to fewer treated acres of Douglas-fir habitat types. Risk of soil compaction at roads and landings is less than B. | Potential soil loss from wildfire is same as C. Less soil compaction on roads than C. |
| Air Quality | No change. Risk of impacts from wildfire remains. | Impacts from prescribed fire (smoke) and fugitive dust from open roads is greatest. | Impacts from prescribed fire (smoke) are less than B and fugitive dust from open roads is the same as B. | Impacts from prescribed fire same as C. Less fugitive dust from roads than C. |
| Noxious Weeds | BFO would continue to treat weeds within project area. | Potential for spread of noxious weeds with vegetation treatments, temporary roads, and re-opened travel routes. | Same as B, but fewer acres would be disturbed during vegetation treatments, fewer temporary routes, and re-opened travel routes. | Same as C. |
| Cultural Resources | No Impact | Cultural resources would be avoided. | Cultural resources would be avoided. | Cultural resources would be avoided. |

| Resource | No Action | Alternative B – Proposed Action | Alternative C | Alternative D |
|---|---|---|---|---|
| Recreation | No Change | Improved motorized recreation opportunities from minor increase in road density. | Same as B | Minor increase in motorized recreation opportunities. |
| Visual Resources | No Change | Moderate short term impacts to color, form and texture. Beneficial long term impacts: returning landscape to a pre-European settlement condition, reduction in monotony, and increased visual/scenic diversity. | Same as B, but to a lesser degree relative to the amount of proposed treatment acres. | Same as C. |

# Chapter 4 - Consultation and Coordination

## 4.1 Public Involvement

The UBHE project has appeared on the Butte Field Office NEPA Log since August 2011. The NEPA Log provides information about ongoing and planned project proposals. This report is available at: http://www.blm.gov/style/medialib/blm/mt/blm_information/nepa_logs/

A news release was issued in The Montana Standard on August 30, 2011. In August 2011, a scoping letter for the UBHE was mailed to approximately 350 individuals, organizations, and tribes. We received 16 responses providing comments on the proposal (Appendix A). The majority of responses were on forestry issues (4), fuels/WUI issues (4), roads (9), weeds (3) and wildlife (4).

Comments were addressed by (1) modifying the proposed action and refining project design features; (2) creation of alternatives to the proposed action; (3) incorporating the comment into the analysis, or (4) explaining why the comments do not warrant further agency response. The Interdisciplinary (ID) Team reviewed the public comments received during scoping and used the comments to develop and refine the proposed action and designed the proposed action to be responsive to public concerns (Appendix A). In general, we received comments expressing concerns about the following:

Noxious Weeds (3 comments): Potential spread of noxious weeds from proposed activities has been analyzed in this EA.

Effects to Wildlife Habitat (4 comments): Potential effects to wildlife habitat have been analyzed in this EA.

Wildland Urban Interface (4 comments): The project has been designed to reduce hazardous fuels and minimize the risk to adjacent private structures from wildfire.

Travel Management (9 comments): Potential effects to changes in travel planning and management have been analyzed in this EA.

## 4.2 Persons and Agencies Consulted:

The Bureau of Land Management consulted the following individuals, Federal, State, tribes, and local agencies during the development of this environmental assessment.
Federal, State, and Local Agencies:

Vanna Boccadori, Montana Fish, Wildlife and Parks
Craig Fager, Montana Fish, Wildlife and Parks
Jim Olsen, Montana Fish, Wildlife and Parks
Brian Robbins, Montana Department of Natural Resources
Fred Staedler, Montana Department of Natural Resources
Anne Vandehey – U.S. Fish and Wildlife Service
Wisdom and Wise River Ranger Districts, Beaverhead-Deerlodge National Forest

Tribes:
Confederated Salish & Kootenai Tribes Tribal Historic Preservation Office
Shoshone-Bannock Tribe Cultural Program

Grazing permittees who utilize BLM grazing allotments within the project area

**4.3 List of Prepares:**

| | |
|---|---|
| Sarah La Marr | Team Lead - Wildlife, Fisheries, Riparian |
| MaryLou Zimmerman | Forestry |
| Corey Meier | Soil, Water, Air |
| Lacy Decker | Noxious Weeds |
| John Sandford | Range |
| Erik Broeder | Range |
| Carrie Kiely | Cultural |
| Brad Colin | Travel Management, Recreation, Visuals |
| Vickie Anderson | Range |
| Roger Olsen | Special Status Plants |
| Bradlee Matthews | Geographic Information System |
| Greg Campbell | Fuels |

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## Glossary of Terms

**AFFECTED ENVIRONMENT:** Natural, physical and human-related environment

**AIR QUALITY:** Refers to standards for various classes of land as designated by the Clean Air Act of 1978.

**ALLOTMENT:** An area of land where one or more livestock operators graze their livestock. Allotments generally consist of BLM lands but may also include other federally managed, stateowned and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

**ALTERNATIVE:** In an Environmental Assessment, one of a number of possible options for responding to the purpose and need for action.

