

# Environmental Assessment

## Forest Management on Casper Mountain, Negro Hill, and Banner Mountain

September 2013

**BLM**

Wyoming High Plains District – Casper Field Office



The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

**BLM/WY/PL-13/039+1030**

**WY-060-EA10-88**

## 1.0 INTRODUCTION

Laramie Mountain Range, for the purpose of this assessment includes Casper Mountain beginning at the Goose Egg Road on the east end and continues along the mountain range to Rocky Ridge on the west end. The north and south boundaries extend to the base of the mountain. The range is in the Platte River Watershed. The project boundary includes all of what is commonly referred to as Casper Mountain and Coal Mountain, as well as a portion of the Laramie Range south of I-25 between Casper and Glenrock. The area between Casper and Glenrock includes Negro Hill and Banner Mountain, see Figure 1 for map. For the purposes of this environmental assessment (EA) this project boundary area will be referred to as Casper Mountain.

The activities proposed for this mountain system include various forest and vegetation management treatments in the Wildland Urban Interface (WUI) and within this mountain range.

### 1.1 Background

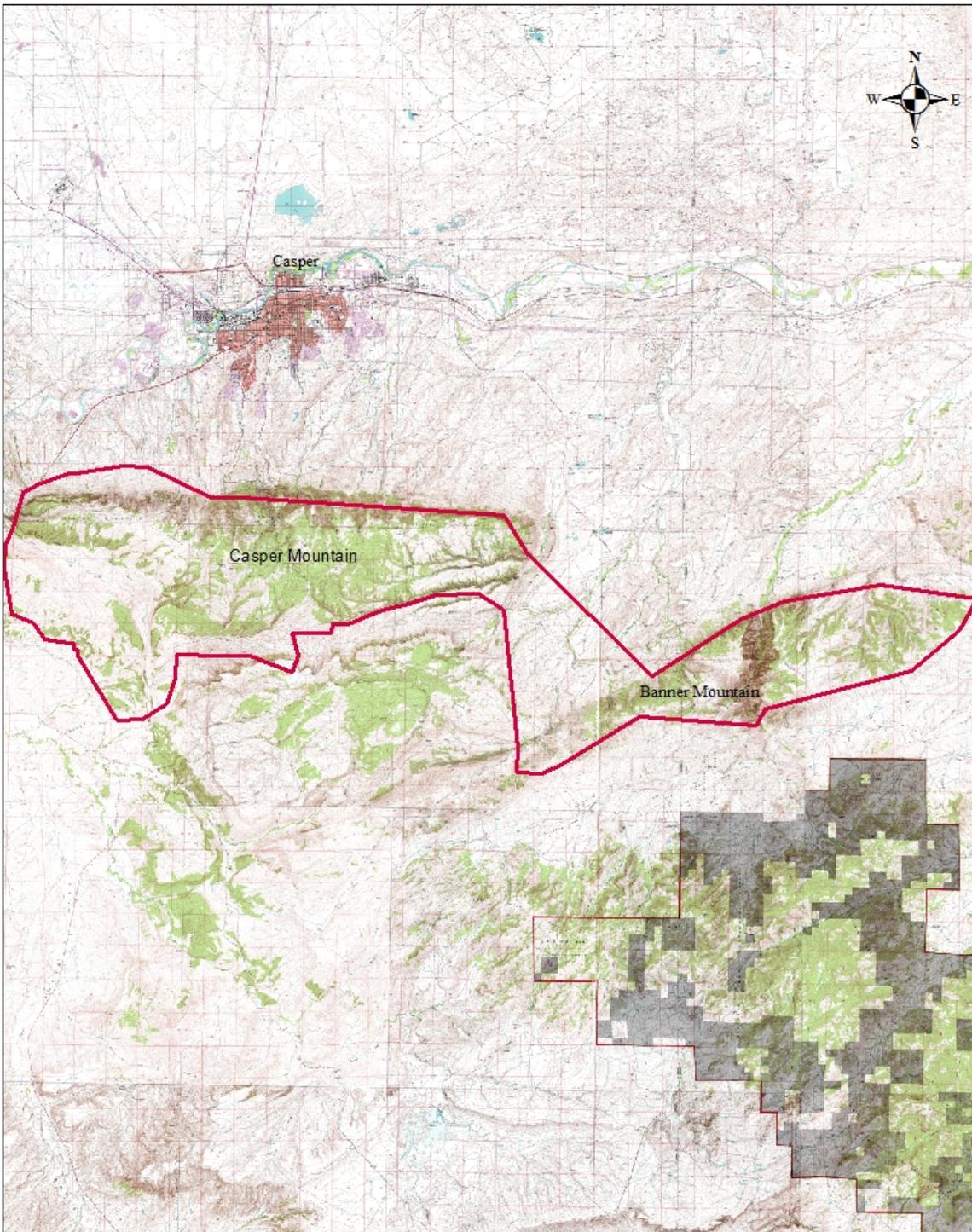
The Bureau of Land Management (BLM) has prepared this environmental assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This EA discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed actions and alternatives.

There are over 800 structures, including homes, summer camps, Hogadon Ski Area, and many other parks and city and county run recreational sites interspersed with the public land holdings. The National Fire Plan, the Natrona and Converse County Firewise Mitigation Projects (Natrona County Wildfire Hazard Assessment and Mitigation Plan), and the Healthy Forests Restoration Act of 2003(HFRA) direct the Bureau of Land Management (BLM) to reduce the risk of large-scale wildland fires, protect human developments intermixed within or adjacent to wildlands, and to protect and improve the health of forests, rangelands, and watersheds.

In response to this direction, the Casper Field Office of the Bureau of Land Management is proposing a variety of activities in the northern Laramie Mountain Range. This project qualifies as an authorized and covered project under HFRA.

**Figure 1**

**CASPER MOUNTAIN PLANNING BOUNDARY**



## 1.2 Purpose and Need for the Proposed Action

The purpose of the proposed actions are to implement treatments to manage the forest resources and vegetation in a sustainable manner to meet ecological, economic, social, and cultural needs of present and future generations by creating a defensible space in the event of a fire, preventing further insect infestation and disease and encourage vegetative diversity between the meadows and the forest.

The need for the proposed action is prescribed for under the Federal Management Policy Act of 1976 (FLPMA), in Section 102 (a) (8), which states, “the public lands be managed in a manner that will protect the quality of the scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use.”

Decision to be Made: The BLM will decide whether or not to implement the proposed treatments, and if so, under what terms and conditions.

## 1.3 Relationship to Statutes, Regulations, Plans or Other Environmental Analyses Conformance with the Land Use Plan

Management actions in the Casper Field Office area must conform to the Record of Decision for the Casper Resource Management Plan decision (CFO RMP), signed in 2007 as amended.

Management activity is directed by the Wyoming BLM Forest and Woodland Management Action Plan of 2003 and the 2005 update.

The following statutes, regulations, and plans apply to the proposed action:

- National Environmental Policy Act (NEPA) of 1969 (Pub. L 91-190; 42 U.S.C. 4321 et seq.)
- Taylor Grazing Act of June 28, 1934, as amended (43 U.S.C. 315 through 315r)
- The Public Rangelands Improvement Act of 1978 (43 U.S.C. 1901, et seq.)
- Federal Land Policy and Management Act (FLPMA) of 1976, as amended (Pub. L. 940579); 90 Stat.2743; 43 U.S.C. 1701 et seq.)
- 43 CFR 4100 Grazing Administration
- Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.)
- Interagency Cooperation Regulations (50 CFR 402)
- Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming, December 2004
- National Historic Preservation Act, as amended.

As required by 43 CFR 1610.5, the Casper Resource Management Plan (RMP) and Record of Decision (ROD) December 2007, has been reviewed to determine that the proposed action

conforms to the land use plan terms and conditions. Specifically, the proposed action conforms to the above land use plan as identified in the following decisions:

1020: Minimize the disturbance to highly erosive soils (575,788 acres of BLM federal mineral estate of which 256,240 acres are BLM surface). Proposed surface-disturbing activities will be modified (located) to avoid areas of highly erosive soils to the greatest extent practicable.

1022: Surface disturbance or development on slopes greater than 25% is prohibited, unless individual site plans are submitted to an approved by the authorize officer meeting the following requirements. Engineered drawing for construction, site drainage design, and final rehabilitation contours with a written rationale describing how the proposed controls will prevent slope failure and erosion, while maintaining viable site topsoil for final reclamation. This plan should also include a timeline identifying the action that will be applied during the construction, production, and rehabilitation phases of the plan so appropriate monitoring protocols can be develop by the BLM to ensure that the plan is meeting the objectives described in the its rationale.

1023: Limit the use of prescribed fire on highly erosive soils to seasons and fire intensity that limit impacts.

1035: Class 1 and Class 2 waters – (Wyoming DEQ water quality standard): NSO within 500 feet and CSU from 500 feet to ¼-mile. Within the CSU area, use best available technology and (or) BMPs to minimize impacts. Wildlife and livestock watering facilities and recreation facilities will be allowed when no other alternatives exist and only when they meet management objectives. Waters other than Class 1 and Class 2 will be considered on a case-by-case basis.

1036: CSU within 500 feet of water wells, springs, or artesian and flowing wells.

3006: Use prescribed burning to achieve measurable 5<sup>th</sup> order watershed objectives from(1) other resources, including but not limited to ; forestry, wildlife, range, vegetation, and watershed; (2) the reduction of hazardous fuels; and(3) the introduction of fire into the fire-adapted ecosystem.

3007: Evaluate all fires and rehabilitate, as needed, for suppression and fire-severity impacts. Chemical treatment where INPS invade will be used to rehabilitate.

4009: Utilize an integrated management approach (i.e., mechanical, chemical, biological, prescribed fire, or livestock grazing) to maintain seral stages within vegetative communities to achieve objectives defined by the range, forestry, wildlife, watershed, and INPS program.

4012: Carry existing HMPs forward. As specified in the Bald Eagle HMP, all roosts outside the Jackson Canyon ACEC are withdrawn from locatable mineral entry and closed to disposal of mineral materials. Develop, revise, update, and consolidate to include management objectives and prescriptions for wildlife.

4028: Silvicultural treatments will be used for insect and disease control and to promote a sustainable flow of small diameter wood products. In old growth and other stands where feasible, the silvicultural treatments will emphasize the restoration of pre-suppression composition, structure and processes. Silvicultural treatments include: pre-commercial and commercial thinning, prescribed fire with clear-cutting, shelterwood, seed-tree cutting, release cutting, improvement and salvage cuttings, chemical treatment, mechanical and planting/seeding when required. Clear-cuts are limited to 20 acres or less and mimic natural disturbance openings.