**ANALYSIS AREA:** The geographic area defining the scope of analysis for a particular resource. This area may be larger than the project area when effects have the potential to extend beyond the boundaries of the proposed action.

**BASAL AREA (BA):** The area of a given section of land that is occupied by the cross-section of tree trunks including bark. Basal area is used to determine percent stocking.

**BENEFICIAL OR POSITIVE:** An effect promoting a favorable result for a specific resource of resource use. Could be used in short-term, long-term, or both short and long-term contexts.

**BEST MANAGEMENT PRACTICES (BMPS):** A suite of techniques that guide, or may be applied to, management actions to that is sensitive to changes due to proposed actions.

aid in achieving desired outcomes. Best management practices are often developed in conjunction with land use plans, but they are not considered a land use plan decision unless the land use plan specifies that they are mandatory. They may be updated or modified without a plan amendment if they are not mandatory.

**BIG GAME:** Large species of wildlife that are hunted, such as elk, deer, bighorn sheep, and
pronghorn antelope.

**BIODIVERSITY:** The diversity of living organisms considered at all levels of organization including genetics, species, and higher taxonomic levels, and the variety of habitats and ecosystems, as well as the processes occurring therein.

**BIOMASS:** Vegetative byproducts or materials leftover from stand treatments usually made up of all or portions of trees and woody shrubs, including limbs, tops, stumps, and stems. This term can refer to such material that can be gathered and transported to cogeneration plants, and there utilized for production of electricity.

**BOARD FEET:** A unit of solid wood one foot square and one inch thick. (BF- board foot, MBFthousand board feet, MMBF million board feet)

**BROWSE:** To browse (verb) is to graze a plant; also, browse (noun) is the tender shoots, twigs and leaves of trees and shrubs often used as food by livestock and wildlife.

**BUFFER ZONE (STRIP):** A protective area adjacent to an area of concern requiring special attention or protection. In contrast to riparian zones which are ecological units, buffer strips can be designed to meet varying management concerns.

**CANDIDATE SPECIES:** Any species included in the Federal Register notice of review that are being considered for listing as threatened or endangered by the U.S. Fish and Wildlife Service.

**CANOPY**: Foliar layer(s) consisting of the crowns of trees or shrubs in a forest or woodland.

**CHEMICAL WEED TREATMENT:** These are treatments using additives, such as applying
herbicides or changing soil nutrient ratios.

**CLEAN AIR ACT:** Federal legislation governing air pollution.
• Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit
around the sun Natural processes within the climate system (e.g., changes in ocean circulation)
• Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification)

**CLIMAX:** The culminating stage in plant succession for a given site where vegetation has
reached a highly stable condition.

**CLIMAX VEGETATION:** The ecological vegetation community that represents the culminating stage or highest development of natural vegetative succession. The climax community often can perpetuate itself indefinitely unless disturbed by
outside forces.

**CODE OF FEDERAL REGULATIONS (CFR):** The official, legal tabulation or regulations directing federal government activities.

**COLLABORATION:** A cooperative process in which interested parties, often with widely varied interests, work together to seek solutions with broad support for managing public and other lands.

**COMMUNITY:** An assemblage of plant and animal populations in a common spatial arrangement.

**COMPOSITION (OF FOREST VEGETATION):** The proportion of each tree species in a stand, expressed as a percentage of the total number, basal area, or volume of all tree species in the stand.

**CONDITION CLASS:** Departure from the historic fire regime, as determined by the number of missed fire return intervals - with respect to the historic fire return interval and the current structure and composition of the system resulting from alternations to the disturbance regime. Three classes categorize the current condition with respect to each of five historic Fire Regime Groups. The relative risk of fire-caused loss of key components defines the system increases for each higher number condition. Class 1 level means little or no risk.

**CONFORMANCE:** That a proposed action shall be specifically provided for in the land use plan or, if not specifically mentioned, shall be clearly consistent with the goals, objectives, or standards of the approved land use plan.

**CONIFER:** A tree or shrub of the order Coniferae with cones and needle-shaped or scale like leaves.

**CONIFEROUS:** Pertaining to conifers, which bear woody cones containing naked seeds.

**CONNECTIVITY:** The degree to which similar but separated vegetation components of a landscape are connected.

**CONTIGUOUS:** lands or legal subdivisions having a common boundary; lands having only a common corner are not contiguous.

**CORRIDOR:** A wide strip of land within which a proposed linear facility could be located.

**COUNCIL ON ENVIRONMENTAL QUALITY (CEQ):** An Executive Office advisory council established by the National Environmental Policy Act of 1969 for review of federal program effects on the environment. They conduct environmental studies and advise the President on environmental matters.

**COVER:** Any form of environmental protection that helps an animal stay alive (mainly shelter from weather and concealment from predators).

**COVER TYPE:** The present vegetation composition of an area, described by the dominant plant species.

**CRITICAL HABITAT:** An area occupied by a threatened or endangered species "on which are found those physical and biological features (1) essential to the conservation of the species, and (2) which may require special management considerations or protection".

**CULTURAL RESOURCE/ CULTURAL PROPERTY:** a definite location of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) or traditional cultural or religious importance to specified social and/or cultural groups. Cultural resources are concrete, material places and things that are located, classified, ranked, and managed through the system of identifying, protecting, and utilizing for public benefit.

**CULTURAL RESOURCE INVENTORY CLASSES:**
Class I – Existing data inventory: a study of published and unpublished documents, records, files, registers, and other sources, resulting in analysis and synthesis of all reasonably available data. Class I inventories encompass prehistoric, historic, and ethnological/sociological elements, and are in large part chronicles of past land uses. They may have major relevance to current land use decisions.

Class II – Sampling field inventory: a statistically based sample survey designed to help characterize the probable density, diversity, and distribution of archaeological properties in a large area by interpreting the results of surveying limited and discontinuous portions of the target area.

Class III – Intensive field inventory: a continuous, intensive survey of an entire

target area, aimed at locating and recording all archaeological properties that have surface indications, by walking close-interval parallel transects (generally at 30 m intervals) until the area has been thoroughly examined.

**CUMULATIVE IMPACT:** The impact on the environment that results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

**DENNING HABITAT:** Habitat used during parturition and rearing of young until they are mobile. The common component appears to be large amounts of coarse woody debris, either down logs or root wads. Coarse woody debris provides escape and thermal cover for kittens. Denning habitat may be found either in older mature forest of conifer or mixed conifer/deciduous types, or in regenerating stands (>20 years since disturbance). Denning habitat must be located within daily travel distance of foraging habitat (typical maximum daily distance for females is 3-6 miles).

**DESIGNATED ROADS AND TRAILS:** Specific roads and trails where some type of motorized vehicle use is allowed either seasonally or year-long.

**DESIRED FUTURE CONDITION:** Outcomes representing the long-term vision of BLM with regard to the resources managed in the Butte Field Office on BLM land.

**DEVELOPED RECREATION:** Recreation that requires facilities and might result in concentrated use of an area; for example, a campground.

**DISPERSED RECREATION:** Recreation activities of an unstructured type which are not confined to specific locations such as recreation sites. Example of these activities may be hunting, fishing, off-road vehicle use, hiking, and sightseeing.

**DISTURBANCE**: Events that alter the structure, composition, or function of terrestrial or aquatic habitats. Natural disturbances include drought, floods, wind, fires, wildlife grazing, and insects and pathogens. Human-caused disturbances include actions such as timber harvest, fire, livestock grazing, road construction, and the introduction of exotic species.

**DIVERSITY:** The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

**DRAINAGE:** The removal of excess water from land by surface or subsurface flow.

**ECOLOGICAL FUNCTION:** The process through which the constituent living and nonliving elements of ecosystems change and interact, including biogeochemical processes and succession.

**ECONOMICS:** The study of allocation of limited resources, goods, and services among competing uses.

**ECOSYSTEM:** A complete, interacting system of living organisms and the land and water that make up their environment; the

home places of all living things, including humans.

**ENCROACH:** Plant succession in the absence of disturbance, in areas the plant type is not desired. Often associated with vegetative type conversion such as conifer colonization of grass or shrub meadows.

**ENDANGERED SPECIES:** Any plant or animal species which is in danger of extinction throughout all or a significant portion of its range.

**ENVIRONMENTAL ASSESSMENT:** A concise public document that analyzes the environmental impacts of a proposed federal action and provides sufficient evidence to determine the level of significance of the impacts.

**ENVIRONMENTAL JUSTICE:** Refers to the fair treatment and meaningful involvement of people of all races, cultures and incomes with respect to the development, implementation and enforcement of environmental laws, regulations, programs and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal state, local and tribal programs and policies. Ephemeral area: Watershed land area that delivers surface water flow during spring runoff, rain, and snow storms to intermittent and perennial streams.

**EROSION:** The wearing away of the land surface by running water, wind, ice, or other geological agents.

**FEDERALLAND POLICY AND MANAGEMENT ACT**
**OF 1976:** Public Law 94-579. October 21, 1976, often referred to as the BLM' s "Organic Act,"
which provides the majority of the BLM's legislated authority, direction, policy, and basic
management guidance.

**FIRE CONDITION CLASS:** Categorizes and describes vegetation composition and structure
conditions that currently exist inside the Fire Regime Groups. Three classes serve as generalized
wildfire risk rankings based on coarse-scale data. The risk components from unwanted wildland fire increases from lowest risk-Condition Class I, to highest-Condition Class 3.