4035: Treat woodland encroachment in grasslands, sagebrush, aspen, and other vegetative communities where it is determined to be detrimental to other resources values or uses.

4039: Protect and(or) enhance riparian, wetland , and streamside areas, as necessary, with special management, including, but not limited to; fencing, development of alternative water supplies, livestock herding, placement of supplements ( feed and mineral), pasture boundary adjustments, and season of use.

5005: Facilitate VRM mitigation in areas that do not meet class objectives as the need or opportunity arises.

5008: Cultural resource inventories and site evaluations within the planning area are in direct response to specific land-use proposals in accordance with Section 106 of the National Historic Preservation Act (NHPA). Additional inventory is carried out, when resources permit, to comply with Section 110 of the NHPA.

5019: Visual resource values will be managed under the VRM classes defined as mapped in the Casper Field Office GIS database. Objectives for visual resources in the Casper Field Office are to manage public lands in a manner that will maintain the overall visual quality. In accordance with BLM Washington Office Visual Resource Manual Series (MS8400) contrast ratings will be completed on all projects prior to final approval. Site specific mitigation measures will be identified prior to project initiation and will be included in silvicultural treatments and forestry contracts.

6014: Roads constructed under other initiatives (e.g., oil and gas exploration) will be evaluated for inclusion in the BLM transportation system. Those roads that meet BLM resource program needs will be considered for cooperative development. When such roads are no longer needed for the original purposes, and prior to termination and obliteration of the road, BLM will assess its utility for addition to the BLM transportation system.

6027: The entire planning area will remain open to dispersed recreation. The camping limit on public lands is set by BLM policy and is currently limited to 14 days. Emphasis will be placed on providing interpretive and information signs and materials for public land visitors, maintaining existing facilities to a high standard consistent with the

recreational setting, and limiting development of additional facilities to those areas where public recreational use of surrounding public lands requires.

6079: Grazing leases will be adjusted where an evaluation of monitoring, field observations or other data indicate changes and either increases or decreases, in forage allocation are needed or when necessary or required by other applicable law or regulation.

6080: Conversions in kinds of livestock and changes in season of use will be considered on a case-by-case basis through and environmental analysis. Such changes will be consistent with rangeland health objectives.

6081: Prevent downward trend in all allotments.

6082: Approximately 1,355,561 acres continue to be open to livestock grazing.

6083: Manage livestock grazing to maintain a protective cover of vegetation and litter with emphasis on the condition of allotment with acreages of highly erosive soils. Target forage utilization levels will be establish for highly erosive soils and grazing management objectives will be developed to meet those objectives. Management techniques may include herding, fencing, rotational grazing, or limiting season of use to meet the target utilization levels on highly erosive soils.

6088: Placement of salt, mineral or forage supplements for livestock, is not allowed within ¼ mile of water, wetlands, and riparian areas, and unless written analysis shows that watershed, riparian, wetland, wildlife, and vegetative values will not be adversely impacted. Forage supplements are required to be “certified weed-free.”

#### **1.4 Scoping, Public Involvement and Issues**

A meeting with the Natrona County Firewise Committee and the Wyoming State Forestry was held to discuss future plans, vegetation treatments, and partnerships for Casper Mountain in the fall of 2010. The Casper Mountain Environmental Analysis was discussed by the Bureau of Land Management, as a necessary component of the planning process and a field trip with Natrona County Firewise and Wyoming State Forestry, was held in the summer of 2012, to designate some of the project locations and partnership opportunities. The projects included in this tour captured lands from various ownership types, including private, state and federal. The vegetation treatments discussed and suggested for implementation would require a cooperative effort to be productive and beneficial to all landowners and Casper Mountain. Partnerships with private landowners and Wyoming State Forestry will be developed where applicable and any access issues will be addressed by BLM and contractors.

## 2.0 PROPOSED ACTION AND ALTERNATIVES

### 2.1 Alternative I – No Action Alternative

#### Forest Resources

The No Action Alternative would consist of the continuation of the current management of BLM forest resources as specified in the CFO RMP 2007; however, the EA completed in August 2003 for the Forest Health project has expired and a new analysis would be required for the BLM to perform and partner with agencies and private landowners to achieve forest health and fuel reduction actions and programs.

The BLM would continue to allow the harvest of forest products to meet the demand for minor forest products as feasible. No coordinated effort to address forest health on a landscape scale is presently planned or identified to occur. No density management or removal of ladder fuels to reduce the risk of wildfire is presently planned or identified to occur.

Future forest products would be sold at fair market value and harvesting operations would be coordinated with adjacent landowners when possible. Timber sales would generally be opportunistic and designed with wildlife habitat objectives in mind.

#### Fire Management

The BLM would continue to use fire suppression tactics as specified in the 2007 CFO RMP, however, hazardous fuel conditions would remain the same and mitigation activities would be limited or nonexistent.

No mechanical thinning or other treatments will be applied to the wildland-urban interface areas.

#### Wildlife Species and Habitat / Jackson Canyon Bald Eagle Habitat

No specific actions to improve wildlife habitat, such as manual thinning and prescribed burning are presently planned or identified to occur. Natural succession in wildlife habitat would continue as well as expansion of conifers into meadows and reduction of browse and forage due to dense coniferous stands and closed canopies.

#### Range-Upland and Riparian Health Standards

The management of rangeland resources and its associated impacts would proceed as specified by the rangeland health evaluations and environmental assessments are completed for the allotments contained in the Casper Mountain EA area.

#### Noxious weeds

The BLM would continue to reduce the populations of noxious weeds on BLM-administered public lands on Casper Mountain. If noxious weeds are found, they would be treated with an integrated weed management approach.

### Recreation

The BLM would continue to manage these public lands for dispersed recreation activities, with limited public access. There would be no expected change from existing uses.

## **2.2 Alternative II – Proposed Action**

The Bureau of Land Management (BLM) Casper Field Office proposes to implement silvicultural treatments in the forest /woodland stands, mountain shrub communities, and open meadows on the Laramie Mountain Range to encourage a mosaic of stands and vegetation with varying ages, density and species diversity to modify insect/disease movement, fire behavior and limit the size of escaped fires. Forest Health issues would be addressed by these treatments and alpine meadows would be encouraged, maintained and enhanced.

These treatments would occur on BLM-administered public lands within the EA boundary, but may not cover the entire stand and would be limited by topography, slope, streamside management zones, cultural resources, and the desire to retain some undisturbed areas of the forest stands. The specific treatment methods would include precommercial and commercial thinning, patch clearcuts for the removal of tree mortality and trees infected with insects and disease, mastication and burning (pile and understory in ponderosa and aspen type), soil scarification for reproductive purposes, fuel hazard reduction with the Casper Mountain Community and the City of Casper and tree planting and seeding. Environmental site factors (slope, exposure, soils, etc.) and desirable outcome would determine the prescription applied to each stand and/or project. See Tables 2.2-1 Proposed Action Forest Treatments and 2.2-2 Proposed Action Vegetation Treatments for additional details.

Priority would be given to the areas that have been identified as currently presenting a fuel hazard in the Wildland Urban Interface (WUI), areas infested with insect and disease and/or mortality, alpine meadows, and areas accessible to the public for the removal of forest products. Since each species has different growth and stand characteristics, and some stands are a mixture of species, an array of prescriptions and treatments would be applied to consider these factors.

Natural biological advantages exist in forest stands with a mixture of species and age classes, since insects and diseases of forest trees are limited rather sharply to one or a few host. These mixed stands offer less opportunity for epidemics. Therefore the emphasis on management would be to encourage these mixed stands of vegetation and vegetation type.

<b>Species (major canopy component)</b>	<b>Acres*</b>	<b>Basal Area or Trees per Acre</b>	<b>Treatments</b>	<b>Basal Area or Trees per Acre After Treatment</b>
Ponderosa Pine (including mixed woodland species)	2,358	>170	Thinning, understory burns, pile burns, removal of meadow expansion, removal of insect/disease infested trees, small clearcuts,	< 160 (60-100)
Lodgepole Pine	1,468	>150	Thinning, irregular shaped clearcuts of 5-10 acres, burning	<(80-100)
Mixed Conifer (including Subalpine Fir)	471	>190	Thinning, understory burns, removal of meadow expansion, removal of insect/disease infested trees, small clearcuts, burning	<170
Aspen/Conifer	290	>30	Thinning, understory burns, removal of meadow expansion, removal of insect/disease infested trees, small clearcuts, burning	<30
Limber Pine	<130	>160	thinning for stand health; Mechanical removal in meadow expansions, mechanical removal of insect infested and diseased trees	<80

\*Acres reflect BLM-administered public lands only.

<b>Species (major canopy component)</b>	<b>Acres*</b>	<b>Treatments</b>
Mesic Meadow Systems, sagebrush meadows, and mountain shrublands	1000	Mastication, hand cutting, burning,
Riparian	179	Hand cutting removal of conifers encroaching into riparian areas.
Intermittent Drainages	114	Hand cutting, burning; removal of conifers encroaching into intermittent drainages.

\* Acres reflect BLM-administered public lands only.

## **Ponderosa Pine Stands**

These forest stands have Ponderosa Pine in the upper canopy layer of the stand and if not pure may include stands or mixed species of Aspen, Lodgepole, and/or Limber Pine. Those growing at the lower altitudes that drift into the shrub and grasslands are considered as woodlands.

### Goals and objectives

The objective would be to restore the ecosystem health of these mature stands and making these trees less susceptible to mortality from insects and disease as well as wildfire.

### Treatments

The silvicultural prescription and applications for these stands will consist of thinning treatments to reduce the number of trees per acre and removal of the trees from meadows where they have expanded and shaded out native grasses and shrubs. A maximum of 100 acres of treatment in this habitat type could occur per year.

There are applications, through which the trees will be removed around structures to create a defensible space in the event of a fire. Small group select harvest will take place in areas of insect and disease mortality and infestation.

A reduction in the basal area of these stands is represented in the photos below. Ponderosa stands greater than 120 trees per acre will be reduced to a basal area between 60 and 100 trees per acre.

Even-aged stands with an average diameter greater than 8 inches in growing stock level (GSL) and of more than 120 sq. ft. basal area in Ponderosa pine and 150 sq. ft. basal area in Lodgepole pine stands is considered highly susceptible to mountain pine beetle attacks. Stands thinned to a 100 basal foot per acre or less can increase protection against beetle attacks.

These treatments will return the open grown Ponderosa forest to their growth habits before the Euro-European settlement. The stands or species within these Ponderosa forest may have a variety of prescriptions and will be included in the residual forest unless the health is compromised by pest and/or pathogens.