**FIRE FREQUENCY**: How often fire burns a given area; often expressed in terms of fire return
intervals. For example, a site might burn over every 5 to 15 years.

**FIRE INTENSITY:** Expression used to describe the power of wildland fires. More commonly described as the rate of energy released per unit length of the fire front.

**FIRE MANAGEMENT PLAN:** A strategic plan that defines a program to manage wildland and prescribed fires and documents the fire management program in the approved land use
plan; the plan is supplemented by operational procedures such as preparedness plans, preplanned
dispatch plans, prescribed fire plans, and prevention plans.

**FIRE MANAGEMENT ZONE:** Administrative unit for wildland fire

suppression, for the execution of all logistical, aviation, and support activities within this geographical area.

**FIRE PREPAREDNESS:** Activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination.

**FIRE REGIMES:** periodicity and pattern of naturally occurring fires in a particular area or vegetative type, described in terms of frequency, biological severity, and aerial extent.

**FIRE SEVERITY:** A qualitative measure of the fire's immediate effects on the ecosystem. Relates to the extent of morality and survival of plant and animal life-both above and below ground and to loss of organic matter.

**FISHERY:** Habitat that supports the propagation and maintenance of fish.

**FORB:** An herbaceous plant that is not a grass, sedge, or rush.

**FOREST HEALTH**: The perceived condition of a forest derived from concerns about such factors as its age, structure, composition, function, vigor, presence, or unusual levels of insects and disease, and resilience to disturbance.

**FOREST HEALTH TREATMENTS:** Treatments that restore forest ecosystems or stands to a condition that sustains their complexity, function, and/or productivity while providing for human needs.

**FOREST LAND:** Land that is now, or has the potential of being, at least 10 percent stocked by forest trees (based on crown closure) or 16.7 percent stocked (based on tree stocking).

**FRAGMENTATION:** The splitting or isolating of patches of similar habitat. Habitat can be fragmented by natural events or development activities.

**FS** – Forest Service

**FUEL LOADING:** The weight of fuels in a given area, usually expressed in tons per acre, pounds per acre, or kilograms per square meter.

**FUEL MANAGEMENT:** Manipulation or reduction of fuels to meet forest protection and management objectives while preserving and enhancing environmental quality.

**FUEL TREATMENT:** The rearrangement or disposal of fuels to reduce the fire hazard.

**FUEL TYPE:** An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that would cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

**GAME SPECIES:** Any species of wildlife or fish for which seasons and bag limits have been prescribed, and which are normally harvested by hunters, trappers, and fisherman under State or federal laws, codes, and regulations.

**GEOGRAPHIC INFORMATION SYSTEM (GIS):** A system of computer hardware, software, data, people and

applications that capture, store, edit, analyze, and graphically display a potentially wide array of geospatial information.

**GRAZING SYSTEM:** The manipulation of livestock grazing to accomplish a desired result.

**GREENHOUSE GAS (GHG):** Gases in the earth's atmosphere that produce the greenhouse effect. Greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxide, halogenated fluorocarbons, ozone, perfluorinated carbons, and hydro fluorocarbons. Changes in the concentration of certain greenhouse gases, due to human activity
such as fossil fuel burning, increase the risk of global climate change.

**HABITAT:** A specific set of physical conditions that surround a species, group of species, or a large community. In wildlife management, the major constituents of habitat are considered to be food, water, cover, and living space. The complete suite of biotic and abiotic components of the environment where an animal lives.

environmental standards and encouraging early public input during review and planning processes. The initiative is based on sound science and helps care for forests and rangelands, reduce the risk of catastrophic fire to communities, help save the lives of firefighters and citizens, and protect threatened and endangered species.

**HERBACEOUS:** Pertaining to or characteristic of an herb (fleshy-stem plant) as distinguished from the woody tissue of shrubs and trees.

**HABITAT CONNECTIVITY:** Vegetative cover in sufficient quantity and arrangement to allow for the movement of wildlife.

**HABITAT DIVERSITY:** The variation in types, sizes, and shapes of landscape elements or
vegetation types.

**HABITAT TYPE:** A site classification of all land areas potentially capable of producing similar plant communities at the climax phase of succession.

**HAZARDOUS FUEL:** Excessive live or dead wildland fuel accumulations that increase the
potential for uncharacteristically intense wildland fire and decrease the capability to protect life,
property, and natural resources.