Ponderosa Pine Stand with Basal Area of approximately 120 trees per acre.



Ponderosa Pine Stand with Basal Area of approximately 60 trees per acre.

## **Lodgepole Pine Stands**

The lodgepole pine grows on soils and in situations that vary widely. It thrives in a variety of topographic settings from mixed stands on the northern and western aspects to the rocky ridges at higher elevations.

It grows in extensive pure stands, and in association with other conifer types such as ponderosa pine, subalpine fir, limber pine, and aspen on Casper Mountain. It has a wide range of tolerance and is utilized extensively for commercial products.

Lodgepole regeneration depends upon the environment and competition from other species. It is a minor seral species in warm moist habitats and a dominant species in the cool dry habitats. Fire regimes have played a role in the succession of this species, especially where the fires have eliminated the seed source from other species. The serotinous cones of the lodgepole allow for successful regeneration after fires. The cones withstand freezing and the seeds are viable for 40 years.

The nature of the reproduction allows for the lodgepole to regenerate in overly dense stands, which results in stagnation of growth at early ages. Since these stands are over-stocked, the root systems are poorly developed and the growth is stunted. Therefore control of stand density offers the greatest opportunity for increasing the growth and health of these stands.

### Goals and Objectives

Restore ecosystem health, remove the accumulation of fuels on the forest floor, remove insect/disease infestations, and compliment the growth in young stands by decreasing stand density.

### Treatments

Perform timber stand improvement techniques (thinning) to reduce stand density and allow for healthier growth and development of lodgepole stands. The initial entry for thinning will occur in the stands <20 years of age (reduce stands to 500-800 trees per acre). The second entry will occur as an individual selection thinning, to leave the best quality trees with the best crowns, best growth, and best health. These entries will encourage and restore the growth potential and has the potential to influence genetic gains by selecting the elite trees. Though Lodgepole does not have old growth characteristics on these sites, the early harvest entries can influence the longevity of a Lodgepole forest stand. A maximum of 100 acres of treatment in this habitat type could occur per year.

Small irregularly shaped clearcuts will occur on mature lodgepole sites, resulting in canopy openings of up to 5 acres unless tree mortality requires the removal of additional trees in those areas. Such areas will create a disruption in the species and crowns, creating age class diversity and the removal of fuels for a running crown fire run. This will also open the soils for grasses, shrubs and lodgepole seed, creating species and structural diversity.

Lodgepole stands that are mature, stands with infestation of insect and disease, blowdown, or natural damages that produce fuels and prevent or stagnate regeneration may also be harvested in the small patch clearcut method.



Blowdown in saturated soils and trees snapped by wind.

### **Mixed Conifer Stands**

These forest stands consist of a mix of ponderosa pine, lodgepole pine, limber pine, juniper, and some subalpine fir in the upper canopy layer of the stand. These stands are transitional areas between habitat types.

#### *Goals and objectives*

The objective would be to manage these habitat types for the primary species within the given transitional area for overall ecosystem health of these stands and making these trees less susceptible to mortality from insect and disease as well as wildfire.

#### *Treatments*

The silvicultural prescription and applications for these stands will consist of thinning treatments to reduce the number of trees per acre and removal of the trees from meadows where they have expanded and shaded out native grasses and shrubs. A maximum of 50 acres of treatment in this habitat type could occur per year.

There are applications, through which the trees will be removed around structures to create a defensible space in the event of a fire. Small group select harvest will take place in areas of insect and disease mortality and infestation.

In stands where ponderosa pine or lodgepole pine are the dominant species these stands would be have treatments similar to those identified above in for those habitat types.

### **Aspen/Conifer**

Quaking Aspen is widely distributed over Casper Mountain, though, currently not a commercially important species for this area, its value as a component of the ecosystem cannot be challenged.

The quaking aspen grows on a broad variety of sites, but grows best where there is moisture. Aspen regeneration is highly dependent on disturbance, such as fire or timber harvest, because the root system of Aspen is the source for vegetative reproduction. The lack of disturbances and the high levels of herbivory by ungulates, has directed the trend of loss toward aspen regeneration and its presence as a diverse component of the Casper Mountain ecosystem.

Aspen management requires an overview of the existing structure and composition of the stand. Aspen is considered an early successional species and in the absence of disturbance will be replaced by shade tolerant conifers. Management actions will be designed to “reset the clock” and keep it as main component of this ecosystem and watershed.

### **Goals and Objectives**

The Casper Mountain fire in 2006 restored the reproductive capacity of many aspen clones on the west end of Casper Mountain and the BLM forest management direction will be to continue the regeneration and the success of regenerating aspen growth.

### **Treatments**

Conifers that are competing with the existing aspen for sunlight and/or water will be removed from the treatment stands. The aspen clones respond to disturbance, so a multitude of treatments may be utilized to attain this growth and response. These treatments include, removing conifer with chainsaws, mechanical treatments, and prescribe burning. In high fuel areas, the fuels will be removed before burning to prevent damage to the clones. A maximum of 50 acres of treatment in this habitat type could occur per year.

Grazing management strategies may be utilized to allow the aspen regeneration to succeed, though the cost and the logistics of fencing will be prohibitive in most circumstances.

### **Limber Pine**

Limber pine is scattered in sparse patches throughout the planning area within its site potentials. There are no large contiguous stands of limber pine identified within the planning area. This

species is experiencing widespread mortality throughout the west from mountain pine beetles and the exotic fungus white pine blister rust.

### Goals and Objectives

This species is listed as a sensitive species in the state of Wyoming. The management strategy for this species is to create healthy stands, where possible with silvicultural treatments.

### Treatments

Trees affected by insect infestations and disease will be removed using mechanical methods. Trees not infected will be left to grow. A maximum of 50 acres of treatment in this habitat type could occur per year.

## **Meadow Systems and Mountain Shrublands**

These habitat types consist of mesic meadow grasslands and mountain shrub communities among conifer forests as well as the lowest elevation habitats along the edges of the conifer forests.

### Goals and Objectives

The management of these areas would be to maintain or improve the health and extent of the habitat, in recognition of their importance for wildlife habitat especially the big game of the area. Mountain shrubs would be promoted in areas where the soils, slopes, and elevation indicate they should exist. Mesic meadow habitats would be promoted in areas where the environmental conditions indicate they should exist.

### Treatments

A combination of treatments will be utilized depending on the site characteristics. The treatments will involve hand cutting, mastication, piling, and burning. Where conifer encroachment is identified, individual trees would be removed through mechanical methods or hand tools. A maximum of 50 acres of treatment in this habitat type could occur per year.

## **Riparian Areas and Intermittent Drainages**

These habitat types are found along saturated soils in drainage bottoms, along small streams, springs and seeps. The vegetation is comprised of sedges, rushes, bluegrass, timothy, dogwood, and various willow species. In some cases these areas are losing their riparian characteristics due to increases in adjacent conifer stand densities, which utilize more of the available water, which in turn allows for expansion in to the areas formerly too wet for conifers to grow.

### Goals and Objectives

The goal for these habitat types would be to maintain or improve the extent of the riparian habitat.

### Treatments

Treatments associated with these areas would include hand-cutting and mechanical removal of conifer species that have encroached into these areas as well as areas identified as formerly containing riparian characteristics. A maximum of 50 acres of treatment in this habitat type could occur per year.

### **2.3 Other Action Alternatives**

No other alternatives were considered or analyzed.

## 3.0 Affected Environment

The following are not present and will not be further analyzed:

Environmental Justice  
Flood Plains  
Hazardous or Solid Wastes  
Mineral Resources  
Native American Religious Concerns  
Paleontology  
Prime or Unique Farmlands  
Special Status Species  
Traditional Cultural Properties  
Water Quality and Prime or Sole Source of Drinking Water  
Wild and Scenic Rivers  
Wilderness Values

The following resources are present and potentially affected and will be analyzed throughout the document.

### 3.1 *Forest Resources*

Past timber harvesting, fire suppression, and natural succession have promoted the development of dense stands of ponderosa and lodgepole pine forest. Currently, the dominant forest at the higher elevations of the mountain is the naturally occurring dense stands of lodgepole pine forest, and mixed stands of lodgepole with subalpine fir and aspen. Consequently, the competition between trees for water, light, and nutrients is pronounced and the vigor expressed by the trees is in decline. The stressed trees have poor resistance to drought, insects, and disease and therefore are at an increased risk for mortality. The most active insect is the mountain pine beetle. The potential exists for epidemic insect infestations resulting in widespread mortality across the landscape. In some places, such infestations have already begun.

The stand conditions are a result of natural seeding after disturbances such as logging and/or wildfire, combined with a change from the naturally occurring regime of low to mixed severity fires on a more frequent basis to reduction and suppression of wildfires. Up until approximately 80 to 100 years ago fire reoccurrence within this area varied from approximately 30 to 150 years. Over the past 80 to 100 years, most of the wildfires have been suppressed (with the exception of the wildfire in 2006, which burned the west end of the mountain) causing the landscape to have a greater proportion of older and denser vegetation with fewer interruptions in fuel continuity (Casper Mountain Complex Community Wildfire Protection Plan or CWPP). Therefore, the forest is at a greater risk of large stand replacing wildfires, rather than the low to mixed severity fires expected under a natural fire regime.

Deciduous stands of aspen and open meadows of grasses, shrubs and forbs have decreased in abundance as forest canopies have expanded and closed, blocking out sunlight and decreasing forest and meadow openings.

### 3.2 Fire Management

**General Fire Hazard Risk** within the Casper Mountain Community is considered high to very high due to the fuel continuity (CWPP). Fuel in the area changes with the elevation and aspect. The vegetation communities are primarily the following:

**6600-7000 feet** Ponderosa pine mixed with sage and common juniper

**7000-7700 feet** Ponderosa pine and limber pine with sage and common juniper

**7700 and above Lodgepole** with pockets of limber pine and aspen

There are dense thickets of sapling and pole-sized trees that have established under the upper forest canopies. These conditions exemplify the ladder fuel equation and promote crown fires. Controlling such fires in this wildland urban interface (> 850 structures on Casper Mountain) will be costly and a great risk to firefighters. The potential for a high intensity wildfire is great and will affect not only the community, but all the resource values including soil, water, wildlife, recreation, cultural, and vegetation.

In recent history, 2006, the Jackson Canyon fire burned on the west end of the mountain. Much of the Jackson Canyon and Red Creek Bald Eagle Roost areas were burned. In 2012, the Shepherder fire on Casper Mountain burned the East side of the mountain, which included some parcels of BLM Forest and alpine meadows. The public lands are surrounded by private and State Of Wyoming lands and there are over 800 structures scattered across the mountain.