**HEALTHY FOREST INITIATIVE OF 2002:** Presidential direction to the Departments of
Agriculture and the Interior to improve regulatory processes and management efficiency in reducing the threat of destructive wildfires while upholding

**HIGH OR MAJOR:** An effect is severe; there would be a highly noticeable, long-term, or permanent measurable change.

**HOME RANGE:** The area in which an animal travels in the scope of natural activities.

**HORIZON (SOIL):** A layer of soil or soil material roughly parallel to the land surface and differing from adjoining genetically related layers in physical, chemical, and biological properties or characteristics, such as color, structure, and texture.

**HYDROLOGIC CONDITION:** The current state of the processes controlling the yield, timing, and quality of water in a watershed. Each physical and biologic process that regulates or influences stream flow and ground-water character has a range of variability associated with the rate or magnitude of energy and mass exchange. At any point in time, each of these processes can be defined by their current rate or magnitude relative to the range of variability associated with each process. Integration of all processes at one time represents hydrologic condition.

**HYDROLOGIC UNIT CODE (HUC):** A coding system developed by the U.S. Geological Survey to map geographic boundaries of watersheds by size.

**HYDROPHYTIC:** Water-loving; ability to grow in water or saturated soils.

**IMPACT:** A modification of the existing environment caused by an action (such as construction or operation of facilities).

**IMPACTS (OR EFFECTS):** Environmental consequences (the scientific and analytical basis for comparison of alternatives) as a result of a proposed action. Effects may be either direct, which are caused by the action and occur at the same time and place, or indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative.

**INDICATOR (SPECIES):** A species of animal or plant whose presence is a fairly certain indication of a particular set of environmental conditions. Indicator species serve to show the effects of development actions on the environment.

**INDIRECT EFFECTS:** Secondary effects that occur in locations other that the initial action or later in time.

**INFILTRATION:** The downward entry of water into the soil or other material.

**INITIAL (FIRE) ATTACK:** An aggressive fire suppression action consistent with firefighter and public safety and values to be protected.

**INTERDISCIPLINARY TEAM:** A group of individuals with different training, representing the physical sciences, social sciences, and environmental design arts, assembled to solve a problem or perform a task. The members of the team proceed to a solution with frequent interaction so that each discipline may provide insights to any stage of the problem and disciplines may combine to provide new solutions. The number and disciplines of the members preparing the plan vary with circumstances. A member may represent one or more discipline or Bureau program interest.

**INVASIVE PLANTS**: Plants which are invasive species.

**INVASIVE SPECIES:** Organisms that have been introduced into an environment where they did not evolve. Executive Order 13112 focuses on organism whose presence is likely to cause economic harm, environmental harm, or harms to human health.

**LEK:** An assembly area where birds, especially sage grouse, carry on display and courtship behavior.

**LINKAGE:** Route that permits movement of individual plants (by dispersal) and animals from a habitat type to another similar habitat type.

**LOAMY:** Intermediate in texture and properties between fine- and course-textured soils.

**LONG TERM:** Effects lasting more than 10 years.

**LOW OR MINOR:** An effect is slight but detectable; there would be a small change.

**LYNX HABITAT:** Lynx occur in mesic coniferous forest that have cold, snowy winters and provide a prey base of snowshoe hare. In the Rocky Mountains primary vegetation that contributes to lynx habitat is lodgepole pine, subalpine fir, and Englemann spruce. Secondary vegetation that, when interspersed within subalpine forests, may also contribute to lynx habitat, includes cool, moist Douglas-fir, grand fir, western larch, and aspen forest. Dry forest types (ponderosa pine, climax lodgepole pine) do not provide lynx habitat.Primary elevations for lynx habitat are between 1500-2000 m. (4,920 – 6,560 ft.) elevation zones in the northern Rockies.

**MANAGEMENT DECISION:** A decision made by the BLM to manage public lands. Management decisions include both land use plan decisions and implementation decisions.

**MEDIUM OR MODERATE:** An effect is readily apparent; there would be a measurable change than could result in a small but permanent change.

**MINE:** An opening or excavation in the earth for extracting minerals.

**MINIMIZE**: To reduce the adverse impact of an operation to the lowest practical level.

**MONITORING PLAN:** The process of tracking the implementation of land use plan decisions and collecting and assessing data/information necessary to evaluate the effectiveness of land use planning decisions.

**NATIONALAMBIENT AIR QUALITY STANDARDS:** The allowable concentrations of air pollutants in the ambient (public outdoor) air. National ambient air quality standards are based on the air quality criteria and divided into primary standards (allowing an adequate margin of safety to protect the public health) and secondary standards (allowing an adequate margin of safety to protect the public welfare). Welfare is defined as including (but not limited to) effects on soils, water, crops, vegetation, human-made materials, animals, wildlife, weather, visibility, climate, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being.

**NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) OF 1969:** An Act that encourages productive and enjoyable harmony between man and his environment and promotes efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; enriches the understanding or the ecological systems and natural resources important to the Nation, and establishes the Council on Environmental Quality.