### 3.3 Threatened and Endangered Species

The following listed species described below are designated as Threatened and Endangered Species and occur on USFWS species list for the Casper Field Office (2012).

#### Black-footed Ferret (*Mustela nigripes*)

The black-footed ferret (endangered) depends upon prairie dogs, their primary prey, for continued existence.

#### Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*)

The Preble's Meadow Jumping Mouse (threatened) lives primarily in heavily vegetated; shrub dominated riparian (streamside) habitats along the foothills of southeastern Wyoming. This area is outside of the geographic distribution of this species.

#### Colorado Butterfly Plant (*Gaura neomexicana* ssp. *coloradensis*) and Designated Critical Habitat

Colorado butterfly plant (threatened) typically occurs in colonies on sub-irrigated alluvial soils on level or slightly sloping floodplains and drainage bottoms at elevations of from 5,000 to 6,400 feet. This project is located outside of the geographic range of this species.

There is no designated critical habitat for this species within the allotment.

#### Ute Ladies'-Tresses Orchid (*Spiranthes diluvialis*)

Ute ladies' tresses orchid (threatened) occurs primarily on low, flat, floodplain terraces or abandoned oxbows close to perennial streams on alluvial soils between 1,500 and 7,000 feet. No suitable habitat occurs on public lands.

#### Blowout Penstemon (*Penstemon haydenii*)

Blowout penstemon (endangered) grows in wind-carved depressions in sparsely vegetated active sand dunes. There is no potential habitat or documented occurrences within the area.

### 3.4 Wildlife

The wildlife concerns considered in relation to the proposed action were: big-game; greater sage grouse; raptor; mountain plover; riparian areas; and BLM Wyoming sensitive species. There is a variety of wildlife species present throughout the project area, including big-game, non-game, small-game, furbearing, and predatory animals. The area is known to support populations of small game and non-game species, but no comprehensive inventories exist for the area. Elk and mule deer utilize the area throughout the year.

The majority of the area is forested interspersed with mountain sagebrush grasslands and mixed mountain shrub communities which provide important browse and security cover for wildlife. Mountain shrub species present in the area include: True Mountain mahogany (*Cercocarpus montanus*), mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*), black sagebrush (*Artemisia nova*), serviceberry (*Amelanchier ssp.*), snowberry (*Symphoricarpos ssp.*), chokecherry (*Prunus virginiana*), rocky mountain maple (*Acer glabrum*), quacking aspen (*Populus tremuloides*) and snowbrush (*Ceanothus velutinus*).

#### Mule Deer

Mule Deer (*Odocoileus hemionus*) are managed as part of The Bates Hole-Hat Six Mule Deer Herd Unit has a post-season population objective of 12,000. The 2011 postseason population estimate indicated 6,110 deer, or 49% below objective. According to WGFD Job Completion Reports this population has been well below objectives since a marked decline in the early 1990's. Mixed-mountain shrub communities in this herd unit are of concern due to the late seral stage and declining vigor of these communities. This is typical of other mixed mountain shrub communities occurring on winter yearlong ranges within this herd unit, including Wyoming big sagebrush, antelope bitterbrush, skunkbush sumac, and serviceberry communities (WGFD 2011). The entire area provides either seasonal or year-round habitat for mule deer. Approximately forty-three percent or 31, 835 acres are classified as Mule Deer Crucial winter range habitat. Over the last 10 years, fawn productivity has declined from moderate to poor in this herd unit, with observed ratios averaging 56 per 100 does over the reporting period of 2009-2011. The extremely low fawn ratio (45/100) of 2010 can primarily be attributed to harsh winter and cold

wet spring conditions and the aforementioned marginal habitat conditions, although fawn ratios unexpectedly improved slightly in 2011 (WGFD 2011).

### Pronghorn Antelope

Pronghorn antelope (*Antilocapra Americana*) are managed as part of the Medicine Bow Herd Unit. The WGFD goal of population management for the Medicine Bow Pronghorn Herd is to reduce pronghorn numbers in order to address habitat concerns. Current habitat conditions warrant a reduction in population size below objective level. The Medicine Bow Pronghorn Herd has been near or above the objective of 60,000. Currently the populations are estimated to be approximately 12% below population objectives (WGFD 2011). Pronghorn antelope are present throughout the area, however, most of the habitat is not generally considered preferred pronghorn habitat. Pronghorns, may utilize the fringe, non-forested areas or traverse other habitats as part of a natural dispersement.

### Elk

Elk (*Cervus canadensis*) are managed as part of the Laramie Peak/Muddy Mountain Herd Unit. The population objective for this herd unit is 5,000. The most recent population estimate for this herd unit is 8,655, or 73% above objective (WGFD 2011). The entire area provides either seasonal or year-round habitat for elk. Approximately 10 percent or 31, 835 acres are classified as Elk Crucial winter range habitat.

### Greater Sage Grouse

The area provides some seasonal habitat for the greater sage-grouse, which is listed as a Candidate Species for the Endangered Species Act. No sage grouse leks are present in the area, although portions of the area may provide important seasonal habitats. Additionally, the area contains 16,443 acres of delineated sage-grouse key habitat area (KHA), as described in WY IM 2010-012. This habitat primarily serves as connectivity habitat joining the Hat-Six complex with the Bates Hole grouse populations.

Male lek attendance in the Bates Hole Shirley Basin LWG area appears to be trending downward in recent years. Male lek attendance on leks throughout area, have experienced a sharp decline in recent years. This decline is likely due to poor recruitment and survival due to unusual weather conditions, although the exact cause is unknown. Sage grouse populations range-wide are declining. All leks in this area are encompassed within the WGFD Management Unit F and Bates Hole/Shirley Basin management area .

### Raptors/neotropical migrants

There are no known occupied raptor nests within the project area. However there are a number of historic raptor nests documented in the vicinity and it is very likely that several raptor nests occur that have not been identified. No intensive raptor surveys have been completed in this area and suitable habitat exists for a variety of raptors. Raptor species likely to occur within the area include the following: golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus*

leucocephalus), red-tailed hawk (*Buteo jamaicensis*), rough-legged hawk (*Buteo lagopus*), ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), northern harrier (*Circus cyaneus*), prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), northern goshawk (*Accipiter gentilis*), Cooper's hawk (*Accipiter cooperii*), sharp shinned hawk (*Accipiter striatus*), and great horned owl (*Bubo virginianus*).

There are two communal winter eagle roosts which occur within the boundaries of the proposed project area. The Jackson Canyon Eagle Roost is utilized by both Bald and Golden Eagles. This roost is located within Jackson Canyon. The Little Red Creek Roost is utilized primarily by Bald Eagles and is located in an unnamed canyon adjacent to Little Red Creek. Eagle roost counts vary significantly depending on weather and other factors.

This also provides habitat for a variety of migratory birds. Migratory bird nest site occupancy is unknown, as no intensive nest surveys have occurred in this area. The area is host to a variety neotropical migrant species from black-billed magpie (*Pica hudsonia*) to mountain bluebirds (*Sialia currucoides*). A complete list of species and habitat requirements can be found in the Wyoming Partners in Flight, Bird Conservation Plan (Nicholoff 2003).

#### Game birds/small and non-game

The area provides important year-round and seasonal habitats for game birds and small game. Dusky grouse (*Dendragapus obscurus*) and wild turkey (*Meleagris gallopavo*) are year-round residents of the area. Both species are found primarily in forested or woodland habitats. Some game species commonly found in the area include cottontail rabbit (*Sylvilagus nuttallii*) and red squirrel (*Tamiasciurus hudsonicus*). There have not been any intensive survey efforts of small game, predators or game birds in the area. Therefore, a complete list of wildlife species is not provided. Refer to Atlas of Birds, Mammals, Amphibians, and Reptiles in Wyoming (Orabona 2012) for a complete list of wildlife that may inhabit the area.

### 3.5 Recreation-VRM

The Visual Resources of the area would not be affected from mechanical or other sivilcultural treatments. The existing landscape would to continue change over time as a result of environmental conditions and factors. Overtime time, some areas would have an overall loss in species diversity having a minor effect on visual resources. Areas that are heavily infested with insects or disease would be impacted as damaged trees die and detract from the overall visual quality.

### 3.6 Air Quality

The State of Wyoming is authorized to administer the Clean Air act. BLM management actions or use authorizations will comply with all Federal and State air quality laws, rules regulations and standards. Provisions for the establishment of air quality standards are included in the Clean Air Act, as amended, and the Wyoming Environmental Quality Act, as amended. Regulations are found in Part 40 of the Code of Federal Regulations and in Wyoming Air Quality Standards and regulations.

### 3.7 Heritage Resources

A files search of existing cultural resource information was conducted for the entire study area. The search identified all formally recorded cultural resource manifestations and all inventories conducted within the study area. Less than 10% of the study area has been intensively inventoried for cultural resources. A total of 25 sites have been documented throughout the study area. Six sites are historic period and are related to ranching and mining activities. A total of 19 sites are prehistoric and represent a range of site types and age. In summary, the prehistoric sites document human occupation of the study area for over 10,000 years and reveal a wide variety of uses by the various prehistoric populations over time. The current data for the study area conforms well with existing prehistoric and historic context data for Central Wyoming, in general and the Laramie Range, in particular. Even though less than 10% of the study area has been intensively inventoried for cultural resources, it can be anticipated that a variety of prehistoric and historic period resources exist throughout the entire study area

### 3.8 Livestock Grazing

Livestock grazing has occurred in the area since the late 1800s. 13 grazing allotments lie within the Casper Mountain project boundary. Within in those 13 grazing allotments is approximately 12,185 acres of federal BLM surface lands. A total of 1332 Animal Unit Months (AUMs) will be affected by the proposed decision. Grazing use in timber stands is less likely to occur than a sagebrush grass community in the project boundary. Most of the grazing use is for cattle year around, some horse and sheep use is also authorized. 1,156 acres of public land within the allotment is unleased, while another 353 acres of public lands is leased through the Recreation and Public Purposes Act(R&PP) of 1954 and is not available for grazing. The following is a list of the affected allotments:

Banner Mountain, Coates, Deer Creek 2, Eagle Ridge, Hess Draw, Little Red Creek, Muddy Mountain, Muddy Mountain 2, Oil Mountain, Pitch Pine, Smith Creek, South Cari Creek, and V R.

Various range improvement projects are on public lands. Table 3.1 is a list of rangeland improvements located within the Casper Mountain EA project boundary.

<b>Project Number</b>	<b>Project Name</b>	<b>Project Type</b>
965723	Coal Fence	Fence
966315	Coal Mountain Electric Fences	Fence
965701	Coal Mountain Fence	Fence
960825	Scott Fence	Fence
966328	Dirty Shirt Electric Fence	Fence
966019	Circle Drive Fence	Fence
965401	Spikes Fence	Fence
964925, 963504, 961395, 960831	Cheney Fences	Fence

961396, 965081	Coates Fences	Fence
965024	Creager-Poppie Fence	Fence
961412	Robinette Fence	Fence
961442	McGhee Fence	Fence
960210	Keith Fence	Fence
960978, 960979	Keith Reservoirs	Reservoir
964528	Howe Spring	Spring

### 3.9 Vegetation

The area falls within 3 precipitation zones as classified by the Natural Resource Conservation Service (NRCS). The higher elevations in the project area are in the 20+ and the 15-19 inch Foothills and Mountains Southeast (FMSE) Major Land Resource Area (MLRA). The lower elevations in the project area are in the 10-14 inch precipitation zone High Plains Southeast (HPSE) MLRA. The project area encompasses 22 ecological sites, many of which are similar in vegetative plant communities. Table 3.2 lists those ecological sites within the Casper Mountain EA project boundary and their associated acreages. It should be noted that woodland sites are present within the project area. Descriptions of these sites can be found in the range site technical guides developed by the NRCS for the state of Wyoming.

<b>Ecological Site</b>	<b>Acres</b>
SHALLOW BREAKS (10-14SE)	3253
SHALLOW LOAMY (15-19SE)	2148
ROCK OUTCROP	1595
LOAMY (15-19SE)	666
SHALLOW LOAMY (10-14 SE)	593
VERY SHALLOW (15-19SE)	528
SHALLOW IGNEOUS (20+)	519
SHALLOW LOAMY (15-19E)	441
NA	340
LOAMY (10-14NP)	336
SHALLOW CLAYEY (10-14SE)	321
LOAMY (15-19E)	263
LOAMY (10-14SE)	250
VERY SHALLOW (10-14SE)	231
PITS AND DUMPS	204
COARSE UPLAND (10-14SE)	113
SHALLOW IGNEOUS (15-19SE)	68
STEEP LOAMY (10-14SE)	64
COARSE UPLAND (15-19SE)	28
VERY SHALLOW (15-19E)	22
VERY SHALLOW (15-19)	3

<b>Ecological Site</b>	<b>Acres</b>
SUBIRRIGATED (10-14SE)	2

Common upland range vegetation found with the project includes ponderosa pine, limber pine, Rocky Mountain juniper, antelope bitterbrush, mountain big sagebrush, Wyoming big sagebrush, rabbitbrush, bluebunch wheatgrass, western wheatgrass, needle-and-thread grass, green needlegrass, prairie Junegrass, Sandberg bluegrass, and a variety of perennial and annual forbs. Riparian plants commonly found include cottonwoods, willows, chokecherry, rose, water birch, sedges, rushes, Kentucky bluegrass, redtop and numerous forbs.

### 3.10 Invasive Non-Native Species and Noxious Weeds

Noxious weeds are present in the Laramie Mountain Range on active allotments and unallocated areas.

Non-native plant species that are difficult to control, easily spread, and injurious to public health, crops, livestock, land or other property have been designated as noxious weeds under the Wyoming Weed and Pest Control Act of 1973. Prohibited noxious weeds pursuant to Wyoming Statute (W.S.) 11-12-104 are identified in Table 3.3.

<b>Common Name</b>	<b>Scientific Name</b>
Field bindweed	<i>Convolvulus arvensis</i> L.
Canada thistle	<i>Cirsium arvense</i> L.
Leafy spurge	<i>Euphorbia esula</i> L.
Perennial sowthistle	<i>Sonchus arvensis</i> L.
Quackgrass	<i>Agropyron repens</i> (L.) Beauv.
Hoary cress (whitetop)	<i>Cardaria draba</i> and <i>Cardaria pubescens</i> (L.) Desv.
Perennial pepperweed (giant whitetop)	<i>Lepidium latifolium</i> L.
Ox-eye daisy	<i>Chrysanthemum leucanthemum</i> L.
Skeletonleaf bursage	<i>Franseria discolor</i> Nutt.
Russian knapweed	<i>Centaurea repens</i> L.
Yellow toadflax	<i>Linaria vulgaris</i> L.
Dalmatian toadflax	<i>Linaria dalmatica</i> (L.) Mill.
Scotch thistle	<i>Onopordum acanthium</i> L.
Musk thistle	<i>Carduus nutans</i> L.
Common burdock	<i>Arctium minus</i> (Hill) Bernh.
Plumeless thistle	<i>Carduus acanthoides</i> L.
Dyers woad	<i>Isatis tinctoria</i> L.
Houndstongue	<i>Cynoglossum officinale</i> L.
Spotted knapweed	<i>Centaurea maculosa</i> Lam.
Diffuse knapweed	<i>Centaurea diffusa</i> Lam.
Purple loosestrife	<i>Lythrum salicaria</i> L.

<b>Table 3.3 Wyoming Noxious Weeds</b>	
<b>Common Name</b>	<b>Scientific Name</b>
Saltcedar	<i>Tamaxix</i> ssp.
Common St. Johnswort	<i>Hypericum perforatum</i>
Common tansy	<i>Tanacetum vulgare</i>
Russian olive	<i>Elaeagnus angustifolia</i> L.

Source: Wyoming Weed and Pest Council website: [www.wyoweed.org](http://www.wyoweed.org)

Some noxious and invasive plant species are present in the project area. Musk thistle (*Carduus nutans*) and Canada thistle (*Cirsium arvense*) have been observed on some of the deeper more productive soil on the lower slopes and in drainage bottoms. These consist of scattered plants and are not found in large quantities. Russian Knapweed has been observed on private lands, but none so far on public lands. Cheatgrass or downy brome (*Bromus tectorum*) is present throughout the area. On public lands cheatgrass is found along major roads and trails, around stock reservoirs, and other areas of disturbance. Cheatgrass is a common component of the understory vegetation on south facing slope in most of the Rocky Mountain juniper communities and some of the ponderosa pine communities. If noxious weeds are discovered in the future on public lands within the allotment, they will be aggressively treated using an integrated pest management (IPM) approach.

### 3.11 Soil Resources

The Natural Resources Conservation Service (NRCS), in cooperation with the BLM and Wyoming Agricultural Experiment Station has prepared a soil survey of Natrona County, Wyoming. Mapping units comprised of more than one series may have major components of highly varying soil characteristics. In addition, each mapping unit is also comprised of inclusions of minor differing soils. Therefore, the variability of soil characteristics within a soil mapping unit may be relatively great. Soils located within the Casper Mountain EA project boundary are found in Table 3.4.

<b>Table 3.4 Soils within the Casper Mountain EA Project Boundary</b>	
Alfack-Foxton complex	Kezar-Irson-Clayburn association
Almy loam	Lander loam
Blazon-Worfman loams	Neldore-Moyerson-Rock outcrop complex
Boyle-Rock outcrop complex	Nunnston loam
Bridger loam	Pilotpeak-Canwall complex
Castner-Chincap-Rock outcrop complex	Redsun-Rock outcrop complex
Cathedral-Rock outcrop complex	Rekop-Rock outcrop complex
Chittum-Sneffels loams	Rencot-Blazon complex
Crago gravelly loam	Rencot-Thermopolis-Rock outcrop association
Curecanti variant very cobbly loam	Rock outcrop-Cathedral complex
Curecanti very stony loam	Rock outcrop-Ustic Torriorthents
Farlow, moist-Starley-Rock outcrop complex	Roughlock loam

Farlow-Starley association	Rubble land-Ustic Torriorthents
Farlow-Starley association	Starley-Rock outcrop complex
Fiveoh-Thermopolis association	Theedle-Shingle-Kishona complex
Grimstone-Grimstone variant loams	Woosley-Starley association
Irson-Kezar-Rock outcrop complex	Zigweid loam
Irson-Sebud complex	

The soils found on public land are primarily shallow well drained soils formed in residuum. These soils have rapid to slow permeability and can be any texture. The soils present are typically found on steep slopes but can be found on most any slope. Also common on these sites are small areas of bedrock and very shallow to deep pockets of soil. In the drainages bottoms the soils can be very deep. The soils within the project area fall within both the Natrona and Converse County map units with varying amounts.

The soils present have been placed in the following soil map units for Natrona County:

- 144- Castner-Chincap-Rock outcrop complex, 10 to 40 percent slopes
- 154-Chittum-Sneffels loams, 5 to 40 percent slopes
- 165-Curecanti very stony loam, 3 to 12 percent slopes
- 180- Farlow, Moist-Starley-Rock outcrop complex, 40 to 65 percent slopes
- 181-Farlow-Starley association, moderately steep
- 182-Fiveoh-Thermopolis association, hilly
- 206-Irson-Sedbud Complex, 40 to 65 percent slopes
- 211-Kezar-Irson-Clayburn association, hilly
- 224-Neldore-Moyerson-Rock outcrop complex, 10 to 30 percent slopes
- 225-Nunnston loam, 2 to 15 percent slopes
- 238-Pits and Dumps
- 243-Redsun-Rock outcrop complex, 15 to 30 percent slopes
- 250-Rencot-Thermopolis-Rock outcrop association, 5 to 40 percent slopes
- 256-Rock outcrop-Ustic Torriorthents, shallow-Rubble land complex, 30 to 100 percent slopes
- 264-Roughlock loam, 0 to 6 percent slopes
- 279-Starley-Rock outcrop complex, 4 to 25 percent slopes

The soils present have been placed in the following soil map units for Converse County:

- 119-Castner-Chincap-Rock outcrop complex, 10 to 40 percent slopes
- 120-Cathedral-Rock outcrop complex, wooded, 6 to 75 percent slopes
- 145-Farlow, Moist-Starley-Rock outcrop complex, 40 to 65 percent slopes
- 206-Pilotpeak-Canwall complex, 3 to 20 percent slopes
- 218-Rock outcrop-Cathedral complex, 10 to 75 percent slopes

A complete description of these soils and their properties can be found in the Soil Survey of Natrona County, Wyoming and Soil Survey of Converse County Southern Part, Wyoming,

published by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS).

### 3.12 Water Resources

Both surface and groundwater resources are present in the planning area. Surface water includes numerous intermittent and ephemeral streams, seeps, and springs. Groundwater resources include free water contained within porous or fractured bedrock that could be used for culinary, agricultural, and industrial purposes. Therefore, the occurrence and distribution of water sources in the planning area depends on climate and structural geology. Ephemeral flow is defined as erratic flow in response to direct precipitation events, snowmelt, and overland flow. Under this regime, the flow generally lasts for a short period after the runoff generating event. Intermittent flow is characterized by more continuous flow during the year in response to interflow, subsurface flow, and shallow groundwater flow. Generally, intermittent flow occurs for a longer period after the event and occurs relatively consistently within a year and from year to year. Perennial is defined as a stream or river (channel) that has continuous flow in parts of its bed all year round during years of normal rainfall.