**NEGLIGIBLE:** An effect at the lower level of detection; there would be no measurable change.
Effects may not be readily noticeable.

**NEUTRAL:** An effect that is neither beneficial nor adverse to a specific resource or resource use.

**NOXIOUS WEEDS:** A plant species designated by Federal or State law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or
not common to the United States.

**NUTRIENT CYCLING:** The circulation of chemical elements such as nitrogen, oxygen, carbon, and phosphorus in specific pathways from the abiotic (not involving or produced by organisms) portions of the environment into organic substances in plants and animals and then back into abiotic forms.

**OBJECTIVE:** A description of a desired condition for a resource. Objectives can be quantified and measured and, where possible, have established time frames for achievement.

**OFF-HIGHWAY VEHICLE (OHV):** Any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding: (1) Any nonamphibious registered motorboat; (2) Any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) Any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) Vehicles in official use; and (5) Any combat or combat support vehicle when used in times of national defense emergencies.

**OLD FOREST STRUCTURE:** Physical forest or woodland characteristics that contribute to the structure, composition, or function of forested stands for a particular forest type. These characteristics include large and old tree components, accumulations of dead wood components such as standing snags and/or downed logs, occurrence of climax plant species or seral trees with a common decadent attributes such as broken or deformed tops and rotten boles, wide variation in tree age classes and stocking levels, and multiple canopy layers.

**OLD-GROWTH:** Forested stands in late successional stages of development meeting the
main characteristics or old forest structures that are described by the forest type for the East-side
Montana Zone in Old-Growth Forest Types of the Northern Region (Green, 19921)

**OPEN**: Generally denotes that an area is available for a particular use or uses. Refer to specific
program definitions found in law, regulations, or policy guidance for application to individual
programs.

**OPEN ROAD**: Open year-round to public and administrative uses.

**OPEN ROAD WITH RESTRICTIONS:** Open to public and administrative uses with seasonal and/or vehicle type limitations.

**OVERSTORY:** The layer of foliage in a forest canopy, often the uppermost layer(s) consisting of the crowns of trees or shrubs.

**PALEONTOLOGICAL RESOURCES (FOSSILS)**: The physical remains of plants and animals preserved in soils and

sedimentary rock formations. Paleontological resources are important for understanding past environments, environmental change, and the evolution of life.

**PERMITTEE (GRAZING):** Holder of a valid permit that authorizes grazing use of the public lands within the grazing district.

**POPULATION:** Within a species, a distinct group of individuals that tend to mate only with members of the group. Because of generations of inbreeding, members of a population tend to have similar genetic characteristics.

**POTENTIAL NATURAL VEGETATION:** The vegetation that would become established if all successional sequences were completed without interferences by man under the present environmental conditions.

**PRE-COMMERCIAL THINNING:** A thinning that does not yield trees of commercial value, usually designed to reduce stocking in order to concentrate growth on the more desirable trees or to meet desired vegetation and/or fuel loading conditions.

**PRESCRIBED FIRE:** The introduction of fire to an area under regulated conditions for specific management purposes.

**PREY BASE:** Populations and types of prey species available to predators.

**PRIORITY HABITATS:** Priority habitats would include habitat for all special status species as well as riparian areas, dry savannah forest, special habitats including caves, cliffs, snags, and down woody material, sagebrush, bitterbrush communities, and mountain mahogany communities.

**PROJECT AREA (VEGETATION):** An area of land within some type of management activity would occur and encompasses a region defined by logical boundaries such as: watersheds, ridges, highways, or ownership blocks of BLM lands. The project area can be both the analysis area and a starting point to determine where treatments or activities should occur, and includes the area needed for supporting structures and activities such as roads, transmission lines, or pipelines.

**PROPER FUNCTIONING CONDITION (PFC):** Ecosystems are in PFC when they function within their historic range of variability.

**PROPOSED ACTION:** A project or set of activities that a federal agency intends to implement, as defined in NEPA regulations.

**PUBLIC INVOLVEMENT:** Any process designed to broaden the information base upon which agency decisions are made by informing the public about BLM activities, plans, and decisions to encourage public understanding about the participation in the planning processes which lead to final decisionmaking.

**PUBLIC LAND:** Land or interest in land owned by the United States and administered by the Secretary of the Interior through the BLM, except lands located on the Outer Continental Shelf, and land held for the benefit of Indians, Aleuts, and Eskimos.

**RANGELAND:** Land used for grazing by livestock and big game animals on which vegetation is dominated by grasses, grass-like plants, forbs, or shrubs.

**RAPTOR:** Bird of prey with sharp talons and strongly curved beaks such as hawks, owls,
vultures, and eagles.

**REASONABLY FORESEEABLE DEVELOPMENT SCENARIO:** The prediction of the type and amount of oil and gas activity that would occur in a given area. The prediction is based on geologic factors, past history of drilling, projected demand for oil and gas, and industry interest.