#### Surface Water

The planning area is part of the North Platte River watershed which is divided further into the Bates Creek and the Muddy Creek watersheds. The western portion of the planning area drains into Bates Creek which drains into the Platte River. The eastern portion of the watershed drains into Muddy Creek which also then flows into the North Platte River.

Streams found within the planning area on public lands are: Red Creek, Muddy Creek, Elkhorn Creek, Big Red Creek, West Fork Garden Creek, Coal Creek, Matheson Creek, Little Red Creek, Deer Creek, Clear Fork Muddy Creek, and the south fork of Cart Creek. Matheson Creek, West Fork Garden Creek, Muddy Creek and Deer Creek have NSO and CSU per RMP, DR #1035.

#### Groundwater

There are three springs located on public lands within the project boundary. These are: Hiker Seep T. 32. R 80 Sec 33, Coates Spring, T. 32. R. 80 Sec. 3, Howe Spring T. 32 R. 80 Sec. 30 and Dead Horse Spring, T. 32. R. 80 Sec. 19, (30). Two of the springs were inventoried in 2011, Hiker Seep and Dead Horse. Coates was not inventoried due to access issues. One water well is located on public lands within the Casper Mountain EA project boundary. Coates Spring #1 is located at T. 32N R. 80W Sec. 3 SWNE. CSU within 500 feet of water wells, springs, or artesian and flowing wells (DR#1036).

### 3.13 Riparian/Wetlands

Several channels were evaluated in 1998 and 1999 for proper functioning condition. This study method documents the hydrologic, vegetative, and erosion deposition of a stream segment. The method also gives a summary determination of proper functioning condition, functional at risk, or nonfunctional determination of stream health states for the segment evaluated.

Riparian/wetland areas are *functioning properly* when adequate vegetation, landform, or large woody debris is present to dissipate stream energy in association with high water flows, therefore reducing erosion, improving water quality, and supporting greater biodiversity (TR 1737-9). Riparian/wetland areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation are considered *functional-at-risk*. Riparian/wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion or improving water quality as listed above are considered *nonfunctional*. The absence of certain physical attributes such as a floodplain where one should be is an indicator of nonfunctioning condition.

Table 3.5 depicts the channels that are either nonfunctioning (NF) or functioning at risk (FAR) within the project boundary. There are 3.79 miles of inventoried riparian zones in the Casper Mountain EA project boundary, see Table 3.5 below.

<b>Riparin ID</b>	<b>Rating</b>	<b>Date</b>	<b>Site Name</b>	<b>Year</b>	<b>Observer</b>	<b>Allotment</b>	<b>Length</b>
031-077-101	PFC	7/22/99	Lower Deer Creek	1999	GS	Unleased	1.71
031-077-101	PFC	7/22/99	Lower Deer Creek	1999	GS	Unleased	0.58
031-077-101	PFC	7/22/99	Lower Deer Creek	1999	GS	Unleased	0.37
031-077-101	PFC	7/22/99	Lower Deer Creek	1999	GS	Unleased	0.41
031-080-101	FAR	8/19/98	Big Red Pine	1998	GS	10017	0.54
031-080-101	FAR	8/19/98	Big Red Pine	1998	GS	10017	0.18

## 4.0 ENVIRONMENTAL EFFECTS

### 4.1 Direct and Indirect Impacts

#### 4.1.1 Forest Resources

##### Alternative I- No Action

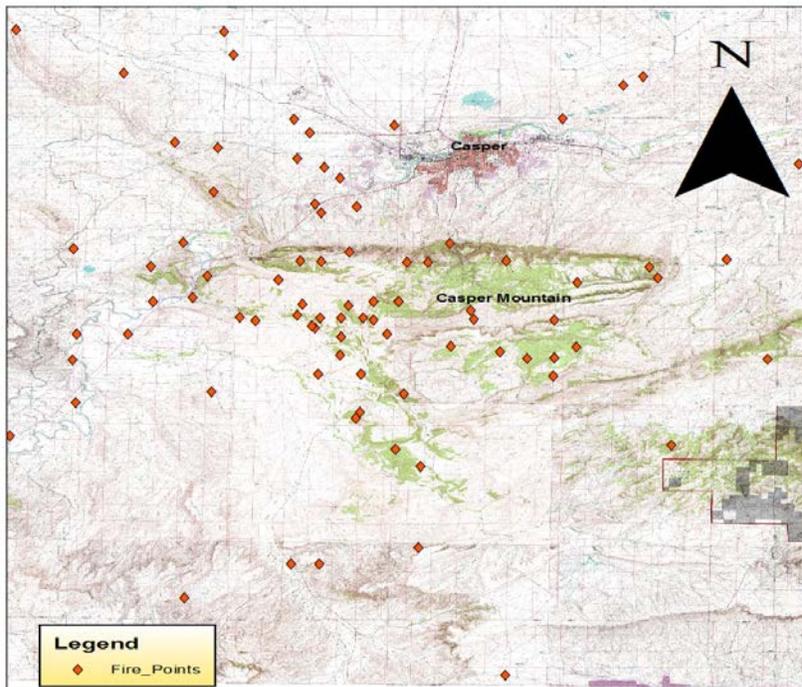
Overall forest health will continue to decline due the lack of species and structural diversity, overcrowding and competition for space, sunlight and water. As the trees encroach into the meadows, species diversity will decrease promoting epidemic insect and disease infestations and a decrease in natural fuel breaks in the instance of a wildfire.

##### Alternative II- Proposed Action

Promoting species diversity, decreasing competition and opening the forest stands will produce forest with the increased probability and ability of defense against fire, insect and disease and other natural disasters. Healthy forest stands, which are managed, play an integral role in the ecosystem for multiple resources. The prescribed treatments will reduce the tree densities of many stands. There will be an increase in diversity of age structure of the treated forest stands. In that case of prescribed understory burns, there is a potential for some loss of mature trees from scorching and soil heating. These losses would be accounted for in the site specific burn plans.

#### 4.1.2 Fire Management

##### Alternative I- No Action



Fire Ignition Points from 1993-2012

The weather patterns that occur in the summer and fall season have associated lightning. Often times, these weather fronts first encounter the south side of Casper Mountain, which is the southern aspect, and is the hottest and driest side of the mountain.

The available ground and ladder fuels will continue to increase and therefore increase fire severity and intensity.

#### Alternative II-Proposed Action

Management of the vegetation, including forests and alpine meadows, would alter fuel structure and continuity to more closely resemble pre-settlement conditions. Brush and tree density and height would be reduced, and stands on all elevations and aspects would be managed to mimic natural disturbance regimes and fuel conditions. The mosaics created with these treatments would improve vegetation health and limit the size and intensity of wildland fires. Under these improved conditions, fire could be used as a management tool for controlling fuel buildup.

#### 4.1.3 Threatened and Endangered Species

The proposed project area was evaluated for the presence of federally listed species occurring on the Species List for the BLM, Casper Field Office. No Threatened and Endangered species or designated Critical Habitats occur on public lands within the proposed project area. Based on this information, it has been determined that this proposed action would have a “No Effect” on federally listed species.

#### 4.1.4 Wildlife

##### Alternative I- No Action

Under the no action alternative, conifers would continue to encroach in to the adjacent sagebrush, mountain shrub, aspen, and riparian habitats. This would result in a reduction of associated wildlife species richness and diversity. As conifers continue to move into adjacent habitat types, there would be a reduction in “edge effect” the diversity of vegetation species and age would also limit the diversity of wildlife habitat. Conifer tree stands would reach tree densities that would increase the potential for catastrophic fire events, which could lead to soil sterilization and long term loss of wildlife habitats while those areas recover.

##### Alternative II- Proposed Action

Wildlife impacts associated with the treatment area are expected to be relatively minor, as only 16 percent (11,377 acres) of the 71,228 acre area is public lands. Treatments would primarily occur during the summer and fall when weather conditions are more favorable and wildlife are much more distributed across the range. Wildlife occurring near areas of active treatment would be temporarily displaced. However, it is expected that wildlife would return to these areas once treatment activities ceased. Small vegetative treatments are planned to occur over a ten year

period, as funding is available. Therefore, the impacts at any one time would be confined to a relatively small area on the order of tens of acres. The wildlife impacts associated with the implementation of this project would be similar to that of dispersed recreation.

Treatments would range from cutting, mastication or skidding utilizing heavy equipment to utilizing chainsaws and other handtools and equipment and would be designed to economically accomplish treatment objectives with minimal disturbance to wildlife and vegetative resources. Mechanical and hand silvicultural treatments would likely result in wildlife avoidance during periods of active treatment. There may be some mortality of wildlife that seek refuge in tree cavities or burrows, but any losses should be minimal. The reproductive rates of small animals are generally high, and any losses would have negligible impacts to a population.

It is expected that treatments would have a negligible effect on raptors, including bald and golden eagles. No active raptor nests are known to occur within the project area, although no intensive surveys have been conducted. Trees within a proposed treatment area would be visually inspected for the presence of nests prior to treatment. Tree cutting would be prohibited within roost exclusion areas and all treatments would be prohibited from November 1 and March 31. Additionally, any raptor nest sites would have a seasonal ½ mile buffer from February 1 to July 31st to protect the birds and nest from disturbance. .

Additionally, winter and spring burning may disrupt big game and raptor nesting activities within the treatment area. If nests are active and birds are incubating prior to the start of ignition activities, human activity, fire or dense smoke may cause the birds to abandon their nests. These same activities may cause birds to choose alternative nest sites if ignition activities occur during nest selection. However, in some cases, incubating golden eagles did not leave the nest during burning activities even when heavy smoke engulfed the nest and fire was immediately below the nest (Oakleaf, 1997). Anecdotal experience has further indicated that some bird species are minimally impacted by prescribed burning operations as long as human activities around the nest site remain minimal. Nests adjacent to the treatment areas should not be affected. Creating openings in dense conifer stands may improve raptor hunting opportunities for small mammals.

Treatments may result in a temporary loss of forage and wildlife security habitat. Broadcast burning would improve the quality, palatability and availability of browse species such as aspen, true mountain mahogany, antelope bitterbrush and other herbaceous forages preferred by wildlife. Burning of brush and residual dead herbaceous material would remove barriers to herbivory, enhance the vigor of herbaceous plants, and increase the relative proportion of green to cured forages. Consequently, large animals such as mule deer, elk and livestock would be attracted to these areas and the herbivory in these areas is expected to increase. Where monitoring indicates excessive herbivory, temporary fencing or other measures may be necessary to avoid undesired effects.

The proposed vegetative treatments are expected to improve the overall health and vigor of the mountain shrub communities and aspen woodlands, including the associated wildlife habitats. Mountain shrub communities and woodlands provide important food and security cover for a variety of wildlife species from big game to non-game species. These communities are

extremely important ecologically, increasing both the wildlife and vegetation species richness and diversity to the area.

The Bates Hole-Hat Six Mule Deer Herd is presently 49 percent below population objectives. Treatment efforts to improve the productivity and viability of critical browse species such as true mountain mahogany would directly benefit this deer herd. Improving the health and vigor of mahogany stands would directly benefit wintering ungulates which rely on these species as an important winter browse. Winter range forage species are generally deficient in three primary areas: total digestible nutrients, digestible protein, and calcium and phosphorus. Mountain mahogany rates high in all three areas and contained the highest percentage of total digestible nutrients of 14 species investigated. Increasing the density of palatable shrubs by one or more techniques can effect dramatic improvement in the nutritive value of range forage (Welch 1981).

New spring growth would begin several weeks earlier in the burned areas compared to unburned communities. This is generally attributed to higher soil temperatures as a result of the more heat being absorbed by the blackened soil. Consequently, the burned areas would be selected over unburned areas by wildlife and livestock during the early spring and summer (Daubenmire 1968). Over time, this increased use will decline (Peek et al. 1979). Also, increased regrowth, due to increased moisture and nutrient availability compared to adjacent unburned areas, and use by wildlife would be expected during the fall. Improved diet quality during spring and fall would benefit mule deer and elk by indirectly alleviating nutritional stresses associated with winter weather.

The treatment would increase community diversity (including age structure) and "edge effect" due to the mosaic burn pattern over most of the area. Edge effect is defined as the "response of organisms, animals in particular, to environmental conditions created where two or more vegetation types meet" (Smith, 1986). Many wildlife species, particularly big game animals, select for these edges. Adequate unburned areas will be maintained for wildlife which exclusively utilizes sagebrush and mountain mahogany as a habitat component.

Effects to Greater sage-grouse will be minor based upon the current habitat availability. The area contains 16,443 acres of delineated sage-grouse key habitat area, and any treatments to these areas which may result in a loss of sagebrush habitat would be subject to guidelines presented in WY IM 2010-012 and WGFD Protocols for Treating Sagebrush (WGFD 2011a). The proposed treatment area is primarily forested and would be considered non-habitat. The majority of sagebrush grassland habitat is fringe habitat associated with conifer and woodland stands. Sage grouse have been observed in these sagebrush interspaces during the summer months. Sage grouse use is thought to be seasonal and associated with natural emigration between the Hat Six Complex and Bates Hole populations. The proposed action should not affect sage grouse movements and some treatments are expected to benefit sage grouse by protecting important meadow habitat.

Any new fencing associated with treatments may restrict or impede wildlife movement to a degree. Some fences and fence designs are also known to present a wildlife strike or entanglement hazard, which could result in an additive mortality within a population. It is assumed that wildlife have adapted to the presence of current fences and are accustomed to

negotiating them in their daily and seasonal movements. Any new fences or fence designs would be evaluated in a separate NEPA document and would meet specifications as described in BLM Manual 1741-1 Fencing handbook.

#### 4.1.5 Recreation

##### *Alternative I – No Action*

The no action alternative would have caused little impact to the recreation potential of the area. Visual resources would undergo natural variations due to progression of unmanaged forest stands. The risk of catastrophic wildfire would be increased and if such fires occurred, there would be an associated loss of the visual aesthetics of the area.

The land ownership patterns within the planning area currently limit much of the dispersed recreation opportunities on the BLM lands. Those areas that are accessible by easement or Right-of-Way would continue to be accessed in the same manner into the future.

##### *Alternative II – Proposed Action*

There would be an increased potential for long term maintenance of the visual resources associated with the planning area. There would be a reduced risk of catastrophic wildfire.

Dispersed recreation opportunities would be impacted while treatments were occurring in those areas that are accessible by the public. However these impacts would only occur while the treatments are underway. The proposed action would result in long term improvements in associated habitat and wildlife diversity. Hunting is one of the recreation opportunities in the area, which would be improved as habitat treatments are carried out that result in increases in big game populations.

#### 4.1.6 Air Quality

Impacts to air quality may include fugitive dust from vehicular travel on unpaved roads, and smoke from slash burning. Management provisions for dust abatement and burning when weather conditions disperse smoke would reduce the potential or severity of these impacts.

#### 4.1.7 Heritage Resources

##### *Alternative I- No Action*

All recorded and unrecorded resources would continue to remain in the same state as currently exists and be subject to current natural forces.

##### *Alternative II – Proposed Action*

Most, if not all, of the proposed activities could have the potential to effect the heritage resources located within the study area. All actions implemented under this alternative would be

considered undertakings as defined in Section 106 of the National Historic Preservation Act (NHPA) and would need to comply with the Act. To comply, each action would follow the procedures outlined in the State Protocol Agreement between the Wyoming BLM and the Wyoming State Historic Preservation Officer (2006). Following the protocol agreement would insure: 1) all significant resources are identified, and 2) all actions implemented under this alternative would take into account the effect of that action on any significant heritage resources. If significant resources are encountered any effect would be eliminated or reduced through avoidance, project redesign or other mitigation measures such as data recovery would be carried out prior to project implementation.

Impacts to fragile cultural resources normally result from surface disturbing actions and those that introduce incompatible elements to the cultural landscape such as visual or audible. Essentially, any activity that creates or has the potential to create surface disturbance, regardless of the resource program to which it may be associated, can cause potential impacts to cultural resources.

The management of cultural resources is subject to a variety of laws and regulations and the BLM is mandated to comply with these. In particular, Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, requires the BLM to take into account the effect of any undertaking on significant cultural resources.

Compliance is achieved through a national programmatic agreement and a subsequent State Protocol Agreement between the Wyoming BLM and the Wyoming State Historic Preservation Office (2006). Together, these agreements outline how BLM will meet its responsibilities under the NHPA. All BLM undertakings will follow these agreements and in particular, the Wyoming Protocol Agreement. The agreements outline the processes for project planning, identification of resources, determination of eligibility, determination of effect, resolution of adverse effects, and unanticipated discovery situations.

#### 4.1.8 Livestock Grazing

##### *Alternative I & II, No action and Proposed Action*

Under both alternatives there would be little to no effect on livestock grazing. The proposed action would cause some initial loss of vegetation, but this is expected to be minimal. This small loss would reduce the amount of forage available for domestic livestock grazing. The proposed action may also disrupt some ranching activities within the project boundary. Following the proposed action there may be an increase in forest under story from opening up the forest canopy.

#### 4.1.9 Vegetation

##### *Alternative I – No Action*

Natural vegetative succession would continue within the given ecological sites. This would lead to dense pine canopies and increase the likelihood of catastrophic stochastic events such as

wildfire, insect infestation, and disease. Conifer trees would continue to encroach into mesic meadow habitats, shrublands, and riparian areas. There would be a loss of species diversity over time.

#### *Alternative II – Proposed Action*

The proposed action would lead to maintenance and/or improvement of vegetative diversity through the prescribed treatments. Conifer stand health would be improved in their associated ecological sites, and the ecological sites where conifers are a low percent composition would be maintained.

#### 4.1.10 Invasive, Non-native, and Noxious Weeds

##### *Alternative I – No Action*

Under the no action alternative, invasive, non-native, and noxious weeds would continue to undergo natural expansion. Infestations would be treated when noticed during other routine program specific field work, or in collaboration with other agencies and individuals.

##### *Alternative II – Proposed Action*

In relation to those treatments that would cause surface disturbance, there would be an increased potential for establishment and expansion of invasive, non-native, and noxious weeds. However, an indirect impact of conducting the treatments under the proposed action would be an increase in monitoring associated with the treatments as well as a field presence to observe any natural expansion of weeds. This would lead to a potential for earlier detection and treatment of undesirable weed species.

#### 4.1.11 Soils Resources

##### *Alternative I & II, No action and Proposed Action*

Under both alternatives there would be little to no effect on soils. The proposed action would cause some initial loss of vegetation thereby increasing the potential of soil loss through erosion, but this is expected to be minimal. Following the proposed action there may be an increase in forest understory from opening up the forest canopy thus increasing plant productivity in return decreasing erosion potential.

#### 4.1.12 Water Resources

##### *Alternative I – No Action*

Under the no action alternative, natural expansion of conifer forests would continue, which would lead to localized use of surface and shallow ground water. This has the potential to lead to the loss of some surface water springs, and annually saturated areas of intermittent streams.

### *Alternative II – Proposed Action*

The Wyoming Forestry Best Management Practices that would be implemented to protect water quality and soils during forest and other management activities are part of the Casper Resource Management Plan to ensure protection of these important resources.

This land area is part of the Platte River watershed. There are several streams flowing from the mountain into the Platte River. Activities that remove vegetation and/ or loosen soil increase the potential for offsite erosion and sediment delivery into the stream system. Sedimentation within the watershed would be minimized through the implementation, inspection, and maintenance of BMPs and the development and implementation of SWPPs (Storm Water Pollution Prevention Plan) and erosion and sediment control plans. Water management plans would include reclamation strategies and mitigation, and minimizing adverse impacts.

When treatments are conducted that would remove conifer encroachment in riparian areas and near the headwaters of intermittent streams, there would be an increase or maintenance of the associated surface waters.

#### 4.1.13 Riparian and Wetland Resources

##### *Alternative I – No Action*

Under the no action alternative, conifer expansion would continue into riparian areas and over time would lead to loss of riparian habitat. Conifer trees use a relatively large amount of water through evapo-transpiration and tree metabolism. They also change soil compositions that make it uninhabitable by riparian vegetation.

##### *Alternative II – Proposed Action*

When conifer treatments are conducted in relation to riparian and wetland areas, it would lead to a maintenance and/or recovery of those areas with an increase in available surface water. Species richness would be maintained in the associated riparian areas.

## **4.2 Mitigation Measures Considered**

The EA must also identify and analyze mitigation measures, if any, which may be taken to avoid or reduce potentially significant effects.