**RECREATION OPPORTUNITY SPECTRUM (ROS):** A framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences are arranged along a continuum or spectrum divided into six classes-primitive, semi-primitive nonmotorized, semi-primitive motorized, roaded natural, rural and urban.

**RESOURCE MANAGEMENT PLAN:** A land use plan as prescribed by the Federal Land Policy and Management Act which establishes, for a given area of land, land-use allocations, coordination guidelines for multiple-use, objectives and actions to be achieved.

**RIPARIAN AREA:** A form of wetland transition between permanently saturated wetlands and
upland areas. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral areas or washes that lack vegetation and dependent on free water in the soil.

**ROAD DENSITY:** Number of miles of open road per square mile.

**RUNOFF:** The water that flows on the land surface from an area in response to rainfall or snowmelt.

**SCENIC QUALITY**: The degree of harmony, contrast, and variety within a landscape.

**SCOPING:** The process of identifying the range of issues, management concerns, preliminary
alternatives, and other components of an environmental impact statement or land-use planning document. It involves both internal and public viewpoints.

**SECTION 7 CONSULTATION:** The requirement of Section 7 of the Endangered Species Act that all federal agencies consult with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service if a proposed action might affect a federally listed species or its critical habitat.

**SECTION 106 COMPLIANCE:** The requirement of Section 106 of the National Historic Preservation Act that any project funded, licensed, permitted, or assisted by the Federal Government be reviewed for impacts to significant historic properties and that the State Historic Preservation Officer and the Advisory Council on Historic Preservation be allowed to comment on a project.

**SECURITY HABITAT**: refers to the protection inherent in any situation that allows elk to remain in a defined area despite an increase in stress or disturbance associated with hunting or other human activities.

**SEDIMENT:** Soil, rock particles and organic or other debris carried from one place to another by wind, water, or gravity.

**SEDIMENTATION:** The process or action of depositing sediment.

**SENSITIVE SPECIES:** Species designated by the State Director, usually in cooperation with the State agency responsible for managing the species and State Natural heritage programs, as sensitive. They are those species that: (1) could become endangered in or extirpated from a State, or within a significant portion of its distribution; (2) are under status review by the FWS and/or NMFS; (3) are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution; (4) are undergoing significant current or predicted downward trends in population or density such that federal listed, proposed, candidate, or State listed status may become necessary; (5) typically have small and widely dispersed populations; (6) inhabit ecological refugia or other specialized or unique habitats; or (7) are State listed but which may be better conserved through application of BLM sensitive species status.

**SERAL:** A temporal and intermediate condition pertaining to the successional stages of biotic communities.

**SHORT TERM:** Effects lasting less than 10 years.

**SHRUB:** A low, woody plant, usually with several stems, that may provide food and/or cover for animals.

**SIGNIFICANT:** An effect that is analyzed in the context of the proposed action to determine the degree or magnitude of importance of the effect, either beneficial or adverse. The degree of significance can be related to other actions with individually insignificant but cumulatively significant impacts.

**SLASH:** Forest residues such as branches, bark, tops, cull logs, broken or uprooted trees, and/or stumps that can be left on the ground or in piles after logging, vegetative or fuels treatments, or land use activities such as road construction.

**SLOPE:** The degree of deviation of a surface from the horizontal.

**SOIL COMPACTION:** A layer of dense soil caused by repeated impacts on or disturbances of the soil surface. Compaction becomes a problem when it begins to limit plant growth, water infiltration, or nutrient cycling processes.

**SOIL PRODUCTIVITY:** The capacity of a soil to produce a plant or sequence of plants under a system of management.

**SOIL TEXTURE:** The relative proportions of the three size groups of soil grains (sand, silt, and clay) in a mass of soil.

**SPECIAL RECREATION MANAGEMENT AREA:** A public lands unit identified in land use plans to direct recreation funding and personnel to fulfill commitments made to provide specific, structured recreation opportunities.

**SPECIAL STATUS SPECIES:** Includes proposed species, listed species, and candidate species under the ESA; State-listed species; and BLM State Director-designated sensitive species.

**SPECIES:** A unit of classification of plants and animals consisting of the largest and most inclusive array of sexually reproducing and cross-fertilizing individuals, which share a common gene pool.

**SPECIES DIVERSITY:** The number, different kinds of, and relative abundances of species present in a given area.

**STAND:** A community of trees or other vegetation uniform in composition, constitution, spatial arrangement, or condition to be distinguishable from adjacent communities.

**STAND COMPOSITION**: The proportion of each tree species in a stand expressed as a percentage of all trees, basal area, or volume.

**STANDARD:** A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., land health standards). To be expressed as a desired outcome or goal.