- Prior to any silvicultural treatment the area should be surveyed for the presence of occupied migratory bird nests. No disturbances would be allowed to trees in the vicinity of any nests occupied by MBTA protected species.
- To protect special status raptor nesting habitats, activities or surface use will not be allowed from February 1st through July 31st within certain areas (TLS). The BLM authorized officer, who will consider topography and special status raptor prey (excluding bald eagles) habitats surrounding the nest site, will determine the size of a buffer zone on a case-by-case basis. Usually the buffer zone will be ¼ to ½ mile.

- No tree cutting would be authorized within the eagle roost boundaries.
- In general, there are three best management practices (BMP) which guide all cultural undertakings. Simply stated these are, in order of preference: avoid, minimize, and mitigate. Significant sites will be avoided if possible. If sites cannot be avoided, the undertaking will minimize its physical surface imprint and a variety of design and coloring techniques will be implemented to minimize its impact to a no effect or no adverse effect determination. If the previous steps do not achieve a no effect or no adverse effect finding then a mitigation plan will be developed in conjunction with BLM, SHPO, the Advisory Council on Historic Preservation (ACHP), and interested parties.
- All BLM permitted activities in the study area will contain the following standard cultural stipulation:
 

The permittee is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, and contact the Authorized Officer of the BLM Casper Field Office. Within five working days the Authorized Officer will inform the operator as to: (1) whether the materials appear eligible for the National Register of Historic Places; (2) the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and, (3) a timeframe for the Authorized Officer to complete an expedited review under 36 CFR 800.11 to confirm, through the State Historic Preservation Officer, that the finds of the Authorized Officer are correct and that mitigation is appropriate. The Authorized Officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the Authorized Officer that the required mitigation has been completed, the operator will then be allowed to resume construction measures.
- No surface-disturbing and wildlife disturbing activities are allowed from November 15 through April 30 (TLS) on all crucial big game winter ranges. The authorized officer can grant exceptions.
- Incorporate all design specifications as stated for Jackson Canyon ACEC
- All trees would be visually inspected prior to treatment to ensure the absence of an occupied migratory bird nest. No tree containing such a nest shall be disturbed.

## **5.0 Cumulative and Residual Effects**

### **5.1 Cumulative Effects**

Cumulative impacts are defined as “the incremental impacts of the action when added to other past, present, and 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” (40 CFR Part 1508.7)

For analysis purposes cumulative impacts will only be considered since the signing of the Casper RMP and ROD (December 2007). All prior cumulative impacts were analyzed and discussed in detail in that document. Therefore, the past and present forest actions consist of 66 total acres of forest treatments that have been completed within the project area since December 2007. They were treatments to remove beetle mortality trees, implement a fuels break in association with a community, and a conifer removal from and aspen stand to promote the aspen recovery.

There have also been two large wildfires that have occurred within the project area since 2006. The Jackson Canyon fire burned approximately 11,770 acres on the west end of Casper Mountain in 2006. The Shepherd Hill fire burned ~15,480 acres on the east end of Casper Mountain in 2012. When taking these fires into account, the intent of the proposed action becomes more apparent, and the maintenance of healthy forests and associated ecological sites on the associated BLM lands could serve as important reserves of these habitats into the future.

There are no other planned or proposed actions known at this time for the project area; therefore, the reasonably foreseeable future forest actions consist only of the proposed action analyzed thoroughly in Chapters 3 and 4 of this document.

Cumulative health of the forest will improve as a result of the vegetative management treatments. Because of the reduced stress from competition, the remaining trees and forest will grow faster and be more resistant to insect and diseases. Structural and species diversity will increase, therefore increasing the resistance to fire, insects, and diseases. This applies to fire hazard as well. In general, the forest stands will be more resilient to wildfire. The forest canopies will be opened to more light and there will be more structural and species diversity. Many of the ground fuels will be eliminated and controlled with prescribe burns.

### **5.2 Residual Impacts**

Some resources may be affected for the short term (less than 3-5 years), and others may be adversely affected for the long term (greater than 20 years). The majority of the treatments would have short term effects; however the results of the treatment could affect some resources for longer periods of time. For example, when a forest is thinned and some of the trees removed, the thermal and hiding cover for big game will be reduced. However, stand density will definitely affect the health and the fuel loads in a stand and if a wildfire, or insect and disease epidemic were to occur, the entire forest may be lost. Often times a balance is the goal in establishing these

projects in our dynamic natural system. Table 5.1 summarizes the long-term and short-term effects of the projects and indicates which resource would be irreversibly or irretrievably affected.

Table 5.1 Residual Impacts Summary				
RESOURCE	IMPACTS		COMMITMENT OF RESOURCES	
	Short Term	Long Term	Irreversible	Irretrievable
Forests/other vegetation	x			
Wildlife	x			
Range/ upland & riparian health standards	x			
Air Quality	x			
Heritage Resources	x			
Livestock Grazing	x			
Noxious Weeds	x			
Soil	x			
Water	x			

The residual impacts from the projects are expected to be minimal and short term, assuming that applicable environmental protection measures are effectively followed through each project and project phase.

Unavoidable short- term impacts would include disturbance of the vegetation and loss of the vegetation and therefore loss of wildlife and livestock habitat and forage and an increased potential for soil and water erosion. Thinning, small clearcuts, removing encroaching trees from meadows, mastication, and burning will remove trees and other vegetation, but as one of the primary goals of these treatments, would create diversity and encourage the reintroduction of grasses and forbes (especially in the meadow settings).

There is always a tradeoff for wildlife in approaching vegetation projects because what is good for one species may not be good for another. However, suitable habitat may be unsustainable overtime due to the high probability of a wildfire (crown fire), insect and disease infestations, and natural and anthropogenic factors such as livestock grazing. Wildlife would be temporarily disturbed during the project, but will return to project areas once the project is complete.

Minor short term air quality degradation is expected from some projects which include equipment, hauling of product, and burning. Fugitive dust and smoke emissions could result from these activities.

There will be monitoring and treatment of noxious weeds in the treatment areas. There will be opportunity for establishment initially after project, but will be treated if invasive characteristics are demonstrated.

## **6.0 TRIBES, INDIVIDUALS, ORGANIZATIONS, or AGENCIES CONSULTED**

Natrona County Firewise Committee  
Wyoming State Forestry Division  
Wyoming Game and Fish Department

## **6.1 LIST OF PREPARERS**

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## **6.2 List of Reviewers**

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Kathleen Lacko - NEPA Coordinator

## **7.0 REFERENCES**

**BLM 2006. State Protocol Agreement the Wyoming BLM State Director and the Wyoming State Historic Preservation Officer (regarding the manner in which BLM will meet its responsibilities under the National Historic Preservation Act)**

**Daubenmire, R. 1968. Ecology of Fire in Grasslands. In Advances in Ecological Research, Vol. 5. Edited by J.B. Cragg. New York, NY. Academic Press.**

**Elliott, Anthony G. and Stanley Anderson. 1997. Management and Wildlife Use of Mountain Mahogany. A literature review and Annotated Bibliography. Wyoming Cooperative Fish and Wildlife Research Unit. Laramie, Wyoming. September 1997.**

**Forestry BMPs, Water Quality Guidelines, Wyoming Forestry Best Management Practices, 2004. Wyoming DEQ and Wyoming State Forestry Division.**

**Gruell, G., S. Bunting, and L. Neuenschwander. 1985. Influence of Fire on Curleaf mountain-mahogany in the intermountain west. In Elliott, Anthony G. and Stanley Anderson. 1997. Management and Wildlife Use of Mountain Mahogany. A literature review and Annotated Bibliography. Wyoming Cooperative Fish and Wildlife Research Unit. Laramie, Wyoming.**

**Haugo, R.D.; Halpern C.B. Vegetation encroachment in a dry montane meadow: a chronosequence approach.**

**Lang, N.L.: Halpern, C.B. The soil seed bank of a montane meadow; consequences of conifer encroachment and implications for restoration. Canadian Journal of Botany.**

**Natrona County Emergency Management Administration. Natrona County Wildfire Hazard Assessment and Mitigation Plan (2006). Hard copy available at 200 North Center, Casper, Wyoming.**

**Nicholoff, S. H., compiler. 2003. Wyoming Bird Conservation Plan, Version 2.0. Wyoming Partners In Flight. Wyoming Game and Fish Department, Lander, WY.**

**Oakleaf, Bob. 1997. Wyoming Game and Fish Department. Personal communication. Orabona, A., C. Rudd, M. Grenier, Z. Walker, S. Patla, and B. Oakleaf. 2012. Atlas of Birds, Mammals, Amphibians, and Reptiles in Wyoming. Wyoming Game and Fish Department Nongame Program, Lander. 232pp**

**Peek, J.M., R.A. Riggs, and J.L. Lauer. 1979. Evaluation of fall burning on bighorn sheep winter range. Journal of Range Management 32(6):430-432**

Shiflet, N. Thomas. 1994. Rangeland Cover Types of the United States. Society for Range Management. Denver, Colorado.

Smith, R.L. 1986. Elements of Ecology, 2nd edition. New York, NY. Harper & Row Publishers, Inc.

Tappeiner II, J.C. Douglas A. Macquire, and Timothy B. Harrington. 2007. Silviculture and ecology of western U.S forests. Oregon State University Press.

USDA. United States Department of Agriculture- Forest Service. United States Department of Interior- Bureau of Land Management. (2004, February). The Healthy Forests Initiative and Healthy Forests Restoration Act *Interim Field Guide*. (Publication No. FS-799).

USDA. United States Department of Agriculture-Natural Resource Conservation Service. Conservation Plant Characteristics-Cercocarpus ledifolius. Accessed at: <http://plants.usda.gov/java/charProfile?symbol=CELE3>

USFWS 2012. United States Fish and Wildlife Service, Wyoming Field Office, Species List for the Casper Field Office. Cheyenne, WY. 2012.

Welch 1981. Improving the Nutritive Value of Winter range Forage. In Managing Intermountain Rangelands – Improvement of Range and Wildlife Habitats. Proceedings of Symposia September 15-17, 1981, Twin Falls, Idaho; June 22-24, 1982 Elko, Nevada.  
WGFD 2011a. WYOMING GAME AND FISH DEPARTMENT PROTOCOLS FOR TREATING SAGEBRUSH TO BE CONSISTENT WITH WYOMING EXECUTIVE ORDER 2011-5 GREATER SAGE-GROUSE CORE AREA PROTECTION (7/8/2011)

WGFD 2011. Wyoming Game and Fish Department Job Completion Reports. Cheyenne.  
BLM 2007. Bureau of Land Management, Casper Resource Management Plan Record of Decision. Casper, WY. December 2007.

Wright, H.A. and A.W. Bailey. 1982. Fire Ecology: United States and Southern Canada. John Wiley and Sons, Inc. 501p.