**STRUCTURE (OF FOREST VEGETATION):** The horizontal and vertical distribution of plants in a stand, including height, diameter, crown layers, and stems of trees, shrubs, herbaceous understory, snags and coarse woody debris.

**SUCCESSION:** The replacement in time of one plant community with another. The prior plant community (or successional stage) creates conditions that area favorable for the establishment of the next stage.

**SUSTAINABILITY:** The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.

**TAKE:** As defined by the Endangered Species Act, “to harass, harm, pursue, hunt, shoot, wound, kill, capture, or collect, or attempt to engage in any such conduct.”

**TEMPORARY ROUTES:** Temporary roads are shortterm overland roads, primitive roads, or trails authorized or acquired for the development, construction or staging of a project or event that has a finite lifespan. Temporary routes are not intended to be part of the permanent or designated transportation network system and must be reclaimed when their intended purpose(s) has been fulfilled. Temporary routes should be constructed to minimum standards necessary to accommodate the intended use; the intent is that the project proponent (or their representative) would reclaim the route once the original project purpose or need has been completed. Temporary routes are considered emergency, single use or permitted activity access. Unless they are specifically intended to accommodate public use, they should not be made available for that use. A temporary route would be authorized or acquired for the specific time period and duration specified in the written authorization (permit, right-of-way, lease, contract etc.) and would be scheduled and budgeted for reclamation to prevent further vehicle use and soil erosion from occurring by providing adequate drainage and re-vegetation." Please keep in mind that complete reclamation of all temporary routes may not be desired or necessary in all situations. When temporary routes are required for periodic use it may be more desirable to close the temporary route

to use, assure proper hydrologic functioning of the road bed, and re-vegetate according to the prescription approved in the authorization than it would be to re-contour soils and slopes to original conditions. In addition, sometimes the BLM allows the temporary route proponent to participate in approved off-site mitigation measures in lieu of reclaiming the temporary route. This type of off-site mitigation is subject to the approval of the BLM's authorized officer.

**TERRESTRIAL SPECIES:** Ground-dwelling plants and animals.

**THERMAL COVER:** Vegetation or topography that prevents radiational heat loss, reduces wind chill during cold weather, and intercepts solar radiation during warm weather.

**THREATENED SPECIES:** Any plant or animal species defined under the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant portion of its range; listings are published in the Federal Register.

**TOTAL MAXIMUM DAILY LOAD:** An estimate of the total quantity of pollutants (from all sources: point, nonpoint, and natural) that may be allowed into waters without exceeding applicable water quality criteria.

**TREATMENT AREA:** The specific area of land where the actual management activity, such as timber harvest, prescribed burning, construction, or other activity would occur. One or more treatment areas can be included in a project area which usually includes adjacent and/or surrounding areas that are not treated, and multiple activities could occur within a single treatment area, concurrently or over time.

**UBHE** – Upper Big Hole East

**UNDERSTORY:** Vegetation (e.g., trees or shrubs) growing under the canopy formed by taller trees.

**UNGULATES:** Hoofed animals, including ruminants but also horses, tapirs, elephants, rhinoceroses, and swine.

**UPLANDS:** Lands at higher elevations than alluvial plains or low stream terraces; all lands outside the riparian-wetland and aquatic zones.

**VEGETATION COMMUNITY:** An assemblage of plant populations in a common spatial arrangement.

**VEGETATION MANIPULATION:** Alteration of vegetation by using fire, plowing, cutting, powered mechanical or other means.

**VEGETATION TYPE:** A plant community with distinguishable characteristics described by the dominant vegetation present.

**VISUAL RESOURCE MANAGEMENT CLASSES:** Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective which prescribes the amount of change allowed in the characteristic landscape.

**WATER QUALITY:** The chemical, physical, and biological characteristics of water with respect to its suitability for a particular use.

**WATERSHED:** A geomorphic area of land and water within the confines of a drainage divide. The total area above a given point on a stream that contributes flow at that point.

**WILDFIRE:** An unplanned, unwanted wildland fire, including unauthorized human-caused fires, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.

**WILDLAND FIRE:** Any nonstructural fire, other than prescribed fire, that occurs in the wildland.

**WILDLAND URBAN INTERFACE (WUI):** The line, area, or zone, where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuel.

**WILDLIFE CORRIDOR:** Landscape elements that connect similar patches of habitat through an area with different characteristics. Wildlife corridors are also segments of land which create a link between critical habitats. For example, streamside vegetation may create a corridor of willows and hardwoods between meadows or through a forest. These linkage zones are where species migrate and intermingle ensuring genetic interchange and consequently long-term survival.

**WINTER RANGE:** Range that is grazed during winter.

**WOODLAND:** A forest community occupied primarily by noncommercial species such as
juniper, mountain mahogany, or quaking aspen groves; all western juniper or limber pine are
classified as woodlands, since juniper and limber pine are classified as noncommercial species.